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Miikka Voutilainen

Poverty, Inequality and the Finnish 1860s Famine

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ABSTRACT

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This study focuses on the long-term socioeconomic background of the last of the West European peacetime population disasters, the Finnish famine of the 1860s. The study aims to uncover the social and economic processes responsible for the increased vulnerability to crop failures, ultimately triggering the famine. This is accomplished through econometric analysis and usage of extensive quantitative data sets. Applying methodology and using source material widely absent from the existing Finnish famine historiography, this study seeks to widen the prevailing emphases of the domestic literature and to contribute to international study of historical subsistence crises.

The main findings of the work are the following. Firstly, contrary to the widely held generalization, Finnish agriculture did not exhibit a sustained productivity decline ultimately leading to the famine. The productivity of grain cultivation grew during the 1800s and only decreased in response to the crop failures of the 1850s and the 1860s.

Secondly, legislation concerning land partitioning upheld and increased economic inequality in the rural Finland by constraining rural work opportunities and increasing the share of vagrant rural laborers, vulnerable to exogenous fluctuations in the labor demand. This, coupled with other legal arrangements, left especially young men in an increasingly disadvantaged position. The process was enforced by the underdevelopment of other sectors of the economy.

Thirdly, multidimensional mapping of poverty and social structure greatly enhances the picture of spatial socioeconomic conditions prevailing in Finland in the mid-1800s. Various measures of poverty and underdevelopment agglomerated in regions subject to recurrent adverse climate shocks. Little evidence for impoverishment driven by population growth could be found.

Fourthly, the crop failure in 1867 constituted a significant income shock and resulted in greatly increased income inequality. By the end of the famine, household incomes remained well below the pre-famine levels, whereas income inequality decreased substantially.

Keywords: Famine, Economic development, Economic growth, Inequality, Poverty, Economic history, Social history, Finland, Nineteenth century.

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FOREWORD

It appears that I've finished a PhD. Good for us all. As accustomed, I take this possibility to thank to those who have travelled along.

Few works of this magnitude would be possible without helping hands. The most important ones are naturally those of my professors: there are many professors but none are quite like these two of mine.

Ilkka. You've always (and I do mean always) found interest and patience when a young researcher has bothered you with yet another "oh my, I think I've found something". I don't believe that this work would have turned out as it did, if you hadn't insisted on the viewpoint that was ultimately accommodated. I very much consider myself as your student and I'm grateful for you asserting that history is an empirical science; regularities have to be uncovered, not decided upon.

Jari. Not only have you encouraged and believed in the work I've been doing from the very first year I came into the department (I kinda miss the railway business), you've always trusted my expertise and judgment. Thank you for all the comments, for the support and time you've always found to listen, and advice on the varying woes of the day. Thank you also for doing such a splendid job as the Head of our Department; not least in providing facilities to conduct this research. I also cherish those shared experiences, such as Germans advising on English; it's always nice to accompany.

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I'd like to thank Professor Kari Pitkänen and Dr. Andrew Newby for letting me participate in the Routledge project and including me in the wider scientific community. Kari, even if your role ultimately in this project was smaller than what we initially planned, the foundation you've laid with your own research has been essential for me to add anything.

Professor Jari Eloranta I'd like to thank for encouraging me to see beyond cosy domestic circles and seek recognition on a wider, international scale. Heli Valtonen (pardon me for excluding "Dr.", because the following escapes academic titles), for providing a junior scholar much needed mentoring especially in the summer of 2011 when he was bewildered and had little clue what to do with his life. Alex Reed and Virginia Mattila, thank you for taking care of the language - yes Alex, "hectares of acreage" sounds weird to me too.

This work would not have been possible without funding from the Finnish Doctoral Programme of History and from the Department of History and Ethnology here at Jyväskylä. Professor Jaakko Pehkonen deserves additional recognition not only for helping me with funding for the early months of 2016, but also for initiating me in the methodology of economics during my Master's.

My workdays would have been infinitely emptier if it wasn't for my colleagues and all of you who have worked and studied at the Department of History and Ethnology during this period. I'd like to thank those with whom I've shared discussions about my thesis, those with whom I've discussed history, and those with whom I've just shared a thought; Tiina Hemminki, Merja Uotila, Kustaa H.J. Vilkuna, Petri Karonen, Olli Matikainen, Olli Turunen, Jari Eilola, Jorma Wilmi, Marja Kokko, Piia Einonen, Matti Roitto, Jarmo Seppälä, Pasi Saarimäki, Elina Kauppinen, Juha-Antti Lamberg, and those very many of you, thank you.

The personnel in room H123 have to be acknowledged separately. I especially want to thank Pirita and Tuomas, but not only for the discussions and reflections on our research; I'm privileged to be able to work in a place where it is possible for someone just to bang on the door loudly, step in and make claims about 'whose' is my walrus.

Mikko and Riina. You've provided me heartfelt and when needed, rightfully critical scientific companionship. Our journey together is like one lights-out train ride from Joensuu - absurdly straightforward.

Lastly, I thank those closest: my family, where I've always found acceptance for all of the avenues I've ever wanted to pursue and a loving home to return to. And Teija, the genuine curiosity you show to varying topics of the day, whether they concern the formation of pyroclastic density currents, the mixing of drums on *Low* or the predatory nature of Haast's eagle never cease to amaze me. Your human warmth and the compassion you show to the world around is undeniably the most valuable of all those things that shape this life of ours.

The grand total of this process is not in this volume. It is in the people I've met, friendships I've made and in the places I've been. Most importantly, I've stood in the foothills of the Cascades and seen Mt. Hood in the first light of a late-August morning.

Lifting up my feet and putting them on the ground.

At Lohikoski in the spring, 24.4.2016
Miikka Voutilainen

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PART III: Articles

PART I: Research framework

"The lofty heavens with their stars looked down on this phase in the history of a lowly people, watching the efforts it was making to keep alive the flickering flame of life for coming, unforeseen fates, for times happier and times more desperate even than these, two, five decades, centuries ahead. The heavens saw immense forests where gold in the millions slumbered beside a dying beggar and a flame-eyed lynx. In the clearings the heavens saw gray villages, where here a man dreamt sated dreams of the farms soon to fall into his hands, there another lay asleep in the knowledge that this was the last Christmas he would ever sleep in his inherited home, and where in packed refuges for vagrants, the shelters, those branches of the nation to which no part had been assigned in coming events slowly disintegrated. So varied were the sights the heavens saw huddled together in one common gray harmony; the time of sharpest discord had not yet come. But in the substance of earth and heaven forces were already at work, some visible, others secret. Christmas Eve 1867."

F.E. Sillanpää (1919/1971)
Meek Heritage, 40

1 INTRODUCTION

Finland experienced her last peacetime mortality crisis with the extensive famine of the 1860s. It marked an end to large West European famines, though war-related nutritional crises still plagued the continent until the end of the Second World War. The Soviet Union receives the dubious honour for having had the last European famine to date with a post-war mortality surge during the late 1940s.[1] Considering the extent of the population loss (prior to this study estimated close to 10 % of the pre-famine population[2]) and its relatively late occasion, it is interesting how little trace the Finnish 1860s famine has left to the international famine canon. In his influential monograph about the Irish famine of the 1840s, Joel Mokyr even goes on to state that his research subject constitutes "the last great European natural disaster" and "the last large-scale natural demographic disaster to strike Europe."[3] The lack of Finnish international publications has quite likely influenced the lack of international interest: putting aside the few international studies that use the Finnish 1860s mainly as a data source,

---

1 The northwest of Finland also had nutritional crises in the 1890s and early 1900s, Turpeinen (1991). Famine-like deaths from hunger were widespread and connected to an economic downturn either side of the civil war (1917-1919), e.g., Rantatupa (1979); (2004). The last substantial food crisis happened during the winter of 1941-1942; see e.g., Danielsbacka (2013), 98-99. Meanwhile, the last nationwide famine in England happened during the mid-1500s, though there were notable mortality peaks in the 1600s and early 1700s, Wrigley and Schofield (1981), 332-336; Klemp and Weisdorf (2012). The last of the large Swedish famines happened during the 1770s, with Norway also having one at that time, Castenbrandt (2012), 68; (2014); Drake (1969), 44. Iceland had a large mortality surge in the 1780s, following the eruption of Laki in 1783, and lesser surges occurred as late as the 1880s, see e.g., Magnússon & Gunnarsson (1987), 105-106. On Nordic famines see also Dribe et al. (2015). Drought-related nutritional crises also took place in Western Siberia and Southern Russia in the mid-1960s. For famines in Imperial Russia and the Soviet Union see e.g., Kahan (1989), 108-141, for a detailed account on the 1946-1948 Soviet famine see Ellman (2000), and also Ó Gráda (2015a), 29. For 20th century famines related to the wars in Europe, see Livi-Bacci (1991), 43-47; Watson (2007); Blum (2013).

2 Pitkänen (1993).

3 Mokyr (1985), 262, 275.

Finnish scholars themselves have released fairly little internationally noted works concerning the famine.[4]

When considered as part of the larger historical frame, the 1860s famine was no aberration. Crop failures plagued Finland recurrently, though large famines were relatively infrequent. From the early 1500s, there was a large subsistence crisis from 1542 to 1545 and during the 1570s; then there were 'the straw years' (*olkivuodet*) at the beginning of the 17th century; relatively unknown famines during the 1630s, 1660s, and 1670s, the great famine of the 1690s; and famines at the beginning of the 1740s and during the 1830s. On the basis of this historical track record, it has been typical to consider the 1860s famine a blow at the last possible stage, either because it forced farmers to modernize the unproductive and inefficient agriculture or because later Finland was vastly better equipped to counter such a natural calamity.[5]

Finnish economy was slow to modernize and absolute poverty was slow to eradicate. Starvation deaths were reported on a yearly basis during the interwar period, with dysentery and typhoid fever epidemics - often connected to low nutrition, poverty, and inadequate housing – experienced in Finland during the depression of the 1930s.[6] Low agricultural productivity, dense housing, high income inequality, and a lack of saveable income were a strict reality in Finland until at least the 1950s.[7] After feverish economic growth during the 'Golden Era' from the 1950s to the mid-1970s (Finnish GDP grew on average 4.9% per annum) and after the continuing growth period (c. 2.7% per annum) until the late 1980s[8], socially discriminatory hunger returned to headlines during the severe economic depression of the early 1990s. The depression also marked a turning point in so far that it marked a point after which a chronic depletion of basic welfare commodities, socioeconomic inequality, and sustained poverty have increased over the previous twenty years.[9] As hunger is strict reality among the lowest income groups even during the twentieth-first century, it should not come as a surprise that subsistence crises constituted a significant

4 Ó Gráda (2001); Doblhammer et al. (2013). Pitkänen's doctoral thesis, (1993), is probably the most widely known. Pitkänen (1992); (2002) with Pitkänen and Mielke (1993) forming the major international publications concerning the 1860s famine. Jutikkala (1955) may be the most internationally cited Finnish famine study, although this focuses on the famine of the 1690s. There has also been a flurry of recent interest, e.g., Myllyntaus (2009) and a recent article collection by Curran, Luciuk & Newby (eds.) (2015), which covers the 1860s famine extensively.

5 Soininen (1974), Turpeinen (1991), Vihola (1991).

6 SVT VI: 79: 54, 112, compare with e.g., 82: 54 and 90: 2-3, 58-59. For connectivity of diseases to nutritional status see e.g., Outram (2001), 169; Castenbrandt (2014), 634; Ferdous et al. (2014),

7 Haatanen (1968), 223–298; Hjerppe & Lefgren (1974); Heikkinen (1986); (1996); Ojala & Nummela (2006); Jäntti (2006); Morrison (2000), 228–229; Jäntti et al. (2010); Kavonius (2007); (2010); Malinen (2014).

8 Hjerppe (1988), 46–47; Jalava and Hjerppe (2006), 39.

9 Vepsä (1973); Heikkilä et al. (1994); Häkkinen and Peltola (2001); Ohisalo & Saari (2014). Even if income inequality measuring Gini coefficient has gone down since 2007, mobility between income classes has decreased steadily since the mid-1990s, SVT: Tulonjaon kokonaistilasto (2013). For effects in terms of health inequalities, see e.g., Lumme et al. (2012); Aittomäki et al. (2014); Hiilamo (2014). For 20th century West European malnutrition see e.g., Bertoni (2015).

national problem all the way until the Finland's independence in 1917, and even beyond.

Whether it is the silence of the deep-rooted and multifaceted malnutrition in Sahelian Africa, the mass-televised catastrophes of the modern developing world and the massive historical disasters entwined in the national self; no singular attribute of poverty has stood the test of time better than hunger and its imagery. Famines are however much more than punctual aberrations that rise above the extensive steady state of malnutrition. Famines are inherently tied to their wider societal context and are therefore in an inseparable relationship with the institutional, social, economic and political environment. The fact that nutritional crises happen at the intersection of these societal forces makes their analysis highly fruitful in uncovering the wider feedback and dependencies prevailing in the socioeconomic context in question. The study of famines reveals mechanisms and social valuations that result in livelihoods failing, to widespread poverty, and deprivation amidst an unequal distribution of power, ownership, and economic assets.

This study is composed in order to show that the deduction about the country's susceptibility to famines simply due to rural poverty is not only a caricaturic portrayal of the prevailing social structure but often also, beyond mere nuances, a gross simplification. Building on advancements in famine research during the past twenty-odd years, this study conceives of nutritional crises as culminations of long-term processes, that stem from multivariate vulnerability to livelihood shocks in a low-productivity agricultural setting, characterised by high socioeconomic inequality. The study of a data-rich individual famine aids us to understand more the general phenomenon and to detect and pinpoint further avenues of research. This is especially important, for not only were famines sizeable threats to pre-industrial economies and populations, they have lingered on, and with climate change, may well intensify in the future.[10]

This sets the scene for the current work. After a fairly active period for Finnish famine historiography during the 1980s and early 1990s[11], the research has since come to a virtual standstill, with only a handful of research articles published concerning the topic since then.[12] This study is therefore written with the aim of bringing the Finnish historical famine discussion up to date and laying the foundations for an approach to the phenomenon from the perspective of economic history. In addition, a macro-level structural analysis of the pre-1860s Finnish economy is undertaken, to strengthen the statistical and theoretical foundations of Finnish economic history of the 19th century and integrate it more fully with existing Finnish historiography.

At this stage it should also be noted that, in order to deal with this topic at the required depth, a large number of sources, questions, and angles of approach have been purposefully left out, all of which clearly deserve mono-

---

10 Concerning modern famines and for future prospectives see e.g., Devereux (2009); Schade (2010); Godfray et al. (2010); Ó Gráda (2015a).

11 Turpeinen (1986); Pitkänen (ed.) (1987); Häkkinen et al. (1991); Turpeinen (1991); Muroma (1991); Häkkinen (ed.) (1992); Pitkänen (1993).

12 Pitkänen (2002); Myllyntaus (2009); Forsberg (2011).

graphs of their own. These include, for instance, the political background of the famine, the working of local communities, coping responses, the long-term effects of the crisis, and recollections of the famine.[13] On should also bear in mind that this study is not a comparative history of the Finnish famine. Findings in international literature on famine are abundantly used here as references and as reflective baselines, but as vast amounts of Finnish topics remain uncovered or are only tentatively scrutinised in this volume, there remains ample research to be done before any adequately comprehensive comparisons can be made. Just in case this much is not self-evident, it is worth pointing out also that this work is no ways an economic history of the Finnish nineteenth century, nor is it a comprehensive or definitive account of the famine; this is because the focus is (perhaps overly) centred on economic and social topics that have previously been neglected in the existing literature on famine in Finland. The traditional famine narrative is available in several excellent references, and revisited here only on a general level. The work strives to broaden famine research in Finland by not only pointing out possible background factors and indicating new avenues for research, but also by suggesting factors that can be ruled out and those which have perhaps been overly emphasised in the existing literature.

1.1 Raising the profile of famines in Finnish historiography

Contrary to several other events that are considered of national importance, the Finnish famine of the 1860s is surprisingly little studied. It tends to be referred to in popular monographs, in local histories, and in various studies covering the era, but either the coverage is cursory and formalistic, or descriptive rather than analytical. The same treatment has been given to the vast majority of Finnish mortality crises, apart from the wars.[14] For many of the Finnish famines, a single study or article is all there is. Another point is that the famines of the early modern period (e.g., in the late 1500s and early 1600s) have been upstaged in research terms by the massive famine of the 1690s, just as all the mortality crises since the early 1700s have been upstaged by the famine of the 1860s. This has meant that several substantial mortality surges have gone unnoticed by the wider historical community, including not only the events for which there is little demographic information available (e.g., the 1670s[15]), but also those for

---

13 For tentative treatment see e.g., Pitkänen (ed.) (1987); Häkkinen et al. (1991); Ó Gráda (2001); Kuusterä and Tarkka (2011); Doblhammer et al. (2013).

14 The Russo-Swedish war (”The Finnish War”) of 1808-1809 has attracted a fair amount of demographic interest, e.g., Turpeinen (1986b); (1987); Pitkänen and Mielke (1993); Pitkänen (2002); Hemminki et al. (2010). Yet the agricultural shortfalls that were happening at the same time are rarely discussed. For climatological evidence concerning this period, see, Holopainen & Helama (2009); Holopainen et al. (2009); Rickard et al. (2010); Loader et al. (2011). Russian occupation in the 1710s and early 1720s, with faminogenic aspects have not been traditionally seen as famines, see, however, Soikkanen (1991), 25-28; Kujala (1999), 23-25; and Vilkuna (2005), 222-230.

15 See, however, Luukko (1945), 120-122.

which highly detailed data could be obtained. One crisis that would fall into the latter category, happened in 1763, for instance, where the average crude mortality rate exceeded 40 per 1000 - often considered adequate to designate a level of crisis.[16] Other crises have been obscured by being in close proximity to wars (such as the 1740s and the 1850s), and others have simply evoked little scholarly interest (especially the famine of the 1830s).[17] This lack of interest seems to be because many believe "famine" should be a term only applied to nationwide mortality responses; thus ruling out regionally confined crises.

This means that the larger famines of the 1690s and 1860s stand out disproportionately in Finnish historiography. Muroma, Mäntylä and Lappalainen have published monographs about the famine of the 1690s. Muroma provides parish-level reconstruction of population loss; Mäntylä regional assessment of the development of tax revenue and public response; while Lappalainen uses the famine mainly as context for a more general narrative about the Swedish Realm during the late 1600s.[18] Concerning the famine of the 1860s, the studies most referred to (nationally) are the doctoral theses by Turpeinen and Pitkänen and the article collection by Häkkinen et al., the latter being the closest that exists to a general reference. Interestingly, and quite revealingly, the seminal study in 1892 by Meurman remained the only extensive work on the 1860s famine for close to a hundred years.[19]

When discussing an event that happened on a national scale and is of macro-social importance, we cannot and should not solely focus on explicit famine studies. After all, the famine is generally covered to a greater or lesser extent by nearly all studies of Finland in the 1800s - as one would hope. As a consequence, a large volume of literature concerning general and local history and literature dealing with socioeconomic aspects of the Finnish 1800s need to be reviewed in this study. Publications like these are, after all, the primary channels through which perception of the famine has spread among scholars and the general public. In order to better understand the questions this study poses, the research framework, and existing gaps in the current research, it is important to understand how Finnish historiography has integrated famines into a more general narrative of the country's history.

Four apparent typologies (below I-IV) occur in the existing literature. These are used to review and categorise what has already been written, so as to better situate this study in its proper context. These typologies constitute the Finnish 'famine folklore', in so far as many of the findings have earned a posi-

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16 Wrigley and Schofield (1981), 332-336, designate all mortality peaks between the years 1541-1871 with crude death rates of over 40 per 1000 as the severest of crises. According to Galloway (1994), the Italian crude death rate never exceeded 50 per 1000 from 1650 to 1881. This leaves five mortality peaks with a crude death rate of over 40 per 1000. See Dupâquier (1989), 190-193, for discussion concerning measuring crisis magnitude. The absence of research concerning the famine of the 1760s is interesting, especially as it has been suggested parish poor aid systems were reformed as a consequence, Pulma (1994), 47.

17 See Voipio (1914) concerning the famine of 1601, Pitkänen (2002) covers cursorily the famines of the 1830s and 1850s, Kauranen (1999) the famine of the 1830s.

18 Mäntylä (1988); Muroma (1991); Lappalainen (2012).

19 Meurman (1892); Turpeinen (1986a); Häkkinen et al. (1991); Pitkänen (1993).

tion which has been accepted with relatively little evidence, or without explicit scientific inquiry.

I. The Finnish famines were national crises. Häkkinen has suggested that the famine of the 1860s occupies a similar position in the Finns' historical understanding, as the 1840s Irish famine does in Ireland, or the Great Depression of the 1930s in the US.[20] Whether this is true or not, the fact is famine historiography in Finland tends to be nationally oriented, to the extent that Turpeinen, for example, dubbed the 1860s famine a "national disaster"[21]. This somewhat 'nationalistic' perspective has two characteristics. First of all, the spatial nature of the crisis is rarely given an in-depth treatment,[22] and secondly, the national perspective rarely places the famine in the wider international context. This has meant that there has been little explicit separation between the factors that were contextually unique and those factors that were and still are typical to famines on the wider scale.

Instead of using the fact that both Sweden and Western Russia experienced crop failures during the 1860s, and the whole Baltic region in the 1690s as a natural setting for comparative research, scholars have mainly used the wider context instead as a backdrop for explaining the a lack of governmental aid.[23] This is illustrated by the discussion over the role of Johan Vilhelm Snellman (at the head of the Senate's financial office in the 1860s) and the role of the Swedish central government (in the 1600s). Historians seem to be divided over whether blaming Snellman and other officials of the time for the slow and inadequate response is anachronistic or not.[24]

Debate over the government's role has generally been seen through more or less implicit fatalism stemming from the natural environment. According to this narrative, Finland was on the periphery of Europe in the pre-industrial period, hampered by long winters and a cold climate. Not only were significant parts of the country hostile for cultivation, but from the point of view of foreign trade, Finland was an island with seas closed during the winter right up until

20 See e.g., Häkkinen (1987), 69–70; Häkkinen & Peltola (2001), 310; (2005), 41; Häkkinen (2006), 43. In Häkkinen & Forsberg (2015), 117, the stance is moderated.

21 Turpeinen (1991), 46. Jutikkala (1952) characterises the famine of the 1690s in a similar manner.

22 See e.g., Ó Gráda (1992), 40-49.

23 Vahtola (2003), 264; Jutikkala (1952); (1955); Muroma (1991); Turpeinen (1986a). Kuisma (2006), 275, presents the international context from an economic point of view. For more on the Baltic context in the 1860s, see e.g., Nelson (1988) and Lust (2015); and for the 1690s, see e.g., Seppel (2015); for Russian famines, see e.g., Kahan (1989), 108-141.

24 Kuusterä (1987); Häkkinen (1991b); Pitkänen (1993), 62; Ó Gráda (2001), 588; Kuusterä and Tarkka (2011), 254, are among critics of the way the crisis was dealt with. Meanwhile, Lappalainen (2012) and Mäntylä (1988) express a similar viewpoint with respect to the Swedish state during the 1690s. Jutikkala (1955), however, considers that there was relatively little the early modern Swedish state could have done to prevent the famine, see also Seppel (2015). According to Klinge (1997), 239, the Finnish officials did "everything possible" when the seriousness of the situation became evident in September and early October 1867. It seems that Snellman has attracted more sympathy in general works, but not in famine studies. Fogel (1992), 280, maintains that all of the famines that plagued England and France between 1500 and 1800 were man-made.

the late 1800s.[25] Several scholars have thus felt that there was relatively little government officials could do when facing crop failure: the country was frost-prone, poor, and was poorly connected to the outside world.[26] This 'inevitability' of sporadic famine outbreaks fits nicely within the national romantic vision of a poor pre-industrial Finland.[27]

Finnish historiography has mainly preferred the term the "(Great) Hunger Years" (*(Suuret) Nälkävuodet)* to describe the famine in the 1860s. Similarly, the massive famine of the 1690s has been called the "Great Death Years"(*Suuret Kuolo(n)vuodet*). The Finnish counterpart for the word "famine"(*nälänhätä*), tends to be used more rarely, often as a synonym to avoid repetition and without any explicit definition.[28] Naturally the Finnish famines are not the only ones with specific names attached to them. The Irish famines earnt monikers such as "year of the slaughter" (*Bliain an Áir*) (famine of 1740-41), and "The Great Famine" (*an Gorta Mór*) and "Black '47" (both concerning the famine of the 1840s). Meanwhile, the famine that struck India in the late 1700s has been called the "skull famine" (*Doji Bara*), and Japanese famines in 1782-87 and 1833-37 were dubbed *Tenmei* and *Tempo*, respectively. Perhaps the most notorious byword for famine is *Holodomor,* "death by hunger", that is used to describe the Ukrainian famine of the 1930s.[29] Categorising malnutrition incidences according to the severity the condition is also widespread. The English language uses "dearth" to distinguish less extreme from cataclysmic famines,[30] and Alex de Waal has shown the variety of language used by Darfurian tribes to describe the varying degrees of poverty from "famines that kill".[31]

The Finnish proper noun *Nälkävuodet* was popularized by Agathon Meurman in 1892. Prior to this, (without a capital letter) it was a common noun that was simply used to talk about famines in general.[32] To lesser events, ones that did not necessarily result in widespread mortality, the term *katovuosi*, a year of crop failure (or "dearth"), was and still is widely employed.[33] Due to the latent peasant romanticism embodied in the term *Nälkävuodet*, the term "famine" is preferred in this study, and there is a further definitional discussion on this provided in chapter 2. This is mainly due to the fact that "famine" refers to the wider phenomenon, whereas "The Hunger Years" (and other assorted popular

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25 Icebreakers were introduced in the early 1890s, Kaukiainen (1993), 112; Klinge (1997), 242–243, see also Ojala & Kaukiainen (2012).

26 Klinge (1997), 242; Virrankoski (1975).

27 See Forsberg (2011) for more on the 1860s famine in late 19th century Finnish literature.

28 Pitkänen (1993) marks a rare exception by covering the conceptual issues.

29 Ó Gráda (2009), 4-6. On p. 6, Ó Gráda points out that "in any language, however, the term famine is emotive one that needs to be used with caution."

30 For e.g., Smith (1804), 24, famine is a ill follow-up to time of dearth: "famine has never arisen from any other cause but the violence of government attempting, by improper means, to remedy the inconveniences of a dearth". Dupâquier (1989), 193-194, considers dearth designating specifically high grain prices. For consideration see e.g., Ó Gráda (2009), 5; de Waal (1990), 471.

31 De Waal (2005), 9-19, 59–77.

32 Meurman (1892), e.g., Koskinen (1866); Tavaststjerna (1892/1960); Teerijoki (1993).

33 Melander & Melander (1928); Kovero (1944).

terms) only refer to a singular monolithic event of perceived national importance and thus that whole canon of popular and romantic connotations.

II. The disease-driven famine mortality was distributed fairly equally between social classes. Famine historiography from the mid-1980s to the early 1990s was very focused on what caused the excess famine mortality in the 1860s, and after the publication of Turpeinen (1986a), and Jutikkala (1987a), demographics and causes of death had become the core of Finnish famine research.[34] Both these authors took considerable trouble to argue that an environment of endemic disease resulted in abrupt and punctual mortality crises, with little connection to economic factors. The stance was immediately met with criticism[35] but it has nonetheless continued to have a substantial impact on how famines are perceived in Finnish historiography[36] and the general consensus still seems to hold that uncovering the causes of death is a fundamental aspect of famine analysis.

Two features need additional emphasis, however. First of all, identifying the causes of excess mortality in a famine is just as justifiable a research agenda as, for example, studying the causes of deaths in a war, even though it is questionable whether answering the latter helps to understand the particular war in any deeper manner. More than in any other facet of Finnish famine historiography, it is here that it becomes evident how international literature published after the 1970s has had little impact on Finnish famine studies. Studying the Soviet famine in the late 1940s, Ellman has emphasised the significant difference between asking (i) why a famine struck in a certain year, and (ii) why a certain country during a certain period was susceptible to famine.[37] Finnish famine historiography has clearly, for the most part dwelt solely on the former question.

The problem with this, is that as mortality in the vast majority of famines is indeed disease-driven,[38] then it ought to be obvious that nothing specifically and *contextually* relevant about Finnish society can be gained by focusing on disease as the main cause of death. From the viewpoint of a literature review, it is extremely problematic that the latent implications embedded in the disease versus hunger debate are not openly put to causal propositions that could be subjected to empirical testing. Häkkinen has pointed out, that there appears to be an implicit connection between the debate over the government's role and the issue concerning the causes of death. He suggests that the 'hunger versus disease' debate entails a moral judgment about underlying agency: if excess mortality resulted from a drop in food supply the government could have pre-

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34 The Finnish disease discussion dates back to at least the late 1800s, see e.g., Forsberg (2011), with Jutikkala arguing for it in (1980a), 157; (2003a), 298; (2003b), 511-512. The latest contribution is Lappalainen (2014) concerning the famine of the 1690s.

35 Kaukiainen (1987), with Pitkänen (1993) were studies that set out to answer to Turpeinen (1986a)'s claims. Yrjö Kaukainen (1984) already showed that mortality and price fluctuations correlated in Finland during the 1800s. See also Jutikkala (1987b).

36 Vahtola (2003), 299–300; Olkkonen (2002), 503; Virrankoski (2009), 525; Lappalainen (2014).

37 Ellman (2000), 620.

38 Even more so in historical instances, see e.g., Galloway (1994), 244; Ó Gráda and Mokyr (2002); Hionidou (2002); Dyson and Ó Gráda (ed.) (2002); Devereux (2007b).

vented the famine with increased imports. On the other hand, if pre-industrial officials could do little against killer diseases they (and selected historians for that matter) could put the 'blame' on vagrant beggars leaving epidemics in their wake.[39]

Besides the underlying moralistic tone, the debate about the causes of death has greatly influenced how the social dimensions of famine are perceived. The implicit assumption appears to be that once the epidemics were on the loose, the crisis lost any connection to an initial economic base. This would imply that impoverishment and deaths from disease mark two different and distinct phases of the crisis.[40]

The idea of evenly distributed misery was markedly present in Meurman's early account, though wide array of critical interpretations also existed.[41] According to Jutikkala, mortality during the famine of the 1690s was spread relatively uniformly across socioeconomic classes[42], a stance criticised by Mäntylä, Kujala and Lappalainen. For the 1860s famine, Kaukiainen has presented evidence from the local parish of Lohja, showing an unequal distribution of mortality. Meanwhile Pitkänen's findings indicate, in the most extensive study yet, that there is a clear social determinant in famine mortality.[43]

Significantly, hardly any studies have been conducted to explain the regional patterns of famine mortality. A quick regional glance is enough to convince one that famine took its toll well beyond the traditional "hunger lands" of Northeastern Finland and also beyond the region known to use substitute foods even during normal harvest years (e.g., tree bark).[44] Before the present study, Pitkänen was the only one to statistically model the spatial correlates of famine-related excess mortality. With sample sizes varying from 13 to 21, his study, though suggestive, was greatly hampered by a lack of statistical power.[45] Yet, in spite of these restrictions, Pitkänen could show that local pre-famine economic conditions were important in determining the mortality rate during the famine.

III. Had it not been for climate-induced frosts, there would have been no famine in the 1860s. The fact that most of the writing on Finnish famine is explicitly atheoretical has quite likely contributed to the disease-driven viewpoint. After all, population sources that list, for example, causes of deaths are easily available and so the emphasis has understandably been skewed to favour demographic

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39 Häkkinen (1994), 63, compare with chapter 2 for the Galtungian interpretation on violence. The role of vagrancy is one of the most repeated, e.g., Soininen (1976); Rosenborg (1976); Virrankoski (2009). Klinge (1997), 240 interestingly considers that staying put in the northern wildernesses was from the prespective of individual survival a superior tactic. Kaukiainen (1987), 28, pinpoints some of the absurdities of the strict disease interpretation.

40 Kelly & Ó Gráda (2014a), 369 suggest that there might be hypothesised differences in the timing of deaths in different social classes - i.e., higher social classes died during the summer months from infectious diseases that had incubated among the hungry lower social classes some months earlier.

41 For a general review of early famine history writing, see Forsberg (2011).

42 Jutikkala (2003a), compare with (1952), 119; (1957a), 356-358.

43 Kaukiainen (1980b), 132; Mäntylä (1988); Pitkänen (1992a), 94–97; Lappalainen (2012).

44 Soininen (1974), 368; Pitkänen (1992b).

45 Pitkänen (1992a), see also Kaukiainen (1987); Pitkänen (1993), 84–85.

aspects such as these.[46] The distinctively demographic undertone of the majority of Finnish famine accounts has resulted in treating famines mainly as population disasters with a fairly simple and straightforward background of widespread pre-crisis poverty and haphazard crop failures.

Crises are, however, the product of historical, social, political and economic processes. Famines rarely have clear-cut beginnings or endings and they may not necessarily manifest themselves directly through mass mortality; and nor does identifying an obvious trigger necessarily explain why famines happen.[47] While there is a clear case for emphasising variations in the food supply as a crucial background factor for historical famine mortality[48], focusing only on the exogenous events and depletion of food supplies provides an inadequate causal explanation for both modern and historical instances of famine.[49]

The Finnish historiographical tradition has used the crop failure explanation unidirectionally; that is, if crop failure happened the previous year to a mortality increase, than a causal connection between the two is invariably made. If crops failed, however, without a resulting increase in mortality, then the events are conveniently ignored. The 1800s featured several cold decades, even if historians emphasize particularly the 1860s.[50] Similarly, the extremely cold summer of 1821 which resulted in widespread crop failure did not nevertheless cause any noticeable increase in mortality. Among others, Solantie observes this but treats it as an abnormality.[51]

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46 The Finnish parish population change tables allow for cause of death data to be operationalised easily, e.g., Kaukovalta (1931); Wirilander (1960), 446; Rosenborg (1976).

47 de Waal (1990); Ellman (2000); Devereux (2007a); Edkins (2007); Ribot (2014).

48 Pitkänen (1991a), 41 suggests that, had the harvests been better in the 1860s, the disastrous mortality surge could have been avoided. Ó Gráda (1999), 13, makes a similar conclusion concerning the 1840s potato harvest failure in Ireland. Ó Gráda (2008) also suggests that, generally, food availability should be focused on more. For a typical Finnish portrayal, see Virrankoski (1973), 213-221, who emphasises the risk of excessive agricultural self-sufficiency given the likelihood of adverse climatic conditions.

49 For instance, the institutional context has attracted a lot of attention: e.g., democratically governed Botswana and Zimbabwe have been considered to have escaped famines in the 1980s, whereas authoritarian Sudan and Ethiopia have succumbed, e.g., de Waal (1996). A similar comparison has been drawn between North and South Korea in the 1990s, see e.g., Ó Gráda (2009), 255-258. Sweden and Finland similarly experienced widely different mortality responses during the 1690s and the 1860s, for Sweden see e.g., Edvinsson (2014); Nelson (1988). For early modern continental considerations, see e.g., Appleby (1979); Fogel (1992).

50 Rantatupa (1971), 135; Turpeinen (1986a), 96–101.

51 Johanson (1924); Melander and Melander (1928); Solantie (2012), 168, 179. Interestingly two volcanic events often considered to have resulted in wide climatic effects - the eruption of Laki in Iceland (1783-1784) and the eruption of Tambora (modern-day Indonesia) in 1815 - are not evident in the Finnish mortality series. The aftermath of the Laki eruption is visible in the drop in spring temperatures for 1784-1786, but no corresponding effect is visible for the Tambora eruption, see e.g., Holopainen et al. (2009). The lack of mortality response to the Laki eruption is interesting especially, as it did result in consecutive crop failures, see e.g., Melander & Melander (1928); Johanson (1924). The extensive famine of the early 1600s seems to have resulted from the eruption of Huaynaputina volcano (in modern Peru), see e.g., Briffa et al. (1998); de Silva & Zielinski (1998); Holopainen & Helama (2009), 217.

The crop failure emphasis has meant that famines are typically seen to be driven by exogenous factors over a relatively short time period.[52] The clearest manifestation of this is the fact that generally only the years 1867 and 1868 have been considered as the years of famine. Occasionally this is lengthened to 1869, with just a handful of studies placing the starting year back to 1865 or 1866. Some international studies even refer to the "Hunger Winter" of 1867-68. Pitkänen, in comparison, has favoured the term "the famine of the 1860s" though with an obvious nod to the mortality peak in 1867-1868.[53]

Even if the emphasis on crop failures has meant that the depth and extent of poverty prior to the 1860s has been neglected in comparison, two macro-social background factors have been included in the narrative of the famine build-up: an increase in the inequality of agricultural land ownership[54] and a Malthusian impoverishment caused by population growth[55]. Both of these factors are thought to have increased not only poverty and inequality in the rural countryside but are also associated with having fewer means to cope with harvest failures.[56] Instead of trying to estimate the regional (spatial) extent of poverty during the mid-1800s, historians have unequivocally resorted to population figures that display the trends in the sizes of the rural social classes. This has been done without any broader connection to income or wealth measures.[57] Inspections of macroeconomic performance have generally been tied to the alleged unproductivity of Finnish 19th century agriculture, that Soininen, influentially, considered to be moribund by the 1860s[58]. Fiscal conditions and state finances have gathered considerably less interest.[59] Against this backdrop, it is not surprising that crop failures have often been considered as the ripples that drown: people living close to subsistence level are affected by the smallest of changes in their disposable income.[60]

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52 Wirilander (1960); Nygård (1971), 110; Rantatupa (1971), 135; Rosenborg (1976), 27; Soininen (1976), 244-245; Ranta (1988), 509-512; Kuisma (2006); Klinge (1997), 237; Vahtola (2003), 264; Virrankoski (2009), 523. Crop-failure orientation is clearly visible in explicitly famine-focused studies such as Turpeinen (1986a); Jutikkala (1994); (2003a); (2003b).

53 Pitkänen (1992a); (1993). Doblhammer et al. (2013) and Turpeinen (1986) place the famine in the years 1866-68. Olkkonen (2002), 503, to the winter of 1867-68; Klinge (1997), 237, in 1865-68; Virrankoski (2009), 527, sees it spanning 1862-68; Vahtola (2003), 264, includes the years 1867-1868 *and* 1865. Ó Gráda (2009), 23, and Kaukiainen (1980a), 484, single out only 1868; while earlier, Ó Gráda (1999), 5, refers to the years 1866-1868.

54 Häkkinen & Forsberg (2015), 104–106. Pulma (1994), 52–53, 64–65; Zetterberg and Pulma (2002); Haatanen (1968)

55 For instance: Jutikkala (1952), 136; Wirilander (1960), 666; Virrankoski (1975), 185–186; Soininen (1976), 243–244; Rosenborg (1976), 16; Nygård (1985), 26; Turpeinen (1986a), 24–28; Ranta (1988), 625; Klinge (1997), 237; Zetterberg and Pulma (2002), 410; Kallioinen (2009), 133–134. See also Gadd (2011), 141–142 and Haatanen (1968), 43.

56 Soininen (1976), 244.

57 For income and/or wealth assessments from pre-industrial Finland, see Jutikkala (1949); (1953); (1991); Markkanen (1977); Nummela (2011); Hemminki (2014), 106-109. For later income assessments see Nummela (1990).

58 Soininen (1974); (1980).

59 Kuusterä (1987); Kuisma (2006); Arola (2006); Kuusterä & Tarkka (2011).

60 Kaukovalta (1931), 668; Wirilander (1960), 59; Heikkinen (1996), 187; Myllyntaus (2009), 90. Jutikkala, however, claims that changes in living standards (when meas-

Economic development during the famine itself has similarly escaped the attention of most. According to Kuisma, businesses were paralysed by the concomitant economic downturn, expressed in a growing number of bankruptcies.[61] A revaluation of the Finnish mark, after the parity with the Russian rouble had ended, decreased the profitability of export sector and increased the real value of foreign loans. Kuusterä and Tarkka have on the other hand suggested that pegging the Finnish mark to the price of silver could have actually increased the government's ability to get foreign loans. They thus concluded that famine happened because of a number of emerging crises, on both the foreign and domestic fronts.[62] Even if these and various other considerations seem to describe a vicious circle of deepening poverty[63], the fact of the matter is that macro-level welfare indicators (e.g., real wages, GDP, harvests) do not display any continuous decline during the 1850s and the 1860s.[64] Even though it is shown later in this work that at least certain rural regions exhibited a decline in living standards during the 1850s and the 1860s, it should be borne in mind that any argument, no matter how valid it might sound, can only become a historical "fact" in so far as it has evidence to back it up.

IV. The 1860s famine marks an important watershed in Finnish economic history. The last of the generalisations from Finland's historical narrative about this famine concerns the debate over whether or not the 1860s marked a watershed in Finland's economic development. Those authors building on Soininen's argument have emphasised that 'traditional' Finnish agriculture had run its course by the 1860s and due to diminishing factors of production its base had slowly become dismantled. From this point of view, the 1860s famine provoked a need to increase agricultural productivity and enabled a transit from low productivity and high variance grain cultivation to more secure animal husbandry.[65] Another group of authors point to the institutional advances that took place within two decades in the mid-1800s and effectively liberalised the markets.[66] Pitkänen, however, since his interpretation is based on demographic

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ured through prices) were not reflected in demographic outcomes, Jutikkala (1980a), 157; Rosenborg (1976), 15; Kaukiainen (1984). The latter is the only actual quantitative study on the matter; and disagrees. Kovero (1944) discusses the demand and supply factors in price formation in Finland during the 1700s. See also Edvinsson (2012) for more detailed Swedish discussion. Häkkinen and Peltola (2001), 310; (2005), 41 depict the 1860s famine as a "catastrophe of mass poverty".

61 Kuisma (2006), 275–277, see also e.g., von Bonsdorff (1956), 261–292; Ojala (1999), 294–300.

62 Kuusterä and Tarkka (2011), 249–250.

63 Pitkänen (1993), 60–68.

64 Heikkinen et al. (1987); Peltonen (1987); Hjerppe (1988). See chapter 5 for details.

65 Soininen (1974); (1976), 248; (1980), 404–407; Vihola (1991), 12; Vesikangas (1992), Kuisma (2006), 270–273; Vihola (1996), 291, 293–295; Klinge (1997), 107; Vahtola (2003), 304. Possibly the most peculiar interpretation is provided by Heikkinen (1996), 1, in which he claims that "the famine can be seen as an important watershed in the history of the Finnish diet".

66 Hjerppe (1988), 19; Ikonen & Valkonen (1987), 310–311. Lamberg (1996) has questioned whether there is even a need to date the onset of economic transition so precisely.

events, considers the 1860s to be simply "the decade of misery", while Kuisma sees it as "a decade of conflicts".[67]

The interpretations that see the famine as a watershed between pre-industrial stagnation and the beginnings of a modern growth regime have attracted their fair share of criticism. Hjerppe has in several contexts rightly pointed out that, even though Finland's GDP series only began from 1860, this does not mean that there would not have been economic growth prior to this.[68] Meanwhile, Rantatupa has pointed out that local agricultural associations were quick and efficient in using the famine as leverage in promoting new cultivation and farming techniques; possibly contributing to the "skewed" perception about the real economic effect of famines. Virrankoski, too, has expressed criticism over the notion that economic growth suddenly emerged out of nothing, while Kaukiainen suggests that, even if the famine was principally to do with problems in agricultural production, advances in farming on the local level would not in themselves have been enough to act as an adequate safeguard from famine.[69]

Generally, scholars have not seen any explicit connection between the famine and economic growth in the latter half of the 1800s. There is, however, a wide range of possibilities for associating the two, both positive and negative. Stemming from the 'dismal science' of classical economics, the Malthusian framework postulates an increase in per capita income after the famine. Whether this kind of mechanism actually existed in pre-industrial Finland is another matter however, and it is discussed more fully in chapters 4 and 5 and in the articles of section III in this thesis. There is also considerable evidence suggesting that, in fact, famines were more likely to have had harmful long term effects on individuals and society as a whole: a reduction in life expectancy, in labour force participation, in literacy, in income; and an increased risk of chronic disease.[70] A wide range of poverty studies have also associated these conditions with an increased risk of destitution, while Osmani has suggested that rather than alleviating endemic poverty, famines would have more likely exacerbated it.[71] Arora too has shown that economic growth in the West (including Finland) has greatly benefited from *increased* life expectancy, which he interprets as a proxy for increased labour productivity.[72]

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67 Pitkänen (1993), 51; Kuisma (2006), 270.

68 Hjerppe (1988), 39-40, see also Schybergson (1980); van Zanden (2001); Bolt and van Zanden (2014).

69 Rantatupa (1971), 136; Kaukiainen (1980b), 132; Virrankoski (2009), 527. Also, the Finnish Economic Society (*Suomen talousseura*) had, since its foundation in 1797, been stressing the importance of crop diversity and grass cultivation for livestock, Rantatupa (1971), 136.

70 Chen and Zhou (2007); van den Berg et al. (2009); Lindeboom et al. (2010); Umana-Aponte (2011); Lumey et al. (2012); Klemp and Weisdorf (2012). Doblhammer et al. (2013) detect a decrease in life expectancy at age 60 for those born within the years of the 1860s famine. Saxton et al. (2013), Kannisto et al. (1997) do not find a corresponding effect from Finland, see also Weil (2014), 640-642. For more on the effects of adverse economic shocks on households in the modern developing world see, e.g., Dercon (2004); Davies (2010). See also Rickard et al. (2010).

71 Osmani (1996); Jütte (1996), 24; King (2002), 51–54.

72 Arora (2001), for general consideration see Weil (2014).

1.2 Research setting

The targets of previous research ultimately reflect the wider historiographical concerns of historians - not only does grouping past research like this show the various points of departure and evaluations made, but also the methodological and theoretical choices taken. On the basis of the review above, it is justifiable to say that there is no lack of famine historiography in Finland, but it is often restricted, atheoretical, and non-causal in its coverage. The atheoreticity apparent in the majority of Finnish famine studies has further corollaries. When no theory is put forward, used to derive predictions, or subjected to testing, then little can be said about whether there is enough evidence to permit drawing a conclusion. Similarly, if there is no theoretical matrix in which to stitch empirical findings together, little can be understood about the interplay between various factors and in general little can be uncovered. For an external reviewer it is thus hard to say when the scientific process began and how it came to a stop and what happened in between. It should, however, be borne in mind that a sizeable share of the theoretical criticism presented here is based on the author's interpretation of the Finnish famine literature in question; it is fairly rare for Finnish historians to put their premises explicitly out in the open.

After careful scrutiny of international famine studies, the following four questions (A-D below) have thus been drawn up, which this book will be addressing.

A. Which factors contributed to the build-up of rural vulnerability to harvest failures during the 1800s? Ribot has argued that attributing poverty, pain, and suffering to natural hazards alone tends to disregard wider forms of causality between the *ex post* and *ex ante* conditions. Blaikie et al. have stressed that researchers ought to acknowledge the fact that without hazards there is no risk of disaster and ultimately there are no disasters if there is no pre-crisis vulnerability. Emphasising that communities are part of their natural surroundings, Adger has maintained that any human action and social organisation is caught up with the natural environment and making any distinction between the two is unavoidably arbitrary. In similar fashion, Pitkänen has pointed out that whatever the effects caused by any freak of nature are, they always mirror the society affected.[73]

The risk of famine in the latter half of the Finnish 1800s thus could not have grown independently of the wider socioeconomic context. Curiously, there are several reasons why the risk of famine should have actually diminished after the first couple of decades of the 19th century - industrialisation had taken a firm foothold in Finland and the country's infrastructure was being aggressively developed. By the time the first railway was opened in 1862, new sources of energy and raw materials were being exploited; the supply of capital

73 Pitkänen (1991a), 41. Blaikie et al. (1994), 49, Alwang et al. (2001), 4, Adger (2006), 268, Ribot (2014), 671.

was growing; the financial environment was stabilising; and entrepreneurs were benefiting from an increase in business that was driven by exports. Internal communication was improving (via the telegraph), newspapers provided information on and to even the remotest corners of the nation, and there was an administration that obtained statistics concerning economic conditions and development throughout the country. As a part of the Russian Empire with favourable trading arrangements, Finland was also close to growing Russian markets and the large city of St. Petersburg.[74]

On the other hand, Finland was presumably poor, located in the far north with well over half its land mass subject to more than a 25% risk of crop failure in rye (its staple grain). In the decades prior to the famine there was noticeable downward social mobility, the clear formation of a large rural underclass and an increasing supply of rural labor; poverty also became increasingly prolonged and intergenerational.[75] These developments are partially evident in the standard macroeconomic measures, according to which Finland was considerably poorer than Western Europe. Finnish GDP per capita was 12.0% below the Swedish in 1820, and 10.9% below the Irish GDP too. In contrast to the larger European narrative that industrialisation brought with it an increase in living standards in the 1800s, Finland's living standards remained roughly stagnant. By 1865, Finland was already 22.4% below Swedish GDP and, by 1870, it was 35.8% below Irish GDP.[76] Had it not been for the decrease in infant mortality, Finnish life expectancy would have decreased during the 1800s.[77] It seems that Finland was thus one of the poorest European countries at this time, and as Ó Gráda has noted, famines are hallmarks of underdevelopment.[78]

B. How extensive was poverty prior to the famine? How many people and/or households were living at the subsistence level? How was average income distributed regionally, and what kind of socioeconomic structures existed in Finland in the mid-1800s? Traditionally Finnish historical economic structure has been seen in terms of different regional practices in agriculture and the various social conventions and family structures embedded in these.[79] The most well-known of these broad generalisations is the dichotomy between slash-and-burn cultivation in Eastern Finland and open range farming in the west of the country. These two kinds of agriculture have also each been associated with a different kind of household arrangement: large, multilayered households in the east, with smaller nuclear families in the west.[80] Rural poverty has typically been seen to be indicated by the number of poor aid recipients in an area (this ranged from about 2% of the population in the south to close to 10% in the north); by the number of farmers without privately owned land; by the numbers living in

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74 Åström (1988), 170–175; Kuisma (2006), 270; (2015); Häkkinen & Forsberg (2015), 102–104.
75 Haatanen (1968); Pulma (1994); Zetterberg and Pulma (2002).
76 The Maddison-Project (revised 2015).
77 Pitkänen (1980), 375–377.
78 Ó Gráda (2009), 9.
79 Soininen (1974); Korhonen (2003), 405–410; Waris (2003).
80 Moring (1996); (2003); Sirén (1999); Waris (1999); (2003).

shanties and working as seasonal agricultural labour; and by the number of vagrant poor without any permanent place of residence.[81] The general narrative has also emphasised the poverty of Eastern Finland in contrast to nascent modernisation in the west of the country.

An emphasis on poverty is justified as it remains the most salient of conditions that shape climate-related vulnerability[82], yet we know remarkably little about the economic conditions in rural Finland during the 1800s. Likewise, considerably little is known about the factors which resulted in poverty. In his well-known monograph about Irish economic history in the early 1800s, Joel Mokyr asked "why Ireland starved", and there is no reason why a similar question should not be asked about Finland as well.

This study is especially involved in the problem of population growth, i.e., looking at the relevance of the Malthusian mechanisms that were supposedly driving down agricultural living standards due to an increase of population. The Malthusian framework offers a varied and explicit hypothesis to study, and most importantly it provides clear predictions about relationships between certain economic and population series which can be quantified. The topic has been previously treated with varying degrees of care: those Finnish scholars who incline towards the disease interpretation of famine mortality have often criticised the Malthusian interpretation of famine causation on the basis that it allegedly suggests that the crucial component in creating a crisis is a drop in food supply, while at the same time emphasising the importance of population growth in depressing living standards.[83] If the Malthusian hypothesis of impoverishment cannot be corroborated, however, this does not automatically mean that famines are independent of food production; it just means that we have to start looking beyond the simplicity of population growth to understand why Finland was poor and vulnerable enough to ultimately starve in the 1860s. To this end, the third and fourth chapter assess the role of landownership and land partitioning legislation in increasing rural poverty and hampering the functioning of agricultural labour markets.

C. How did the famine manifest itself on the economic level in households?
A simple fact is that we do not know to what extent the 1860s famine was an income shock for households. We do not know how large a decrease in average income resulted from the crop failures of 1866 and 1867, how it was spread out regionally, or how the economic downturn affected the distribution of resources among the population. This does not mean it did not happen though: according to Pitkänen, the crop failure of 1862 already marked the beginning of an increasing burden of debt among farmers. A significant proportion of them were indebted by the mid-1860s, unemployment rose, and a decrease in demand was

81 Kilpi (1913); (1915); Pipping (1940); Haatanen (1968); Pulma (1994); Häkkinen and Peltola (2001); (2005). One of the most graphic groups of the pre-industrial poor has typically been seen to compose of people living in chimneyless hut's (*savutupa)*. These also focused on the eastern part of the country, Vuorinen (2006), 127–131.
82 Ribot (2014), 672.
83 Turpeinen (1986a); Jutikkala (1987a), 125, 134.

transferred to other sectors of the economy. Extensive malnutrition and the inability of local poor relief to handle the worsening situation were apparent by 1866 and turned into mass mortality after the failure of the crops in the autumn of 1867.[84]

The source materials used in this study offer the unique possibility of tracking household level income and its distribution during the famine. On the basis of current development studies, it is clear that environmental shocks result in decreased expenditures and in distress sales of productive assets which jeopardises food consumption and the livelihoods of poorer households. The negative impacts vary with the systematic differences in households' exposure to risks and their ability to cope with them.[85] Studying rural Ethiopian households, Thiede concludes that environmental shocks tend to level out livestock inequalities within the community. Comparative Finnish evidence from history is scarce: according to Vennola, the large famine during the early 1600s resulted not only in a decrease in the average number of livestock per household but also to the virtual disappearance of wealthy households from northern parts of Finland. According to Nummela, the warfare in Western Finland during the 1590s resulted in a heterogeneous response in regional cattle averages but generally there was an increase in inequality. On average, wealth decreased and its distribution skewed.[86]

Average income and its distribution can have wide significance when explaining the observed spatial patterns of mortality response, and Pitkänen shows that mortality was generally negatively associated with regional income levels during the 1860s[87]. If average income matters in the buildup of welfare, its distribution cannot be disregarded.[88] Recent sociological studies have suggested that inequality entails a lack of social cohesion, which turns into social segregation and an increased unwillingness to participate in redistributive action. Indeed, Ramcharan has shown, using US state-level data from 1890 to 1930 that willingness to redistribute resources was negatively associated with the state's level of land inequality. Häkkinen has pointed out that landowning farmers were generally unwilling to organise aid during the severest phase of the 1860s famine. This highlights the famine's societal nature and reinforces Vanhaute's suggestion that famines triggered by harvest failures only occurred when societal institutions failed and the moral economy ceased to function.[89]

D. Which factors explain the regional mortality response? Answering the final question ties the three previous questions together and, given the crop failures,

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84 Pitkänen (1993), 65–66; Häkkinen & Forsberg (2015).
85 Dercon (2004); Gray & Mueller (2012); Thiede (2014), 181
86 Thiede (2014); Nummela (2011); Nummela (1996); Vennola (1900).
87 Pitkänen (1992a), 92–93.
88 Atkinson (1970); Sen (1976).
89 Wilkinson & Pickett (2006); Ramcharan (2010); Vanhaute (2011); Häkkinen (1992), (1994). The peasants' unwillingness has noted e.g., in Blomstedt (1981), 94; Viikki (1989), 27; Teerijoki (1993), 177; Ahtiainen and Tervonen (1998), 337-338. Rosenberg (1995), 19-20, note that local administrative control was important in shaping local relief actions.

will help quantify those social structures which fanned the crisis into a full-blown famine. The only available regression analysis concerning the 1860s famine associates high grain prices and dependence on grain cultivation to regional mortality patterns, but importantly it does not observe systematic connection between social variables and regional mortality.[90] Observations concerning the determinants of regional mortality help us to understand how poverty and vulnerability were embedded in the fabric of society beyond the traditional categories of landowners, crofters, and rural workers. This, more than any other single topic uncovered, underlines the rationale of the study at hand.

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Before proceeding, it is worth noting that in some sense, these questions have been present all the time, even if the rigorous testing insisted on here and the conceptualisation are novel in the context of Finnish famine historiography. As will be shown throughout this work and summarised in the conclusion, answering the four questions (A-D) set out in detail above is crucial to understanding why the Finnish famine ever happened in the first place. So far, the existing famine historiography has uncovered generalisations and rough claims about the social and economic background to the 1860s famine, but forgotten that these alone might not warrant the conclusions implied about the causal sequence leading up to the crisis.

This study aims to use quantitative methodology to provide detailed answers to the questions. Here, more than in anywhere else, this work departs from the existing Finnish historiographical tradition which has been shaped only nominally by the so-called new economic history, or ‘cliometrics’.[91] If we treat “method” as a process that leads to the verification or falsification of a claim, or producing an answer to a question set, then we have to acknowledge that the statements such as “population growth increased poverty” actually entails certain methodological requirements concerning the empirical dimensions within.[92] Importantly, however, one does not have to be an econometrician to inspect whether a claim such as this is true or not. The robustness of the conclusion without sufficient data or appropriate methods is another matter, but focusing on that escapes the more general point: for the sake of transparency and to avoid spurious saturation of the field, acknowledging the limits to knowledge is an essential endeavour. Here researchers have to make a distinction from a claim that appears legitimate at face value, from one that is actually empirically corroborated, or from one that can even be empirically inspected.

From this point of view, this work has all the ingredients for academic fury that defined those game-changing cliometric works of the 1960s and ‘70s. The author, however, shies away from condemning previous scholars with the rhe-

90 Pitkänen (1992a).
91 For general consideration see especially Jalava et al. (2007).
92 In this manner, Keynes’ consideration that economic theory is a “method rather than a doctrine”, as quoted in McCloskey (1978), 15, is highly poignant.

torical aggression typical to the early cliometric movement.[93] It should be understood that the methodological, theoretical and empirical emphases in previous works are cited in terms of their divergence from the ones put forward here, mainly for the omission rather than commission of certain aspects. Furthermore, these "omissions" are partial artefacts of a modern perspective to previous historiography and stem in the majority of cases from developments in the field that have happened over the past couple of decades. As will be shown on many occasions in this work, the historical method (regardless of how one wishes to define it) has been rather effective in uncovering patterns of change and the relevant targets of interest.

In this respect this is not a traditional cliometric study. One of the aims of the methodology applied in this work is to underline that quantitative economic history is much more than just a field of applied economics.[94] Partially based on the theoretical stance of this work, but also on the demands posed by the historical reality, this work cannot afford to ignore, as some modern econometric history has, how (also) the quantitative historical sources were born at the nexus of administrative actions and cultural norms. It is therefore worthwhile making a clear distinction between mathematical mainstream economics and quantitative economic history - by accepting certain methodological standpoints prevailing in economics, not that all their ontological burden have to be brought along.[95] After all, Demeulemeester and Diebolt have emphasised that the supposedly time-invariant nature of economic laws simultaneously implies their ahistoricality. Even if many practitioners of econometrics state that they are plainly letting the data speak for itself, it ought to be self-evident that the facts never tell their own history, and they never arise spontaneously.[96] Not only do we have to acknowledge the constructivist side of any historiography, but we must accept the inherent subjectivity of the results in terms of the means by which we measure and quantify the past. An apt example of this is provided by Atkinson who stresses the difference between "objective" measures and the level of social acceptance prevailing in actual societies.[97]

To conclude this section, I wish to emphasise the importance of two perspectives which are both key components of this thesis and balance each other out. First of all, to quote Hoover, "[e]conometrics […] is about observing unob-

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93 Examples abound: Fogel & Engerman (1974), 6, consider past interpretations of the American slave economy "so wrong", and Mokyr (1985), 6, suggests that oversimplified inferences lacking theoretical and empirical rigour are "dangerous". McCloskey (1978), 15, considers that cliometrics helped in "rethinking bad economics and reshuffling misused numbers" and that the niche for cliometrics arose because "the prevailing standards of economic thinking ha[d] been low". McCloskey furthermore considers that when it came to understanding how economies worked it was "child's play" for cliometricians to make economically untrained previous historians "look foolish". It is thus important to contextualise early cliometrics research with respect to the historiography of the time and understand the rhetorical aggression in terms of a young discipline carving out a space for itself.

94 See e.g., Goldin (1994), 3; Demeulemeester & Diebolt (2007), 15.

95 This concerns especially behavioral assumptions such as profit maximisation or focus on equilibrium analysis, see e.g., Blaug (2002).

96 Demeulemeester & Diebolt (2007), 9, 12.

97 Atkinson (1970).

vious regularities. The existence of such regularities, at least locally, is a requirement of realism [of models and abstract theories]".[98] In this context, of reviewing qualitative or semi-quantitative historical research, it means that statistical approach can pinpoint those places where, in retrospect, research had previously taken non-trivial leaps, either by insisting on spurious relationships or disregarding those relationships that were not apparent when eyeballing the data. The second perspective is that history is a discipline which is always striving towards synthesis. As Demeulemeester and Diebolt suggest, if quantitative economic history was detached from its historical dimensions, it would simply become a mere set of "retrospective econometric exercises".[99]

1.3 Sources

Historical famine studies are often marred by recurrent absence of sources. This mainly stems from the fact that the majority of European countries had their last nationwide famines prior to the 1700s, leaving little economic, social and demographic materials behind.[100] This is not solely a problem of historical famines and for example Ravallion has pointed out that "[t]here can be little hope of rigorously testing the relationships [of interest] econometrically on suitable micro-data collected under famine conditions."[101] But the late occurrence of the 1860s Finnish famine creates a problem of another kind: the sheer volume of sources is well beyond the scope of any single study. Because of this, a strict selection of sources has been undertaken here.

First of all, this is a quantitative study that aims to answer the quantitative questions iterated in the previous subchapter. This means that the vast majority of principal sources are quantitative, and are employed to construct longitudinal datasets. The construction of such datasets requires a substantial effort and because of the scale of the work required relative to the time available, several sources that could have highlighted specifically local conditions but are not widely available, or are numerically inconvertible have had to be ruled out. These include various local reports, both at the parish level and from different levels of the administrative hierarchy.[102]

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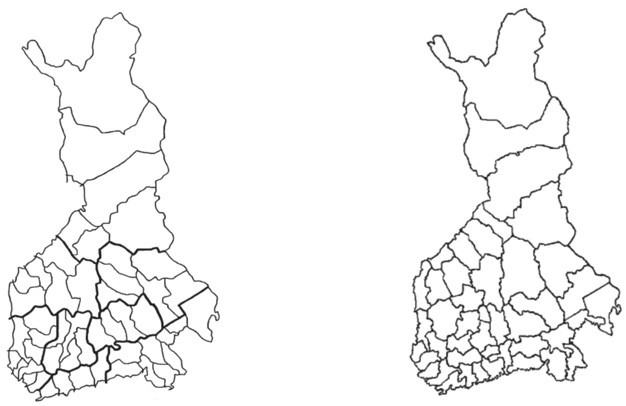
98 Hoover (2002), 173. There is a connection with Friedman's (1953) positivism here.
99 Demeulemeester & Diebolt (2007), 15.
100 Pitkänen (1992a), 81–82. For example demographic loss even during the fairly recent famines such as the Irish famine of the 1840s and the Ukrainian famine of the 1930s have to be estimated due to the lack of vital annual data, e.g., Mokyr (1985), Vallin et al. (2002).
101 Ravallion (1997a), 1212. For considerations concerning the developing world see e.g., Dirks (1980), 22; Dyson (1993), 17. Hugo (1984), 12, states that "[i]t is paradoxical that some of the best work on the demographic impacts of famines which utilises the most imaginative and innovative analysis and interpretations of a wide variety of sources has been completed by historical demographers".
102 Local historical studies have abundantly covered local descriptive sources, e.g., Oksanen (1985), 362-364; Viikki (1989), 20-30; Rosenberg (1995), 15-22. Turpeinen

Secondly, this work is a regional macro-study. It means that the focus is generally not on individuals (though individual information is provided for illustrative purposes, and data is collected at the lowest possible level). It is on parishes (*seurakunta*), administrative districts (*kihlakunta*), deaneries (*rovastikunta)* and provinces (*lääni*). Administrative districts and deaneries are the most common statistical units used in this study and are presented in MAP 1.



Administrative districs (kihlakunnat) and provinces (läänit) in bold face

Deaneries (rovastikunnat)

MAP 1 Regional districts of interest

See Appendix A for detailed identification.
Source: Turpeinen (1986a), Pitkänen (1993)

Some regions were excluded: the administrative district of Lapland is not included in the majority of the analysis here, as the population was legally exempt from the taxes studied here. The province of Viipuri is not included in the taxation data either, as its income tax registers are currently located in archives in Russia. Similarly, like Pitkänen, this study excludes the Greek Orthodox population due to incomplete statistical material.[103]

Lastly, the focus of the study is on rural not urban parishes. The reason for this is two-fold. First of all, even if urban centres featured a mortality increase during the famine, they were left comparatively unaffected. Häkkinen has, for example, stated that for the majority of it, the famine was a rural phenomenon.[104] Because of their greatly different trajectories during the famine, the in-

(1986a) reviews various official reports and Pitkänen (1993), 70-80, has comprehensively documented the depiction of the famine from the viewpoint of medical officers.

103 Constituting some 50,000 people, Pitkänen (1993), 29-30. Spatially this means exclusion of Salmi deanery in the eastern parts of province of Viipuri.

104 Pitkänen (1991a), 58; Pitkänen (1993), 88-89; Häkkinen (2006), 43. Pitkänen (1993), 114, has estimated that only 3.1% of excess mortality in 1868 resulted from urban mortality. Studies focusing on urban famines are scarce, see however Garenne (2007) for the famine in Antananarivo (the capital of Madagascar). Ó Gráda (1999), 157-193, discusses the famine in Dublin in the 1840s, Livi-Bacci (1991), 43-47, reviews urban war famines in 20th century Europe. Swift (1989) has explicitly pointed out that it tends to

clusion of urban regions would have caused unavoidable comparisons to be drawn between the rural and urban, which was not the aim of this study. For this same reason the Åland archipelago is generally not included in the analysis.[105] Secondly, and more importantly, sources also differ in nature to some extent between urban and rural regions. This stems especially from the fact that legislation concerning taxes and poor relief differed not only between urban and rural localities, but also between different urban communities too.[106]

Because this study aims to uncover pre-famine development in the whole of rural Finland, certain constraints have to be placed on the comparative use of various sources. In order to arrive at conclusions about the social structure and poverty for the whole of Finland in the 1860s, a certain amount of simplification was regrettably necessary. This contrasts with specifically regional studies which allow for the careful scrutiny and comparison of different sources which provide information about local social structure from a number of perspectives. With close to no objection, these studies have concluded that bureaucratic and clerical pre-industrial sources are unreliable or at least inadequate in describing local conditions when used solely.[107] This finding, though important from the standpoint of historiography and for understanding how history is generated through sources, is of little worth and self-defeating if it then fails to suggest the means to circumnavigate these source inadequacies. The remaining sections of this subchapter detail the various sources used.

Population registers

The standard source for providing information concerning pre-industrial Finland's social structure have been the population tables that were compiled by Lutheran priests. Under national legislation, parish priests had to complete two separate statistical forms, the so-called population (census) and population change tables. A thorough population census listing e.g., population age structure and social class divisions was originally compiled every three years, but from 1775 onwards the information was gathered only every five years. Annually compiled population change tables provide the causes of death statistics, the monthly number of vital events (births, deaths and marriages), and some breakdowns of these according to social or marital status.[108]

Even if the Finnish population registers are considered to have been one of the best sources available for the pre-industrial era[109], they have their fair share of problems. These include the apparent lack of population especially in

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be the rural population groups that are susceptible to famine; e.g., during the Chinese famine (1959-1961), the urban food supply was maintained even if it resulted in a worsening situation in the rural provinces, see e.g., Lin & Yang (2000); Clément (2012).

105 See e.g., Turpeinen (1986a), 133-135, concerning the situation in the Åland islands. See also Eriksson et al. (2008).

106 Louhivuori (1915), 128–129; Pulma (1994), 57–58; Nummela (2006).

107 E.g. Pitkänen (1977), Sirén (1999), Happonen (2009), Uotila (2014).

108 Pitkänen, et al. (1989), 97; Pitkänen (1993), 27–38.

109 For a data quality discussion see Pitkänen (1979); (1993), 31-33; for similar data from other Nordic countries, see, e.g., Drake (1969); Edvinsson (2015).

the early stages of the registration, the under-reporting of infant mortality, problems stemming from migration, and errors during mortality crises due to the inability to keep to the "home parish rule" which stipulated that the deceased needed to be registered in their parish of origin.[110]

The majority of these errors in the sources either became less significant with time or constituted a problem only temporarily; but there are certain sources of possible systematic error that may have persisted. First of all, from a socioeconomic standpoint, it has been customary to criticise the social class division in the tables as it understated the actual plurality of rural livelihoods and subsequently the true social spectrum.[111] As labour demand varied and sources of livelihoods were multiple throughout the course of year, the livelihood division is simplified. As a consequence, these tables have been given a rather harsh treatment, even though it was typical to categorise people with a single social position or occupation in all pre-industrial population sources.[112]

Secondly, the information on the social status and occupation of women are deficient. For example, farmers' wives are included among the farmers' families, not as part of the workforce.[113] This causes problems in estimating the extent to which families used their own folk as labour. As will be discussed later on, poor households were usually unable to hire external help, and so it is likely that the work role of family members is more pronounced in poorer regions of the country than in others. However, this and other regionally specific error sources (e.g., differences in registering practices) can be controlled in statistical settings.

Thirdly, the development of industrial livelihoods remain hidden within the rigid statistical categories. As the tables remained unchanged for the majority of the 1800s, economic development that brought new jobs like railway construction are hidden in the figures.[114]

Even if the social division in the tables does not depict every nuance of the agricultural economy accurately, the homogeneity of the information and its long-term comparability makes these tables superior and technically the only available longitudinal macro-level source on social structure dating from the early modern period for Finland. Furthermore, this study is mainly interested in information that ought to be fairly unambiguous: the division of cadastral groups, the number of poor relief recipients, the number of marriages, etc. If we were concerned in actual livelihoods beyond the major groupings, the majority

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110 Pitkänen (1977); (1993), 34; Jutikkala (1978); Pitkänen & Laakso (1999). Pitkänen (1979) has estimated that the first population census (in 1749) lacks some 5% of the actual population. Even if this is not insignificant, the percentage is still considerably low when compared to other pre-industrial sources providing information on the total population (e.g., poll tax registers below).

111 Soininen (1974) 20–21; Manninen (1976), 20–22; Sirén (1999), 178–179; Hemminki (2014), 68; Uotila (2014).

112 Naturally different sources could provide different information, see especially Uotila (2014).

113 Soininen (1974), 20.

114 Manninen (1976), 21.

of official sources, including deanery population tables would also be largely insufficient.[115]

For this study, deanery population tables were collected from the years 1845-1865. Kilpi's figures for the provinces are also of great use in this study.

Poll tax registers

Originally intended for the tracking of individuals paying the poll tax (*henkiraha/ mantalspenning*), the registers constitute one of the oldest and most often used Finnish sources to identify individuals and households and to track population movements.[116] Nationwide compiling of poll tax registers started in 1634, with prior taxation legislation codified in the early 1600s. In this study, the poll tax registers are used for two purposes: to collect data about local social structure (population level, social class, mean household size, age distribution) and to obtain information about payments of two taxes - the poll tax and household tax (*käräjäkappavero/ tingsgästningskappar*).

The household tax is one of the oldest tax obligations in Finnish legislation. The tax which was collected for the upkeep of local judiciaries, had medieval roots and was codified in the early 1600s, with several reforms conducted during the 1700s and early 1800s. In 1778 the tax was set at c. 20 liters of grain. The level was maintained in the reforms of 1858 and 1865 when the tax burden was cut with the eradication of civil servant payment (*lagmans- och häradshöfdingeräntan*) that had been collected simultaneously and on identical grounds. The unit of taxation was each "independent" household with a livelihood gained from agriculture.[117]

The poll tax was a person-specific tax, dating back to the *enörespenningar* (1605) and *hjonelagspenningar* (1609). After a number of reforms, the first actual poll tax was introduced in the early 1630s and in 1652 the initial lower age boundary of twelve was increased to 15 and the upper age limit was set to 63. The tax remained largely the same until the mid-1860s when a wider reform was enacted, setting the tax at two marks for men and a mark for women (corresponding to 14.6 and 7.3 litres of rye in 1865's taxation prices, respectively).[118] The reform not only simplified the collection of tax but also eradicated a sizeable proportion of previous exemptions and so widened the tax base. In 1816, about 59% of the rural population paid the poll tax; but by 1861 this had

115 Pitkänen (1993), 31–33; Uotila (2014), 45.

116 Jutikkala (1957b); Matinolli (1969), 148–151; Nallinmaa-Luoto (1983), 391–394; Väärä (1998), 153–157. Recently e.g., Siren (1999); Piilahti (2007); Happonen (2009); Uotila (2014).

117 Von Bonsdorff (1833), 614–620; Nevanlinna (1907), 499-500. The tax has extremely rarely been used in Finnish historiography, see however Kaukiainen (1980b), 130-131. Along with the extension of the poll tax in 1865, the eradication of the so-called 'legal guardianship' extended the tax liability of household tax to the lower rural social classes, see the second article in Section III, subchapter 4.3 and e.g., Jutikkala (1958), 385. Technically the household tax was four *kappas* of grain, one *kappa* equalling roughly 5.5 litres.

118 Von Bonsdorff (1833), 582–599; *Lagberedningens betänkande* (1898), 26–28; Lext (1967), 43–47; Orrman (1980); Vattula (1983), 437; Piilahti (2007), 38; Uotila (2014), 44–46.

dropped to 49%.[119] After the poll tax reform in 1865, this went up to 52.6% with an average non-demographic exemption rate of 10.6%.

Careful examination of the social characteristics of tax exemptions and whether or not they provide recoverable information about poverty are studied in detail in the second article of section III. This contrasts with previous Finnish studies that have resolved to use tax exemptions in a rather cursory way and often treated them as additional information on an individual level rather than as a genuine variable of interest.[120] The prolific Swedish economic historian Eli Heckscher was one of the first in the Nordic context to point out that the extent of taxation, in terms of households and people taxed varied with the general economic conditions. Jutikkala later questioned this connection.[121] Based on Swedish experience, Engberg has suggested that losing or gaining exemption and poor relief dependency reflects the local allocation of extremely scarce resources - help was given only when it was absolutely crucial.[122] Finnish tax exemption studies, focusing on the 16th and 17th centuries have concluded that exemptions increased rapidly over the short term in response to harvest failures but farms fairly rarely kept this status for more than a couple of years at a time.[123] The early modern practice that a farm unable to pay taxes could have been confiscated by the state quite likely contributed to farmers' unwillingness to prolong the exemption period.[124] As portrayed in the second article in section III, being tax-exempt became a chronic state for the majority of the social underclass in Finland after the onset of downward social mobility during the late 18th and early 19th centuries.

For studies concerning the years after 1749, population registers have been used as the main source to illustrate population movements, though poll tax registers with other clerical documents have remained an essential source for evaluating social structure and individual life events. Poll tax registers have often been perceived insufficient as macro-population sources and they duly lacked some 19% of the Finnish population listed in the church registers in 1805, but this was down to only 4.9% in 1860. Kaukiainen has shown a similar increase of coverage at the local-level.[125] The coverage of the Finnish poll tax registers is worth comparing to, for example, British hearth tax lists (as these were estimated to be lacking up to 40% of the population).[126]

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119 Kilpi (1913), 109.

120 Uotila (2014), see also e.g., Sirén (1999) where poll tax exemption is treated mainly as a source-critical question. Tax exemptions have also been dealt with extensively concerning farm desertions in the early modern period, see e.g., Mäkelä (1977); (1979); Mäkelä-Alitalo (2003); Gissel et al. (eds.) (1981); Keränen (1986).

121 Heckscher (1933), 219–254; Jutikkala (1957), 157. For other Swedish considerations see e.g., Lundsjö (1975); Söderberg (1978). For general literature review see second article in section III.

122 Engberg (2006), 48–49

123 Orrman (1986), 248–255; Keränen (1986), 624–625

124 Mäkelä-Alitalo (2003), 192–195

125 Kilpi (1913), 9, 110; Jutikkala (1957); Kaukiainen (1979); Palm (1993), 90–91. See also SVT II (1879): 10-15, 96-100 concerning the comparison between different population registers.

126 Husband (1984), 46–47

Even if the population coverage of the poll tax registers in the mid-1860s was high on average , there apparently was a social gradient in the inclusion in the registers; people who were poor, vagrants and without social ties to the local communities were typically missing.[127] Not only does this affect the inclusion and accuracy of registering of people but affects also the household structure apparent in the registers. As with other historical fiscal sources, the cadastral nature of the land had an important role in the poll tax registers too, and those individuals and households which did not fit clearly into the landowner-tenant dichotomy were often treated in a more or less cursory manner; i.e., lumped into catch-all social categories.[128]

The contemporaries used poll tax registers as a local bureaucratic benchmark: for example, income tax registers (in the section immediately below) were compiled on the basis of poll tax registers.[129] This enforces the interplay between taxpaying, officially acknowledged social position and appearance in pre-industrial fiscal sources.

The analysis in this study is based on parish-level poll tax registers for years 1865-1870. Within the limits of previously used regional delineations, all parish registers were then fed into the longitudinal data base, thereby providing a substantial amount of information on the regional demographic patterns and socioeconomic conditions in rural Finland.

Income tax registers

On 2 March 1865, an Imperial Statute was issued to introduce Finland's first income tax, *suostuntavero*.[130] Unlike other principal sources used in this study, the taxation registers have been little used in previous Finnish economic history and so no extensive macro-level assessment concerning their applicability has yet been conducted. As a result, this particular source is discussed below in greater detail than the other sources used in this study.

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127 Sirén (1999), 177; Happonen (2009), 37-39; Uotila (2014), 45. For an international treatment of the same phenomenon, see e.g., Arkell (1987); King (2002), 54; Vikström (2006), 227, 232.

128 E.g., Uotila (2014), 45.

129 Imperial Statute (2.3.1865) 2:15, 18. For local contemporary practice, see e.g., Häme provincial income tax registers from Messukylä, 1866, IGac:2, 464.

130 For the historical and legislative background see e.g., Wikström (1985), 21-47; *Lagberedningens betänkande* (1898), 67-79. Finland was one of the first to introduce extensive income tax. England made the first experiments with it in 1799, and Sweden in 1810. Both were quickly abandoned, then reintroduced in England (1842) and in Sweden (1902), Åkerman (1967); Wikström (1985), 26-27; Gårestad (1987), 36-41; O'Brien (1988). Finnish companies were also subject to income tax, see e.g., Jutikkala (1991), 77; Nykänen (2012). Due to difficulties separating business, corporate, and household incomes, the two former were included in the taxation data. While this departs from the household emphasis, the cases are too few to affect ratio scales (urban localities remained the explicit centres of corporate activity). Besides, exclusion of an income just on the basis of source would greatly distort the income-relations during an era when there was little separation between corporate and private income. Joint stock companies were liberalised in the 1860s, prior to this there were only a handful. In the mid-1860s, there were about 40 joint stock companies, all of them registered in towns, a few operating in the countryside, see Schybergson (1964), 22-23.

Income tax, ultimately discarded after 1885, was mildly progressive: for incomes between 501 and 5000 marks, the tax rate was 0.8% (of the amount above the 500-mark threshold), for 5001 to 10,000 marks it was 1% of that amount, and for incomes exceeding 10,000 marks it was 1.2%;[131] and because of the practice of rounding up incomes, the lowest incomes observed in the registers are those of 600 marks.[132] The initial legislation concerning income tax was effective from 1865 to 1867 and this remained with only marginal alterations until 1872. In 1868 the tax was effectively increased by removing the deduction of the 500 marks for those with an income of over 2500 marks. Simultaneously investments to expand economic activity ceased to be deductible.[133] There were also some institutions and individuals entitled to exemption (e.g., people who were not permanent citizens), but perhaps the biggest and only noteworthy tax-exempt group were people living in the district of Lapland. In accordance with the underlying classic liberalism of the era's economic policy, no class-specific tax exemption criteria were introduced.[134]

In principle, a tax payer was assigned previous year's income (i.e. income reported in 1865 was income earned in 1864), though it is uncertain to what extent the economic status at the moment of the taxation was weighted; at least no income tax was assigned if the tax payer died before the first of July.[135] The definition of yearly income was cursory, though quite modern in several aspects. Tax was targeted at the incomes from wages, capital returns and inheritances[136], after the deduction of "natural costs" - i.e., interest and payments to the state and local community. Dividends were excluded, however, in order to avoid taxing corporate income twice. Jutikkala sees this as effectively downgrading the assessment of incomes in the upper bracket of income distribution.[137]

Taxable income was assessed by local taxation boards, and based on each taxpayer's declaration. Some 26% of taxpayers declared their incomes in 1865, but only 3.7% were doing so in 1871. As the vast majority of annual incomes thus had to be set by the taxation boards, the applicability of tax records for assessing individual income has attracted wide criticism. Myllyntaus, for instance, has considered that the income valuations did not accurately follow general

131 SVT IV: 1 (1869), 5-8; Jutikkala (1991), 74.

132 Resulting in a truncated distribution, with truncation point at 500 marks. There are some scarce exceptions where incomes were reported to an accuracy of 50 or 25 marks. For the official practice for rounding up figures, see Imperial Statute (2.3.1865), 2:20. See Appendix C also, and subchapter 4.4 for details on estimating the whole distribution.

133 This reform was interesting especially as it increased taxation at the high-end of income distribution. Abolishment of the investment deduction has been suggested hampering investments (Wikström 1985, 30), though due to the low tax percentage this seems slightly exaggerated.

134 SVT IV: 1 (1869), 5-6; Wikström (1985), 16, 27. This contrasts to the household tax reform happening at the same time, where certain social groups remained tax-exempt.

135 Wikström (1985), 22.

136 Though not if the beneficiary was the deceased's spouse or direct relative (i.e., parent or child), SVT IV: 1 (1869), 6. Inheritances have proved a problem when studying individual incomes, Jutikkala 1991), 76-77.

137 Wikström (1985), 22–23; Jutikkala (1991), 75–76.

movements of the economy.[138] Furthermore, the definition of income has been considered too vague to have been implemented uniformly across the country and the coverage of the taxation has been considered scanty.[139] In order to arrive at the latter conclusion, several authors have stressed the apparent fact that only 4.5 % of the Finnish population paid the tax in 1865 with the percentage remaining as low as 6.9 % still in the early 1880s.[140] Wikström has also maintained that only about half of the gross national income was subject to taxation and that income tax formed only 3% of all Finnish tax revenue.[141]

These issues have led to a general pessimism about the usability of the income tax registers. In Jutikkala's opinion, a detailed inspection of the income registers would scarcely repay the effort because incomes below the taxation threshold would remain hidden anyway. But even for the observable section of the distribution, Myllyntaus has, for instance, argued that incomes represented in the registers did not accurately reflect the real income relationships in the countryside. As the revenue collected during the first three years of tax was roughly 43% lower than what initial estimates suggested it would be, Pihkala has suggested that the tax was collected carelessly and has thus deemed the whole income tax endeavour as a "failure".[142]

However, I would argue that the majority of these considerations are somewhat hasty, if not simply wrong. First of all, there is no apparent reason, why the total population should be selected as the denominator. Indeed, the total adult population would be impossible to properly take into account (with few exceptions) when one bears in mind the status of women in the labour market.[143] As described by contemporary officials, it was the household that was considered as the taxpayer; income was generally brought in by a single (male) member of the household, with too few exceptions for it to matter on the

138 Myllyntaus (1978), 35. Contradicting this, on macro-level the tax revenue actually followed the development of GDP in market prices. This suggests that on average, the tax does actually reflect economic development, Hjerppe (1988), 30–31.

139 Myllyntaus (1978), 35; SVT IV: 4 (1885), 1-2

140 If people between 15 and 64 are used as the reference, then the 1865 percentage (though still low) rises to roughly 7% in rural Finland.

141 Wikström (1985), 45.

142 Pihkala (1977), 45; Myllyntaus (1978), 35; Wikström (1985), 29, 44; Jutikkala (1991), 74–75. The officials were quite aware of the fact that the income tax under-perfomed with respect to its continental counterparts. According to the contemporary valuations, in Prussia, where the taxation threshold of income tax was set at 420 Reichsmark (taking the exchange rate into account, at roughly the same level as the Finnish taxation threshold), about 75% of the "population" did pay income tax, whereas in Finland, paying the tax was an exception, SVT IV: 4 (1885), 1-2. Negative opinions about the efficiency of the tax collection are most likely influenced by the official interpretation of the early results of the taxation; according to SVT IV: 2 (1875), 11, the contemporary view was that differences between taxation coverage and the "commonly known" socioeconomic conditions in rural parishes reflected the local differences in the implementation of the taxation code.

143 Pylkkänen (2009), 43. The essential reform was the law of 1864 which increased the economic independence of unmarried women, through enabling women to choose their marital partners and reducing their dependence on guardians (father or husband). In 1889 rights were also extended to married women.

macro-level).[144] If we therefore interpret the number of taxed as households that exceeded the income boundary, then of all Finnish rural households some 24.6% were paying the tax in 1865, with this figure being over 40% of households in some regions, though less than 10% in some western parts of the country. In the later stages (1881), around 30% of all Finnish rural households were paying the tax. Pitkänen has similarly pointed out that a significant number of rural households were taxed, including majority of peasant freeholder and virtually all gentry households. According to the population tables, there were 84,446 freeholder households in Finland in 1865 and 62,050 of those subject to income tax were assigned the principal livelihood of agriculture (this included the wealthier crofters), which yielded a taxation coverage of 73.5%. If croftsteads (63,002) are included, the coverage drops to 42.1%.[145] It is important to note, however, that it is likely that many crofts, being small, probably did not exceed the taxation threshold.

Secondly, Jutikkala has suggested that the majority of all income was actually subject to taxation and that those with a yearly income of less than 500 marks had little to no real wealth. But there is no denying that the lower boundary of the tax was high, however. At 500 marks, it equalled roughly 2.6 times the Finnish GDP per capita at the market value of that time. But in a society that was living at close to subsistence level; with low wages and a low rate of adaptation to the monetary economy, the usage of explicit income measures has met with criticism. Jutikkala has suggested that the income of lower social groups was most likely difficult to assess because much of their livelihoods relied on the natural economy, not monetary. This difficulty would lead to lumping households together within the same social class; whereas people who received explicitly monetary incomes (e.g., merchants, industrialists, civil servants) were likely to be assessed closer to their actual income level[146] and subsequently tax registers have most often been used to study the latter social groups.[147]

The following three calculations illustrate the taxation threshold by comparing prices and payments made in kind (i.e., natural economy). First of all, the minimum taxed income corresponded to over 22 barrels of rye at market prices in 1865. As will be depicted in detail in chapter 3, this amount would correspond to roughly 3 hectares of cultivated acreage, whereas it has been estimated that an adult required about 0.2-0.3 hectares for subsistence. Consequently the minimum threshold appears high.

Secondly, as suggested in article 2 of section III, if "typical" male and female farm servants are considered forming a household, the income of this household quite likely ranged between 430 and 520 marks (including upkeep).

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144 SVT IV: 2 (1875), 9, refers to households (*huonekunta*) and SVT IV: 4 (1885), 1 refers to families as taxation subjects. Wikström (1985), 44 refers to households as tax subjects.

145 Jutikkala (1991), 74, 78–79; Kilpi (1913): tables 34, 35; SVT IV: 1 (1869), 9; Vattula (1983), 16; Pitkänen (1992), 91.

146 Jutikkala (1991), 75.

147 Mauranen (1981); Jutikkala (1991); Kaarniranta (2001). See also Frigren (2016), 304–309.

The farm labourer wages were considered high even by contemporary standards; and as servants were in income terms above the lowest of the rural social segments, these (rather sizable) agricultural social classes would be below the 500-mark threshold. Labourers with a family occasionally received higher wages[148], and this is reflected in their sporadic appearances in the income tax registers.

Thirdly, the upkeep costs of pensioners provide another point of comparison. After transferring their farms to their eldest sons, farmers were guaranteed a pension (*syytinki*), funded by the home farm. According to Koskikallio, the monetary value of the average annual upkeep of a single pensioner in the period 1863-1874 would have been around 360 marks, and 470 marks for a couple.[149] Both this and the servant benchmark include a rather diverse diet and e.g., housing and therefore represent rather high figures to be considered as representative annual incomes in the lower section of the income distribution.

When assessing the applicability of the income tax registers, it is important to acknowledge that often the perceived ability to pay income tax was socially determined simply on the basis of an individual's wealth and position in society.[150] This may have been the cause for continuity in the assessed yearly incomes even if the subject's economic position changed. One could reasonably assume that it will also have downgraded the taxed income when compared to actual income; given that the income level set by the taxation board was agreed to by the taxpayer (as evident in the registers), it could not have been too high.[151] As the number of tax declarations dropped with every tax year that passed, average incomes calculated straight from the income tax registers would have most likely become downgraded.[152]

The income tax board consisted of local people who probably were aware of the general economic situation of people living in their taxation district. Kaarniranta has emphasised this aspect of taxation practice, making them a valid economic source. He furthermore considers that other economic sources support the information provided in the income tax registers (e.g. estate inventories and bankruptcy documents).[153] In answer to the perceived continuity of the tax, further inspection of the income tax registers suggests that incomes

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148 Haatanen (1968), 43.

149 Koskikallio (1927), 170–179, see also Jutikkala (1958), 320–328.

150 It has also been shown that people's incomes could have been set at a different level depending on the tax - municipal taxes were often based on higher income assessments due to the need for local revenue, see e.g., Nummela (1989), 197; Turunen (2012), 106.

151 The situation deteriorated during the famine due to forced temporary migration and mortality. In 1867, in the town of Pidisjärvi (modern Nivala) in the province of Oulu, the vast majority of taxpayers were absent from the taxation board meeting and ultimately only the parish priest was income taxed, Oulu provincial income tax registers for 1867, Ge4:22.

152 The absence of inflation correction in the tax rates can in principle increase taxation due to the so-called bracket creep phenomenon during inflatory periods. The 1860s and 1870s witnessed strong deflatory periods though, García-Iglesias & Kilponen (2006), 195.

153 Kaarniranta (2001), 22–23.

were genuinely reviewed on a yearly basis; i.e., the income assessments were not simply duplicated from the previous year.[154]

For example, in Siikajoki parish, Ostrobothia, Sakarias Mankinen was relieved of paying income tax in 1868 on the basis of his debt burden and the costly upkeep of his family, even though governmental officials were against the exemption on the basis that Mankinen cultivated the largest and most fertile lands in the parish.[155] Similarly, for the year 1865, in the city of Turku, E. Söderstrand and F. Lindqvist were initially assessed as having a yearly taxable income of 2000 marks, but later this was revised as both were considered too poor to pay the tax. Similar incidents were reported in Mikkeli in 1867 and in 1868, where junior officers A. Karjalainen and A. Lindeback were initially assessed as having a yearly taxable income of 1200 marks and then this was revised as they were considered too poor.[156] But the system could sometimes work the other way round too; in 1882, D. Oinonen (from Kivijärvi) and E. Möttönen (from Karstula), declared yearly taxable incomes of 100 and 0 marks, respectively, but the taxation boards in both cases considered them too low and they were each made to pay 300 marks. Occasionally increases seem extremely high: J. Matilainen (also from Karstula) declared a taxable income of 300 marks in 1882, but taking into account the fertile lands he was farming and the fact that he was receiving interest from loans he had granted, the taxation board raised his taxable income to 800 marks.[157]

These examples show that even if wealth and possession were an important starting point for assessing a taxpayer's yearly income, there were detailed hearings and investigations made to accurately determine the various income channels. Ultimately, the economic situation of some taxpayers may have deteriorated too much for them to pay their tax, and this would lead to arrears. Due to the difficulties involved in following each case of appeal and arrears of payment, the income data is collected from provincial tax records and thus reflect the stand taken by the local taxation board, regardless of whether the taxpayer ultimately delivered or not.

Even if some of the criticisms of using the income tax registers do have their merits, for the most part they are hasty, as no formal assessment has ever been attempted, let alone made, to quantitatively assess how the collection of income tax functioned and how (in)effectively the taxation boards actually carried out their duties. The low tax revenue could plausibly reflect the prevailing poverty in the countryside; not to mention the fact that the tax rates themselves

154 Incomes could vary significantly on a yearly basis. For example, the patron of Kullaa ironworks, K. F. Lönegren, earnt a yearly income of 56,000, 40,000 and 83,000 for the years 1865-1867, while Karl Knuutila a farmer in the village of Penttilä earnt 3100, 2000 and 1900 for the same years, Turku and Pori provincial income tax registers (1866-1868), IGak:2-4. It was officially considered that there was some degree of continuity in the tax assessments, see e.g., SVT IV: 2 (1875), 10.

155 Vaasa provincial income tax registers for 1869, GIc:5.

156 Turku and Pori provincial income tax registers for 1866, IGak:2, Mikkeli provincial income tax registers for 1868, 1869. According to official reports, these practices were widespread after the famine, see SVT IV: 2 (1875), 9.

157 Laukaa district income tax registers, Gbb:1.

were (by modern standards) very low, and the minimum threshold for taxation quite high.

The real beauty of the data is in its uniqueness; the majority of historical income distribution assessments are based on occupational information and, on the macro-level, on social class tables.[158] The Finnish data exceptionally offers general income information and when estimated appropriately, the truncation can be taken into account to reveal information about the total income distribution. Thus, for all their weaknesses as a source, the income tax registers form the only one which was put together under unified legislation to provide systematic household-level income information and allows its macro-level distribution to be tracked for the period 1865-69.

The income information was gathered from the provincial income tax registers for these years, and the income tax data from 1870 (for 1869) was collected by professor Ilkka Nummela. Unfortunately the 1870 income tax registers from the province of Kuopio are missing, hence information from 1871 was used; but on the basis Kaarniranta's assesment, there seems to be no income growth in the early 1870s in Kuopio[159], hence this gap heaping should probably not result in significant distortions. Printed statistics were used in the third article in the section III. The taxation records are therefore available for about 350,000 households.

Other sources

Besides the three major sources listed above, this study uses the annual provincial Governors' reports, which included information on each year's harvests. Official statistics are also used where necessary, especially concerning the population and economic variables. Certain sections of the literature are used as data sources too. These are all duly noted and discussed where appropriate. The harvest figures, in particular, are thoroughly examined and critically assessed in chapter 3.

1.4 Structure of the study

This study consists of three parts or sections. Chapter 2 completes section I of the study and provides outlines for the theoretical framework and key concepts. These are covered through an extensive conceptual discussion. The second section commences with chapter 3, where the Finnish agricultural context of the 1800s is outlined. Devoting a complete chapter to this particular branch of the economy is justified on the basis that during the 1800s Finland was heavily dependent on domestic grain production with crop failures causing recurrent economic problems. The chapter provides estimates of long-term agricultural

158 See e.g., Milanovic et al. (2011). Income assessments in Mokyr (1985), 10-11, 24-28 are based on enquiry data, and derived through estimation. Extensive income distributions are widely available only from the 1900s, see e.g., Morrison (2000).

159 Kaarniranta (2001), 93

production and productivity and seeks to examine the extent to which, if at all, the famine was due to the low productivity and deteriorating state of pre-famine agriculture. Chapter 4 seeks to quantify the extent and nature of Finnish rural poverty just before famine struck. More specifically, this chapter assesses the role of three particular background factors to the famine. The first of these is the development of socioeconomic macro-variables during the 1800s. Building on the European Marriage Pattern literature and the so-called nuclear hardship hypothesis, the second factor concerns the regional pattern of rural household structure as one of the clearest manifestations of contextual forms of inequality. Lastly, the functioning of the rural labour markets is reviewed while seeking to explain the spatial extent of the lowest rural social classes and underemployed. The chapter concludes with regional income and inequality estimates and mappings of the spatial coverage of socioeconomic variables. Chapter 5 is dedicated to the famine itself and rounds off section II by presenting a concise chronology, outlining the demographic patterns of the crisis, and providing intertemporal and spatial estimates of poverty, income and equality measures. The fifth chapter is followed with a concluding chapter, which revisits the four research questions (A-D) set out in 1.2 to provide a multipronged answer to the main question: why did the 1860s famine in Finland happen?

Section III of this study consists of three articles which provide deeper inspection of certain topics. Hereafter, the articles are referred to in the text with the corresponding numbers in square brackets. The first of these articles is *[1] Malthusian checks in pre-industrial Sweden and Finland: a comparative analysis of the demographic regimes* (published in *Scandinavian Economic History Review,* 3/2015). The article provides a modern multivariate time series analysis of the interactions between demographic vital rates (crude birth, death, and marriage) and living standards measured in real wages. The results should be reviewed in tandem with chapter 4. The article investigates Malthusian population dynamics within a rigorous statistical framework (for the first time with Finnish macro-data). The comparison to Sweden is highly interesting, as roughly identical data is available. The study builds on recent international findings which have raised questions about the societal background factors that dictate Malthusian population dynamics. According to the traditional interpretation[160] population adjustment happened mainly through mortality in low-income countries (e.g., dominance of the 'positive check' relationship between real wages and deaths), whereas high-income pre-industrial countries (such as England and Holland) would have witnessed population dynamics mainly governed by the 'preventive check' - a positive relationship between births and marriages to living standards. Some recent works have either provided information which does not lend support for the hypothesis[161] or which provide a considerably more nuanced picture.[162]

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160 Galloway (1988).

161 Norway in Klemp & Møller (2015); Dennison & Ogilvie (2014). Weir (1984) has discussed similar themes with respect to English and French demography-economy regimes.

162 Guinanne & Ogilvie (2014).

The study finds that the Swedish vital rates were considerably more sensitive to living standards, both in the long and short-term. Furthermore, the Finnish death rates seem to have been fairly independent of living standards measured in real wages. Marriages on the other hand displayed significant response in Finland, as did births in response to marriages. The downward social mobility that characterised rural Finland in the 1800s is thought to be a possible factor resulting in the Finnish population dynamics being governed by preventive check.

The second article, *[2] Poverty and tax exemptions in mid-nineteenth century rural Finland* (forthcoming in *Journal of Finnish Studies* 1/2016) assesses the applicability of tax exemptions in studying rural poverty. The article features a significant methodological discussion over the usage of Finnish poll tax registers and the usability of the taxation information therein. Additionally, the article adds critical depth to the discussion about sources in the previous subchapter (1.4). The findings in *[2]* are reflected upon in chapter 4, and hence they should be read in conjunction.

The article leans on the oft observed fact that, even if exemption records are widely available, it is uncertain whether the exempt can be considered being poor in any contextually meaningful way. Contrary to several previous claims that taxation sources are unreliable in poverty studies, *[2]* shows that under controlled settings, tax exemption information does display promising features. These include a high exemption percentage of households without adult male members, small average household size of the tax exempt, and a clear concentration of exemptions in the lower rural social classes. According to the findings of the article, conclusions on the usability of exemption information depend heavily on which tax records are studied. Taxes levied at the individual level were not necessarily dependent on the households' economic status, and similarly household-level taxes may have been independent of the inhabitants' social and economic conditions. The significant observation from this is that on an individual/household level it is important to distinguish the fiscal and social purposes of different taxes when using them to assess the prevalence of poverty.

On average, the exemption rates are in line with several accounts from pre-industrial Western Europe. This could be interpreted as backing the social-constructivist view that poor relief and tax exemptions mainly reflect local conventions, without necessitating any connection to local economic conditions. Then again, the principal component analysis conducted in chapter 4 provides ample evidence that there was negative association between income measures and exemption rates. The finding contradicts the hypothesised positive link between living standards and tax exemptions/poor relief - higher rates do not in fact reflect greater local resources available for aid.

The third article, *[3] Feeding the famine: social vulnerability and dislocation during the Finnish famine of the 1860s* (in Curran, Luciuk and Newby (eds.), *Famines in European Economic History,* Routledge, 2015) studies the local determinants of excess mortality during the 1860s famine in Finland. The article reviews several practical issues concerning the measurement of vulnerability and ought to be read as a methodological discussion about the implementation and causal interpretation of the vulnerability concept discussed in chapter 2. In addition, the article supports chapter 5 by providing spatial information on the determinants of mortality.

In conjunction with subchapter 2.1, the article maintains that in order to avoid anachronism, historical vulnerability studies need to quantitively study events where vulnerability surfaced in order to understand why certain population segments in certain social surroundings were vulnerable to exogenous shocks, such as crop failure. Using cluster analysis, three spatial sub-groups are distinguished, each of which display different background factors of the famine mortality. By stressing spatial dependence in the mortality causation, the article enforces the role of local socioeconomic structures in understanding the spatial complexity of excess mortality and sequences leading to the famine. Spatial socioeconomic structures are considered in detail in chapter 4 and hence it complements *[3]*, and should be read in conjunction.

2 APPROACHING FAMINE

This chapter provides conceptual insights to the key terms used in this study, especially "famine" and "vulnerability". Rather than providing a rigorous definition for the concepts that have provoked such debate in the literature of development, certain facets useful in their historical usage are highlighted instead. This chapter additionally provides specific theoretical premises and critical insights concerning famine analysis. One focus of interest is the food availability framework (often considered synonymous with Malthusian analysis), and another concerns the legal socioeconomic environment (also known as the 'entitlement approach').

2.1 Key concepts

Famine

Famine is notoriously difficult to define. According to Bengtsson, studies of excess mortality can be divided into two schools: studies of famine (e.g., with an explicit focus on events); and studies on the effects of harvest variation and living standards on mortality. Meuvret has traditionally been acknowledged as the first to formulate the notion of "subsistence crisis" (in the mid-1940s), though the term was greatly popularised by Goubert in the early 1960s.[163] By the 1980s, explicit famine studies had gained momentum and were visible in vigorous conceptual and theoretical work. Scholars came increasingly to distinguish the role of social structures and institutions in the outbreak of famines. Rangasami, for instance, highlighted the sociality of the process; Currey and Hugo the community in the focus of the crisis; while Dirks was one of the first

163 Meuvret (1946); (1965); Goubert (1960). For discussion of pre-1990 studies of subsistence crises, see e.g., Walter and Schofield (1989), 1-73; Dupâquier (1989), 193-194; Bengtsson (2004a), 37; Fogel (2004), 5-6.

to capture the nascent paradigm shift by stating that "when starvation becomes a mass experience, the phenomenon is no longer purely biological".[164]

In hindsight, however, the literature during the 1970s and the '80s was underpinned by an overtly optimistic view about how the key concepts could be treated. An early example of this is provided by Alamgir who considered that the operational definition of famine should permit one to clearly distinguish between famine and non-famine situations[165], reflected later in tell-tale definitions such as Ravallion's "geographic area experiences famine when unusually high mortality risk is associated with an unusually severe threat to the food consumption of at least some people in the area"; and Ó Gráda's, which defined famine as a "widespread lack of food leading directly to excess mortality from starvation or hunger-induced illnesses".[166] Stress on malnutrition being acute and widespread was also included in the early definitions of famine. For example, Rivers et al. placed starvation as a semantic prerequisite for the definition of famine, with Mayer considering that "[i]n statistical terms, [famine] can be defined as a severe shortage of food accompanied by a significant increase in the local or regional death rate". These definitions were cemented by Sen stating that "famines imply starvation", later considered problematic especially since not only starvation at least explicitly implies an outcome (to starve = to die) but also because insisting purely on starvation interprets the cause of death rather narrowly.[167]

While it is thoroughly reasonable to maintain a nutritional emphasis in the definition[168], the link to mortality has raised critical voices. It has been emphasised that the factors which contribute towards mass mortality are already present well before the actual catastrophe; in other words, death is not a necessary condition of famine and by focusing on food shortages and the subsequent mortality draws attention to only one aspect of famine.[169] Rangasami has considered that famine mortality describes only the biological culmination and that the word "famine" tends to be used to refer only to the terminal phase and not the entire process.[170] On the basis of regional evidence from India (the Bombay region in 1905-06, and Bihar in 1966-67), Dyson considers that "excess mortality is not an inevitable component of famine"[171]. A few years earlier, de Waal maintained that we should abandon the notion that a famine necessarily involves mass starvation that leads to deaths. According to de Waal, the connectivity of mortality and famine should be replaced with a notion that famines are particularly virulent forms of poverty, often leading to an increase in mortality.[172]

164 Dirks (1980), 24; Currey and Hugo (1984); Rangasami (1985).
165 Alamgir (1981), 20.
166 Ravallion (1997a), 1205; Ó Gráda (2007), 5.
167 Mayer (1975), 572; Rivers et al. (1976), 355; Sen (1981a), 39; de Waal (2005), 10. According to Fine (1997), 624, "[f]amine would *appear* to involve geographical and chronological concentrations of death in which social arrangements, broadly conceived, for individual food availability have failed" [Italics added].
168 E.g. to discriminate famines from events of epidemic diseases outbreaks.
169 Rangasami (1985); Howe & Devereux (2007), 30; see also Ravallion (1997a), 1217.
170 Rangasami (1985).
171 Dyson (1993), 25, see also Osmani (1996), 608-609.
172 De Waal (1990), 484.

Studying Malian social responses to food shortages, Hill suggested that mortality prevailing in urban-bound migratory groups had been high prior to the crisis already but became visible with migration. This line of reasoning suggests that if mortality increases during a food crisis, then social positions cannot have remained stable - some proportion of people have lost their social position and fallen into one where the mortality risk is higher. This would mean that the increase in mortality during a famine would actually be a spurious reflection of a simultaneous rapid downward social circulation.[173] This is especially worth bearing in mind when we look at those studies which focus on whether a lack of cohesive social structure is a factor in translating nutritional shocks into massive food crises.[174]

By the end of the 1980s, Arnold was pointing out that famine poses a fundamental paradox in being both an event and structure.[175] Indeed, famines tend to be characterised by a short intense period of high mortality, temporary migration and food scarcity, and the clear majority of (Finnish) historiography has treated famine in this way - an abrupt breakdown of food production systems that result in an upsurge in mortality. In several historical instances emphasis on famine as an event is influenced by the inherent bias of the materials: written source riddled with horrific depictions of famine or long demographic time series where mortality surges are easily pinpointed.[176] Interpreting famine as purely an event, however, poses difficulties in tracking the long-term processes which lead to mortality peaks. More importantly, focusing on a crisis which seems strictly limited to certain years tempts one to treat famines as outcomes of exogenous shocks (e.g., crop failures) to poor and deprived communities.[177]

In contrast, by emphasising the structural side, Arnold acknowledged the now standard recognition that famines are inherently connected to the prevailing social and economic stratifications, which are often products of long-term political processes. The structural approach also acknowledges how it is nigh-on impossible to unambiguously distinguish famine conditions from prevailing endemic malnutrition. In the early 1990s, de Waal made an important contribution to the literature by asking whether famines differ in any fundamental way from widespread chronic malnutrition, which may well have already been prevalent beforehand.[178] According to him, the presence of social disruption is

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173 Hill (1989), see e.g., Osmani (1996), 608 for consideration.

174 E.g. de Waal (1990); Hionidou (2002); Vanhaute (2011), 60.

175 Arnold (1988), 6

176 See e.g., Melander & Melander (1928); Myllyntaus (2009). See also e.g., Ó Gráda (2009), 45-52.

177 Rivers et al. (1976), 356 point out that "[s]tarvation is a sudden and late event, and if epidemiologists continue to regard their role as being the definition of starved populations in anthropometric terms they will, with rare exceptions continue to arrive after the crisis has passed, and add to the pile of uninterpretable measures of endemic malnutrition". According to Hendrie (1997), 68, the "construction of 'famine' as a disaster event […] enables famine to be detached from its embeddedness within a set of historically specific and locally based economic and political processes".

178 See also Hugo (1984), 16 and Osmani (1996), 608-609. Among others Hugo and Ó Gráda have pointed out that, when juxtaposed with historical famines, their modern counterparts seem fairly moderate and have little impact on mortality at the national level, with nutritional depletion barely more severe than the acute malnutrition that

crucial in distinguishing the "ice" of famines from the "freezing water" of endemic starvation. This was perhaps the first occasion when the fuzziness of famine conditions were explicitly addressed.[179] Emphases such as these encouraged famine studies to henceforth focus more on livelihoods and led Webb and von Braun, for instance, to characterise famine as a "disruption of society through the cumulative failure of production, distribution, and consumption systems", with the principal consequence being reduced nutritional intake. A few years prior to this, Walker suggested that famine be understood as a long term process which accelerates destitution to the point where livelihoods become untenable for certain sections of society.[180]

Far from being of mere semantic importance, controversies concerning the occurrence of famines in Iraq in the 1990s, Sudan in 1998, Ethiopia in 1999-2000 and 2002-2003, Malawi in 2002, and Somalia in 2011 are tied inseparably to this definition debate; reminding us of the utter importance of finding applicable and accurate definitions of the phenomenon.[181] Lack of consensus on a definition, still evident today, has had important ramifications for famine response and accountability, and it has led to inadequate and often delayed intervention.[182]

The concept of 'food security' is a particular case in point. It first started being used in this particular context in the mid-1970s at the World Food Conference and was redefined by the World Bank in the mid-eighties. The definition used today stems from the one made at the World Food Summit in 1996 to describe conditions (at the individual, household, national, regional and global levels) where all people, at all times, have physical and economic access to sufficient safe and nutritious food to meet their dietary requirements for a healthy and active life.[183] Food security has conventionally four dimensions to it: availability, access, utilisation, and stability.[184] "Availability" refers to both the macro and micro availability of nutrition (e.g., dietary energy and protein supply, and average value of food production). "Access" incorporates transport infrastructure, but also covers measures such as GDP per capita, food price indices, the prevalence of undernourishment, and how much the poor spend on food. "Utilization" refers to how foodstuffs are processed safely (e.g., water and sanitation), but also outcomes of food availability and usage (e.g., undernutrition,

prevails everyday. Ó Gráda (2009), 6, even considers endemic malnutrition as a "slow-burning famine", though in (2015a), 32, he notes that "[i]t is important to distinguish famine from steady state, non-famine malnutrition".

179 De Waal (1990).

180 Walker (1989), 6; Webb & von Braun (1994), 3; Baro & Deubel (2006), 522.

181 E.g. Rubin (2014), 2-3. Reflecting on the Niger food crisis in 2005, Ó Gráda (2015a), 22 considers that "if a famine is taken to mean 'shortage of food or purchasing power that leads directly to excess mortality from starvation or hunger-induced diseases', then it is doubtful whether the […] crisis […] qualified. "

182 Howe and Devereux (2007), 27-28; Rubin (2014). See also Ó Gráda (2015a).

183 FAO (1996). See also Pinstrup-Andersen (2009), 5; Baro & Deubel (2006), 525-526. For general discussion on the topic see e.g., Jones et al. (2013). Burchi & De Muro (2015), 1-2, point out that dimensions given principal focus differ between various approaches to food security.

184 E.g. FAO (2015).

and mineral and vitamin deficiencies). "Stability" refers to the annual variability of food prices, food production, the significance of food imports, and also the sustainability of all the other dimensions.

The concept of food security has made an important impact on development literature, but has had remarkably little effect on historical famine analysis. The multidimensionality of food security would make it an ideal tool for a discipline pathologically interested in the context of the event, especially as the modern ingredients that determine food security have conventionally been present in one form or another, albeit implicitly, in several historical famine studies. Availability and access, for instance, have been treated in terms of yearly pre-industrial population fluctuations[185], energy accounting of pre-industrial living standards, and historical consumption assessments[186]. Meanwhile, stability (in terms of the annual variability of food prices and the significance of food imports) has not only been incorporated into the working of food markets during a famine, but has also been discussed in terms of the price elasticity of consumption baskets, and the role of foreign trade in securing food availability.[187]

The usefulness of the food security concept is emphasised by the fact that food security can have dynamic characteristics: it may occur as an acute or chronic problem and its degree of severity can vary in time.[188] The UN's Food and Agriculture Organisation (FAO)'s definition of food security suggests that famines can be detected and defined through a lack of those factors which ensure food security. For instance, according to Dilley and Boudreau, a famine happens "when extreme and widespread food insecurity leads to a partial collapse of the socio-economic order and excess mortality".[189] From the perspective of historical famine studies, the concept of food security opens up a wide contextually informed base for assessing nutritional crises, in that a breakdown of any of the components of food security may result in subsistence crisis, not just simply a slump in food supply. Food security should not be seen simply in terms of the counterfactual scenario; if we look at it in terms of its dimensions, it becomes clear why some people and nations have historically been more food secure than others.[190] Indeed, the greater the share of resources devoted to the

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185 E.g. Appleby (1979); Lee (1981); Weir (1984); Eckstein et al. (1984),

186 Crafts (1985); Heikkinen (1996); Bengtsson (2004a), 47; Floud et al. (2011); Schneider (2013); Gazeley & Newell (2015).

187 E.g. Fogel (1992); Ó Gráda (2001); (2005); Hindle (2008); Hipkin (2008); Schneider (2013).

188 Baro and Deubel (2006), 526. Burchi & De Muro (2015), however, point out that there are differences in the analytical focus of different strands of the literature on food security, some clearly fitting better to the analysis of general issues of poverty, food security, and development, while others are better for analysing crises.

189 Dilley and Boudreau (2001), 234. In somewhat similar fashion Baro and Deubel (2006), 529 define famine in relation to household coping strategies: "famine conditions are created when a majority of households are forced to prioritise the maintenance of current food consumption levels over their future capacity to ensure income generation".

190 According to Hutchinson (1992), 10, as cited in Dilley & Boudreau (2001), 237, both in modern and in historical instances some sections of the population are rendered more susceptible to the adverse consequences of disasters than others at any point in time.

acquisition of food and health services, the more prone the household has generally been to food insecurity.

TABLE 1 Howe and Devereux famine intensity scale

Levels	Phase designation	Malnutrition and mortality indicators	Food security descriptions
0	Food security conditions	CDR < 0.2 per 10000 per day and wasting < 2.3%	Social system is cohesive, prices are stable, negligible adoption of coping strategies
1	Food insecurity conditions	0.2 ≤ CDR < 0.5 per 10000 per day and/or 2.3 % ≤ wasting < 10 %.	Social system remains cohesive, price instability and seasonal shortage of key items, reversible "adaptive" strategies are employed
2	Food crisis conditions	0.5 ≤ CDR < 1 per 10000 per day and/or 10 % ≤ wasting < 20 %. Prevalence of oedema	Social system significantly stressed but remains largely cohesive, dramatic rise in price of food and other basic items, adaptive mechanisms start to fail, increase in irreversible coping strategies
3	Famine conditions	1 ≤ CDR < 5 per 10000 per day and/or 20 % ≤ wasting < 40 %. Prevalence of oedema	Clear signs of social breakdown appear, markets begin to close or collapse, coping strategies are exhausted and survival strategies are adopted, affected population identify food as the dominant problem at the onset of the crisis
4	Severe famine conditions	5 ≤ CDR < 15 per 10000 per day and/or wasting ≥ 40%. Prevalence of oedema	Widespread social breakdown, markets are closed or inaccessible to affected population, survival strategies are widespread, affected population identify food as the dominant problem at the onset of the crisis
5	Extreme famine conditions	CDR ≥ 15 per 10000 per day.	Complete social breakdown, widespread mortality, affected population identify food as the dominant problem at the onset of the crisis

Note: CDR = crude death rate.
Wasting: Proportion of child population (6 months - 5 years) below 80 % of the median weight-for-height or below -2 Z-score weight-for-height.
Source: Adapted from Howe and Devereux (2007), 38.

Howe and Devereux have attempted to group traditional definitions of famine and the dimensions of food security together into a more general framework. Building on food security literature, they have proposed a scale and classification of famines (TABLE 1), which takes into account mortality during a given timeframe, socioeconomic responses, and nutritional status; thereby answering the criticism of dichotomic famine definitions (which depict famine as either being present or not). The scale starts with "food security conditions" and proceeds through four worsening stages to "extreme famine conditions", with the crucial qualitative difference between food crisis and lowest degree of famine being (as depicted by de Waal) the emergence of social disintegration.[191]

191 Howe and Devereux (2007); de Waal (1990).

The Howe-Devereux scale is mainly meant to be used as an extension of various early warning systems to widen the temporal and spatial focus of famine definition so as to cope better in future and assess the culpability of various actors. It should not only help in looking beyond imminent causal factors (e.g., crop failures), but also help to distinguish unclear famine events from endemic poverty and malnutrition. Furthermore, the famine scale approach can direct interest away from simply mortality towards a vast number of other crucial features that could help anticipate famine.

In historical studies the scale definition may prove difficult to apply though, most importantly because there is a lack of available sources to provide the information needed. This is especially true concerning nutritional intake values and reliable descriptions of prevailing social conditions. Furthermore, in several historical cases, even reliable annual (let alone daily) mortality rates may be difficult to obtain. But perhaps the biggest problem is that the scale is mainly meant to be applied in the context of the modern developing world, so it risks exaggerating normal pre-industrial conditions of seasonal undernutrition as if they were pre-famine poverty-stricken circumstances on the brink of escalation; and it might therefore turn out anachronistic. Even if historical societies were often subsistence societies, they did not have to be societies with widespread everyday starvation.[192] A certain degree of care is therefore required when assessing what the 'normal' pre-industrial conditions were, and where in the alleged continuum leading to a mortality crisis were the societies actually located. A typical historical portrayal of this kind of continuum is provided by Emmanuel Le Roy Ladurie in his celebrated "The Peasants of Languedoc". According to him, "harvest failure [...] affected living standards that were already depressed and impoverished. For this reason it created acute shortages and sometimes famine"[193].

Pre-industrial actors were often reasonably well aware of the risks inherent in their natural surroundings and had a range of buffer institutions from granaries to public relief programs.[194] For example, Wrigley points out that "[u]ntil well into the nineteenth century no other aspect of economic life was consistently of such great concern to private individuals and to public authorities alike as the scale of the last harvest and the prospects for the next year".[195] Besides nationwide structures, local social conventions also existed. For example, Dribe et al. show how manorial estates in Southern Sweden provided safeguards for the surrounding parishes in the event of poor harvests.[196] Pitkänen has emphasised that the Finnish rural labourers were also generally safeguarded against "normal" harvest failures, as long as the employers (typically freeholder peasants) were relatively well off. This of course does not mean that hunger did not exist in pre-industrial societies; it most certainly did. There are a

192 Clark (2007a), 23.
193 Le Roy Ladurie (1976), 133.
194 Kelly and Ó Gráda (2014a); Komlos and Landes (1991); Shiue (2004); Fogel (1992); Teerijoki (1993); Nelson (1988).
195 Wrigley (1989), 263.
196 Dribe et al. (2012).

variety of reasons to believe that at least some segments of society suffered from hunger at least seasonally, and reassessments taking into account factors such as digestion costs and food quality have given a rather morose picture of pre-industrial European living standards.[197]

Importantly, however, even in the most impoverished societies, famines are not everyday occurrences.[198] This appears to hold true even if poverty is directly associated with access to resources affecting the ability to cope from extreme events. Resources and wealth do not intrinsically guarantee food security, however, since resources are mediated through for instance, property rights, and rights to buy and sell, all of which may in turn be violated.[199] The largest and most political famines of the twentieth century (e.g., Ukraine 1932-1933, China 1959-1961, Ethiopia 1984-1985) quite clearly remind us that a famine definition which only describes the event in terms of diminishing nutritional intake and an increase of mortality risks painting a rather naïve picture of the phenomenon. The anthropogenic nature of the vast majority of twentieth century famines has made it vital to introduce the perpetuators, political motives, and the treatment of violence within the concept.[200] Galtung's well-known analysis discriminates two forms of violence - personal and structural - the latter which has a clear connection to famine studies.[201] According to Galtung, when no explicit actor commits an act of violence, (a cause which increases the difference between what an individual could potentially achieve and what he actually accomplishes), then violence embedded in structures is present. He uses death by tuberculosis as an example of this: if allowed to happen at a time when there is the medical know-how to prevent it happening, it would constitute structural violence; whereas if it happened to someone living in the 1800s (when such treatment did not yet exist) it would not. In these terms, it could be argued that starvation is almost always a result of violence, whether through acts of commission or omission, or whether there is a direct subject-action-object relationship present or not. For example, global inequalities resulting from world trade mechanisms would be a violent cause of starvation as much as a siege during a war.[202] This Galtungian framework is useful in historical studies in that it is contextually informed: the avoidability of an act is dependent on the time and place in question. Emphasising the role of history in famine studies, Arnold has pointed out that a historical approach to famine needs to examine the importance of long term structural determinants and fit each famine into a wider historical context, without losing track of the singular political and cultural meaning of events, and their possible role as a catalyst of historical change.[203]

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197 Pitkänen (1993), 9; Schneider (2013); Gazeley & Newell (2015).
198 Arnold (1988), 6.
199 Adger (1999), 252-253.
200 Macrae & Zwi (1994); Marcus (2003); Edkins (2007).
201 Galtung (1969).
202 Galtung (1969), 168-171.
203 Arnold (1988), 11; Hill (1989), 178-179; De Waal (1990), 484.

Vulnerability

Was the high variability of pre-industrial mortality simply a result of low average income, reflecting highly unequal income distribution, so that even the smallest of livelihood shocks were "ripples that drown" - leading to increased mortality rates? According to the typical view in economic history, "lower wealth per capita implies higher vulnerability to any kind of disaster", and "the lower purchasing power […] put a greater proportion of […] population at the edge of biological survival".[204] In a similar fashion, Herdt has maintained that a population suffering from chronic food insecurity is more prone to a full-blown famine and small fluctuations in living standards can lead to emergencies.[205]

While it is widely acknowledged that poverty does constitute an important contributing factor to food insecurity, through pushing people closer to the starvation boundary, there has been call for a more detailed picture: one that would strip away the implicit passiveness of the pre-industrial actor in the face of livelihood shocks. For example, Bengtsson et al. have proposed that historical living standards should be thought of in terms of an individual's ability to overcome economic stress, and similarly Dribe et al. highlight that an individual's ability to avoid the impacts of economic stress should be viewed as connected to a higher standard of living, which does not necessarily mean a higher average income.[206] This approach defines welfare *ex post*, leaving the door open for intervening social institutions. Jütte points out that in a historical setting, modern poverty measurements are "unrealistic and lack a consistent historical perspective" and that measuring historical poverty "must proceed within the context of contemporary sources and not within a general theory of basic needs […]".[207] Concurrent with this perspective, Burton et al. consider that hazards are essentially mediated by (contextually dependent) institutional structures and that increased economic activity does not necessarily reduce the impact of hazards.[208] Modern development studies have increasingly recognised that the extent to which people suffer from calamities is greatly affected by factors other than income and poverty. Outcomes seem to depend on both of the likelihood of being exposed to hazards, on the magnitude of the shocks, and on the capacity (individual and social) to withstand these.[209] These insights are included in the notion of 'vulnerability'.

One crucial development in the concept of vulnerability dates to a paradigmatic shift in the literature on disaster during the 1980s, when the interpretation that human disasters were the monocausal result of natural events such as earthquakes, and floods, etc., came under heavy criticism. In the initial stages,

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204 Mokyr (1985), 262; Fernihough (2011), 329.

205 Herdt (2004), 505, see also Baro & Deubel (2006), 526. Conversely, Vanhaute, Ó Gráda & Paping, (2007), 35–36 suggest that the long-term reduction of the risk of European famine is linked to increased agricultural productivity, improved means of communication, and strengthened local support of livelihoods and gains in terms of welfare and living standards (albeit slow in the early stages).

206 Bengtsson et al. (2004); Bengtsson (2004a), 33; Dribe et al. (2012).

207 Jütte (1996), 45, 46.

208 Burton et al. (1993) as cited in Adger (2006), 271.

209 Dilley and Boudreau (2001), 231.

Blaikie et al. pointed out that vulnerability is, by definition, the social insecurity prevailing *ex ante* to the natural hazards themselves. According to this reasoning, without a hazard there is no disaster, and without vulnerability there is no hazard. Similarly O'Keefe et al. considered that "without people, there is no disaster", highlighting the fact that disasters are by definition adverse events *for people* (not necessarily for everything else), and they can also be of anthropogenic origins, directly or indirectly. Ribot has pointed out that climate events and hazards associated with them cannot be considered as "acts of God" if people are able to respond to them. Yet while often triggered by climate stress, identifying the trigger does not in itself explain why a famine happened, instead they need to be considered as "historical, social and political-economic products influenced by institutional and environmental dynamics and materialize through process of change".[210]

The eventual success of the vulnerability concept lay firmly in the strength of the dynamics the term encapsulated and within its inherent historical awareness. Adger maintains that understanding vulnerability should be based on a historically informed analysis of present structures; and that through its relation to economic and political aspects of livelihoods and resource use, vulnerability has strong historical and temporal dimensions. Ribot goes even further, accentuating that vulnerability is produced by the individuals' social environment and all that enables or disables people's abilities to maintain their security is part of vulnerability's causal structure. Acknowledging this forces researchers to take a structured look back at evaluating how and why societies put certain categories of people at risk. Webb and Harinarayan emphasise that, in the case of existing vulnerability, the conditions of a certain group of people may be worse than they should be and could possibly continue to worsen, which brings the concept close to that of Galtungian structural violence.[211]

Even if the concept of vulnerability was introduced to account for the socioeconomic and political aspects of disasters that had been largely absent from the literature before the 1980s[212], a clearly defined causal structure still remains elusive in vulnerability analysis and constitutes its inherent weakness.[213] For example, Ribot is able to point out that the vast majority of vulnerability studies seek to identify indicators rather than explanation, fixes rather than causes, and who is vulnerable rather than why. This leaves a lingering question: vulnerable to what?[214] Perceptions about the causality chain differ between disaster and food security literature. In disaster literature people and societies are considered vulnerable 'to a hazard' which may lead to a disaster, whereas in food se-

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210 O'Keefe et al. (1976); Blaikie et al. (1994); Ellman (2000), 619-621; Dilley and Boudreau (2001), 235; Baro and Deubel (2006), 527; Devereux (2007b), 69; Ribot (2014), 667, 671. Food security analysis which takes into account long-term perspectives, contextual socioeconomic constraints, social responses, and vulnerability is called a "sustainable livelihood approach" e.g., in Burchi & De Muro (2015).

211 Galtung (1969); Webb and Harinarayan (1999), 301; Ribot (2014), 669-670.

212 Dilley and Boudreau (2001), 231.

213 E.g. Webb and Harinarayan (1999); Baro & Deubel (2006), see also Hart (2009). For causal consideration see e.g., Downing (1990), 5-8; Watts & Bohle (1993).

214 Dilley and Boudreau (2001), 231; Ribot (2014), 669-670.

curity literature people are vulnerable 'to famine, food insecurity and hunger'. From the latter stance, vulnerability (whether individual or collective) is the propensity to experience a certain event, in this case macro-level famine, on individual-level food insecurity.[215]

Dilley and Boudreau consider that the food security literature treats vulnerability as "a static state of categorical defenselessness" which threatens to render the concept ethereal and elusive. Defending the disaster stance, they postulate that events leading to negative outcomes must be tracked and characteristics of the exposed groups must be identified in order to understand who will be affected and to what degree, so as to properly identify which shocks are probable, which sections of society are likely to be exposed, and the likely results.[216]

One further, historico-philosophical, problem in the food security stance is that assigning pre-famine vulnerability to certain groups is inherently acontextual and risks enforcing historical stereotypes.[217] On a more general level, historians are confined by their source material, so that the only famines which we can detect (especially in the pre-industrial context) are those which left their mark; and in this respect historical famine vulnerability analysis has to follow the stance of disaster literature.[218]

As this study treats famine as an evolving phenomenon and not a singular event, the socioeconomic processes also during the crisis have to be acknowledged. As will be argued in *[3]*, the risks that different social groups faced during a famine evolved with and were conditional to the wider social situation. The modern stance in famine literature, which emphasises the diversity of social, economic and demographic responses to livelihood shocks, seems to turn the criticism that disaster vulnerability literature is too unspecific on its head: a single shock could very well lead to different outcomes on individuals since a shock typically did not affect everyone identically.[219]

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215 Dilley and Boudreau (2001), 230-231. The food security stance (Downing 1990, 9) states that "vulnerability refers to consequence, rather than a cause", adding that by asserting that individuals, communities, or nations are vulnerable to shocks (droughts etc.) implies a causal linkage between the pre-disaster event and an unspecified negative impact. See also Downing (1991). Menwhile, Devereux (2009), 26, considers "vulnerability *to* famine is closely correlated with vulnerability *of* livelihoods" [Italics added]. Concerning Downing's critique, it is important to stress again that famine is in not a clearly defined outcome either.

216 Dilley and Boudreau (2001), 234-236.

217 For example, Rygel, O'Sullivan and Yarnal (2006), based on previous research, define old age as a contributing factor to social vulnerability in their studies. For historical societies, this practice could, however, produce a dangerously simplified picture. Not only were skills transmitted between generations (see e.g., Moring 2003, 82; Marttila 2012), but in certain circumstances certain groups (the elderly here) may have tacit knowledge (e.g., of famine foods) which turns out to be crucial for the survival of some households.

218 See also e.g., Ó Gráda (1999), 26, where he defines causality in terms of "vulnerability of the economy *to a shock* such as the potato blight" and similarly Sen (1981a), 126 describes vulnerability *to* drought, whereas Mokyr (1985), 262, sees it as vulnerability *to* disaster [Italics added].

219 Chambers (1989), 1; Downing (1991), 9; Dilley and Boudreau (2001), 233-235; Bengtsson & Broström (2011), 120; Thiede (2014). Rangasami (1985) and Edkins (2007) note

A wide array of methods is suggested in the recent literature to measure vulnerability, the majority of these are multivariate dimension reduction techniques (e.g., principal component analysis, factor analysis, cluster analysis).[220] According to Adger, the extent of individual vulnerability is indicated by poverty indices and dependency measures on those resources considered risky. These measures would assess access to resources, diversity of income sources, and the social status of an individual within the wider community. Vulnerability on a collective (e.g., national) level also takes into account institutional and market factors, such as the prevalence of social security, the quality of infrastructure, and the governmental capability to function. In this respect, measures such as GDP per capita, various income inequality metrics, and institutional arrangements may prove highly practicable.[221] The need to account for various forms of inequality is also widely acknowledged in the vulnerability literature. Ribot, for instance, has considered that "the inability to sustain stresses is produced by […] social differentiation, unequal access to resources, poverty, poor infrastructure, lack of representation and inadequate systems of social security […] and planning". Meanwhile, Blaikie et al. highlight the fact that social differentiation is a crucial factor in the cumulative progression of vulnerability, while Baro and Deubel, as well as Vogel and Smith have suggested that the recent negative effects of famines in Sub-Saharan Africa have been magnified by an upsurge of complex emergency situations rooted in structural vulnerabilities that limit equitable access to resources.[222]

The selection of the variables of interest is problematic, however. As has been noted by both Hutchinson and Anderson, not only is the list of possible indicators for vulnerability technically infinite, but also everyone is (to at least some extent) vulnerable given a shock large enough.[223] Reflecting on the methodological problems entangled in recent measures of welfare, it is reasonable to point out the notion by Webb and Harinarayan that to assess vulnerability one must actually measure an absent or a negative quantity, i.e., something that

for the simultaneous existence of winners and losers, see also Ó Gráda (1999), 122-156, Lindeboom et al. (2010). In the context of Finnish 1860s famine, the compulsory auctions have been emphasised, see e.g., Voipaala (1941), 200-202.

220 According to Ribot (2014), 668, "[u]nderstanding rural vulnerability – including food insecurity – requires […] multi-scale analytics". For application see *[3]* and e.g., Clark et al. (1998); Rygel et al. (2006); Sharma & Patwardhan (2008).

221 Adger (1999).

222 Blaikie et al. (1994); Adger (1999), 252; Ribot (2014), 671. Baro & Deubel (2006), 522; Vogel & Smith (2002), 315.

223 Hutchinson (1992), 14, as cited in Dilley & Boudreau (2001), 237; Andersson (1995), 41, similarly Downing (1990), 9 states that "[e]veryone is vulnerable, but their level, of vulnerability varies over time and according to their social, economic, and political status". To this end, it is extremely difficult to consider the populations of Holland or Leningrad susceptible to famine conditions prior to the Second World War even if famines ultimately did take place, see e.g., Livi-Bacci (1991); Watson (2007). The common characteristic of war famines in Europe in the 20th century is that they affected urban populations the most, which contrasts with most other historical and modern famines.

does not actually exist - "[i]t is an *absence* of security, basic needs, social protection, political power and coping options […] ".[224]

Devereux has pointed out that "[a]ll famines can be analysed as sequential or simultaneous failures in each possible source of food for affected population groups"[225]. This translates to a famine-related definition of vulnerability in *[3]* as "a measure of an individual inability to maintain, re-establish or substitute a (lost) livelihood and in due process to avoid exposure to potentially hazardous socio-environmental conditions". In the following chapters those population groups which were vulnerable to livelihood shocks are located and those socio-economic structures are sought out which proved prone to disintegration after a protracted economic stress; in order to understand better why the combination of economic crises eventually led to a massive famine in 1860s Finland. A context-based reconstruction of the historical social reality should also answer Jütte's critique about the application of modern welfare concepts in historical settings: modern measures need to be given a historically concrete base.

2.2 Theories of famine causation

It is difficult to work out which propositions about the background factors contribute most towards a causal theory in the famine literature. In most cases, studies are silent about the actual causation, highlighting instead emphases, and thus providing more of a general analysis of events. In this section, two main analytical frameworks are presented and certain sections of the literature are reviewed that discuss the applicability of these main theoretical stances and those that have augmented them.

The Malthusian framework

Probably the simplest way to analyse famine outbreaks is to track changes in the aggregate food supply. The most straightforward explanation to nutrition based excess mortality is naturally that there are too many mouths to feed with too little food. Arguably the most well-known formulation of this is has been that provided by Thomas R. Malthus in his political pamphlet originally published in 1798, which was heavily revised in the second publication (1803). Writings which were originally targeted as a commentary on the English social question have stood the test of time regardless of the polemics within. Mark Blaug has even considered that the number of analytical insights captured in the original writings have "few parallels in the history of social science".[226]

Among its several facets, famine analysis in the Malthusian framework builds upon the idea that population movements follow the movements of liv-

224 Webb and Harinarayan (1999), 298.
225 Devereux (2009), 26.
226 Blaug (1997), 65. This, of course, is no normative statement. For a historical review of the ideas dubbed "Malthusian" see e.g., Blaug (1997); Brezis & Young (2014); Burchi & De Muro (2015), 2.

ing standards. The same mechanism has also been considered to explain the long-term stagnation of welfare in the pre-industrial era. Currently, however, there seems to be little consensus about the crucial ingredients that would define a Malthusian economy. For example, Nicolini points out that the vast majority of empirical studies rely on a rather arbitrary selection of features considered relevant for such a definition.[227] Empirical implications vary from the Irish and Finnish traditions, where Malthusianism often refers to living standards kept close to subsistence level by excess population growth[228], to more modern long-run growth theories emphasising, for instance, the micro-economic trade-off between child quantity and quality, and explicitly modelling macro-economic relationships for example between equilibrium income and agricultural productivity.[229]

It is however the Malthusian demography-economy interactions that have the principal application value in famine analysis. In recent literature, it has been customary to model these interactions with the following equations[230]:

(1) $w_t = w_0 - w_1 p_t + a_t$
(2) $b_t = b_0 + b_1 w_t$
(3) $d_t = d_0 - d_1 w_t$
(4) $p_t = p_{t-1} - d_t + b_t$

The equations *(1)-(4)* display the real wages (w_t), births (b_t), deaths (d_t) and population level (p_t) in natural logarithms and designate the four standard building block of Malthusian economy analysis.[231] First of all, wages are determined by the population and technology. Due to diminishing returns, population growth leads to a decline in real wages ($w_1 > 0$). A positive technology shock (a) increases real wages over the short-term, but due to the demographic response, it translates into a higher population at the initial wage level. The demographic development of the economy is thus dictated by two check mechanisms: an increase in wages leads to an increase in births *(2)* (known as 'preventive check'); while a decrease in wages leads to an increase in deaths *(3)* ('positive check').[232]

Traditionally, preventive check is considered in terms of marriages (m_t) and formulated as:

(5) $m_t = m_0 + m_1 w_t$
(6) $b_t = b_0 + b_1 m_t$.

227 Nicolini (2007), 100.
228 E.g. Mokyr (1985); Ó Gráda (1999); Kelly & Ó Gráda (2015).
229 E.g. Sharp, Strulik & Weisdorf (2012); Galor (2011). See *[1]* for further discussion.
230 See e.g., Fernihough (2013); Møller and Sharp (2014).
231 Formulation of (4) displays the end year population. Other formulations are naturally possible.
232 See e.g., Galor (2011), 68-74; Sharp, Strulik & Weisdorf (2012); Møller and Sharp (2014); Klemp and Møller (2015).

The relationship *(5)* suggests that the decline of marriage rates (m_t) can be understood as indicative of economic distress[233], which is a useful property, as marriage rates can be taken as a proxy measure of economic conditions in the event that *i)* the relationship *(5)* can be considered to exist, and *ii)* that there is only data on marriage rates available.

Interest in whether these mechanisms were actually working in the pre-industrial period has increased with the development of so-called unified growth theories.[234] It has been customary to consider that economic modernisation slowly eradicated positive check from early modern Europe, and Galloway (among others) suggests that positive check was mainly attributed to various metrics of underdevelopment.[235] Edvinsson has, however, maintained that the choice of welfare measures in equation *(1)* might crucially alter whether *(2)* and *(3)* are even detected.[236]

As there are no works combining the newest strands of growth theory and famine literature, the modern Malthusian literature has not yet been considered in the context of mortality crises: if no positive check relation has been found, could this be considered to imply the non-existence of famine and vice versa? This clearly does not seem to be the case, at least for pre-industrial England (no positive check can be found, although small scale famines occurred well into the eighteenth century), or Sweden (where positive check can be found, but famines were effectively absent throughout the nineteenth century).[237] At first sight, one could assume that the positive check relationship portrayed in equation *(3)* would be sufficient to allow for mortality crises and it is because of this attractive simplicity that endogenous positive check has remained the null hypothesis in famine causations. This has been especially evident in the context of the Irish famine of the 1840s, but has also been considered applying to other famines as well. This has strengthened the deterministic interpretation of pre-industrial population dynamics and leads to interpreting historical famines as regrettable but likely outcomes of land shortage and overpopulation.[238] In some instances, positive check has even been proposed as an explanation for crises which display

233 Weisdorf & Sharp (2009), 68; Campbell & Ó Gráda (2011), 878.
234 See especially Galor &Weil (2000); Galor (2011).
235 Galloway (1988). Modernization should be understood in wider manner than as a mere increase in income, see e.g., Kelly and Ó Gráda (2014). For wider discussion of this reasoning, see *[1]*.
236 Real wages and grain prices are the most often applied welfare measures. For consideration in the Swedish context see Edvinsson (2014), who considers per capita harvests as the most appropriate.
237 Bengtsson & Broström (2011) however consider that the last Swedish famine were in 1812, 1816, 1826 and 1841, corresponding to nationwide crude death rates of 30.22, 22.51, 22.47 and 19.31 respectively (Historisk Statistik för Sverige). The famine of the 1868 has been considered delineating to the Northern Sweden, Nelson (1988). Crude mortality rate in 1868 in Sweden was 21.04. All of these rates are fairly negligible. Mortality increases during English famines of the 1600s and the 1700s are likewise moderate; see e.g., Wrigley & Schofield (1981). Naturally, the inexistence of long-run relationship between living standards and mortality could give rise to punctuated reaction in mortality to correct for the imbalance between population and resources unchecked by "normal" equilibrating mechanisms.
238 Ó Gráda (2008), 5.

clear characteristics of genocide.[239] Interestingly however, even the “clearest case of overpopulation”[240], Ireland prior to the famine of the 1840s, fails to provide evidence for steady adjustment arising from the proposed disequilibrium between resources and the population, even if the existence of some form of Malthusian process has been established from the cross-sectional data.[241]

There are, however, at least three major problems deducing famine-causation from this simplified Malthusian framework. First of all, there is no clear understanding what phenomena should be included within the sphere of the positive check; from a historical perspective there would appear to be no consensus on what mechanisms should comprise the toolbox of mortality’s adjustment process, and whether research should emphasise abrupt adjustments or long-run relationships. Several empirical applications deem only *normal* variation of mortality relevant (i.e., outlier filtered), whereas the leading unified growth theoretician, Oded Galor, has considered mortality crises (such as wars, epidemics, and famines) as being part of positive check.[242] Meanwhile, Ó Gráda considers that positive check is a mortality induced correction to a population exceeding its equilibrium level, which will result in a permanent reduction in the population. Few actual famines seem to qualify as positive check by this definition. Ó Gráda also highlights that mortality crises could be considered as “ultimate checks” which happen only after previous preventive and positive checks fail to eradicate the disequilibrium between resources and population. This would mean that positive check is a “normal”, not excessive reaction of mortality to variations in living standards.[243]

Secondly, Kelly and Ó Gráda have pointed out that relatively little attention has been paid to the micro-level mechanisms purportedly responsible for the checks detected, and go on to suggest that the latent assumption of starvation in explaining positive check fits relatively poorly with the historical evidence of excess mortality in famines caused mainly by diseases after an increase in temporary vagrancy. Bengtsson and Broström add to this by pointing out that determining mortality responses is not enough to fully understand interactions between factors at the macro and micro-level.[244] If we stick firmly to a linear causality between mortality and living standards, an increase in the former results from a decrease in the latter as if there were no buffer institutions or public welfare systems, thus ruling out a large portion of what is currently understood as being crucial in preventing famines and mortality crises, namely the prevailing socio-institutional environment.

Thirdly, mortality surges often appear as outliers in empirical analysis; they seemingly cannot be modelled within the linear lagged time series framework.

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239 Kidane (1989), 521, compare with e.g., Marcus (2003)

240 Grigg (1980), 139.

241 Ó Gráda (1999), 28-34; Mokyr (1985), 30-80; McGregor (1989). Persson (2008), 168 quite rightfully points out that cross-section data is not valid in inspection of time-dependent relationships between variables of interest.

242 Galor (2011), 67.

243 Kelly & Ó Gráda (2014a). Ó Gráda (2008) brings out the diversity in “fertility control” in various cultural settings, including infanticides.

244 Kelly & Ó Gráda (2014), 359; Bengtsson & Broström (2011), 121.

This has been clearly evident in several empirical studies using some version of vector autoregression models. In order to get the models to meet the diagnostics of multi-normality and the lack of autocorrelation, mortality peaks often have to be controlled (usually with dummy variables).[245] Studies that have established the existence of positive check have generally considered the elasticity between real wages and mortality range between roughly -0.1 and -0.2 over the long-term.[246] Crises generally contradict this observation: over the short term, mortality can substantially overshoot the long-run equilibrium relationship with wages (i.e., mortality over-reacts to alterations in living standards). In a detailed analysis, Bengtsson and Broström helpfully emphasise that mortality crises ("outcomes") should not be included in statistical analyses of long-run relationships as they result in a serious bias when estimating the relationships.[247]

The clearest way in which Malthusian analysis has impacted on famine studies is through the implied role of food supply. This has been construed as the 'food availability decline' (FAD) interpretation of famine causation; whether or not the drop in food supply is sufficient to create the observed crisis. Specifically this has prevailed within the wider umbrella of "Neo-Malthusianism", that has existed in various forms in the literature since the 1960s and '70s,[248] and in famine models which emphasise climatic and natural factors as the ultimate triggers. The latter has been given substantial room especially in accounting for the 1840s Irish famine, the 1860s Finnish famine and the Great Leap Famine in China.[249] Devereux has pointed out that this "old famine" way of thinking persevered right up until the early 2000s. The Ethiopian famine of the 1980s as well as more recent food crises in Ethiopia and Malawi have all been seen as droughts of biblical proportions and as ultimate outcomes of Malthusian population pressure.[250] Balancing between strictly environmental and strictly political perceptions, Arnold has considered that even if the simple Malthusian explanation ('too many mouths to feed with too little food') is not the most likely panacea to analyse famines, when it is considered together with economic stag-

245 E.g. Nicolini (2007); Weisdorf & Sharp (2009); Fernihough (2013); Møller & Sharp (2014). Similar approach is applied in *[1]*.

246 E.g. Fernihough (2013); Møller & Sharp (2014), 129; see also Galloway (1988).

247 Bengtsson & Broström (2011). Campbell & Ó Gráda (2011), 880, consider that the price elasticity of grain was high because genuine declines in food availability long remained an essential part of agricultural economies, see also Ravallion (1997a), 1212-1213. Ó Gráda (2008), 32, considers that the Great Leap Famine in China was an outlier in demographic terms but its spatial characteristics does fit to development differences between regions.

248 See e.g., Arnold (1988), 39-42; Burchi & De Muro (2015), 2.

249 The role of the potato and potato blight in the Irish context have been considered, e.g., in Mokyr (1985), 7-9, and Ó Gráda (1999), 13-24. The role of food availability during the 1959-1961 Chinese famine has also been covered, e.g., in Ó Gráda (2008), Clément (2012). European wide mortality surges during 1690s and 1740s have been treated in the context of weather abnormalities, see e.g., Post (1985); Walter & Schofield (1989), 56; Dupâquier (1989), 196-197; Kelly & Ó Gráda (2014b). Ó Gráda (1999), 34-37 also considers the role of climate in Ireland. Lefgren (1974) is the only Finnish study analysing food supply. According to him, the food supply did not decline sufficiently to merit the observed magnitude of excess mortality. This stance has been criticised, e.g., by Turpeinen (1986a), 142 and Pitkänen (1993), 62.

250 Devereux (2007a), 13.

nation, the state of technology, and prevailing social and political ideologies then pre-famine population growth might prove integral to a wider understanding of the famine escalation.[251]

Entitlement approach

Highlighting the ambiguous role of FAD as a catalyst in the Bengal famine in 1943-1944, Amartya Sen formulated the highly influential 'entitlement approach' as an alternative general framework to understand famine outbreaks and to detect vulnerable groups in terms of their livelihoods and kind of welfare shock suffered.[252] Entitlements were defined as "the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces"[253]. In spite of its vocabulary, the entitlement approach is not normative; entitlements are derived from legally-based property rights, not from general moral or universal human rights.[254] Contrary to the widely dominant famine paradigm before the 1980s, which emphasised the role of failures in the food supply, Sen's famine analysis stressed the role of individual access to food, i.e., the demand side.[255]

The entitlement approach marked the first important paradigmatic shift, away from the prior emphasis on environment and climate, to focus instead on food markets and the legitimate and economic means available to individuals for acquiring food.[256] Within this context, the focus was on entitlements to production (growing), trade (buying), the fruits of one's own labour (working), and transfer (being given food by others). An individual faced starvation if entitlements were not sufficient to provide with adequate food for subsistence. Famine is then defined as a scaled-up version of these individual fates: a certain social or geographical group of people faces famine when a sufficient decline in their entitlements is simultaneously experienced.[257] The consequent famine is due to a 'food entitlement decline' (FED). This formulation removes drop in the food supply from the list of necessary conditions for famine, so much so, that it even allows for the possibility of an increase in food supply during a famine.[258] However, one should note, that FAD and FED are not mutually exclusive, in fact they are most likely to both be present at the outbreak of a famine.

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251 Arnold (1988), 42.

252 Especially Sen (1981a). For recent considerations concerning the Bengal famine see e.g., Tauger (2003); Islam (2007); Ó Gráda (2008), 20-32; (2009), 159-165.

253 Sen (1984), 497.

254 Devereux (2007b), 67. See e.g., Rangasami (1985) and especially Edkins (2007) for discussion concerning the introduction of explicit normativity to the famine analysis.

255 Ravallion (1997a), 1209, criticizes the strict interpretation that the Sen's framework would display a clear-cut demand-side explanation.

256 Devereux (2007a), 11–12.

257 Osmani (1995), 256; Devereux (2007b), 67.

258 E.g. famine in Antananarivo in 1985-1986 was not associated with a notable FAD condition; rice production had actually increased from the low point in the mid-1970s, see Garenne (2007), 188-185. Sen (1981a), 86-112 considers that there is relatively little evidence for a substantial drop in food supply during the Ethiopian famine 1972-1974, see also Baro & Deubel (2006), 524.

Following Sen (1981b, 439), in its simplest form[259], the entitlement approach can be illustrated with the following equations. First, consider group *j*, characterised as selling or consuming commodity *j*. Then, let q_j be the amount of commodity *j* each member of the group *j* can sell or consume, and let the price of the commodity *j* be p_j . Then, assume that there is one staple food commodity available, the price of which is denoted with p_f. Then, the maximum food entitlement (F_j) of group *j*, can be denoted by the equation:

$$(7) \quad F_j = q_j p_j / p_f = q_j e_j,$$

where e_j is the food exchange rate for group *j*, and $\partial F_j / \partial p_f < 0$, $\partial F_j / \partial\{p_j, q_j\} > 0$ and $\partial F_j / \partial e_j > 0$.

Commodity *j* may or may not be a produced commodity, as for example labour sells labour power. In reality, it is necessary to associate several different commodities to certain occupation, which lead to defining q_j and p_j as vectors and $q_j p_j$ as an inner product. Furthermore, if the occupation consists of food producers, then $p_j = p_f$, $e_j = 1$ and $F_f = q_f$.

Some fairly simple comparative statistics can be observed from *(7)*:

1. assuming a lack of one's own food production, the individual entitlement to food decreases if the food prices rise;
2. the individual entitlement to food increases if the price of one's own production and/or volume of it increases, or the food exchange rate improves.

A decrease in one's own food production is typified as a 'direct entitlement failure', while worsened ability to purchase food is 'trade entitlement failure'. Food producers face direct entitlement failure with a decline in their own production, while other social groups (producing goods other than food) face trade entitlement failure when their terms of exchange worsen *or* when the total availability of food declines sufficiently. Furthermore, groups that participate in some form of subsistence cultivation, but also resort to market purchases, may face simultaneously both direct and trade entitlement failures.[260] Possible factors that can lead an individual to starve include, for instance, unemployment (a drop in q_j); a decrease in income (a drop in p_j); or an exogenous increase in food prices (a rise in p_f). Individuals starve if F_j does not amount to enough food to eat; leaving them below the biological minimum food requirement (starvation conditions)[261]:

$$(8) \quad F_j < F_{min}$$

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259 See also Sen (1981a).

260 Burchi & De Muro (2015), 4.

261 See e.g., Devereux (2007b) for various interpretations concerning meeting this condition. The condition may, for instance, result in an increased risk of mortality, but not to death.

Sen emphasised that this drastically simplified model only made sense in helping locate important aspects of famine analysis, whereas Pitkänen suggests that the contextuality the approach requires actually increases its applicability to historical studies, as the framework prompts the researcher to acknowledge the position of different social groups and take the prevailing social context into account.[262]

There are however five crucial limitations to the usage of the entitlements as defined above[263]. First of all, the analysis is difficult to apply in the event of fuzzy entitlements. As acknowledged by Sen, even in capitalist market economies, entitlements may not be clearly defined in the absence of a unique and reachable Walrasian market-clearing equilibrium. Furthermore, the social and economic context may be ambiguous in terms of property rights; ownership relationships between individuals may be multilayered, complex and contested.[264] Entitlements can also be scale-dependent (i.e., varying as a function of the level of analysis). Additionally, heterogeneity within the unit of analysis increases considerably when the scope of the study aggregates from singular individuals to households, communities, and nations. In these cases, the need for explicit treatment of inequality increases.[265]

Secondly, there may be people who choose to starve. According to Baro and Deubel, famine conditions are marked with households forced to prioritise the maintenance of their current food consumption levels over their future capacity to ensure income generation.[266] In a similar fashion, the entitlement approach assumes that any shortfall in food automatically results in behavioural response, namely to conversion of the property/wealth endowments to avoid the condition *(8)*. The simplest version of the entitlement approach therefore disregards the possibility of intertemporal entitlement allocation, though there is no objection why *(7)* could not be formulated in a dynamic manner. Anthropological famine studies have documented many cases where some members of a famine-stricken population routinely "choose to starve" for the benefit of other members of the community - for instance, they refrain from selling production assets even if they could be used to purchase food. Contrary to Sen's version of starvation, Ravallion points out that people choosing to starve are essentially accepting a higher mortality risk in order to hold on to certain economic

262 Pitkänen (1993), 63. According Drèze & Sen (1989), 24, "[s]eeing hunger as entitlement failure points to possible remedies as well as helping us to understand the forces that generate hunger and sustain it."

263 The first four were outlined originally in Sen (1981b), 437-439, and discussed in greater detail in Devereux (2007b). The discussion presented here is based especially on the latter. The fifth is referred to in Devereux (2007b), but only briefly. See also Fine (1997), 626.

264 Sen (1981b), 437-438; Devereux (2007b).

265 Sen later advocated the usage of household level entitlement measures, Sen (1997). There are a variety of methods that take into account the inequality of average welfare measures, see e.g., Atkinson (1970); Sen (1976), see also Hicks (1997).

266 Baro & Deubel (2006), 529.

assets.[267] Especially in the case of pre-industrial famines, it is relatively easy to understand that in the absence of economic growth, expensive cattle, for example, were spared as long as possible in order to maintain some future chances of income and wealth.

Thirdly, the entitlement analysis is overly focused on starvation as being the cause of famine deaths. Initially, entitlement analysis was positioned as a leading challenger to the "Malthusian" FAD interpretation of famine escalation, but according to Devereux, this mainly stemmed from Sen carelessly juxtaposing his framework with what he considered to be the prevailing interpretation.[268] That said, the entitlement analysis is highly food-oriented in its vocabulary, especially by postulating that a famine is generated by individuals plunging into the "starvation set". The problem with this emphasis is that during famines, people rarely actually die of starvation; according to Mokyr and Ó Gráda, only around 10% of the total number of famine victims in 1840s Ireland were listed as having died of plain starvation, and the percentage (12.8%) was not much higher in the famine in Petrograd (1918-1922). Meanwhile, in Finland (1868), according to official death statistics, only 1.7% of deaths were attributed to hunger.[269]

As pointed out by Kelly and Ó Gráda, even if the standard interpretation seems to be that the poor die due to starvation, it is only after the introduction of modern medicine that people started to starve to death during famines. Studying the Greek islands during the Second World War, Hionidou suggests that the nature of famine mortality is largely dictated by the extent to which the social structure remains cohesive or breaks down, and what kind of endemic disease environment prevailed in the pre-famine community.[270] According to her categorisation, disease-driven excess mortality is the rule in societies where contagious diseases are already prevalent and where social structures disintegrate in famine conditions - as was the case in the vast majority of pre-industrial famines. On the other hand, genuine starvation deaths feature in societies which maintain their cohesive social structure in a famine, and where degenerative diseases were the pre-famine norm - as was the case in the European war famines of the 1940s.[271]

Fourthly, some transfers can violate the legal rights of other individuals. As has been pointed out by Rangasami, Keen, and Edkins, the entitlement analysis excludes intention as a causal trigger.[272] Critics of the entitlement approach point out that Sen's framework treats famines as economic disasters, with an analytical emphasis on poverty and market mechanisms, and an assumption that those in government are benevolent. On the basis of the African famines of

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267 Ravallion (1987), as cited in Devereux (2007b), 72. Baro & Deubel (2006), 529 consider that "rising levels of malnutrition should thus be interpreted not as failure of strategies adopted but as one of their costs". See also Corbett (1988).

268 Devereux (2007b), 68.

269 Mokyr and Ó Gráda (2002), 358; Ó Gráda (2008), 19; SVT VI: 2, (1871), XXXIV.

270 Kelly and Ó Gráda (2014), 359; Hionidou (2002).

271 Hionidou (2002). Livi-Bacci (1991); Watson (2007).

272 Rangasami (1985); Keen (1994); Edkins (2007); Devereux (2007b).

the 1980s, however, de Waal proposes that the coping capacity of a society does not break down to create a famine conditions, but rather it is broken.[273] Devereux's analysis of 32 famines that took place during the 20th century concludes that the principal cause of 21 of them was political.[274] Complex emergencies and war famines are not, however, anything new. Outram considers that war-induced social turmoil was also a crucial determinant of the high mortality experienced during the Thirty Year's War, and Vilkuna points out that the crop confiscations and arbitrary violence perpetuated by the Russian occupation forces in Finland in the mid-1710s led to a famine in spite of reasonably good harvests.[275]

Highlighting accountability and the democratic voice, another of Amartya Sen's influential concepts, known as 'Sen's law', asserts that there has never been famine in a society a with working multi-party democracy and free press[276]. This reasoning sees food security as a public service, uncontested if those liable for upholding the service are monitored and kept accountable for their actions.[277] There has been a wide debate on whether the Sen's law is empirically verifiable. On the basis of large comparative analyses, Plümber and Neumayer as well as Burchi have detected that *on average* the prevalence of corrupt autocratic regimes do increase famine mortality, but the strict form of Sen's law (the impossibility of famine given democracy and a free press) does not seem to hold. This has also been emphasised by recent experiences in the developing world.[278] De Waal muddies the water further by suggesting that autocracies may actually prove highly effective in upholding food security, if famine prevention is deemed necessary.[279] There are also historical objections to the strict validity of the law, as evidenced from the 1840s Irish and 1860s Finnish famines. Both of them happened in states with a relatively free press and nascent democratic institutions. Meanwhile the Finnish famine of 1917-1919 confirms recent findings from Africa (especially Malawi in the early 2000s) to suggest that the maturity of a democratic regime may prove important.[280]

Fifthly and lastly, there are reservations concerning the approach's applicability in analysing a macro-economy. Essentially the entitlement approach provides a micro-level framework and tracks the possibilities of food consumption for individuals or, as Fine puts it "the entitlement approach is concerned with the micro(-economic) capability for survival".[281] Analytically identifying

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273 De Waal (1990), 486. Although Meuvret (1965), 507, did also acknowledge the role of war in causing pre-industrial demographic disturbances.
274 Devereux (2000).
275 Outram (2001); Vilkuna (2005), 222–230.
276 E.g. Sen (1999), 178.
277 Mousseau and Mittal (2006), 6 as cited in Devereux (2009), 32.
278 Plümber and Neumayer (2009); Burchi (2011). Borderline cases include Bangladesh (1974), Sudan (1986-88), Ethiopia (1999-2000), Malawi (2002-2003), Niger (2005), see e.g., De Waal (2000), 11; Devereux (2009), 31; Ó Gráda (2015a).
279 De Waal (2000) 17-18.
280 Devereux & Tiba (2007); Devereux (2009).
281 Fine (1997), 624.

famines by aggregating the starvation of individuals[282] is also problematic because famines are communal and societal phenomena and may include severe nonlinearities[283]. Not only may the aggregation of individuals simply be impossible (mathematically speaking[284]) but the aggregation may also produce unpalatable contextual implications. Simply aggregating entitlement functions is against the very idea of a stratified socioeconomic structure where it would, by definition, be difficult to find a representative starver.

Bridging these famine typologies, Ellman suggests that FAD famines could effectively be categorised into type I and II cases; where type I famines are those in which the food supply *cannot* be redistributed in any feasible way to prevent famine, while type II are those in which political actions *can* remedy inconveniences caused by the decline in food supply.[285]

2.3 Conclusion

This chapter has reviewed some of the crucial building blocks of famine analysis. As was stressed in 2.1, however, the conceptual work done within the sphere of famine studies, and in the frameworks of food security, and vulnerability have not produced a comprehensive and rigorous definition for famine. This is not unexpected, taking into consideration the plurality of forms famine can take, and the possible causal chains leading to a crisis. Howe and Devereux have thus pointed out that a definition for famine must be "agreed upon" rather than "found".[286]

One could approach the definition dilemma through identifying the cause of famine onset, or by detecting necessary outcomes. The former is difficult as famines are heavily tied to the socioeconomic contexts in question - a famine inducing shock in one setting may leave a society mostly intact in another; and the latter is problematic when intervention and endemic disease are taken into account - an efficient intervention may well prevent an economic downturn escalating into a famine, and absence of epidemic diseases may keep the mortality rates low even during extensive temporal migration. It seems such problems become concrete just as soon as a researcher seems to 'find' a definition that works in a particular case of famine, because simultaneously several contextual properties will turn out to be unfit for even the most general of definitions.

In terms of necessity, one could plausibly maintain that two ingredients are essential though - a focus on food and on the community in question. A famine is a phenomenon that is marked with reduced food intake for some people in the community (i.e., it is not an individual condition). Two further

282 This interpretation of the entitlement approach is common, e.g., Osmani (1995); Fine (1997); Devereux (2007b), 67.
283 Dirks (1980); Currey and Hugo (1984); Rangasami (1985); Fine (1997), 630.
284 For aggregation of individual demand curves, see Cowell (2005), 114-117.
285 Ellman (2000), 621.
286 Howe & Devereux (2007), 45.

emphases have to be made. Firstly, food intake is actually *reduced* as distinct from endemic malnutrition, where food intake is already low. Secondly, a group with increased mortality risk does not have to be unambiguously identifiable; i.e., because of communicable diseases, death does not necessarily fall on only those who are starving. From a postmodernist point of view it can be argued that famine is ultimately socially constructed and cannot be reduced to a mere number of individual factors, such as starvation deaths.[287]

One future direction that could prove fruitful is to treat famines as socioeconomic syndromes. In this way, the connective causal background for food decline (regardless of whether the depletion happens through conscious action or through crop failure) could be adjoined to various, but not strictly necessary social, economic, and demographic responses.[288] Simultaneously the idea of a famine syndrome allows us to circumnavigate the counterfactual bog implied by Alwang, Siegel, and Jorgensen, as *ex post* welfare losses are neither necessary nor sufficient for the existence of *ex ante* vulnerability.[289] This may arise from relief or political actions, both of which may evolve in quite a haphazard manner as the crisis unfolds.

As a conclusion to the first part of this work, and as an opening to the following chapters, there are three primary dimensions that need to be covered in an effective socioeconomic analysis of historical famine. Research has to (i) understand why the components behind food supply and/or demand systems are vulnerable to certain shocks; (ii) unearth the differences in socioeconomic responses to livelihood shocks, and uncover the factors behind the increased mortality risk among certain social and spatial segments; and (iii) track how the crisis unfolds, quantify the collapse of both local and national socioeconomic structures, and trace the feedbacks - if prolonged or severe enough. The importance of these dimensions remains above the conceptual quagmire of famine. This study thus proceeds by exploring these dimensions in relation to the workings of the Finnish macro-economy and assesses the micro-level constraints imposed by pre-famine society on individuals.

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287 Fine (1997), 624-625.

288 According to De Waal (2000) we can distinguish five ingredients for famine (hunger, impoverishment, social breakdown, mortality and coping strategies to resist the first four components), and three different levels of famine (i. hunger and impoverishment, ii. elevated mortality, iii. extremely high mortality, severe social dislocation, and collapse). In this manner, the treatment would not differ from medical syndromes, such as AIDS, which can be transmitted and spread both through voluntary and involuntary means and can surface in various ways but still constituting a singular etiological condition. For the consideration of symptoms see e.g., Ó Gráda (2009), 6-7.

289 Alwang et al. (2001), 4.

PART II: The Finnish economy in the 1800s and the economic character of the 1860s famine

3 THE DEVELOPMENT OF FINNISH AGRICULTURE IN THE NINETEENTH CENTURY

Finland is the second northernmost country in the world.[290] The country extends from the hemiboreal zone in its southern archipelago to the border of the arctic zone in the north.[291] Though nearly a quarter of Finland's territory lies north of the Arctic Circle, the North Atlantic Drift and Gulf Stream convey warmth from the mostly ice-free Atlantic Ocean and southern Baltic Sea. This contributes to temperate winter climate, atypical to regions located in similar latitudes (e.g. Siberia and Greenland).[292]

The climate and weather patterns have clearly had a substantial impact on the country's population history. The early population settlements were strictly confined by climatic conditions to the south-west corner of the country and only started a permanent spread northwards during the High Middle Ages. This northeast-bound population expansion was assisted by the introduction of a resistant variety of rye (to snow mould fungi), and mediated by slash-and-burn agriculture that was the prevalent method for obtaining the ash needed as the rye's seedbed. By the Early Middle Ages, permanent settlements in the inner western parts of the country (especially the region of Häme) had reached the 62nd parallel north in only two locations and it has been estimated that in these regions the northern boundary of settlements remained virtually unchanged between the 1100s and mid-1500s. In the eastern parts of the country, settlements spread quicker, and there were some isolated agricultural settlements as far north as Kainuu by the 1530s.[293]

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290 When ranked according to the coordinates of the southernmost point. Iceland's southernmost point is located in Surtsey Island, 63°17'N, Finland's corresponding location is Bogskär in Föglö, Åland islands (59°30'N). Faroe Islands has the southernmost coordinates at 61°20'N (part of Norway up until 1814 and part of Denmark thereafter). Greenland, Canada, Russia, Norway and United States have landmass beyond the northernmost Finnish point (within the current and 1865's borders) of 70°05'N.

291 Solantie (2012), 53–60.

292 Karttunen et al. (2008), 356–367.

293 Keränen (1986), 369; Orrman (2003a), 72–80; (2003b), 98–103, Korpela (2012); Luttinen (2012), 95; Solantie (2012). Here the settlements are understood in terms of perma-

The medieval spread of the agricultural settlements was hampered by two characteristic features of the northern climate: the shortness of growing season and the risk of frosts especially in May and early June, as well as in the late August and early September.[294] Indeed, frosts in the late summer and early autumn were responsible for crop failures well into the 1900s, though after the 1800s, crises in subsistence were less linked to weather patterns. The potentially hazardous consequences of the climate was that much of the pre-industrial Finnish diet was based on cultivated grain. While dietary customs differed between regions[295], it has been suggested that in places and for certain social groups up to 50% of protein and calorific intake was provided by grain and especially rye - "the food of the poor" as Fernand Braudel has described it.[296] Grain was especially important for the poorer sections of society, and in this respect it corresponds to the Irish dependency on potatoes in the 19th century.[297]

This chapter presents the Finnish agricultural society in the 19th century in terms of economic structure and social composition, and provides novel estimates of the extent and volume of Finnish grain production for first decades of the century. Specific interest is placed on investigating whether pre-famine agriculture exhibits a decline in productivity as has been suggested by several Finnish economic historians. The chapter starts with a review of the agricultural context and the variability of harvests in Finland during this period; and using qualitative harvest assessments, the volumes of oats, barley, and rye are estimated. Some conclusions are then drawn concerning the development of the agricultural economy and its connectivity to society as a whole.

3.1 Social context in the 1800s rural Finland

Finland was a pronouncedly agrarian country in the pre-industrial era. Roughly 90% of the population worked in agriculture, and in rural parts the proportion neared 96%. According to available estimates, the share of industrial labour grew only moderately during the 1800s, from 2.5% in 1815 to roughly 4% by 1870.[298] Indeed, the proportion of the population engaged in manufacturing did not exceed 20% prior to the 1910s and it accounted for under 20% of the GDP until well into the 1890s. This meant that Finland retained its agrarian economic structure for well over a hundred years after the first European nations had begun to industrialise. According to Schybergson, handicrafts, food, textiles, wood, paper, and metal industries employed only around 14,000 people in 1820,

nent farmsteads subject to taxation. There were isolated settlements in the Northern Finland already after the latest ice age and attempts at cultivation in the Middle Ages, see e.g. Huurre (1986), 157-163.

294 Solantie (1987); Orrman (2003a); 67–80; Myllyntaus (2009).

295 See e.g., Ikonen (1991a), 81-83; (1991b).

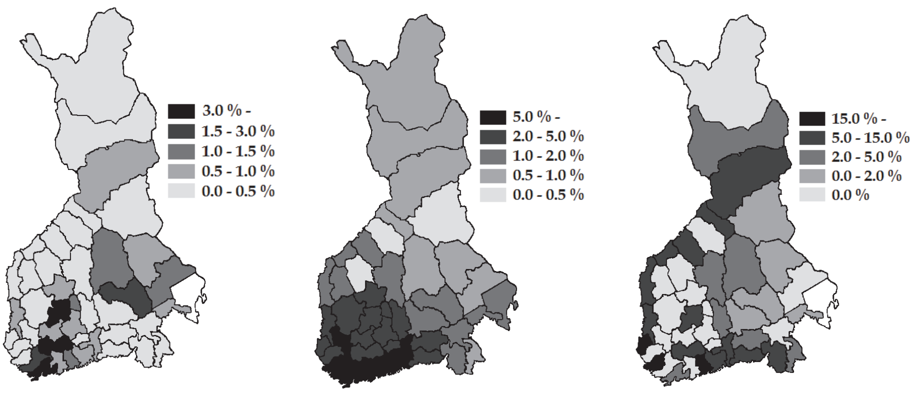
296 Braudel (1967), 72; Myllyntaus (2009), 85 provides similar interpretation.

297 See e.g., Ó Gráda (1999), 13-24; Mokyr (1985), 7-8.

298 Soininen (1974); Schybergson (1980).

growing to only about 31,000 by 1860.[299] However, the dominance of agriculture might be partially a result of grouping livelihoods in the official statistics. As has been shown, handicrafts especially, and other forms of home production were quite likely more widespread than statistical materials would indicate.[300] Similarly, the strict statistical delineations provide rigid labour shares, leaving the seasonal nature of employment unaccounted for.

Prior to the famine outbreak, in 1865, both rural industrialisation and handicrafts were concentrated in the south-western parts of the country, in the provinces of Uusimaa, Turku and Pori, and Häme, where about 54% of all rural industrial workers, and 66% of all craftsmen lived (MAP 2). Meanwhile, Ostrobothnia clearly stood out as a region where neither industry nor handicrafts were present to any great extent.



MAP 2 Industrialisation, handicrafts, and urbanisation in Finnish deaneries in 1865

Source: Deanery population tables (1865).
Note: Left: Rural industrial workers in relation to rural population between ages 15 and 60, middle: craftsmen in relation to rural male population between ages 15 and 60, right: urban population in relation to total deanery population.

The manufacturing role of rural craftsmen remained important for the majority of the 19th century. In fact, the growth of the rural sector may have even hampered the growth of urban handicrafts because of intensified competition, and also because there were restrictions imposed on handicraft livelihoods in urban centres.[301] While only men were allowed to practise handicrafts, women made up some 13.8% of the industrial workforce in rural parishes, though in certain urban centres (e.g., Tampere) the percentage was considerably higher.[302] High-

299 Heikkinen & Hjerppe (1986) number those employed in industry and industrial handicrafts at roughly 30,800 for 1860. But these two figures are not directly comparable due to their different composition. There still remains considerable uncertainty concerning the industrialisation process in the years preceding 1860.
300 Soininen (1974), 302–306; Uotila (2014).
301 Uotila (2014), 22.
302 E.g. Markkola (1994).

lighting the lopsidedness of the economy, the rate of urbanisation remained under 10% until the early 1890s, although the share of the urban population did start to grow slowly in the mid-1820s. In certain places, the urbanisation of deaneries was substantially higher than in the country on the whole - particularly in the coastal regions and close to Helsinki and Turku.

The biggest social change taking place in Finland during the 1800s was not so much that the economy slowly modernised, but that the number of landless grew among the rural population. Although the clearest manifestation of this is considered to have been the change in ratio of landowning to landless from 3:1 to 1:1 (between the 1820s and mid-1870s)[303], the dichotomy between landowning and landless somewhat oversimplifies the rural reality. While it has been customary to treat the landowning group as a coherent whole, there was in fact a range of cadastral categories within, varying from landowning nobility to small-scale independent farmers. The rural gentry, consisting of the nobility and high-ranking officials, were typically landowners, even if the proportion actually engaging in agriculture was low.[304] The size of the uppermost social segment was small: only roughly 2% (including children) can be considered to have been part of the rural gentry. Freeholder peasants were clearly the largest group among landowners, and in marked distinction to the status of peasants in most other places in continental Europe, the Finnish freeholders cultivated the land they owned or over which they had legal control.[305]

The remainder of the farming population were tenants. Those that rented a whole farm were known as *lampuodit*, while a significantly larger proportion of them were crofters (*torpparit*), cultivating a rented section of another's freehold farm. The poorest group within the tenant farming population were the cottagers (*mäkitupalaiset)* who, unlike crofters, had no real arable land but small plots instead on which they could grow their staples. While it seems that typically gentry and freeholder peasant farmers were at the top of the rural economic ranking, the wealthiest crofters were sometimes on par or even above the poorest of the landowning peasants. Sharp boundaries are also tricky to draw within the lower socioeconomic groups - there were some cottagers who might own their lodgings and then crofters with very little land to actually cultivate.[306]

In some ways, the inequality of land ownership was a structural feature of the peasant economy that required an external (especially seasonal) work-

303 Häkkinen & Forsberg (2015), 105-106, see also Kilpi (1913); Pipping (1940); Pulma (1994), 51-55. Haatanen (1968), 40, for example, states that 'let it be a cottage or a piece of land [...] telling poor from poorer'. The landowner-landless dichotomy and the downward social mobility has been dealt extensively also in the Swedish context, see e.g., Gadd (2000); (2011); Dribe & Svensson (2008). See *[2]* for detailed discussion concerning the rural social structure in the 1860s.

304 E.g. Gadd (2000), 93–110; Jutikkala (2003c). For gentry's agriculture see e.g., Soininen (1974), 28-29; Wirilander (1974), 119–124; Jutikkala (2003d), 447.

305 Conserning taxation and landownership see e.g., Hemminki (2014); see also Jutikkala (1957b); Huuhka (1999), 65–75; Lappalainen (2006), 161–163; Olsson and Svensson (2010), 283.

306 Rasila (2003a), 376-377. Due to the problems of telling crofts from smaller cottages, a limit of 2 hectares of cultivated acreage was eventually introduced. This was considered enough to provide livelihood to a croft farmer.

force.[307] The demand for extra farm labour (external to the family) depended on the demographic structure of the farms; the younger the children, the more likely it was that farms needed extra help. As was generally the rule in Northern and Western Europe (and neighbouring Sweden), the Finnish freehold farms usually consisted of 5 to 10 people: the peasant farmer and his wife, their children, a farm-hand and/or maid, and sometimes members of the older generation.[308] In the normal course of an agricultural life, it was customary throughout the Nordic countries for young men and women (ranging from 15-30 years old) to move away from the parental household to work under yearly contracts as farm workers.[309] Farmers generally favoured keeping male and female servants wherever possible, but being cheaper and more versatile in the tasks they would do, there were generally more female servants.[310] The system encouraged social mobility and people would often find their prospective partners in this way, but during the 1800s, an increasing proportion of people were unable to set up a household of their own and remained farm labourers (*muonamiehet*) even after marrying and starting a family.

The workers that had yearly contracts were joined especially during harvest time by additional labour, the growth of which was one sign of the tendency for social mobility to be in a downward direction during the 1800s. The lowest segment of rural society was made up of lodgers (*itselliset*), which were a highly heterogeneous group of people, the majority of whom lived in small huts or spent an unsettled life travelling from one house to another and mainly working as a seasonal laborers on farms. In this study the seasonal labour that includes cottagers and lodgers is dubbed 'vagrant labour'. It is acknowledged that defining the rural workforce in terms of whether they owned or rented land, or had a yearly contract may simplify the picture somewhat (especially as cottagers were likely to be less mobile than lodgers); but this choice has been made for analytical convenience. The two groups can, to some extent, be distinguished using poll tax registers, as has been done in *[2]*, but when using deanery population tables the groups cannot be distinguished.[311]

TABLE 2 presents the growth of the most important agricultural groups between 1815 and 1865. Farmers (both freeholder and tenant) are measured in terms of the number of farm masters; while technically different from the total number of farms, the numbers ought to correlate highly and have been used interchangeably on a macro-level.[312] The numbers do not include families -

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307 For seasonal cycle of the rural labour markets see e.g., Uotila (2015), 61-63.
308 Gadd (2011), 129-130.
309 Moring (2003); Wilmi (1991); Harnesk (1990).
310 Moring (2003), 80-84. For details, see section 4.3.
311 E.g. Rasila (2003a), 376-377. Even for the negative connotation of ”vagrancy”, the term refers to a main characteristic fairly uniform to the group; people were vagrant in the mobile sense of the word and often had to move around in order to make a living. Haatanen (1968), 64, considers this group as "lodgers and cottagers". Concerning temporary migrant labour (e.g., urban-bound), Uotila (2015), 43, uses the Finnish term *kulkutyöväki* which quite closely translates to vagrant labour. The two groups are not identical, though.
312 E.g., Rasila (1961), 21-22, Vattula (1983), 16.

wives, children and live-in relatives.[313] Because of this, the figures cannot be taken as direct proxies of how labour demand and supply developed, as especially the older children of farmers could easily crowd out demand for external labour.[314]

TABLE 2 The growth of rural social classes 1815-1865 (1815=100)

	1815	1825	1835	1845	1855	1865
Freeholders	100	106.6	105.0	104.9	107.7	112.2
Croft and rental farmers	100	119.0	149.8	160.5	189.5	200.3
All farmers	100	110.7	119.8	123.3	134.8	141.4
Farm workers	100	110.1	118.4	134.0	142.9	152.0
Vagrant labour	100	126.9	164.8	215.7	187.4	243.5
Total population	100	114.9	127.2	141.2	154.1	168.2

Note: Farmers category includes freeholders, crofters and whole farm renters. Vagrant labour includes both men and women.
Source: Kilpi (1913).

The downward social mobility was enforced by population growth in an environment where land partitioning legislation effectively restricted the creation of new farms (see chapter 4). During the 1800s the number of freeholders remained roughly stable in the southern parts of the country, but grew in other places, especially in Ostrobothnia. Besides the increase in freehold farms, there was also an increase of crofts in the provinces of Vaasa and Oulu. As can be seen from MAP 3, in computational terms the number of people per farm was highest in a region ranging from the southwest of Finland to the northeastern region of Kainuu.

To the extent that it can be verified, the number of farmworkers grew roughly in accordance with the number of farms. The increase in vagrant labourers, mainly filling the seasonal labour demand, was most prominent in the southwest of Finland but also in the eastern provinces of Kuopio and Mikkeli.[315] By the mid-1800s the social change had utterly transformed socioeconomic structures that had existed for hundreds of years - regions that in the beginning of the eighteenth century had been dominated by freeholder farmers were now

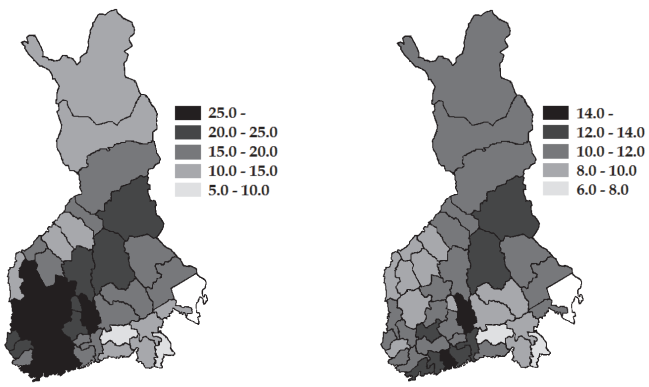
313 It has been considered that the information concerning men is statistically of greater quality. This is mainly due to the fact that men were categorized in more detail on an occupational level, while women were given a much more cursory treatment, see Kilpi (1913) for details.

314 See section 4.3.

315 Pitkänen (1980), 378–382; Pitkänen (1991a), 48; Pulma (1994), 51–55. There are some conflicting interpretations concerning the growth of live-in servants; according to Rahikainen (2006), 155–158, the number of servants per farm grew during the 1800s, but Kaukiainen (1980b), 56, does not observe such a trend (for more on this, see chapter 4). For more general evidence, see e.g., Bekar & Reed (2013), who discuss the mechanisms of land inequality in medieval England, and Clark & Hamilton (2006) who provide evidence for the greater reproductive success of high-income households.

overwhelmed by landless population groups. These groups were no longer just the old and infirm, but young people fit to work.[316]

This development has led to the general acceptance that economic inequality grew in rural Finland at least from the late 1830s onwards.[317] It is true that one should not downplay the importance of land access in pre-industrial Finland - land was not only a vehicle for livelihood, it was also the key to economic and political rights.[318] Therefore, albeit crude, the number of people per farm is a proxy for rural inequality. A growth in this number signalled the growth of between-individual inequality which manifested itself on the farm-level as an increase in within-household inequality.[319] On the societal scale, the increase in the number of vagrant labourers also demarked increased dependence on seasonal employment provided by farms and simultaneously indicated an increased vulnerability to labour demand shocks.



MAP 3 Population per farms in Finnish rural deaneries in 1865

Source: Deanery population tables (1865)
Note: Left: Rural population per freeholder peasant farms, right: rural population per freeholder peasant farms and croftsteads.

3.2 The agrarian Finnish economy

Simplifying the picture a bit, the Finnish agricultural context can be described in terms of the geographical character of cultivation practices. First of all, the west of Finland was characterised by permanent open field agriculture, while slash-and-burn cultivation prevailed in the east. Secondly, rye was the most

316 Moring (1996), 106. See also Pitkänen (1991a), 44-47.
317 See e.g., Soininen (1974), 370, 394-401. Soininen also considers that the rural economic inequality was lower in the 1700s than in the 1800s.
318 Moring (1996), 93.
319 Pitkänen (1991a), 42-47.

important staple in the south of the province of Oulu, and cold-resistant barley in the east and north of Finland.[320] On the countrywide level, rye's prominent position is notable. From the 1820s to the 1870s, rye constituted some 42-48% of all seed sown in the country, while barley and oats both came in at roughly 23-29%. The proportion of oats increased substantially only after the 1870s, mainly as a result from increased animal husbandry and export demand.[321]

A 'barrel', which was the standard measure of volume for grain in pre-industrial Finland corresponded to 165 litres, and depending on the grain variety, weighed some 90-110 kilograms.[322] Based on Soininen's accounts, the regional rye harvest per hectare varied from 8.0 barrels in the southeast of Finland to 10.8 in Northern Ostrobothnia, with the countrywide average at 9.5 barrels per hectare. Barley harvests per sown hectare were considerably higher than those of rye, with the lowest hectare level for barley in the east of Finland, and a normal variation from 6.7 to 9.1 barrels per hectare. In the south of Finland, the barley harvest normally varied from 8.5 to 10.9 barrels per hectare, while Oulu systematically had an annual barley harvest of 12 barrels per hectare. These are converted to kilograms and summed up below in TABLE 3.[323]

TABLE 3 Regional harvest per hectare for rye and barley, kilograms

	Rye	Barley
West Finland	910–1070	730–1050
East Finland	715–940	570–930
Ostrobothnia	1040–1140	
Northern Finland		1040–1600/1800
Whole country	910–1000	1050–1100

Source: Soininen (1974), 122, 125.

Oats constituted a third important grain, though generally used as animal fodder.[324] Oats were often cultivated in marginal soils, in slash-and-burn fields in last phases of field usage, often in the third or fourth year after the area had begun to be cultivated. Besides rye and barley, turnip was the sole staple crop to be part of the Finnish diet to any significant extent. Swedes, beans and cabbage were known more or less but remained of little importance as food source. Potatoes were introduced to Finland in the 1730s, and the educational campaign for potato cultivation only stopped in the 1850s, by which time it was considered a well enough known crop.[325]

320 Nuanced distinctions can be made on the basis of e.g., crop circulation, see e.g., Soininen (1974), 86-96; Jutikkala (1980b), 188–192.
321 Soininen (1974), 167–172; Vihola (1991), 14–19.
322 Soininen (1974), 121–122; 124 Rasila (2003c), 622.
323 Soininen (1974), 120–127.
324 Though naturally one could assume that oat was preferred to variety of surrogate foodstuffs, if rye and barley harvests failed.
325 Soininen (1974), 165-185. Potato blights during the mid-1800s dampened the eagerness of Finns to adopt potato cultivation. See also Ikonen (1991a); (1991b).

One can justifiably ask, why did Finnish farmers cultivate rye to the extent that they did, given the fact that with barley one generally reaped larger per hectare harvest. Traditional interpretations stress the cultural preference for rye; the taste was perceived to be better.[326] It is, however, quite unlikely that rye would have been given higher preference in low-yield high-risk agricultural economy solely on the basis of taste; there duly were economic rationales for its cultivation. First of all, the amount of seed sown downplays the actual dominance of rye, as with a barrel of rye approximately 0.66 hectares could be sown, while the corresponding figures for barley and oats were roughly 0.50 and 0.37-0.50 hectares, respectively.[327] This means that a much smaller acreage was needed for rye than for barley to grow the same volume of grain, helping to accumulate a grain surplus, even in areas where per capita acreage was low.[328]

A second important explanatory factor for the dominance of rye is that it tended to have higher a yield than other staples (in the ratio of harvest to sown seed). According to Soininen, during the 1830s, Finnish rye had yield ratios of 6.59, barley 5.01 and oats 4.56. Using the harvest data available in the provincial reports (1842-1870)[329], it can be observed that the mean yield ratio for rye was 6.00, 4.68 for barley and 4.71 for oats ($p<0.001$).[330] Barley is considered as having been more resistant to cooler northern climes and the low temperatures of the late summer, but it seems that rye, with its generally higher yield, was favoured even if there was greater variance ($p=0.043$[331]) in this figure.

The higher risk of crop failure with rye might also have been a reason for its higher market price, but the prospective high-yields also made it a worthwhile venture.[332] After all, sowing a barrel of rye rather than barley could result

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326 E.g. Soininen (1974), 94; Heikkinen (1988), 77, see also Vilkuna (2003), 257–260.

327 Soininen (1974), 167–168. Volume sown per acreage depended on the field type too; slash-and-burn fields were sown rather sparsely. This was mainly because after the burning, little tilling was carried out, leaving a large number of stones and tree stumps standing, which lowered the effective sowing area, see Luttinen (2012), 106.

328 Lack of sowing seed was pronounced especially after crop failures, Pitkänen (1991a), 49; Heikkinen (1988), 104; Hemminki (2014), 153–154. See also *[2]*. According to Pitkänen (1993), 59, District Medical Officers often emphasised that that a considerable proportion of the farmers typically held very small or virtually non-existent grain reserves from previous years. Storage of grain constituted a considerably larger component of wealth in slash-and-burn regions than in the Western Finland, e.g., Soininen (1974), 367.

329 See also section 3.3.

330 These correspond quite well with Finnish yield ratios from the 16th and 17th centuries, Swedish ratios from the 18th and 19th centuries and continental ratios from medieval times, see e.g., Braudel (1967), 78–83; Tornberg (1989); Edvinsson (2009). See also Soininen (1974), 116–127; Kaukiainen (1980b), 95; Clark (1992).

331 P-value of the Levene-test for homogeneity of variance. In terms of coefficient of variation, oats had the highest proportional variation of yield ratios.

332 The average price of rye was considerably higher than that of barley's, perhaps also indicating higher demand and thus greater popularity: e.g., from 1870–1874 the country's average official market price for rye was 22.10 marks per barrel, while barley was 17.82 a barrel - making rye 24% more expensive, Vattula (1983), 437, 441, see also Pitkänen (1993), 53–60.

in a difference of 200 kg of consumable grain.[333] It will perhaps not come as too much of a surprise then that farmers particularly opposed taxes to be paid in grains, explored in more detail in *[2]*.[334]

Land usage survey from 1864 uncovers spatial patterns of acreage and cultivation practices. Even if the 1864 survey is convenient for descriptive spatial analysis, Soininen has considered the 1864 survey unreliable for two particular reasons. First of all, the total field area in the survey was recorded as being 835,266 hectares, which is greater than the total field area in land survey conducted in 1880 (830,115 hectares), probably a result of double-counting of certain farms. Secondly, the 1864 survey does not include burn-over marshland cultivation, which thus ignores acreages especially in the province of Vaasa.[335] Acknowledging these deficiencies, plotting the 1864 survey data yields distinguishable differences in cultivation patterns between different areas (MAP 4): e.g., open range agriculture was prevalent in the southern and western parts of the country, while slash-and-burn cultivation dominated the east. During the 1830s, over 50% of rye was harvested from slash-and-burn fields in the eastern provinces of Kuopio and Mikkeli. While the extent of this practice shrank during the 1800s, as can be observed, the technique was still very much alive in the 1860s; there were also substantial slash-and-burn acreages in Northern Häme and in Eastern Vaasa.[336]

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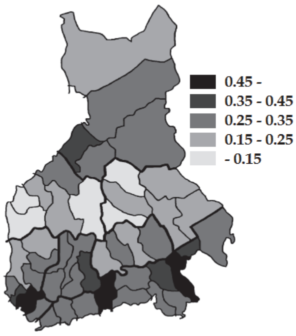
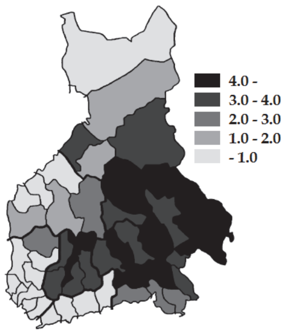
333 Using averages reported in Soininen (1974), 122, 124, one barrel of rye weighs roughly 108.9 kg, one barrel of barley 94.1 kg. Average yield ratios of 6.0 and 4.68 resulted in harvests of 653 kg from rye barrel sown and 440 kg from barley.

334 See also Solantie (2012), 183-187. For example, a household was liable to pay the so-called household tax, *käräjäkappavero*, four *kappa's* (roughly 20 litres) of grain. Assuming a barrel weighed 100 kg, the weight of the household grain tax was roughly 12 kg. If this grain had been sown and harvested with a yield ratio of five, this would translate to a harvest of roughly 60 kg, (or 170 grams per day). This corresponds to close on half of the average daily consumption of rye, as suggested by Heikkinen (1996). Given the low level of agricultural productivity, even a small loss of sowing seed corresponded to a significant decline in harvest, given that the loss could not be compensated (e.g., through loans, which then again could lead to debts). Reunala (1987), 376, also points out that grain was highly valuable especially because it was easy to store, transport and to exchange for other commodities and money. Heikkinen (1988), 104, claims that currency was perceived as more valuable than grain though. See also Soininen (1974), 357.

335 Soininen (1974), 127-129. Burn-over cultivation *(kytöviljely)* could be applied both to reclaimed marshlands and to fields already under cultivation. Burn-over fertilised the ground by burning the upper layer of the soil (which was peat in marshes), or through layering wood, sticks and branches over the field and burning them. By the early 1800s, the burn-over method was mainly applied to marshlands, see e.g., Soininen (1974), 138-150.

336 Soininen (1974), 57. Reunala (1987). Similarly to the practice in eastern parts of the country, a substantial proportion of rye growers used slash-and-burn methods in these regions in the 1830s. Slash-and-burn methods also prevailed in remoter parts of Finland well into the twentieth century. In 1900, 5-6% of rye and barley harvested in the provinces of Kuopio and Mikkeli came from slash-and-burn, and 10.8% of rye and barley harvested in Vaasa came from marshland fields, SVT II: 8, 51; for more on spatial distribution in the early 1800s see e.g., Jutikkala (1958), 349-350.





MAP 4 Arable land per capita in 1864

Source: SVT III:1 (1869), II-XXIII.
Note. Field acreage per capita (left), Slash-and-burn acreage per capita (right). Measured in hectares.

Slash-and-burn agriculture has been considered by some to be a sign of unsustainable underdeveloped agriculture,[337] yet not only was it a convenient and traditional field clearance method, but also much too profitable to be overlooked. It has been considered that slash-and-burn acreages gave yield ratios of at least 8-16, while with the *huhta* technique (used in slash-and-burn cultivation of conifer forests) the average ratio was 15-24 (sometimes even as high as 40).[338]

Successful implementation of slash-and-burn required a sparse population, and free prospecting rights to forests. This meant that as long as population density remained low and property rights to forests were not tied to land ownership (i.e. kept in the tradition of prospecting), slash-and-burn provided a sound livelihood for many.[339] According to Soininen, the availability of suitable woodlands declined considerably by the 1850s as a result of the population growth that forced rapid reintroduction of abandoned slash-and-burn fields into cultivation.[340] It has been considered that even in the early 1800s there were

337 See e.g., Barrett (1999). Compare with Myllyntaus et al. (2002).

338 Soininen (1974), 67; (1980), 391; Heikkinen (1988), 73-77; Korhonen (2003), 407; Luttinen (2012), 105-106. There are accounts of yield ratios as high as 100 for specific varieties of rye sown in *huhta*, Soininen (1974), 169. If it wasn't for the higher yield ratios, the economic incentives of slash-and-burn would be considerably smaller - after all, these fields had to be sown more sparsely, hence they required larger yield ratios in order to equal harvest volumes from traditional fields. Jutikkala (2003d), 459, suggests that for this very reason the profitability of slash-and-burn is partly illusory. Indeed, there are contemporary accounts from the 1700s which deem every form of slash-and-burn unprofitable when compared to normal field cultivation, Luttinen (2012), 106.

339 Luttinen (2012), 92-93; Korhonen (2003), 406-407. According to the traditional common law practice the clearance for slash-and-burn determined the property rights to the field, Luttinen (2012), 98, 117.

340 Slash-and-burn clearance in the same place was usually viable for roughly three to four years, after which the field had to be abandoned. Normally the regrowth of forest enabled reintroduction after 20-40 years, Korhonen (2003), 406-407. See Reunala (1987), 376; Heikkinen (1988), 74-76.

considerable areas where yields in slash-and-burn were lower than those obtained from normal field cultivation, but it seems that the costs of turning slash-and-burn clearings into fields (i.e., tilling them) were apparently too high for the poorest of farmers to abandon the method.[341] On the other hand, a problematic situation also came about if farmers turned to animal husbandry, meaning less work opportunities for large rural workforce and subsequently an increase of rural unemployment.[342]

Besides the increasing trouble in finding sufficiently large areas for slash-and-burn to make it worthwhile, the method also encouraged a more unequal wealth distribution than the traditional field cultivation. This was especially because poorest in the agricultural population could rarely *i)* get hold of the sizeable forest plots required, or *ii)* acquire enough labour force to undertake slash-and-burn. In the early modern period, slash-and-burn probably encouraged population expansion into eastern and northern wildernesses where there were still untouched woodlands, and this effectively mitigated the increase of a landless rural underclass in Eastern Finland. But then with the eventual exhaustion of suitable forest reserves and development of legislation concerning forestry property rights, this safety valve effectively disappeared.[343]

Rural inequality in the west had considerably deeper roots: the south-western parts of Finland constitute the region with the longest continuous historical settlements, and because of this, land inequality was a long-term product of property and inheritance rights, later greatly shaped by varying possibilities to obtain tenancies.

The inequality in land distribution was close to an inescapable fact of life. According to the land surveys of freehold farms conducted between 1850 and 1880, there was roughly 0.55 hectares of field per capita on an average farm.[344] It should be noted, however, that due to crop rotation practices, the acreage in cultivation in a given year did not necessarily match the acreage the farmer owned or rented. The larger the acreage, the more elaborated the rotation system the farmer could employ. This may partially explain the positive associa-

341 Soininen (1974), 70-71, 391. Due to high yield ratios in the first harvests, slash-and-burn cultivation quickly compensated for the initial clearance and labour costs. But due to natural depletion, slash-and-burn fields faced rapidly diminishing productivity and in this way the method may have caused poverty traps in Eastern Finland.

342 Soininen (1974), 413-415, 458.

343 Luttinen (2012), 92. During the late 1700s, the co-called *isojako* land reform effectively restricted the legal right of the poorer members of society to use slash-and-burn, see e.g., Korhonen (2003), 407-408. Jutikkala (2003d), 459, points out that *isojako* abolished the landless population's route to upward social mobility via slash-and-burn, which had existed prior to the reform. According to Pulma (1994), 24, the slash-and-burn of the landless was tolerated, but not exactly endorsed during the 1600s. Jutikkala (1957a), 202, considers that the able-bodied landless with free prospecting rights to slash-and-burn may actually have been economically better-off than the poorest of freeholders. For more on the socioeconomic consequences of land reforms, see e.g., Talvitie (2013), especially 18-27. Heikkinen points out that at least in the early 1800s a rural workman could still participate in a slash-and-burn cooperative and obtain via his labour the right to sow these fields, Heikkinen (1988), 76; Pulma (1994), 27. See also Luttinen (2012), 98.

344 Soininen (1974), 132.

tion between the crop productivity of farms and average farm size detected by Olsson and Svensson using data from Swedish farms (which had identical institutional arrangements to the Finnish ones, see *[1]* and *[2]* for more details)[345] pinpointing to mechanisms that may have contributed to sustained economic inequality in the rural Nordic regions.

Even for the inequalities, on average, however, the cultivated acreage was sufficient to provide enough food for the population in the 1800s both in the western and eastern parts of country.[346] Due to the differences in grain weights, yields and the amount needed to sow a given acreage size, it is hard to give the exact acreage required for an adult's upkeep. It has been traditionally considered that an adult needed two barrels, and a child one barrel of grain per year for subsistence.[347] While the actual weight and energy content of a barrel of grain depended on the quality and variety of grain[348], it can be assumed that a barrel weighed roughly 100-120 kg and when distributed evenly provided a daily 1,000 kcal of energy.[349] This would mean that two barrels of grain would exceed the minimum daily subsistence requirement of 1,800 kcal and constitute roughly 550-650 grams of grain per day. This level of subsistence would correspond to c. 0.2 - 0.3 hectares,[350] which was easily met with the acreage available in the mid-1860s.[351]

The low yield ratios, small per capita acreages and unequal land ownership led to widespread endemic malnutrition in rural Finland even during normal harvest years and resulted in the widespread adoption of various surrogate foodstuffs (MAP 5). The most well-known of these were *pettu* (bark bread made of flours incorporating the phloem of pinewood); and roots of bog

345 Olsson & Svensson (2010).

346 Soininen (1974), 127-131; Solantie (2012), 232. Finland is considered to have been self-sufficient in terms of grain production during the 1700s, though there are no actual statistics to verify this. There is information of grain imports in the 1780s and the 1790s, when in certain years the import volumes were close to 40,000 barrels. Depending on the assumptions of the aggregate harvests, the import of 40,000 barrels would equal mere 1 to 2% of total production. A concrete growth of imports is traditionally considered to have happened after the 1820s, though the actual need for grain imports was considered small prior to the 1850s, see e.g., Soininen (1974), 187-189. Soininen (1974), 193, considers that imports constituted roughly 7% of the total cereal supply during 1851-1860, and grew to 17.5% in the following decade. These figures are probably exaggerations though, as official figures often downplayed the real size of the harvest (see section 3.4). See also Kaukiainen (2006), especially 133.

347 E.g. Ikonen (1991), 25. Kaukiainen (1980b), 130, puts this at 1.9 barrels, while Vihola (1994), 84, criticises averages below 2 barrels, and considers that an adult required annual energy intake that would correspond to roughly 2.4 to 3.6 barrels of grain per year. Equally, it was typical for communities to provide a child placed in a foster home with an annual 1-2 barrels of grain, Kulmala (1967), 353.

348 Turpeinen (1986a); 142, Pitkänen (1993), 62.

349 Vihola (1994), 84.

350 Two barrels equal roughly 330 litres. With a yield ratio of 5, this corresponds to sowing 66 litres. If this was rye, then one could sow 0.004 hectares with a litre. This suggests that for two barrels per harvest, one needed 0.264 hectares of acreage. This calculation is naturally sensitive to the quality of grain selected. Furthermore, estimating the total food supply from the harvest per hectare requires more precise spatial information about how the cultivated acreage was used, but this information is difficult to obtain.

351 Solantie (2012), 232. See also Wilmi (2003a), 182.

arum, *(suo)vehka* (*calla palustris*). The husks of seed grain and straws were also sporadically consumed, and usage of lichen was widely propagated during the famine in the 1860s.[352] On the basis of an enquiry made in the 1830s, at least 5% of population in the majority of rural parishes had to resort to surrogate foods, mainly bark bread, even during normal harvest years. In some parts of the country, bark bread was consumed by over 50% of population during normal harvest years, and in these regions virtually everyone had to resort to various famine foods during the years of crop failure. [353]

Surrogate foods generally made a poor and unsavoury diet. Bark flours especially were of low nutritional quality. It has been suggested that an adult required 1.5 kg of bark flours daily to provide the adequate amount of energy. Even if it had been physiologically possible for humans to consume such an amount of tree bark, the time when it was most practical to collect pine phloem (in spring when it was also at its most nutritious) was a point in the year when nobody would yet know what the outcome of the autumn harvest would be like.[354]

MAP 5 Usage of famine bread in normal harvest year and high risk region for crop failure in rye

Source: Soininen (1974), 368. Solantie (2012), 169.
Note: Black region depicts a region where at least 5% of population used surrogate foodstuffs during normal harvest years in the 1830s. The gray line designates an area north of which rye exhibited over 25% annual risk of harvest failure (the lower risk in the proximity of Lake Oulujärvi is not depicted here, and nor is the harvest risk assessed for the province of Viipuri).

On average, surrogate foods were consumed considerably more often in central and northern parts of the country, in regions where the cultivation of rye to

352 E.g. Haatanen (1968), 84–86; Häkkinen (1991a), 91–113; Häkkinen & Forsberg (2015), 109.
353 See e.g., Liakka (1923); Soininen (1974), 368–369. One can justifiably ask whether the adopted extent of surrogate foods at this magnitude corresponds to "surrogacy" in any meaningful extent.
354 Häkkinen (1991a), 93–98. The taste of bark bread is generally considered "bitter", see e.g., Nelson (1988).

open acreages was difficult. This applies especially to Eastern Ostrobothnia and to Northern Finland where rye had a 25% annual risk of failure.[355] As rye was staple of slash-and-burn fields, the restricted land-access left the poorest generally resorting to barley and therefore it seems that, contrary to Braudel's statement, cheap barley was in fact the staple of the poor, not rye.

There are relatively few studies concerning the actual diet of Finland's rural population. According to Vennola, the poorest spent roughly 60% of their income on foodstuffs in the early 1900s, while Heikkinen puts it at 50-55% during the late 1800s and early 1900s.[356] Meanwhile, both Heikkinen and Lefgren have presented more detailed description of the distribution of food consumption. These estimates suggest that the daily calorific intake per consumer unit was roughly 2,300-2,400 kcal in the early 1860s.[357] These are roughly on a par with general level in the rest of Europe.[358] Both Heikkinen and Lefgren's estimates are averages based on official statistics of harvests and production, and therefore the proportion of grain in the diet is most likely to have been played down and the proportion of animal protein exaggerated. The everyday food in rural Finland was rather simple, generally consisting of cooked turnips, eaten with bread and salted fish. Water or buttermilk were the common drinks. Beer, butter, cheese, and meat were mainly kept for special occasions. Different forms of porridge were the most typical food made out of grains, while the consumption of baked bread seems to have been exaggerated.[359]

Heikkinen and Lefgren both estimate that on a macro-level the average consumption of grain was only some 500 grams per day, and this would have provided roughly 60% of the daily energy intake in the early 1860s.[360] Based on a consumption inventory conducted in Eastern Finland, Heikkinen et al. consider that the consumption for a typical poor rural household consisted of just four barrels of rye, three barrels of barley, 4.25 kg of butter, and half a barrel of salted herring per year.[361]

The abundance of grain in diets is also reflected in contemporary wages that were paid in kind. According to Vihola, a male farmworker was given, among other things, 4 barrels of rye and half a barrel of barley as an annual wage, corresponding to 1,170 grams of rye and 124 grams of barley per day.[362] In roughly similar context, Swedish wage recommendations from 1845 for a farmworker with family suggested a yearly wage that included 440 litres of bar-

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355 The region where there is a risk of rye harvest failure closely follows that of late spring and early autumn frosts. When taking the extent of cultivation into account, the risk is pronouncedly prominent between the 62nd and 64th parallels north, Solantie (1987). These same regions exhibited endemic hunger even in the early 1900s and there were reports of starvation deaths during the 1917-1919 famine, Rantatupa (1979); (2004). See also Paulaharju (1930), 155–156.

356 Vennola (1909); Heikkinen (1996), 14.

357 Heikkinen (1996); Lefgren (1974), see also Heikkinen (1981).

358 See e.g., Federico (2003); Fogel (2004), 8-12; Floud et al. (2011), 155–158.

359 Wilmi (2003a), 178–180.

360 Heikkinen (1996); Lefgren (1974).

361 Heikkinen et al. (1987), 69. Salt fish was widely used also inland due to its preservability, Ikonen (1991), 26.

362 Vihola (1994), 85-88.

ley and 18 litres of wheat, corresponding to about 2.8 barrels of grain (a daily 920 grams).[363]

Consumption of animal based foodstuffs most likely varied extensively between income groups. According to Vihola, in Southwestern Finland servants on an annual contract received wages that typically included meat (roughly 41 kg per year, or c. 100g per day), and a substantial amount of buttermilk (roughly 1.3 litres per day) left over from butter churning.[364] Servants' wages also included fish. When turned into energy, it is estimated that 60% of servants' energy consumption in the southwest came from rye. In comparison, potato was 9-12%, barley 6-7%, beans roughly 2%, meat and fish 10%, and dairy 10 % of total energy consumption.

It is, however, worthwhile noting that the annual wages of farm servants tend to exaggerate rural living standards, and they cannot be used as such to estimate the incomes of the landless population segments. After all, wages of rural servants were so high that many farms could only afford to hire them when the harvest years were good.[365]

3.3 A history of crop failures

As the pre-industrial Finnish diet was clearly tied to harvest outcomes, the existence and extent of crop failure needs additional emphasis. There is still a fair degree of uncertainty concerning the actual risks involved with grain cultivation in pre-industrial Finland. Had it been as insecure as has been suggested by some[366], it is hard to see how any form of permanent settlements could have been established in Eastern and Northern Finland or how the population could have grown at the rate it did - especially in the early modern period, when climate conditions are considered to have been particularly harsh.[367] Even settlements in the northeast region of Kainuu endured the recurrence of crop failures and the cold climate phase in the late 1500s, only to be obliterated ultimately not by the weather but by war.[368]

The blame for the reoccurrence of crop failures during the early modern period has traditionally been placed on the Little Ice Age, a cold climate phase starting in the sixteenth century and lasting until the mid-1800s.[369] The often identified culprit for the severest phase during the 1600s is the virtual absence

363 Gadd (2000), 226.
364 Vihola (1994), 87.
365 See section 4.3 for detailed discussion.
366 E.g. Jutikkala (2003a); Myllyntaus (2009); Solantie (2012).
367 According to Edvinsson (2015), the Swedish population grew some 0.4% annually in the early modern period. Pitkänen (2007) has suggested a similar rate for the 16th and 17th centuries. Depending on the assumption concerning the initial population level in the early 1600s, the annual population growth ranged between 0.27% and 0.52% during the century, for considerations see e.g., Luukko (1967); Åström (1978); Muroma (1991).
368 Keränen (1986), 393-379, see also Mäkinen (2002), 204-208.
369 For plurality of the definition see e.g., Jones & Mann (2004); Kelly & Ó Gráda (2013).

of sunspots during the 'Maunder minimum' (roughly 1645-1715), though a geophysical explanation has also been proposed.[370] Recently, Kelly and Ó Gráda have presented scepticism whether or not the Little Ice Age (or the preceding Medieval Warm Period) ever actually existed and whether the term is useful for any genuine historio-climatological purpose.[371] According to Kelly and Ó Gráda, the existing data scarcely show any persistent drop in temperatures during the early modern period. They do however recognise several Europe-wide cold phases, most importantly 1591-1598, 1687-1698 and 1809-1817.[372] Reviewing the global climate during the past millennia, Jones and Mann consider that the 1400s, 1600s and 1800s were the coldest centuries during the last millenium, but they highlight that regional datasets should not be used for inference concerning climate changes on a hemispheric or global level. Similarly Holopainen et al. point out that one should be careful interpreting weather anomalies and short-term climate swings without proper investigation of hemispheric and global means.[373]

In Finnish historiography the climate-driven historical interpretation has been put forward especially by Jutikkala, Tornberg, and Solantie.[374] With respect to the 1860s famine, especially Turpeinen has been keen to emphasise the abnormally cold weather conditions, referring to the spring of 1867 as "the last breath of the Little Ice Age" and describes a period when the "whole of nature seemed to go off the rails".[375] Studying the weather and climate background of the spring of 1867, Jantunen and Ruosteenoja consider that the coldness was largely due to an unusually permanent anomaly in planetary waves, which steered cold air masses into Northern Europe. This contradicts explanations such as the vastness of sea-ice north of Scandinavia or sunspot minimum.[376]

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370 E.g. Miller et al. (2012).

371 Kelly & Ó Gráda (2013), 303–308. Helama et al. (2009) have reconstructed a summer temperature series using tree-ring data from Northern Finland that spans from AD 750 to the 2000s. According to them AD 931-1180 and AD 1601-1850 were the warmest and coolest 250 year-periods, respectively.

372 Kelly & Ó Gráda (2013), (2014b). There was acknowledged agricultural problems also in Finland during all of these, see e.g., Tornberg (1989); Karonen & Nummela (2007); Holopainen & Helama (2009). European famines of the 1709–1710 and 1740–41 also had Finnish counterparts, see e.g., Valpas (1967); Pitkänen (1992); Kujala (1999).

373 Kelly & Ó Gráda (2014b); Helama et al. (2009); Holopainen et al. (2009). See e.g., Jones & Mann (2004), 19 for review from climatological side.

374 The climatological fatalism has been widely adopted especially concerning the 1500s and the 1600s, e.g., Pulma (1994), 19-20 considers that the society of the seventeenth century "was still at the mercy of nature". Holopainen & Helama (2009) consider that covariation between barley and rye harvests were considerably stronger in the 1500s than in the later decades.

375 Turpeinen (1986a), 19; (1991), 50; Jutikkala (1994), 19–20; (2003b), 504–505. The connection between the cold mid-1800s and Little Ice Age has been popularised among historians by Le Roy Ladurie. Abysmal weather conditions are the most explicitly dealt culprits behind crop failures in the Finnish tradition, see e.g., Melander & Melander (1928); Kovero (1944); Jokipii (1974), 115-116; Myllyntaus (2009). For a more detailed analysis see e.g., Holopainen & Helama (2009). Regardless of the connection between a cold 1867 to long-term climatic conditions, the Little Ice Age is a "fifth wheel" in the story and there is little need to invoke it. I'm grateful to Prof. Ó Gráda for insisting on this.

376 Hamilton & Garcia (1984); Jantunen & Ruosteenoja (2000).

There are temperature estimates available for the pre-industrial period, the reconstructions by Holopainen et al., and Loader et al are inspected here in greater detail. The former covers years from 1750 to the 2000s, the latter starting from 1693. The Holopainen et al. series is a multiproxy reconstruction of temperatures for February-June and is based on ice-break up, ice extent, plant phenological and lake varve thickness data from Southern Finland. The Loader et al. estimate covers spring months April and May and is based on ice break-up data from Torniojoki river and is directly applicable concerning the temperatures in the Northern Finland. FIGURE 1 plots these for years 1750-1880.

Clearly observable outliers during 1750-1880 are springs 1756, 1772, 1784-1786, 1805-1814, 1829-1830, the mid-1830s, 1845, 1856 and 1867. Of the listed years, substantial food crises were only experienced during the 1808-1809 war, the 1830s and 1867. The coldest decades in terms of spring temperatures in the Southern Finland were clearly 1810s, 1840s and 1850s, the late 1760s and 1780s were apparently cold in the northern parts of the country. The fact that spring temperatures are in poor correlation with mortality crises indicates that if the autumn grain (grain sown in previous autumn that wintered under the snow) failed due to cold spring (as happened in 1867) the annual grain harvest could still be fairly well compensated with grain sown in the spring (spring grain). Aggregate food availability was jeopardized only after the grain sown in spring also failed due to excessively cold or warm summer and/or early frost in the autumn. The failures of both autumn and spring grain were however partially connected: failure of autumn grain most likely resulted from pro-longed winters, and contributed to later sowing of spring grain, thus shifting the ripening and subsequent harvest to a later occasion, thereby increasing the risk of autumn frosts.[377]

[377] See especially Holopainen & Helama (2009), 217-219. Through comparison of England and France, Appleby has suggested that regions too dependent on spring grain alone faced an increase in famine probability. He includes Northern England and Scandinavia on the list. According to Soininen, the increasing proportion of spring grain during the 1800s was mainly connected to an increase of fodder cultivation, Appleby (1979); Soininen (1974), 94–95.

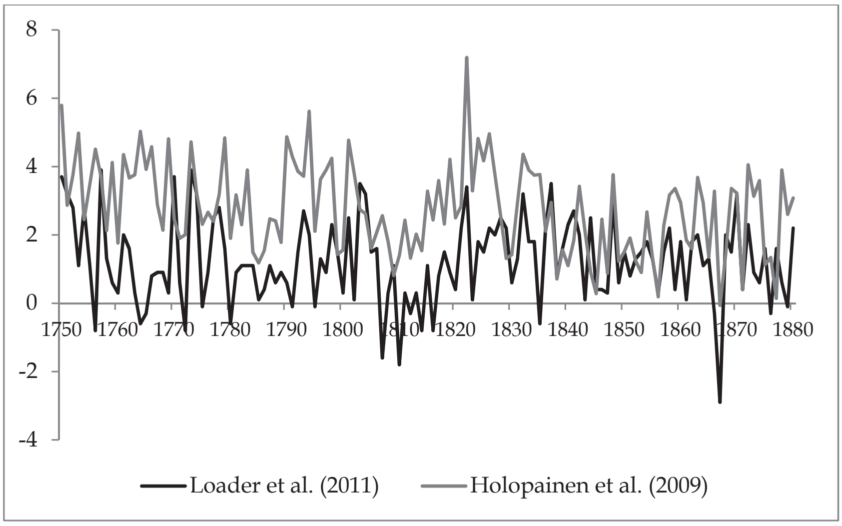

FIGURE 1 Average spring temperatures in Finland 1750-1880

Source: Holopainen et al. (2009), Loader et al. (2011).
Note: Temperature data from Holopainen et al. (2009) and Loader et al. (2011). Holopainen et al. (2009) covers February-June, from Loader et al. (2011) covers April-May. The former reconstruction covers the Southern Finland, the latter the northern parts of the country.

The susceptibility of harvests to frosts did not go unheeded by contemporary pre-industrial observers, though a well-known nineteenth century Finnish historian Yrjö Koskinen made, in hindsight, a tragicomically premature conclusion when in 1866 he considered that crop failures had lost their power to plunge the Finnish society into chaos.[378] The widely cited conventional wisdom held that during the 1700s and the 1800s, there were, on average, five mediocre, two plentiful, two poor, and one failed harvest per decade.[379] Using qualitative harvest information available in Melander and Melander (1928), Myllyntaus has considered that in the years 1300 to 1930 there was at least 110 major crop failures, with an average of 1.7 per decade and that during the 1600s and the 1700s the average rose to 3.0 and 3.3 respectively.[380] Regional studies have produced similar accounts: Virrankoski has considered that from 1601 to 1690 approximately every third year was marked with crop failures in Northern Ostrobothnia. Recurrent failures in the 1630s and 1640s resulted in stagnation and even retreat of settlement expansion.[381]

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378 Koskinen (1866), 73.
379 For a review see especially Tornberg (1989), 71–80. Melander & Melander (1928), 351 present this as three poor harvests and two failures.
380 Myllyntaus (2009), 80.
381 Virrankoski (1973), 207–221.

TABLE 4 The occurrence of crop failures according to two qualitative sources

	Melander & Melander (1928)				Johanson (1924)*			
	Singular crop failures	Two consecutive	Three or more consecutive	Total number	Singular crop failures	Two consecutive	Three or more consecutive	Total number
1540–1599	4	1	3	18 (30.5 %)	-	-	-	-
1600–1699	7	2	6	34 (34.3 %)	10	2	6	38 (38.4 %)
1700–1799	10	4	3	30 (30.3 %)	7	5	5	37 (37.4 %)
1800–1899	8	4	0	16 (16.2 %)	6	1	0	7 (10.0 %)

Source: Data from Johanson (1924) and Melander & Melander (1928)
Note: Number of events reported. The failure percentage in parenthesis. See text for details.
**Qualitative harvest assessment has four categories for 1600-1809, and seven for 1810-1870. The seven category assessment is on provincial level and reported separately for each grain variety. Hence, a year is interpreted as a crop failure if either rye and/or barley harvest scored a value of 1 or 2 in the majority (i.e., at least four) of the provinces. For the 19th century, the Johanson assessment covers only period 1800-1870.*

There are, however, reasons to believe that interpreting dichotomic crop failure accounts in this manner results in an excessively gloomy picture of Finnish agricultural history. What has remarkably been little acknowledged in Finnish historiography is the fact that crop failures do not equal famines, even if Myllyntaus goes on to state that "at least part of the population faced a famine every third year during those [1600s, 1700s] two centuries"[382]. There are milder statements also; Jokipii considers that frequent crop failures were common trouble in agrarian society and resulted in a reduction of aggregate production and endangered the livelihood of many.[383]

The fact that staple crops failed more often than mortality rates surged to crisis levels, is actually quite believable on the basis what we know about pre-industrial economies.[384] As has been pointed out by Ó Gráda, even the most underdeveloped economies have ways to mitigate hazards and historically the worst famines have due to at least two consecutive failures of the staple crops.[385] TABLE 4 displays data from two studies presenting qualitative harvest

382 Myllyntaus (2009), 80. Pitkänen (1991a), 38, marks an exception by clearly noting the difference between the two. See e.g., Dupaquier (1989); Howe & Devereux (2007) and the discussion in chapter 2 concerning how famine events are distinguished. Galloway (1994) suggests a threshold crude death rate of 40 per 1000 for crisis years. In the data spanning 1541 to 1870, England had 6 (1557-1559, 1625, 1665, 1729); in the data spanning 1630-1870, Sweden had 14 (1633, 1650-1653, 1675-1676, 1697-1698, 1710, 1743, 1773, 1809); and from 1722 to 1870, Finland had 8 (1740, 1742, 1763, 1791, 1808-1809, 1833, 1868); Wrigley & Schofield (1981); Vattula (1983); Edvinsson (2015). These counts result in crisis probabilities of 0.018, 0.058 and 0.054, respectively. That is, crop failures are considerably more common than genuine mortality crises. See e.g., Lee (1981); Kaukiainen (1984); Edvinsson (2009) for the relationship between crop failures and mortality crises in England, Finland and Sweden.

383 Jokipii (1974), 122. Italics added.

384 See also Dribe et al. (2015).

385 Ó Gráda (2007), 7.

assessments for the pre-industrial period. Melander and Melander (1928) provide crude dichotomic information (harvest failure *or* normal year) on the occurrence of crop failures, whereas Johanson (1924) provides a scale of four categories on the countrywide level for 1600-1809, and seven on a provincial level for 1810-1870. Concurrent with previous accounts, roughly one in every three years in the period 1540-1800 was seen as a crop failure of some magnitude, corroborating the general consensus that crop failures were more common during the early modern era than in later centuries.[386]

It is however important to note that the sources used to derive this conclusion improve considerably after the early 1800s. Currently there is no way of knowing the actual extent of crop failures presented in the qualitative information prior to the 1810s. Hence, local but well-documented failures in the southern parts of the country may bias the early modern assessments,[387] and taking these figures at face value, the sensitivity of Finnish grain cultivation is most likely exaggerated on a macro-level. It needs thus to be emphasised that the pre-1800s crop failures reported in Melander and Melander (1928) and in Johanson (1924) do not necessarily *i)* represent crop failures of equal size in terms of a regional drop in food supply, nor *ii)* represent solely major crop failures.

This is especially evident when more nuanced information is available. The harvest assessments presented in Johanson (1924) for the 1800s give more detailed information on the harvest outcomes; not only is the scale wider but also the data is given on a provincial and grain variety level. As presented in TABLE 5, during the 19th century, crop failures plagued especially the provinces of Vaasa, Kuopio, and Oulu. In Vaasa, rye and/or barley crops failed 27 times from 1810 to 1870, making it a 22.5% failure rate. The corresponding percentages are 18.3 and 15.8 for Kuopio and Oulu, respectively.[388] The northern provinces also experienced simultaneous failures in both rye and barley harvests considerably more often than the southern provinces. Vaasa once again displays the poorest of development - close to 17% of harvest years marked a failure of both rye and barley harvests, including the four years in a row; 1830-1833.

386 See e.g., Ojala & Nummela (2006). On the basis of manorial data from the late 1500s and early 1600s, it can be estimated that coefficient of variation for rye yields was roughly 0.38 and 0.43 for barley yields. These dropped to 0.28 and 0.26, respectively by the late 1700s and early 1800s. The available official harvest yields from 1840s to 1860s produce coefficients of variation of 0.27 and 0.25, for rye and barley, Tornberg (1989); Holopainen & Helama (2009); Provincial governor's reports (1840-1865), JKK 146-149, JKK 149a; SVT II: 2. The reduced variation in grain yields has been documented also in the Western Europe, Campbell & Ó Gráda (2011), 873-874.

387 For similar interpretation see Holopainen & Helama (2009).

388 The concentration of crop failures in Vaasa and Kuopio are in line with the high frost risks between the 62nd and 64th parallels north, see Solantie (1987). It has been considered that the crop failures grew in importance when marginal soils came under cultivation during the 1800s in the northern provinces, see e.g., Haatanen (1968), 85–86; Klinge (1997), 239; Solantie (2012), 216–218. The role of marginal land cultivation and crop failures has also been assessed e.g., by Le Roy Ladurie (1976), 55.

TABLE 5 Distribution of crop failures 1810-1870

	Province	Oulu	Kuopio	Viipuri	Mikkeli	Vaasa	Häme	Turku and Pori	Uusi-maa	Sum
Rye	Extremely severe failure	2	3	0	1	4	1	0	2	13
	Severe failure	7	8	7	3	10	3	1	1	40
Barley	Extremely severe failure	4	7	2	6	5	0	0	0	24
	Severe failure	6	4	5	1	8	4	2	4	34
Sum	Extremely severe failure	6	10	2	7	9	1	0	2	37
	Severe failure	13	12	12	4	18	7	3	5	74
Sum total		19	22	14	11	27	8	3	7	111
Simultaneous failure of rye and barley harvests		6	8	5	1	10	4	1	2	37

Source: Data from Johanson (1924)
Note: "Extremely severe failure" refers to the lowest of the Johanson's qualitative categories, "severe failure" to the second lowest.

According to Ó Gráda, back-to-back harvest failures were rare, but did happen more often than what would be expected on a purely random basis.[389] According to the qualitative assessments, the probability for harvest failure from the 1500s to the late 1700s was roughly 1 in 3. This means that assuming a completely random occurrence, the probability for three consecutive crop failures is 0.037, for four 0.012 and for five 0.004; corresponding to expected repose intervals of 27, 81, and 243 years, respectively (meaning that, for every 200 years, there was about 8 cases of three consecutive failure years, about 2 of four consecutive failure years and 1 of five consecutive failure years). It thus appears that the prolonged harvest failures as experienced in the periods: 1542-1546; 1595-1598 and continuing in 1600-1601; 1630-1635; 1672-1676 are clearly more than just random occurrences.

The most natural explanation for the temporal and spatial concentration of harvest failures is the (short-term) autocorrelation in weather. This however is not excessively strong in the Holopainen et al. (2009) reconstruction: for 1750-1880 the autocorrelation for the first four lags are 0.254, 0.232, 0.196 and 0.215. In the Loader et al. (2011) reconstruction, the autocorrelations for the first four lags between 1693 and 1880 are a mere 0.120, -0.004, 0.120 and 0.148. The first lag autocorrelations in the differenced series are highly negative, -0.472 and -0.425, respectively. The rest of the lags are effectively zero.[390]

From the perspective of economic history, there are varieties of mechanisms which open up the possibilities for endogenous determinants of crop failures. First of all, not only did a failed harvest produce low quality seed to

389 Ó Gráda (2007), 7-9
390 The lack of autocorrelation and other statistical properties of a temperature series is discussed by Kelly & Ó Gráda (2014b).

cultivate, low harvests also probably resulted in a decrease in the acreage sown the following year. Secondly, in pre-industrial agriculture, the fixed effects the farmers faced such as soil fertility and level of technology were highly persistent, creating longlasting constraints on their agricultural livelihood. Thirdly, crop failures may have resulted in a decrease in capital inputs; these included e.g., livestock needed to produce manure for fertilisation and various other forms of assets.[391] Famine-inducing crop failures may also have reduced labour inputs through mortality and in the longer-term through adverse effects on young/ unborn children.[392]

3.4 Finnish cultivation economy during the 1800s

There is relatively little available information about harvest volumes prior to the 19th century from any country. This has meant that in the prominent GDP reconstructions, harvests (and the majority of production) are estimated indirectly. The easiest, though somewhat controversial, method to deduce agricultural output is to estimate an aggregate demand function. These models tend to assume that demand for agricultural output was in positive relationship to incomes and had a negative price elasticity. Some estimates have also integrated industrial output in the estimates.[393] Other approaches include collecting harvest data directly from farm accounts and from a variety of local sources, or using multiproxy reconstruction methods.[394] No such reconstructions have been made of the Finnish agricultural production as yet.

The most salient of generalisations concerning Finnish macroeconomic history of the 19th century, is the idea that Finnish agriculture ran into crisis well before the famine of the 1860s. The consensus seems to be that in the eastern parts the slash-and-burn cultivation was becoming less productive due to the lack of suitable woodlands and the excessive recultivation of previous (and thus less fertile) clearings. In Southern Finland, a progressive reduction in pasture lands in relation to fields meant there was less fodder available for livestock

391 This is worth reviewing concurrently with the “choosing to starve” discussion in section 2.2. Alderman (1996) shows that households in rural Pakistan exhibited more difficulties in smoothing consumption after successive shocks than after a singular shock.

392 Arora (2001), for instance, suggests a connection between life expectancy and economic growth. There are various studies on the long-term effects. For example, Chen and Zhou (2007) and Umana-Aponte (2011) show that famines experienced in childhood had a variety of adverse socioeconomic effects in adulthood, Lindeboom et al. (2010) show evidence for decreased life-expectancy in later life after malnutrition in childhood.

393 See e.g., Alvarez-Nogal & Prados De La Escosura (2007); Malanima (2011); Schön & Krantz (2012).

394 Edvinsson (2009); Olsson & Svensson (2010); Campbell & Ó Gráda (2011) see also Clark (2015).

which in turn meant less manure to fertilise the fields.[395] This yields a simple hypothesis, which will be tested in this subchapter: *the productivity in agriculture decreased during the 1800s.*

TABLE 6 Growth percentages of agricultural inputs in given regions from the late 1700s to the mid-1800s

Region	Arable lands	Population per farm	Pasture lands
Uusimaa	135	102	41
Turku and Pori	143	115	30
Häme	105	204	32
Provinces in the southern arable land region	*124*	*144*	*36*
Vaasa	408	247	119
Provinces in the arable land region	*150*	*162*	*59*
Mikkeli	162	102	124
Kuopio	459	144	236
Provinces in the slash-and-burn region	*358*	*132*	*203*

Source: Soininen (1974), 137, 160.

The actual existence of an agricultural production crisis is much more uncertain than what might be thought on the basis of what is generally told about 19th century Finnish history.[396] First of all, it is not evidently clear what is meant when researchers refer to this crisis. Should it be considered synonymous with downward social mobility; or does the decreasing proportion of pasture to arable land suffice as an indicator? Furthermore, it is uncertain what kind of productivity is being referred to - is it capital, land, or labour? TABLE 6 presents growth percentages for arable and pasture land as well as the growth in number of people per farm between two land surveys, one conducted in the late 1700s, the other in the mid-1800s. Even if there are deficiencies and bias in the sample, especially for Southern Finland, the data has been thought to show that "there were growing problems with fertilisation"[397]: in several places in Southern Finland the size of arable acreage more than doubled (>100%), while pasturage only grew by 30-40% during the same time period.

However, without specification of production function this is not enough to actually prove there were productivity problems in agriculture. Indeed, even

395 E.g. Soininen (1974); Jutikkala (2003b), 506 Solantie (2012), 213–226. See e.g., Gadd (2011), 143-145, for equivalent development in Sweden. Olsson & Svensson (2010) show that productivity developed differently depending on the kind of farm.

396 E.g. Virrankoski (1975), 110–111; Pulma (1994), 67; Vahtola (2003), 214–217.

397 Soininen (1974), 458; Jutikkala (2003), 460. Clark (1992) provides extensive discussion on the so-called Postan thesis, which (like Soininen and Jutikkala) states that population pressure led to more and more pasture (and woodland) being converted into arable land, which reduced the flow of manure (and hence of nitrogen) to each acre of arable. Reflecting the implicit charm of the thesis, Clark (1992), 80, notes that it is supposed that "rents on newly reclaimed lands should have declined over time … but … no evidence [is given]".

the most vocal proponents of the crisis hypothesis have been surprisingly vague, even contradictory, in their arguments. For example, Soininen creates an extensive case for the diminishing fertilisation of the land due to lack of pasturage and manure, but then goes on to state that "the arable cultivation area of Western Finland underwent no actual crisis except during the crop failures of the 1860s". Similarly Jutikkala states that, "when the climate temporarily worsened in the 1860s, the [pre-crisis] balance broke down everywhere" [398]. The latter, however, then explicitly states that production and population were *not* in disequilibrium prior to the recurrence of crop failures. Both of the authors also point out the versatility of compensatory cultivation techniques that were undertaken in response to the conceived crisis, thus showing that the farming population were not accepting the alleged diminishing productivity passively. Prior to this study, Ojala and Nummela have presented crude estimates suggesting that grain production per agricultural worker actually *grew* between 1800 and 1860. Using the parish of Lohja in Southern Finland as an example, Kaukiainen notes that there is little evidence of any production crisis prior to the famine.[399]

It is important to highlight that, if not inflicted on purpose (e.g., war famines), pre-industrial famines were most likely always preceded by a decline in agricultural productivity. This stems from the fact stressed earlier, that large famines were typically caused by back-to-back harvest failures or by a longer string of poor and dismal harvests. Shocks such as these force the output levels to drop and as inputs often do not adjust in a similar manner, productivity will, by definition, fall.[400] Analytically it is therefore important to notice that a series of bad, below-trend harvest years might be confused with agricultural production reaching stasis. It is feasible that analysis of the development of any pre-famine production can provide spurious evidence of the economy reaching a production plateau. Because of this, it is important to assess whether the productivity decline stemmed from endogenous factors or was simply caused by exogenous variables such as the weather.

The extent of the agricultural productivity decline could be assessed if more was known about the development of grain production. Prior to this study, no systematic information on harvest levels has been available from Finland for the pre-1842 period. The parish population registers of 1805 and 1810 do include information on each parish's harvest, but these and similar information from administrative districts for 1824, 1825 and 1827 are widely considered unreliable.[401] Provincial governors were obliged to report on the harvest

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398 Soininen (1974), 396, 458; Jutikkala (2003), 460.

399 Kaukiainen (1980b), 112–118; Ojala and Nummela (2006). Importantly, context-wise, Allen (2003) has shown that low agricultural productivity and a low level of urbanisation coexisted in those Western European economies which can be considered being poor during the early modern period.

400 In the case of land productivity, for example, this naturally results from the fact that inputs are determined prior to the realisation of the output. The decline may also be, however, a partially statistical construction that stems from the unavailability of sufficient statistical material (in terms of frequency) to cogently address the question.

401 Soininen (1974), 186-188; Johanson (1924), 120-122; Vattula (1983), 64, 81.

and volume of seed sown from the 1840s onwards. From the provinces of Mikkeli and Oulu, this data is available as of 1842; from Kuopio, Viipuri, Vaasa, and Häme it was 1845. Data from Uusimaa started being recorded in 1847; and in the province of Turku and Pori, data is available from 1848. These continue uninterrupted all the way up to the 1900s.

Even if this data may be the only uniform source available for assessing Finnish harvests in the 1800s, Solantie has questioned their usefulness, and considered the volumes as evident in the series too low.[402] This most likely is the case, as in 1860, for example, governors reported that the total rye and barley harvest was 3,417,620 barrels, corresponding to roughly 1.96 barrels per capita - 2 barrels was often considered the reasonable subsistence minimum (see section 3.2). Even if we included oats in this calculation, we would still be well below three barrels per capita, and this volume would still require us to exclude the granary seed required for sowing the following year. Similarly, Swedish official figures are widely considered to include only about half of the total harvest.[403]

Technically, provincial data would allow for calculation of yield ratios, which under certain sowing assumptions could be turned into an aggregate harvest series using agricultural acreage. At the current moment, however, we lack a good quality acreage series and therefore have to rely on the provincial data as it is. The best advice appears to be that one should remain critical concerning the provincial data until further research reveals otherwise, and the series should thus be considered in terms of mainly reflecting growth indices and preliminary long-term trends in Finnish grain output.

As already noted above, V.F. Johanson (1924) has provided qualitative harvest assessments using a scale of seven categories for each province from 1810 onwards.[404] In this study, these provincial assessments are used to increase the length of the harvest information beyond the data available from the 1840s. For all years there is an assessment for at least one variety of grain (rye, barley, and oats).[405] The rye series is the most complete, and gaps in the barley series were filled using values of the rye series. The oats series, which had the most missing values, was subsequently filled using values of the barley series; as the two original series are more correlated than those of rye and oats. Remaining gaps in rye are filled with the arithmetic mean of the two adjacent values (*t-1, t+1*), and then rounded up.

The transformation of subjective harvest assessments into actual levels of harvest is not a trivial matter. First of all, it may in practice prove difficult to determine whether the assessment presents an ordinal, interval, or ratio scale. Edvinsson quite correctly points out that, at face value, one cannot tell whether the difference between two categories at one end of the scale corresponds to a

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402 Solantie (2012), 160.
403 Edvinsson (2009), 4.
404 Johanson also reports assessments with three categories for the 1800s. Official agricultural statistics (SVT III: 1, 26) have qualitative assessment with four categories for 1846-1868.
405 Information for the year 1820 is lacking, so it is interpolated using the arithmetic mean in the following analysis.

difference of similar magnitude at the other end (i.e., total harvest failure and bad harvest versus extremely good harvest and good harvest).[406]

Secondly, it is unclear whether we should consider that assessments always point to the same harvest outcome. This is especially problematic at the lower end of the distribution. Comparing Swedish harvest assessments to price changes, Jörberg has detected a clear correlation between the two but with extensive price variation within each assessment category.[407] In the Finnish case, large famines have often been considered to result from "(close to) a total failure"[408] of harvest, and yet it is unclear what is technically meant by this "total". It seems likely that to infer these as years with yield ratios and harvest per capita as zero is a gross exaggeration. Pitkänen has pointed out that even the 1867 harvest failure did not affect every part of the country in the same way, and in several locations in the south, the harvest was, at worst, only mediocre.[409]

There is no denying that historical crop failures could have resulted in substantially low harvests, especially locally. According to Tornberg, the yield ratios of rye in the southwest of Finland in 1676 and 1677 were as low as 2.1 and 2.2, while the 1554 and 1601 harvest failures yielded average ratios of 0.96 and 1.67 in barley, and 1.37 and 3.67 in rye, respectively. Holopainen and Helama estimate that crop failures during the 1770s resulted in yield ratios of roughly 2.3 in barley and 2 in rye, while Salo has calculated that the 1862 harvest failure resulted in average yield ratios of less than one in the district of Kalajoki.[410] The worst famine in Finnish history is considered to have happened in the late 1690s. According to Virrankoski, the harvests for 1696 in Northern Ostrobothnia were 73.1% below the average for 1688-1690, with regional maximum and minimum drops from pre-famine levels ranging from 96% to 35%.[411] Considering that the average yield ratio was somewhere in the region of 5, these would have translated to a yield ratio range of 0.2, and 3.25, with average of 1.3. So, even if the crop failures may have resulted in substantial drops in grain harvests, at least something was typically harvested even during the most severe of crises. This still does not eradicate the fact that as the margin above subsistence was already small for a sizable share of the rural population, drops of this magnitude could clearly spell disaster in a context of inequality and poverty.

The third problem in the usage of qualitative harvest assessments is the lack of knowledge as to whether the categories should be considered as yield ratios or per capita harvests. The success of pre-industrial harvests was mainly understood through yield ratios, but in terms of reconstruction, per capita harvest would be easier to transform into volumes, as there is a population time series available.

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406 Edvinsson (2009), 14–15.
407 Jörberg (1972b), 69–75.
408 Jutikkala (1980b), 199; Turpeinen (1986a), 100; Keränen (1994), 59; Heikkinen (1996), 1; Myllyntaus (2009), 85. Staying true to the discourse, Klinge (1997), 239, talks about the "destruction of harvests".
409 Pitkänen (1991a), 41. See also Chapter 5.3 in this volume.
410 Tornberg (1989); Salo (2008), 48; Holopainen & Helama (2009), 218, see also Karonen & Nummela (2007).
411 Virrankoski (1973), 217-218.

In the first stage, the assessments were assumed corresponding to per capita volumes. The robustness and rationale of this will be discussed further on. After this assumption, the more important question, whether the qualitative scale corresponds in any way to per capita harvest levels needs to be assessed. According to an initial inspection, all grain varieties show on average a positive association to subjective harvest assessment scales, but especially in barley and oats the variation in each class is considerably wide. This is not surprising - these grains were grown in differing proportions in each section of the country, so that even highly abundant harvests of oats (in terms of yields) were fairly low in per capita terms in Eastern and Northern Finland. Similarly, over 60% of Finnish barley harvest came from the northern provinces of Oulu, Kuopio, and Vaasa. About 50% of the grain harvest in the last two provinces was barley, while in Oulu, 70% of the harvest was barley.

Variation in cultivation practices increase the variance of the estimates. In order to obtain any meaningful results, the quantification has to take into consideration the variation between provinces. To that end, a following regression model was estimated covering the years 1842-1870:

$$(9)\ P_{i,t} = a_0 A_{i,t} + a_1 D_i + u_{i,t},$$

where P is harvest per capita, A is the harvest assessment as provided in Johanson (1924), D represents dummy variables for each province (i), and u is the error term. a_0 and a_1 are then estimated using logarithmic values of A and P.[412] This yields an estimate for relationship between "actual" per capita harvest level and Johanson's harvest assessment; i.e., through this we can turn the qualitative assessment into per capita levels. This calibration procedure is conducted for all three grain varieties (rye, barley and oats) separately, and the estimated models are reported in TABLE 7.

412 Provincial population is calculated using deanary level population change tables and data in Vattula (1983), 20. The intercept was excluded to avoid a dummy variable trap. Logarithmic data provides higher R^2 values than untransformed data.

TABLE 7 Regression models for the relationship between grain harvests per capita and qualitative harvest assessments

Dependent variable:	Rye harvest per capita	Barley harvest per capita	Oat harvest per capita
Harvest assessment	0.406 (9.36)**	0.414 (9.89)**	0.339 (5.24)**
Province dummies			
Vaasa	-0.36 (-4.73)**	-0.59 (-7.99)**	-1.73 (-15.14)**
Häme	-0.42 (-5.24)**	-1.53 (-19.60)**	-1.20 (-9.98)**
Kuopio	-0.52 (-6.65)**	-0.56 (-7.70)**	-1.89 (-16.93)**
Turku and Pori	-0.20 (-2.56)*	-1.49 (-19.16)**	-0.75 (-6.28)**
Viipuri	-0.67 (-8.65)**	-1.77 (-23.87)**	-0.56 (-4.81)**
Mikkeli	-0.43 (-5.44)**	-1.37 (-17.23)**	-1.27 (-10.47)**
Oulu	-1.06 (-14.32)**	-0.36 (-5.09)**	-3.81 (-34.17)**
Uusimaa	-0.17 (-2.02)*	-2.03 (-26.39)**	-0.67 (-5.75)**
N	204	206	206
Adjusted R^2	0.663	0.854	0.879

*Note: Estimated using OLS. * Denotes statistical significance at 5 % level, ** at 1 % level. T-statistics in parentheses.*

The estimated a_0 coefficients can be interpreted as elasticities. For rye and barley the coefficients are roughly similar (0.41), for oats marginally lower (0.34). This means a 1% increase in harvest assessment corresponds to a 0.41% increase in rye and barley harvest per capita, and to 0.34% increase in oats harvest per capita. The confidence intervals of the slopes overlap, which suggests that the per capita elasticities of harvest assessments can be considered as being roughly identical between the grain varieties. This considerably increases the trustworthiness of the results and applicability of the assessments. The adjusted R^2 values are reasonably high for barley and oats (province dummies included, the assessments capture over 85% of the variation in harvests), considerably lower for rye (66% explained). To test, whether the qualitative scale should be considered being yield ratios, *(9)* was also estimated with provincial yield ratios as dependent variable. When yield ratios were used, the models produced R^2 statistics 0.585, 0.546 and 0.514 for rye, barley and oats, respectively. As the aim is to give the model best possible fit in the calibration period, the maximization of R^2 is reasonable objective. Based on this, per capita harvests were used.

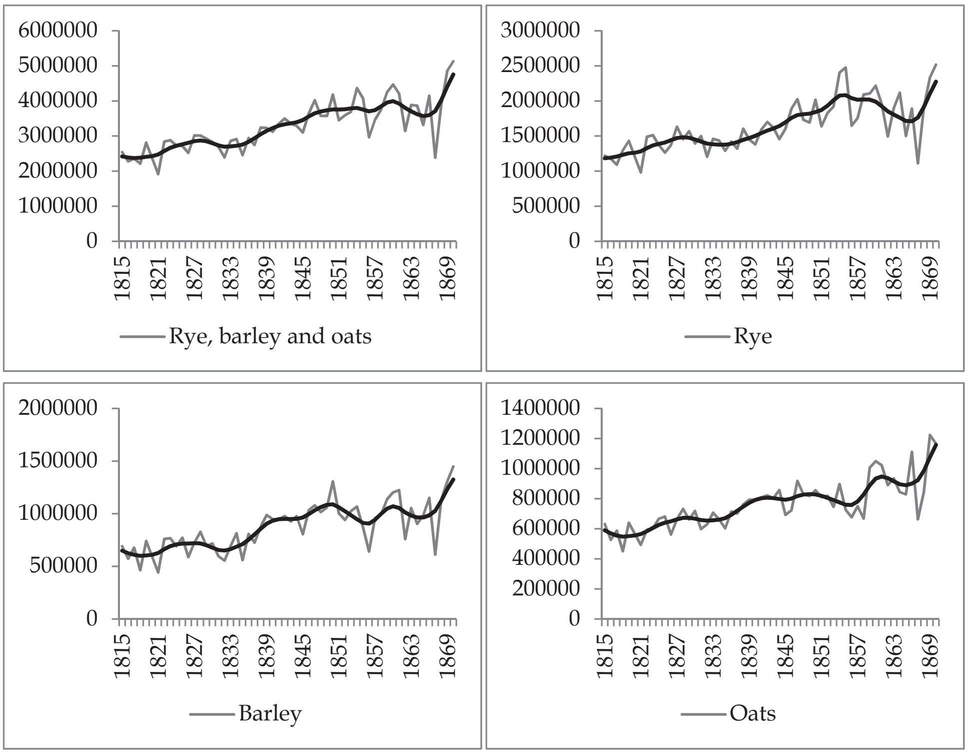

FIGURE 2 Total volume of Finnish grain production 1815-1870 (in barrels)

Source: Harvest levels are obtained through estimation based on model (9) for 1815-1840s. Remaining data is obtained from governors' reports (1842-1865) and official statistics (1866-1870; SVT II:2). Population is constructed on provincial level using deanery population tables (1815-1870) and information provided in Vattula (1983).
Note: One barrel = c. 165 liters. Smoothed using Hodrick-Prescott filter with lambda = 6.25. The missing values for 1820 is calculated as arithmetic means of the t-1 and t+1 values.

Before going to the estimation results, three critical points need to be emphasised. First of all, the data set used in the calibration is from the provincial reports; that is, the means produced by the models are identical to those of the original data for the period 1842-1870 and therefore they cannot correct for possible errors in the variable levels, which (as discussed earlier) may be substantial. Secondly, the estimation produces too low variance. This results simply from the fact that the independent variable has only seven categories which, in itself will tend to have a levelling effect - i.e., we are more likely to get peak values which are too low, and trough values which are too high. The model therefore underestimates the extent of harvest failures and thus should not be interpreted too strictly for any given year.[413] Thirdly, the estimation assumes

[413] The variance could and should be increased in the future with introduction of additional variables, especially grain prices.

that grain shares, in terms of total volume, remained constant over the long-term. This does not pose a fatal problem, however, as the role of oats only increased after the 1870s, and the relative shares of different grain most likely remained roughly constant during the early 1800s.

The model *(9)* thus yields harvest per capita estimates on the provincial level. By multiplying these with the population total we obtain the total harvest in each of the provinces and these are then summed to produce estimates on a countrywide level. FIGURE 2 thus shows Finland's total output of rye, barley, and oats on an annual basis; and, where available, the original data of provincial governors' reports is used.

On a general level, the total volume of grain production grew between 1815 and 1870. The downturn during the 1830s is clearly visible, with the pronounced crop failures in 1832 and 1835. The crop failure of 1832 that triggered a famine was preceded by a poor harvest of barley, while the 1835 failure happened after a fairly reasonable harvest in 1834.[414] Another noteworthy harvest failure happened in the 1850s, when mostly the northern provinces experienced widespread failures in their barley harvests. The failure of 1856 happened in the middle of a run of stagnant barley harvests dating back to the early 1840s (excluding the peak harvest in 1850). On the countrywide level, the reduction in barley harvests did not result in an aggregate per capita decline in grain availability, because there was a simultaneous increase in rye harvests. This compensatory development was particularly evident in the early 1850s. The abundant harvests in the 1840s are visible in this series too, and were reflected in low mortality rates during this period (the mean crude mortality rate in 1838-1845 was a mere 21.92, some 17% below the long-term average).[415] FIGURE 3 reports grain volumes in per capita terms, and the severity of the 1867 harvest failure is evidently clear. Indeed, it was the simultaneous failure in all grain varieties in 1867 that is particularly worth noting.

To test the hypothesis concerning the decline of agricultural productivity in the 19th century, a productivity index needs to be constructed. Grain yields provide crude information on the productivity of land used in farming, so the time series of average provincial yields are reported in FIGURE 4. The decline in barley and oat harvests in the early 1850s, as evidenced in previous figures is visible here too, though the trend is mainly caused by the failure of 1856. The crop failures of 1862 and 1867 are visible too. Importantly, however, no sustained decline is visible in any of the series. Time trends were clearly found to be insignificant in each case; rye (p=0.201), barley (p=0.820), oats (p=0.718). The scant evidence for any decline in rye stems from the failures of 1862 and 1867. If these are replaced with long run averages, the p-value for the time-trend rises to 0.564.[416]

414 See e.g., Kauranen (1999); Pitkänen (2002).
415 Vattula (1983), 38; Strömmer (1969), 22-26; here average of 1810-1834.
416 It is worthwhile to note that yield averages that are derived from governors' reports from 1840s to 1860s are lower than yield averages from 1830s that are reported in Soininen (1974), 118. Soininen does not, however, report standard errors and thus we cannot infer the statistical significance of this difference.

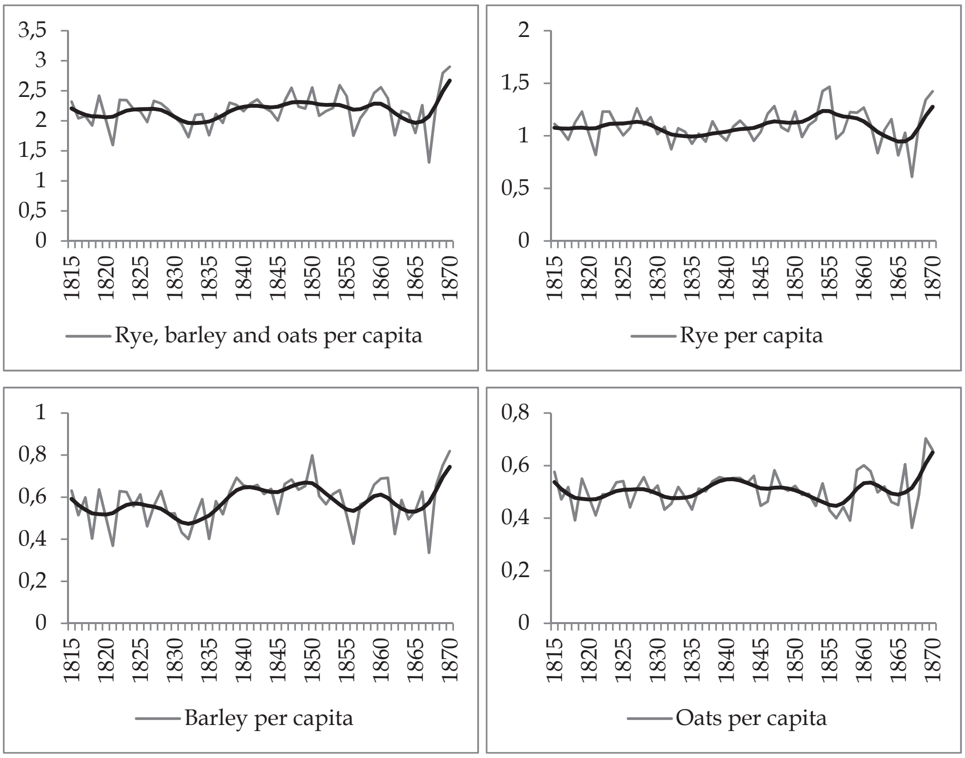

FIGURE 3 Finnish grain production per capita 1815-1870

Source: See Figure 3.2.
Note: Smoothed using Hodrick-Prescott filter with lambda = 6.25.

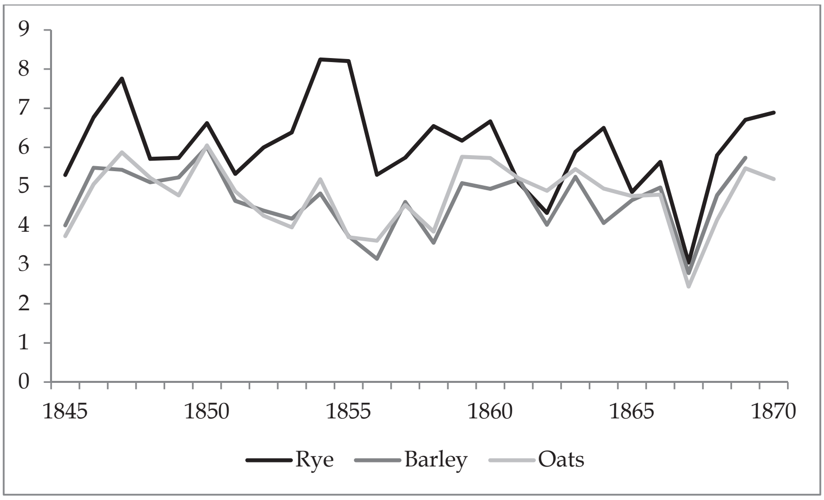

FIGURE 4 Average grain yields in rye, barley and oats, 1845-1870

Source: Provincial governor's reports (1840-1865), SVT II: 2
Note: Average of provincial grain yields.

Another possibility is to study the productivity of labour, measured here with a simple ratio of index of production to index of workforce. Mainly because of a lack of suitable labour input measures, several international studies have proxied rural labour force with rural population.[417] This approach has two important pit-falls. First of all, the denominator can fundamentally affect the outcome, hence care should be placed upon its choice. By assuming that rural population and labour force followed the same trends, one also assumes stability of the rural economic structure.[418] Hoffman has considered that the size of the agricultural labour force is extremely difficult to calculate with sufficient precision, especially when actors in the agricultural economy may have engaged in several different livelihoods at once.[419] Secondly, the amounts of working days and hours are difficult to obtain. Dividing output with labour input postulates no changes in the hours worked, leaving productivity increase through intensification of working unaccounted for. Furthermore, we lack suitable farm-level microdata employed efficiently in some productivity studies.[420]

417 E.g. Allen (2003), compare with Ojala & Nummela (2006)
418 See e.g., Haatanen (1968), 9-13; Wilmi (1991) for differentiation of Finnish rural social structure already in the 1600s.
419 Hoffman (1991).
420 Allen (1982); Hoffman (1991); Olsson & Svensson (2010).

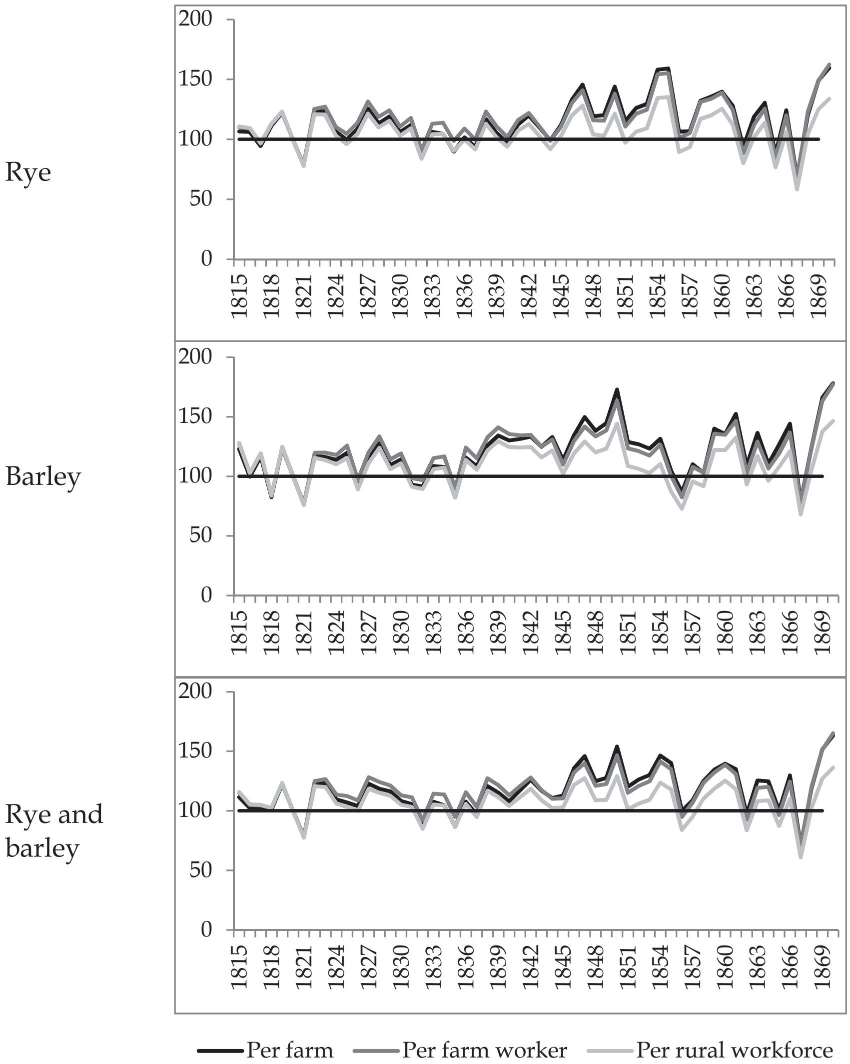

FIGURE 5 Productivity in Finnish grain cultivation (1820=100)

Note: Means based on provincial data. The data on the number of workers and farms is provided by Kilpi (1913). The original data has been reported on five year interval, here linearly interpolated. See text for details.

The population tables used in this study nevertheless provide quite detailed information on the structure of rural livelihoods and, based on the deanery level social tables, the size of the rural labour force can be calculated at five year intervals.[421] In the following, three particular denominators were used: the

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421 Yearly data was obtained through linear interpolation.

number of farms (including both freeholder estates and tenant farms);[422] the number of farmworkers;[423] and the number of people included in the whole rural workforce.[424] Addressing Hoffman's criticism, the number of farms is, in this way, highly reliable for the cadastral nature of taxation and the prevailing social structure. As will be discussed later, the number of farmworkers also includes the adult children of each household and therefore serve as a proxy for annual employment; and then the vagrant labourers are also included to capture the whole supply of rural labour.

The averages of provincial productivity are reported in FIGURE 5.[425] With the exception of the crop failures in the 1830s and 1860s, agricultural productivity grew during the first half of the 19th century. The figures highlight the importance of which production input variable is selected; the productivity measures differ greatly from one another. Farm and rural worker productivity move roughly together, increasing substantially during the time period; but productivity per rural workforce diverges from farm-level productivity in the late 1830s, stagnates and starts to decline in barley cultivation already during the 1840s, and in rye from the late 1850s onwards. Farm and worker productivity increased in rye until the mid-1850s, but productivity in barley cultivation decreased significantly during the 1850s, and this resulted in overall depression in grain productivity. Meanwhile, the productivity of rye cultivation stagnates after the crop failure of 1856, but only starts to actually decrease in the early 1860s.

When inspecting productivity on a provincial level (FIGURE 6), it seems that the southern provinces of Uusimaa, Turku and Pori, Häme, Mikkeli and Viipuri had slow productivity growth throughout the 1800s, with a marked downturn during the 1830s. The average growth rate is certainly tricky to pin down accurately, due to the high volatility, but it does appear that the southern provinces showed a somewhat lower average growth in farm-level productivity (approximately 0.5-1.0%) between the 1820s and 1850s than the northern provinces, where the farm-level productivity increase exceeded 1% annually. The fact that productivity growth in terms of different inputs vary is to be expected on the basis of their different growth rates. It is typical that productivity increases more when calculated in terms of worker than in terms of e.g., popula-

422 The "farm" group consists of freeholder peasants, whole farms renters and croft farmers.

423 The "rural worker" group consists of live-in agricultural servants (*rengit, piiat*) and adult sons and daughters of farmers still living at home. The sons of peasants (*talonpoikaispojat*) classified separately are not included, as there is a risk of double counting some of the population, see e.g., Kilpi (1913), 35, 46-47. The results were extremely robust to their exclusion. See section 4.3 for a more detailed discussion.

424 The "rural workforce" consists of rural workers (the group listed previously) and of lodgers able to work (*f. työkykyiset itsellismiehet*) and unmarried lodger women (*f. naimattomat itsellisnaiset*).

425 The qualitative results are robust to the definition of the mean (among others, weighed and harmonic means were also inspected).

tion and for example English agricultural output declined in the early 1800s per capita but increased per worker.[426]

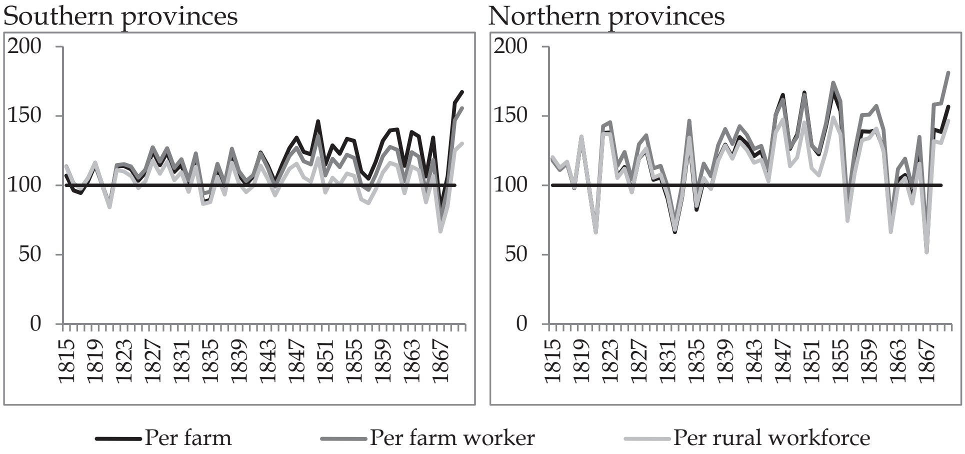

FIGURE 6 Regional agricultural productivity

Note: Total production of rye and barley in relation to labour measures

The higher productivity growth in the northern provinces is to be expected on the basis of the production input variables displayed in TABLE 6. This suggests that in the slash-and-burn region, the increase in agricultural productivity during the 1840s and early 1850s happened through more effective usage of the rural workforce. If the increase of labour productivity resulted from increased capital inputs, either the increase of arable and pastures reduced under-employment during the period, or resulted in an increase of work at the farm-level. Clark has suggested the latter - that differences in agricultural productivity in the early modern period most likely reflected differences in work intensity. His reasoning is that there were relatively few actual innovations which could genuinely increase agricultural productivity during the period.[427] Finnish agriculture mainly evolved through different crop circulation methods and through minor changes in cultivation tools. Based on local evidence, Kaukiainen considers that the introduction of new equipment such as ploughs could scarcely have resulted in any tremendous increase in productivity.[428]

426 For a literature review, see Olsson & Svensson (2010), 286-287. For more on English agricultural labour productivity, see Broadberry et al. (2015), 340-370. According to Allen (1988), agricultural productivity increased partly because of increased farm sizes and reduction in labour.

427 Clark (1987), see (1992) for consideration on the nitrogen content of the soil.

428 Soininen (1974), 96-115; Kaukiainen (1980b), 112-118; Korhonen (2003). Edvinsson (2013) suggests that technological innovations in Swedish agriculture, such as iron tools, counteracted a reduction in per capita production that otherwise could have been the result of population growth in the 1600s and the 1700s.

The divergence of the productivity measures is smaller in the northern provinces than in the south. This is understandable because of the prevalence of work-intensive slash-and-burn in the north. Also, being the staple crop in the northern provinces, the different barley productivity measures follow one another more closely than the rye measures (FIGURE 5). In the southern provinces the total workforce productivity of rye and barley cultivation remained stagnant during the first half of the 1800s.

The different productivity trajectories partially stem from the rural conditions displayed in TABLE 2 - the number of farms (even when crofts are taken into account) grew considerably slower than population or vagrant labour in the countryside. As the land was mostly cultivated in freehold farms (by tenants or the freeholders themselves), farmers were the ones who gained most from the growth in agricultural output. This was reinforced by the fact that rural real wages did not grow during the 1820-1870 period and this therefore implies that rural income inequality increased after the late 1830s.[429]

In the northern provinces, the productivity downturns were seemingly connected to crop failures and thus to the weather.[430] The crop failures in the mid-1850s caused a temporary decline in productivity in the southern provinces but a sustained one in the north. Productivity in the south only really fell in the wake of the crop failure of 1862, after which there is a persistent downward trend all the way until 1869. As is evident from FIGURE 6, the rebounds in the mid-1860s were clearly insufficient to correct the downturn. In this way, the consideration by Baro and Deubel that "famines […] can be viewed within […] the limited ability to recover from negative impacts"[431] is important in understanding the spatial patterns of famine escalation in the context also of Finland in the mid-nineteenth century.

3.5 Discussion

There was productivity growth in agriculture during the 1800s, but the long-term growth was sensitive to exogenous shocks. This growth has two important corollaries. First of all, the increase of agricultural productivity that started in the late 1830s[432] happened at the same time as the first stages of Finnish indus-

429 Real wages (see 4.1 in next chapter) diverged from these productivity measures, however, in the late 1830s and 1840s; i.e., they did not follow the increase.

430 For a more general representation concerning climate shocks and agricultural productivity see Dalgaard et al. (2015).

431 Baro & Deubel (2006), 526. In relation to the 1860s famine, Pitkänen (1991a), 50, and (1993) 60-68, has emphasised the "delicate balance" between harvest outcomes and grain loans needed for sowing if harvests fail. Consecutive failures led peasants to fall into excessive debt.

432 This "start" may prove to be an illusion that results merely from the time span; e.g., Olsson & Svensson (2010) suggest that Swedish agriculture exhibited productivity growth already in the late 1700s. In the estimates presented here, the productivity appears to return in the late 1830s to a trend-level which can be projected already from the late 1820s onwards.

trialisation. This is to be expected on the basis of several models that anticipate a connection between an increase in agricultural productivity and the onset of industrialisation. In his pioneering work, Crafts has suggested that, given the inelasticity of food demand, an increase in per capita income leads to the reallocation of labour to non-agricultural sectors. The important implication of this is that population growth in itself is insufficient for generating the growth of an industrial workforce; in fact, under certain conditions, population growth can actually result in de-industrialisation. In line with this, Heikkinen presents some estimates of (time series) income elasticities for cereal demand, placing them roughly between 0.2 and 0.6; well within the boundaries for the applicability of the Crafts' model.[433]

In a more elaborate version presented by Kögel and Prskawetz, an exogenous increase in agricultural total factor productivity causes population growth and per capita manufacturing output to increase. In a similar fashion, Strulik and Weisdorf model an increase of productivity in the industrial sector in response to a productivity increase in agriculture. In this model, the process leads to a decrease in total fertility rate and ultimately to convergence with a steady growth path.[434] In terms of Finnish agricultural history the big question is, whether there actually existed a sufficiently big enough economic sector outside agriculture that could absorb those freed up from the agricultural sector. This topic will be scrutinised in greater detail in chapter 4, but overall it appears that, contrary to models which postulate increased inequality during industrialisation through the existence of (two) different sectors of the economy exhibiting different growth processes[435], the Finnish evidence suggests that the nascent modernisation of the economy may have actually depressed average living standards with the unemployment caused by less need for agricultural labour.[436]

The second corollary is that these results cast reasonable doubt on the interpretation that the 1860s famine was preceded and ultimately caused by a historically unique crisis in agricultural productivity. Only in terms of total workforce productivity was there evident stagnation and pre-famine decline. This however comes with substantial regional and grain variety differences; and the decline in total workforce productivity in the 1850s mainly stemmed from a downturn driven by crop failure in the northern provinces.

The case for the absence of a structurally sustained productivity decline is more compelling. First of all, productivity increase was possible to obtain, though the growth mainly targeted landowners and croft farmers. Whether the increase in labour productivity of annually contracted farmworkers translated to increased wages and/or decreased employment is uncertain. There is some local evidence of increased wages for the yearly contract workers, but no macro-level assessment has yet been conducted.[437] Similarly, it is unclear, how the

433 Crafts (1985); Heikkinen (1996), 14. See also Campbell & Ó Gráda (2011), 875-877.
434 Kögel and Prskawetz (2001); Strulik and Weisdorf (2008).
435 One classic and simple treatment is provided by Robinson (1976).
436 See also, e.g., Mokyr (1985), 12-13; Allen (1988).
437 E.g. Rosenborg (1995).

increased productivity of the yearly contract labour affected external labour demand on the farm-level.[438]

Secondly, it is somewhat difficult to confidently separate the downturn of productivity during the late 1850s and the early 1860s from the abysmal weather conditions that characterised the period. At least, currently we lack sufficient data to undertake such a task.[439] Lastly and more importantly, the famine of the 1830s was preceded by an almost identical downturn in productivity as the famine in the 1860s. When the loss of variance in grain output estimation is taken into account, the late 1820s and early 1830s scarcely differ from the situation 30 years later. In this respect there actually is no qualitative difference between the famines of the 1830s and the 1860s, except in terms of scale. This is not unexpected; as was emphasised earlier all large pre-industrial mortality crises were preceded by a longer span of bad harvests or genuine harvest failures.[440]

The increase in agricultural labour productivity during the 1840s fits poorly to the narrative which suggests that the famine of the 1860s was a "final crisis" for the under-developed pre-industrial Finnish agriculture. Similarly no downward trend was observed in the grain yields prior to the famine. Instead, after the famine the yields returned to averages above those before the famine, suggesting that there was not much wrong in the agricultural quality of the land.[441]

The productivity growth is also important in refuting the sleepwalking discourse of famine escalation. It seems reasonable to argue that Finnish agriculture began to modernise (at least) from the late 1830s onwards, but the process was too slow to deal with the crop failures beginning in the 1850s. On the historiographical side, this alleviates the "blame" put on agricultural actors considered to be using factors of production excessively to the extent that their own livelihoods became untenable.

The different productivity rates of labour inputs highlight two fundamental aspects shaping the economic structure: access to land through ownership, and tenant contracts and employment possibilities provided by the farming sector. The diverging productivity patterns emphasise that a larger role should be given to the analysis of rural inequality and for a more explicit treatment of how this inequality developed. These are scrutinised in chapter 4.

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438 See Section 4.3 for details. There is a persistent "folklore" in the Finnish historiography that farmers started to use increasingly cheaper seasonal labour during the 1800s, see e.g., Kaukiainen (1980b). This has not been empirically verified.

439 See e.g., Dalgaard et al. (2015) for more general discussion.

440 Similarly, on the basis of real wage reconstruction by Geary and Stark, the Irish real wages stagnate prior to the famine outbreak in the 1840s. Ó Gráda and Mokyr have presented evidence for deepening poverty prior to the famine, Geary & Stark (2004); Ó Gráda & Mokyr (1988).

441 It naturally could be that the famine induced mortality reduced farming in the marginal soils and therefore led an increase in the average land quality in use. No such assessment has been made.

3.6 Conclusion

This chapter focused on Finland's agricultural economy, the social composition of rural Finland, the natural boundaries of production and the productivity of grain cultivation. The emphasis on grain production is reasonable, considering the dietary significance of grain and pre-industrial aggregate production.

Pre-industrial Finnish agriculture was prone to harvest failures only to a certain extent: large crop failures and especially large famines were rare. The crop failures occurred more often and in greater magnitude in the northern provinces. The south was widely free of crop failure from 1810 to 1870, while the province of Vaasa fared the worst - there were substantial failures of rye and/or barley harvests roughly every four and a half years, and every sixth year both the rye and barley harvests failed at the same time.

Finnish agricultural productivity grew during the 1800s but the growth concerned mainly farmers and yearly contract farmworkers. The differences in regional productivity patterns suggest that the economic inequality grew after the late 1830s, more substantially in the southern provinces than in the slash-and-burn regions of the east and north. This productivity increase contradicts the previously held idea that Finnish pre-industrial agriculture was inefficient, underdeveloped, and crisis-prone. Instead of considering the 1860s famine as the final crisis in a dying agricultural regime, it is more likely that by increasing rural inequality over the short-term, the modernisation of the agricultural system increased its vulnerability to shocks. The evidence presented here highlights the need for a more detailed analysis of this system and of those institutional factors affecting the social and economic structure which alleviated the buildup of socioeconomic segregation. The social structure created by the agricultural economy is the subject of the following chapter.

4 THE EXTENT AND NATURE OF PRE-FAMINE POVERTY IN FINLAND

According to Ó Gráda, famines are hallmarks of poverty and underdevelopment. On the basis of experiences in the West, this is hard to argue with - the onset of the Industrial Revolution and the rise of social security systems indeed resulted in the eradication of famines from the Western world, with the last strongholds of poverty holding out in the within-country peripheries, relatively far from the administrational centres.[442] Considerably more controversy surrounds the question, of whether or not this being underdeveloped is, however, a sufficient or necessary condition for the existence of famines. While mortality surges have traditionally been seen as an organic part of the pre-industrial era,[443] whether this be due to nutrition crises or disease epidemics, the degree to which rising average incomes have had an effect on eradicating malnutrition from the modern developed world is still a much debated topic.[444]

According to traditional interpretations, the pre-industrial world was condemned to widespread and permanent levels of destitution driven by low agricultural output and by a population growth that reacted to the slightest increase in welfare. Together these constituted a condition of unstoppable

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442 Ó Gráda (2009), 9, see also (2007); (2015a). Vanhaute, Ó Gráda & Paping, (2007), 35–36. See also Ó Gráda (1999), 230-231. For peripheral geography and the disappearance of English famines see Appleby (1978); Wrigley & Schofield (1981), 645-693; Walter & Schofield (1989), especially 41-48; and Klemp & Weisdorf (2012). For consideration in the Nordic context, see Nelson (1988) on Sweden; and Turpeinen (1991) and Rantatupa (2003) on Finland. See also Newby & Myllyntaus (2015), 149-150, and Gray (2015) for more on the core-periphery discussion concerning the famines in Ireland in the 1840s, and in Finland in the 1860s.

443 Watkins & Menken (1985), 647.

444 Fogel (1992); Floud et al. (2011), 116-118 and Kelly & Ó Gráda (2014a) have emphasised the role of social security and state intervention in eradicating famines. Mokyr (1985), 6, puts this down to the close to axiomatic stance of modern vulnerability literature that "poverty does not lead inevitably to disaster, and disasters do not require a necessary precondition of poverty." For more on inequality and growth see Ravallion (1997b); (2001); Dollar & Kraay (2002).

poverty known as the Malthusian trap.[445] Assessments as to the level of this poverty in England ranged from "a third to half [of the population]", which meant it was seen as a "massive and permanent element".[446] According to Woolf, about one third of the Florentine population in the mid-1700s applied for poor relief and even those studies which tended to yield lower poverty rates still placed their estimates between 15 and 25% of the population.[447] Laslett maintained that there was no reason to suspect there not being a sizeable section of the pre-industrial population that had to look for collectivity in order to get by and Clark considers that the yields per acre were so small that even by subsistence standards they could hardly sustain large populations.[448] Overall, the consensus appears to be that by any 'modern' standard the pre-industrial world was wretchedly poor.[449]

Due to the lack of historical sources which provide genuine information on income levels, research has often had to settle for indirect means of measuring poverty. In the Swedish case, Lundsjö and Söderberg have used the inability to pay the smallest of personal taxes as an indicator. Depending on the geographic region, some 10 to 30% of the Swedish adult population was exempt from these taxes during the 1800s.[450] Juxtaposing these figures with official Swedish poor relief rates provides support for the general consensus that fiscal sources (i.e., tax exemptions) tend to display higher historical poverty levels than what can be obtained from poor relief censuses, as only a few percent of the Swedish population was entitled to poor relief during the 1800s. In Finland the proportion of population subject to poor relief was about 3% in 1865, ranging from some 2% in the southern parts of the country to 6.3% in the province of Oulu.[451] Whether these small percentages reflect a low level of poverty or simply a selection bias regarding who qualified for poor relief is an open question.[452]

Like the extent of the pre-industrial poverty, the pro-poor nature of the early economic growth is widely discussed in economic history literature. Starting especially from the classic contribution of Simon Kuznets in 1955, there has been a wide interest in whether the early stages of industrialisation in the late 1700s and early-1800s witnessed an increase in economic inequality and/or a decrease in the average income.[453]

445 Gregory Clark is quite likely the most vocal proponent of this hypothesis; Clark (2007a).
446 Wrightson (1982), 148; Beier (1983), 5.
447 Hoskins (1957); Lindert & Williamson (1983); Arkell (1987), especially 47; Woolf (1986), 161, 163. See also Ó Gráda (1999), 24-25 for similar considerations about pre-famine Ireland.
448 Laslett (1988), 164; Clark (1992), 61.
449 Häkkinen (2016) captures the general pessimism in retrospect when stating that "poverty was so widespread that at first glance attempts to calculate its exact levels and amounts seem to be a waste of time".
450 Söderberg (1978); Lundsjö (1975).
451 Kilpi (1913); (1915); Jütte (1996), 47; Bengtsson (2004b), 138–142; Engberg (2006), 39.
452 Arkell (1987), 39; Lees (1998), 29-30; Engberg (2006), 52–53; Vikström (2006), 225.
453 For negative considerations, see e.g., Feinstein (1998); Allen (2001); Komlos (1993); (1999); Malanima (2011), for positive see e.g., Grubb (1999); Broadberry et al. (2013); Milanovic et al. (2011). On the basis of Italian evidence from medieval and early

According to currently available evidence, Finland was a latecomer in terms of economic growth. Poverty and underdevelopment, as we would see them today were strikingly permanent.[454] The country one of the poorest, or even *the* poorest when compared to those (Western) European countries in the 1800s that had macro-economic measures available. Macro measures are, however, indicative at best of the socioeconomic structure and the vulnerability of livelihoods; two countries with roughly identical incomes and development levels can exhibit widely different trajectories after an exogenous economic shock.[455] In order to provide a considerably more detailed picture than that of mere macro welfare measures this chapter employs novel spatial data to provide insights into Finnish economic performance during the 1800s, and to the extent and dynamics of pre-famine poverty.

4.1 The development of the Finnish macroeconomic living standards prior to the 1860s

Not much is known about Finnish living standards during the 1800s. There are, however, some commonly held beliefs about Finnish economic growth before 1860, after which GDP figures are available. Hjerppe has suggested, though without detailed calculations, that Finnish GDP grew at a rate of circa 0.3-0.4% per annum in the period 1820-1860. The back-projected estimate of Heikkinen et al. for 1820 is included in the Maddison database - an increase in GDP from the 1820 per capita level of 781 Int. GK$ to the 1860 level of 959 Int. GK$ corresponds to an annual growth of about 0.52%. Eloranta et al. (2015) have suggested in a trial estimation that the 1820 Finnish benchmark may, however, need an upward revision of about 5.5-15%, and this would thereby downgrade the annual growth to 0.16-0.38%.[456]

Either way, as long as the GDP per capita growth rates lie below 1% per annum, the Finnish evidence concurs with the long held consensus that, historically speaking, economic growth is a fairly recent phenomenon. Van Zanden has argued that GDP per capita in Western Europe, on average, increased 15-35% between 1500 and 1820 and that the increase came entirely from non-agrarian sectors.[457]

The increased population share of the lowest social classes has crucially affected Finnish historians' negative perception concerning the development of

modern times, Alfani (2015) suggests that inequality grew independently of whether the economy was growing or stagnating at any one time.

454 Hjerppe (1988); Heikkinen (1997), 143–145; Häkkinen & Peltonen (2001); (2005); Hjerppe & Jalava (2006).

455 De Waal (1996); Ravallion (1997a), 1208; Ó Gráda (2009), 255-258.

456 Heikkinen et al. (1987), 74–75, 92–93; Hjerppe (1988), 39–40; Eloranta et al. (2015).

457 Van Zanden (2001), 82–84. It is nevertheless worthwhile to point out that the grain production does not equal to total agricultural production: e.g., in 1860 about 40% of gross value of production in agriculture came from rye, barley, wheat and oats, milk constituted about 22% and production of beef and pork about 16%, see Viita (1965).

living standards during the 1800s.[458] To diversify this interpretation, however, there are relatively few studies that explicitly assess economic development and welfare in pre-1860s Finland. According to Pitkänen, mortality rates increased in several age groups during the 1800s and only infant mortality exhibited a substantial decrease between 1811 and 1865.[459] Based on anthropometric data, the average heights of Finnish soldiers recruited into the Swedish army decreased from an estimated 169.0 cm in 1764 to 166.9 cm in 1804. This happened in a period when there was also a decrease in real wages.[460] There is crude evidence from the early 19th century showing a continuing decline in heights, but due to the unaccounted distributional truncation no firm conclusions can be drawn.[461]

Probate inventories are a source that is extensively used to provide information about pre-industrial wealth. Markkanen has used these from a large part of Central Finland to provide cross-sections from 1850-1851 and 1870-1871. According to these, there is some sporadic evidence for a decline in wealth between 1850 and 1870 especially among freeholders; and on the basis of more extensive data, Heikkinen et al. seem to concur, suggesting there was decline in gross wealth of both urban and rural probate inventories after the mid-1850s, but just like the figures presented in Nummela (1994), those of Markkanen and Heikkinen et al. also suffer from a sampling bias that remains unaccounted for.[462] In the case of probate inventories, the bias arises because the probability that an inventory would be made of a deceased person's estate varied from year to year, as could the cut-off point below which inventories would generally not be made.[463] Because of this sampling bias, it is uncertain whether the observed declines in average height and wealth reflect genuine population phenomena or simply variations in the samples.

Currently the only available long-term estimate about pre-1860 economic growth in Finland is provided by the real wages series by Heikkinen et al. (1987) (FIGURE 7). The applied consumer price index is based on a commodity basket including rye, barley, butter, and salted herring. This composition is considered reflecting the scarcity typical for a rural Finnish household during the nineteenth century.[464] The prices used are conversion prices, 'market price scales'

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458 The roughly similar socioeconomic development in Sweden has produced more or less concurrent interpretations see e.g. Söderberg (1985), Engberg (2006). Milanovic et al. (2011) are one of the latest advocates for an explicit connectivity of low social class and low average income.

459 Pitkänen (1980), 375–377.

460 Penttinen et al. (2013), 410; Nummela & Penttinen (2007); Penttinen et al. (2003), Nummela (1994). Jörberg (1972b), 343, has raised doubts about the decline in Swedish real wages providing any information on the general economic situation prevailing in agriculture in the late 1700s, see however Tornberg (1989), 77–78; Gadd (2000), 345–346; and Rickard et al. (2010), who all suggest that Finnish and Swedish living standards did actually decline in the late 1700s.

461 Nummela (1994), 114–115.

462 Markkanen (1977), Heikkinen et al. (1987).

463 Nummela (1995) suggested that if those estates that were not inventoried are considered without any wealth, the subsequent Gini coefficients on the wealth distributions would reach above 0.90; much too high to be believable

464 Heikkinen et al. (1987), 69.

(*verohinnat*), which were compiled originally to provide crude macro-level information about the relative value of products and agricultural wages and to give a value to various payments that were made in kind.[465] Even if it does seem that the conversion prices yield variance estimates that are too low, they have been found to display roughly identical patterns to those of other price data and are generally considered to be reliable.[466] The nominal wage is based on the daily rate of a male agricultural labourer. Close to half of all the Finnish men working in agriculture were farm labourers, though it is difficult to confidently assess the actual percentage because it depends on which social groups are included; however, it is likely that up to some 30% of the rural population were wage earners.[467]

FIGURE 7 Finnish real wages, 1731-1870
Source: Heikkinen et al. (1987)

As will be shown in *[1]*, the Finnish demographic rates were clearly less sensitive to living standards measured in real wages than those of Sweden or some other European countries judging from the existing literature. One possible explanation for this is that real wages fail to properly represent the living standards in Finland. Traditionally the same has been argued on the basis that Finland was a vastly agrarian country where a substantial proportion of the wages were paid in kind and where the majority of farmers were more or less self-supporting.[468] There is no formal investigation as to whether prices and wages were genuine economic constraints to the majority of people, though Pitkänen has argued that geographical differences in regional price levels corresponded

465 Johanson (1926); Jörberg (1972a); (1972b); Heikkinen et al. (1987); Edvinsson & Söderberg (2011a); Edvinsson & Söderberg (2011b).
466 Jörberg (1972a), 16–77; Heikkinen et al. (1987); Edvinsson & Söderberg (2011a), 272–273.
467 Kilpi (1913), 99–101; Hjerppe (1988), 59, see also Gadd (2011); Morell et al. (2011), 289.
468 Soininen (1974), 368–369.

to respective differences in the crops, even in regions where imports had an impact on prices.[469]

But when we use wages and prices to judge living standards in the pre-industrial world we need to bear in mind how the markets functioned at this time as well. According to Devereux, all recent African famines are characterised by a failure of markets to deliver access to food at affordable prices. Similar to modern markets in the developing world, it seems that the pre-industrial food markets can also be considered "thin", characterized by *i)* unequal temporal distribution of food supply and demand, *ii)* abrupt (often seasonal) changes in the relative value of assets and food, and *iii)* labour which had a purchasing power sensitive to fluctuations in nominal wages and food prices. This intertemporal inconsistency of purchasing power and market supply that contributes to the thinness of the markets can be observed with seasonal fluctuations in the year, and variations in harvests from year to year. While the thinness of the markets may have hampered individuals' ability to participate in market exchange on the general level, it is thought that the adversity caused by thin markets particularly affect the poor and vulnerable.[470]

Of the few Finnish studies that exist on the subject, Karonen and Nummela have suggested inland regional grain markets were already well-integrated by the late 1500s; while Pitkänen has also inferred that the short-term pattern of price fluctuations in the 1860s indicate well-integrated markets.[471] The only formal test on this subject is provided by Ó Gráda, who studied price adjustments in the Finnish rye markets during the 1860s. According to him, several pre-industrial food markets, such as rye in Finland, functioned better during crop failures and famines than in normal times. Only in the province of Viipuri did rye prices display slower eradication of market disequilibrium during the famine years of the 1860s.[472]

4.2 The Finnish household system

Pre-industrial societies have tended to have one characteristic in common: there was an increase of marriages and births when living standards improve, and a decrease of these when they worsen. This response has been conventionally dubbed as the Malthusian preventive check[473], and has generally been associat-

469 Pitkänen (1993), 57–59. Pitkänen also points out that, for example, subsistence farmers had to acquire their income from other sources than market sales, 68.

470 Devereux (2009), 27. See also Persson (2000), 23-46.

471 Karonen & Nummela (2007); Pitkänen (1991a), 61; (1993), 53-56.

472 Ó Gráda (2001) see also (2005). According to Goodwin & Piggot (2001), threshold models provide faster price adjustments than those which do not account for threshold prices above/under which the adjustment happens. Based on this, faster adjustment during a famine may be due to the high prices that increase profits by reducing the relative impact of (fixed) transaction costs.

473 See *[1]* for literature review concerning the geographical extent and Section 2.2 for further consideration.

ed with a social structure dominated by the nuclear family that was widely evident in pre-industrial Western Europe. The classic perception has been that this very mechanism provided the region with an economic cutting edge during the early modern period over Central and Eastern European countries, though this has been recently contested.[474]

Given the preventive check, the fluctuations in the number of marriages should indicate economic fluctuations; and when there was an economic downturn marriages would be postponed, especially among the rural poor, who would marry later than the rest of the population and have smaller families.[475]

The marital system played a crucial role not only in determining social macro-structures such as these but also in shaping the micro-contexts of individuals. And yet, as Moring has emphasised, as well as Guinanne and Ogilvie, family dynamics did not simply manifest themselves in observable social structures; they were also controlled by social, economic, and cultural constraints.[476]

The marital system designated more than how a household was formed: it represented a crucial ingredient in how individuals were tied to their local communities and how their social surroundings dictated their living standards. The so-called 'neo-local practice' is often thought to go hand-in-hand with the nuclear household context - in other words, a person had to leave the parental household to form a new one after marrying.[477] Laslett has considered that the more widespread the nuclear family, and the more strictly neo-local rules are applied, then the more important collective institutions will be for the security of the individual in the event of economic stress.[478] An existence of the nuclear family ideal and a simultaneous assumption of neo-locality could have caused a substantial within-household inequality of attainable living standards if leaving the parental household was prolonged due to economic difficulties. This means that if marital prospects and the possibility of setting up one's own household diminished, neo-locality would have made cohabitation compulsory. Large households born this way ought to be differentiated from collaborative large households, as the former quite likely entailed more unequal within-household power relationships, leaving certain household members in a more disadvantaged position if the household's livelihoods unravelled.[479] This might explain why the number of households per capita was observed as being in negative

474 For review see e.g., Dennison & Ogilvie (2014).

475 Kaukiainen (1979); Arkell (1987), 45; Moring (2003); Rickard et al. (2010).

476 Moring (1996); (2003); Guinnane & Ogilvie (2008); (2014). As maintained by Michael Mitterauer and Karl Kaser, the age at marriage was also influenced by the institutions of inheritance, which aimed to keep parental farms undivided, for more on this, see Waris (1999), 30.

477 Laslett (1988), 153. For Finnish interpretations see e.g., Ylikangas (1968); Kaukiainen (1973)

478 Laslett (1988), see also e.g., Vikström (2003), 230.

479 This can be interpreted through the individual ability to command the household's resources. It seems appropriate to assume that an increased mean household size due to prolonged marrying also increases the likelihood of within-household inequality. For example Pulma (1994), 27, considers that large extended households alleviated the growth of lower social classes in Eastern Finland - those who set up independent poor households in Western Finland remained within these large households in the East.

association with the spatial patterns of famine mortality in *[3]*: the unavailability of local and central governmental aid during the famine left individuals with few sources of income when the household system ceased to provide subsistence.[480]

John Hajnal, an influential pioneer in historical family studies, considered that a divide roughly ranging from St. Petersburg to Trieste separated Europe historically in terms of family institutions.[481] According to him, the Western European marital system was characterised by first marriage at a late age, households composed of nuclear families, and a high percentage of people never marrying. On the contrary, the Eastern European marital system was characterised by low age at marriage, high marital coverage and a marital landscape dominated by extended households.[482]

According to the most straightforward assessments, the Hajnalian divide has been considered to cut Finland in two. The outlined Western European pattern has been considered to prevail in Western Finland, as a result of the permanent open field agriculture, whereas the work-intensive livelihood structures (slash-and-burn cultivation and tar burning) in Eastern Finland especially and also in Eastern Ostrobothnia have typically been seen as conducive to large and/or extended households.[483] Exactly where and whether the divide lay within the country is vastly unexplored. In terms of the size of a household, it has been emphasised that there should be a distinction made between a household with many children and one with a genuinely multi-family structure.[484] While in principle this is true, given the high childhood mortality in the pre-industrial era, it is quite obvious that households of more than 10 people could hardly exist without some sort of social extension.

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480 Whether or not the mean household size is connected to a household's living standards and whether it varied with social mobility, is tied to a larger discussion about the pro-poor nature of early economic growth. The extent to which mean household size can be considered as a reflection of welfare differences is uncertain and likewise it is unclear whether the size of a singular household is enough to indicate its social position, see e.g., Arkell (1987), 45-46; Deaton & Paxson (1998); and the discussion in *[2]*. This obscurity is reinforced by the fact that the long-term dynamics of mean Finnish household size lies virtually uncovered. According to Waris, large households were most abundant in the early 1800s, but the chronology and socioeconomic factors behind their emergence and disappearance is poorly understood, Waris (2003), 495, 497 see also Soininen (1974), 392–393; Pulma (1994), 25-27; Sirén (1999), 142.

481 Esp. Hajnal (1965).

482 Hajnal (1965); Sirén (1999), 9-15; Waris (1999), 29-30; Dennison & Ogilvie (2014), 651–652. Hajnal's original treatment considered only i) high age at marriage and ii) a high proportion of people never marrying, Hajnal (1965), 101.

483 For a review of Finnish typologies see Waris (1999), 178-179. Sirén (1999) considers that the western parts of the province of Viipuri straddled the Hajnalian divide.

484 Pulma (1994), 27. An older Finnish tradition defined the concept of a large household on the basis of a semi-arbitrary choice of the number of people belonging to a household. The cut-off point typically was placed somewhere between 10 to 15 inhabitants, Waris (2003), 495.

TABLE 8 Rural population and the number of households in 1865 according to different sources

	Poll tax registers			Deanery population tables		
	Rural Population	Number of households	Mean household size	Rural population	Number of households	Mean household size
Uusimaa	128649	19931	6.45	147020	24794	5.93
Turku and Pori	260292	47938	5.43	280719	49671	5.65
Häme	159496	30246	5.27	169469	26982	6.28
Mikkeli	152557	17570	8.68	160392	25016	6.41
Viipuri*	251301	35865	7.01	234573	*25962*	*6.98*
Kuopio	209810	22141	9.48	212610	29986	7.09
Vaasa	282050	46754	6.03	300309	49368	6.08
Oulu	157629	30848	5.11	177095	25553	6.93

Sources: Deanery tables (1865), Poll tax registers (1865), SVT III: Maatalous, XXXIV-XXXVII.
Note: Data from population tables are grouped according to deaneries, hence there are some differences between population totals presented here and e.g., in Vattula (1983), 28-29.
**Poll tax data for Viipuri is from the year 1864. The household data is missing from the deanery of Viipuri; the number of households and mean household size are calculated using the data from the five remaining deaneries (the deanery of Salmi is not included).*

Hajnal himself originally excluded Finland from his analysis and actually considered that the country did not belong to same family system as "Northwestern Europe", mainly because of the apparent lack of the distinguishing features.[485] Moring has suggested that during the 19th century Finnish society in the southern parts of the country came closer to the Western European marriage pattern due to the proletarianisation process of agriculture. Rather than depicting the marriage system as a form of prudent "Malthusian forethought", she maintains that it was actually the increasingly limited chances of marriage in the 18th and 19th centuries which was critical in determining an average household's structure.[486] Meanwhile, Jutikkala has suggested that land partitioning restrictions from the late 1700s onwards hindered the formation of new households; where the clearing of new acreage was possible (in the 1800s), the propensity to marry remained high.[487]

Finnish marital research has mainly focused on micro-level inspection of the household system[488], scrutinized here on macro-level for wider generality. The data concerning the mean household size and the size distribution of households is obtainable on macro-level. The poll tax data allows for calculation of mean household sizes and deanery population tables present a more detailed

485 Hajnal (1983), 66.
486 Moring (1996), (2003).
487 Jutikkala (1958), 238. Even if the statement is widespread, see e.g., Virrankoski (1973), 130-133; Kaukiainen (1973), 115; Pirinen (1982), 316-328, the actual effect of the partitioning legislation on marital formation on macro-level is unclear.
488 E.g., Moring (1996); Waris (1999); Sirén (1999). This stems from the tradition highly influenced by the approach of the Cambridge school, requiring analytical detail only obtainable (in any work-economically sound manner) on micro-level.

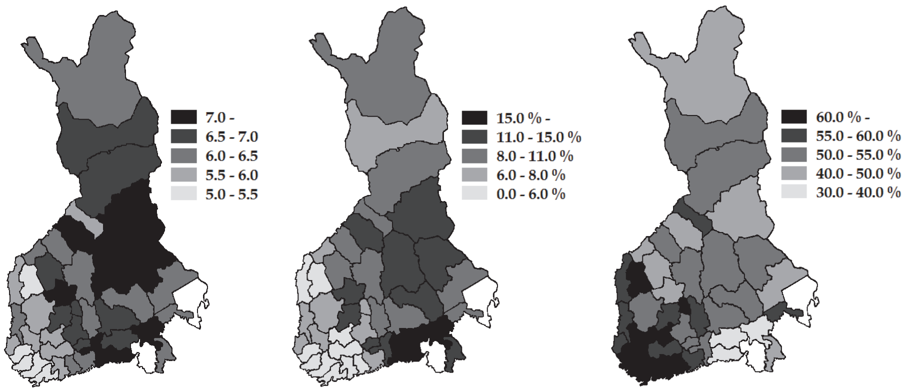
breakdown by household size classification: 2 or smaller, 3 to 5, 6 to 10, 11 to 15 and above 15. TABLE 8 presents the number of population, households and the calculated mean household size in rural provinces in 1865. The findings support the general perception that households were larger in the Eastern provinces. An interesting disparity between the two sources is that the poll tax registers provide larger mean sizes, especially in the slash-and-burn regions of the country. The differences are not unexpected, however, as the deanery population tables were first and foremost put together to provide information about demographic variables, while poll tax registers were compiled for taxation purposes. There are a couple of obvious possibilities why some households were dropped from poll tax registers. First of all, some rural labourer households were probably not included in taxation registers if the taxes levied on these households were paid by the employer freeholder (e.g., in connection to wage and labour arrangements). In these cases taxation practices may have resulted in lumping households together which would artificially increase the mean household size so the size would partially reflect differences in the level of labour the household demanded.[489]

Secondly, some servant or tenant households were granted tax exemption and not included in the registers as independent households due to the cadastral nature of the landowner. This applies especially to farm labourers with families living on the premises of gentry in Southern Finland. Some social groups may also have been listed as live-in servants, even if they actually had a separate household.[490] Thirdly, there may have been differences in how the old people living alone were treated. All of these considerations lead one to acknowledge that, to some extent, the computational mean household size is a statistical abstraction; it is difficult (especially with aggregate data) to strictly define the limits of collaboration within these "constructed" households.[491] What this means however is that the robustness of the qualitative results concerning the household structure may be sensitive to the selection of source material.

Some additional information can be obtained through more detailed geographical analysis. The information provided in the deanery population tables is displayed in MAP 6. The spatial patterns support the macro-division displayed in TABLE 8, but adds nuances: there were still substantial regions in Western Finland which had a large mean household size in 1865, with over 10% of households exceeding a size of 11. If the mean household size, share of large (over 11) and small (less than 6 inhabitants) households are taken to indicate the prevalence of the Western European marriage pattern, then the Hajnalian divide ranged from the coast of the Baltic Sea (or *Kvarken*) in Southern Ostrobothnia through eastern parts of the province of Turku and Pori, and through

489 See *[2]* and e.g., Rahikainen (2006), 164. See also Imperial Statute (30.1.1865), 6:42. It has been considered that especially in slash-and-burn regions a large family is indicative of wealth in a household, at least for the head of it, see Pulma (1994), 26–27; Laslett (1988), 154-155.
490 See *[2]* for wider discussion.
491 Pirinen (1982), 316-328; Waris (2003), 494.

southern parts of the province of Häme, to eastern parts of the province of Uusimaa. There are some notable regions with a substantial proportion of small households east of this divide, while the northern parts of the province of Häme showed a simultaneous coexistence of small and large households.

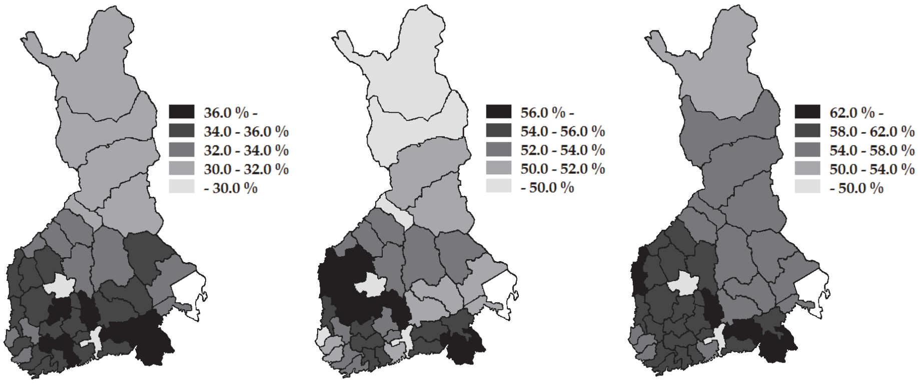


MAP 6 Spatial distribution of household size in Finnish rural deaneries in 1865

Source: Deanery population tables (1865)
Note: From left to right: mean household size, percentage of households with over 11 inhabitants, percentage of households with less than 6 inhabitants.

Taken at face value, this supports the prevailing stance in Finnish historiography concerning the macro-patterns of family division, but the picture still lacks one crucial aspect though - how large a share of adults were married. Sirén, who has provided the most vocal evidence for the distinction between western and eastern Finnish family systems, has considered that as would be expected on the basis of the Eastern European family model, marriage was not a crucial factor in determining household formation in Eastern Finland. She therefore asserts that the Malthusian preventive check did *not* operate in the east of Finland, and neither was it a significant factor in the formation of family structure either.[492]

492 Sirén (1999), 142-143. On page 142, Sirén acknowledges that there might have been economic forces at work behind the large family system, but maintain that “cultural values and conceptions about family are deeper variables than economic benefits”. Partanen (2004) similarly suggests that the family structure in Southeast Finland was close to the Eastern European form of family.



Per capita *Per adult population* *Per adult population excl. widows*

MAP 7 Marital coverage in rural deaneries in 1865

Note: Married population in relation to various denominators.
Source: Deanery population tables (1865)

In *[1]* it is shown that between the 1740s and 1860s Finland displayed a high sensitivity of marriage rates to living standards on a macro-level, and even greater sensitivity of birth to marriage rates. Not only does this suggest that the central component of the Western European marriage system was actually in place in the pre-industrial Finland, but it provides tangible evidence for the existence of population dynamics driven by preventive check. Marital ages would provide further information about the workings of the family system, but unfortunately prior to the 1880s there is no available macro-data on the age at marriage, though in principle the information could be obtained by combing through the marriages in church registers. Only sporadic regional evidence is available concerning the age at marriage prior the 1880s, and it seems that rural women were typically in their mid-20s when they married, while the men's average age was somewhat higher. On the basis of local evidence, and in line with the Hajnalian divide, the marital age seemed to have been lower in the eastern than in the western parts of Finland.[493]

While a representative spatial collection of age at marriage is an impossible task within this study, a proxy measure can easily be obtained on the macro-level by using the number of people married.[494] If Finland really was split into two distinct marital systems, we should observe a positive correlation between mean household size and marital coverage between the regions - a small mean household size should coexist with low marital coverage, and vice versa. In

493 Sirén (1999), 115–116; Moring (2003), 84–87; Partanen (2004), 75-80.

494 Palm (2000), 64-66, also uses marital coverage to suggest that Sweden displayed characteristics of the East European marital system in the 1620s, with 76.5% of all over-15s (including widows) as married. According to Pitkänen (1981), 278, 33.8% of women aged between 20 and 24 were married in rural Finland in 1880, while for men it was 17.1%. The relation switched after the mid-30s though - among 35 to 39 year olds, 81.7% of all men and 76.9% of all women were married.

MAP 7, the number of married men and women are split into three different population measures: total population, the adult population (over age 15), and adult population excluding widows and widowers.[495] As a general observation, marital coverage greatly increases when moving westwards in Finland. As pointed out by Jutikkala and shown earlier in MAP 3, the higher the number of farms (crofts and freehold farms) per capita, the higher the proportion of people married. This applies crucially to Ostrobothnia and southern parts of Viipuri. When the household size distribution and marital coverage are inspected together, there is virtually no evidence for a strict Hajnalian division, as the largest proportion of people unmarried was found to be in Eastern Finland where the mean household sizes were largest. This conflicts with the expected outcome that large household size should correspond with a high propensity to marry. On the basis of this, it would appear that the ability of individuals to establish independent households dictated marital patterns in both Western and Eastern Finland.[496] The southwest corner of Viipuri and parts of Mikkeli provinces mark an exception; there high marital coverage coexisted not only with large mean household size but also a significant percentage share of the households being large (MAP 6). In this manner, some of the previous conclusions are corroborated, but to generalise this as being characteristic of the whole slash-and-burn region is a clear exaggeration.[497]

To assess the pre-famine development of the marriage system in greater detail, the intertemporal patterns of marital coverage were also studied. Here the focus was placed on the number of marriages in relation to adult population (i.e., over-15s), including widows and widowers. MAP 8 shows deanery level changes in marital coverage between 1845 and 1855, the period of early economic growth; between 1855 and 1860, during the initial stages of economic problems (detailed in chapter 3); and between 1860 and 1865, during the pre-famine years.

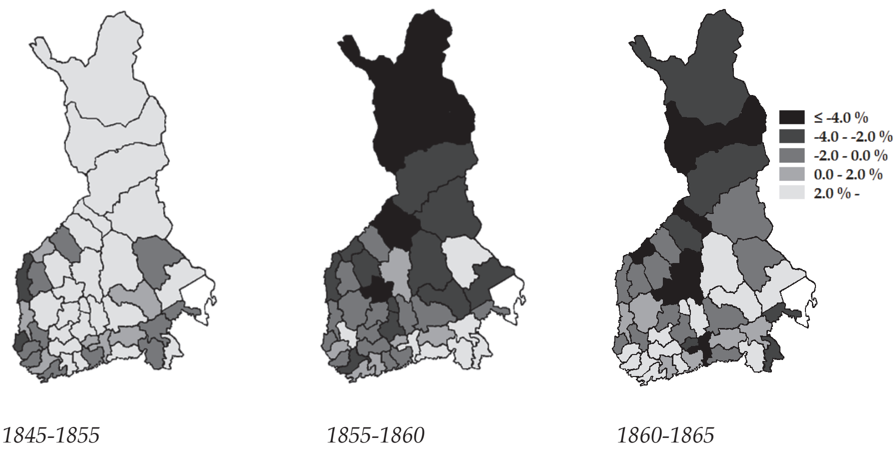
The first map reports spatial changes in the marriage pool between 1845 and 1855. Only an increase in mortality in Uusimaa in the early 1850s and Crimean War skirmishes along the coast of Ostrobothnia (1854-1855) hampered the otherwise favourable economic climate that prevailed until the latter half of the 1850s. These may go some way to explain the decrease in marital coverage in some parts of the coastal region. Besides these and some isolated regions in Eastern Finland, marital coverage increased in every other part of the country between 1845 and 1855, particularly rapidly in the inland parts of Western Fin-

495 The age and social status when widowed greatly affected whether or not one would remarry.

496 Here the inspection is done in relationship to agricultural employment, other livelihoods may have had an effect, e.g., Goose (2008) shows that work opportunities in cottage industries lowered female marriage ages, see also Partanen (2004) for similar evidence from the Karelian Isthmus. Importantly for future considerations of Finnish patterns, Goose considers that this had the effect of only postponing marriage, i.e., affecting the age at marriage, not necessarily ruling it out altogether.

497 This naturally does not mean that extended households did not exist in Eastern Finland, rather this questions *i)* the typicality and *ii)* the determinants of the feature.

land and in Northern Finland, where growth exceeded 6% during the ten-year period.



MAP 8 Changes in the size of the marital coverage, 1845-1865

Note: The marital coverage measured using the proportion of marriages to the number of over 15 year olds.
Source: Deanery population tables (1845, 1855, 1860, 1865)

As is evident from the second map, the tide turned in the late 1850s, but the regional severity of the decrease in marital coverage varies considerably. One noticeable feature is the depth of decrease in the provinces of Vaasa and Oulu and in parts of Kuopio. The pronounced decrease in Vaasa and Oulu happened at the same time as a decrease in crude marriage rates and an increase in the proportion of vagrant labourers.[498]

After a marital boom in the late 1830s and in 1840s, an increasing number of young people remained unmarried for a prolonged period. This suggests that the decreased propensity to marry was a cohort level phenomenon and of structural origins, and yielded a substantial burden on the local socioeconomic structure. Regions that had previously featured an extensive croft and freehold farm coverage were now witnessing an increasing share of unmarried working-aged people. During the late 1850s, the marriage pool increased only in Southern Finland, and the trend continued during the first half of the 1860s. Excluding certain regions that featured marital rebounds, by the first five years of the 1860s, the decline in marital coverage was experienced widely in the inland deaneries.

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498 These are based on calculations using data from deanery population change tables and from Vattula (1983). The number of vagrant labourers is from Kilpi (1913). The details are not elaborated here, but are available on request. In the 1820s and in the 1840s, both provinces exhibited crude marriage rates varying between a high of 8 and 10 per 1000. By the early 1850s, marriage rates had declined in both provinces to roughly 7 per 1000.

Based on these accounts, it would appear that the Finnish marital system was sensitive to economic fluctuations and that if the marital system that prevailed in the majority of Eastern deaneries is to be considered distinct from the Western Finnish marital system, *it is mainly in terms of the functioning of the system*. As will be scrutinised in detail further below, the lack of marriages in Eastern Finland most likely stemmed from the individual economic hardships that resulted in diminishing possibilities for individuals to establish a household of their own. This places the majority of Finland (excluding parts of province of Viipuri) under the Western European marital system. Significantly, MAP 6 shows us that large households were also to be found in several rural regions in Western Finland that are typically considered to have been poor, e.g., Tyrvää, Tampere and Keuruu. Therefore, rather than signalling the simultaneous presence of both eastern and western marital systems within a single country, the large mean household size in several (eastern) deaneries most likely stemmed from perceived difficulties in getting married - an expected result for the preventive check mechanism. These difficulties are of intrinsic interest - if Finnish social and institutional structures emphasised a nuclear family ideal and neolocal rules, the increase of the within-household inequality stipulated by the inability to leave the parental household could have proven highly problematic in the event of economic stress.

4.3 Employment and labour markets in the rural Finland

Agricultural economies exhibited a certain degree of economic specialisation. The larger the mean household size in rural regions the more room there was for rural labour markets. In general terms, the need for agricultural labour markets is determined by the extent of individuals' access to agricultural land; with low land inequality, there is no substantial need for rural labour markets and labour markets are of little economic importance. Conversely, with sufficient land inequality, labour markets can prove important mediators of economic shock on the rural poor.[499] Studies of the late 19th century rural Finnish labour markets are scarce and studies about pre-1860 labour markets are even more so. Heikkinen rightly points out that the majority of Finnish social and economic history has not really differentiated between the lack of rural land ownership and the individual's actual labour market position. Landlessness was ultimately a question of institutionally determined ownership or tenancy, whereas one's position in labour markets, e.g., being an agricultural labourer, was ultimately determined through demand and supply of labour.[500]

499 Ravallion (1997a), 1222. See also Jayne et al. (2003) for the role of land access and welfare in developing countries.
500 Heikkinen (1997), 71.

The Finnish pre-industrial rural labour markets were distinctly bipartite. On the one hand, they were characterised by a life-cycle service of farmworkers with annual contracts, on the other there is general consensus that the 1800s saw an increase in the number of underemployed, "relative surplus population" - people unable to find sufficient work and too numerous to make a living.[501] Whether the growth of a rural underclass signified the birth of "disguised unemployment" during this period is uncertain. The term was originally coined by Joan Robinson in the mid-1930s and was extensively theorised about in the 1950s and 1960s[502] to describe a situation where more people than needed are employed to produce the prevailing output with existing techniques and the existing supply of non-labour inputs. Generally, disguised unemployment refers to a situation in which a worker's wage exceeds his marginal productivity; a factor is not used efficiently. This means that while the total output would be lowered due to the removal of disguised unemployment from production, the output per worker would nonetheless actually increase.[503] Nurkse's formulation of disguised unemployment has certain convenient properties for our context. According to him, more workers could be engaged in a farming task than are actually needed, resulting in a situation where productive workers have to produce enough to maintain their unproductive counterparts. Behaviour such as this may result from the mortality evasiveness of a society, i.e., the moral economy keeps the excess labour housed and fed. In capital-poor economies this also might be a crucial feature of the poverty trap, as saving potential is allocated to the upkeep of the unproductive members of the society. [504]

The only available studies estimating the efficiency of labour usage are done by Kaukiainen for 1880-1970 and by both Peltonen and Heikkinen for 1860-1900.[505] According to these studies, there seems to be significantly more rural labour available in Finland than was actually necessary to produce the output obtained. Using crude assumptions, Kaukiainen suggests that in 1880 only about 50-60% of rural working aged men were required to produce the yearly output. Heikkinen suggests that the discrepancy between actual rural labour force and necessary labour requirement was 27 to 30% during the late 1800s.[506]

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501 See especially Heikkinen (1997), 69 and literature indicated there. The earliest of critical reviews were presented already in Kilpi (1917), see also Utterström (1954); Valpas (1967), 49-52; Haatanen (1968). As a rare case of explicit causality in the account, Pitkänen (1980), 383, considers that the excess supply of rural labour resulted in the stagnation of wages.

502 Robinson (1936), see also e.g., Nurkse (1953), Sen (1966).

503 In its strictest form, marginal productivity of disguised unemployed labour is considered zero. In a less strict form, disguised unemployment can be perceived as a condition where marginal productivity is less than the prevailing wage, see e.g., Takagi (1978), Kalirajan (1995). Takagi has considered that zero marginal productivity is one of the factors which cause surplus labour and surplus labour is a special situation of disguised unemployment

504 Nurkse (1953), 37. See also Sen (1957).

505 Kaukiainen (1981); Peltonen (1987); Heikkinen (1997).

506 See e.g., Pitkänen (1991a), 48 for contemporary complaints concerning the underemployed.

The underemployed in rural Finland mainly consisted of people from the lodger and cottager groups, which in this study form the group that have been named vagrant labourers, even if this somewhat simplifies the picture. It is likely that cottagers who typically had a small plot of land and some form of housing earned surplus income by working in nearby farms, whereas lodgers quite likely moved around more.[507]

Even if the previous literature has granted a certain intrinsic stability to the employment of Finnish farmworkers, yearly employment greatly depended on the wealth of the farms taking on labour.[508] This was not only enforced by common practice, but also to some extent by the legislation; as from 1858 to 1889, July 29 was the first day of every year that a new annual contract could be drawn up.[509] This increased the importance of a successful autumn harvest in determining the demand for extra-household labour. If a worker continued in the same farm, it is likely that the contract was made between the worker and the master at some point prior to the new contract season beginning. If however the farm wanted to recruit a new labourer, they would usually find out at the marketplace or in meetings after the church sermon; but sometimes there were also mass hiring events.[510] Technically, freeholders and larger crofts were able to keep their elder sons and daughters living in the same household and thus could avoid having to get servants from the labour markets, if deemed necessary.[511]

Until 1865 (and in a certain form until the 1880s), the Finnish labour markets were marked by legislation which (i) hampered free movement of labour and (ii) tied segments of the adult landless population (over-15s) to the *legal guardianship* of those with a legal occupation (e.g., farmers, traders, industrialists etc.). Originally the legislation was brought in to exercise control over vagrants (in the negative sense of the word), but from the late 1700s the legislation began to slowly affect an ever increasing proportion of Finns.

One characteristic feature of the legislation was so-called 'service compulsion' that obliged people without permanent livelihoods to register with those who could provide legal guardianship. The laws enacted in the 1600s and 1700s were born out of the need to regulate the rural labour markets in an environment of greatly constrained labour supply brought about by the wars and famines.[512] After a strict phase in the late 1700s, the law of 1805 partly alleviated the coverage of service compulsion, by relieving married people from it but simultaneously increasing the local bond of vagrants by stipulating that they had to be employed in their parish of residence. An act in 1829 and the Poor Aid Act of

507 Rasila (2003a), 376–377.
508 See especially Wilmi (1991), 270–276.
509 Rosenberg (1995), 110. Rahikainen (2006), 162–163. The 1805 law did not restrict in anyway the start and end period of a worker's contract, as long as the worker was not working in more than one farm at the time.
510 Rosenberg (1995), 110-111; Wilmi (1991), 237–297.
511 See e.g., Waris (2003) for discussion concerning the household size and labour. Wilmi (1991), 258-262 however points out that there is no clear connection between external labour demand and extended large families.
512 Haatanen (1968), 29; Wilmi (1991), 65–76.

1852 increased this level of social control over the poorest social classes. The 1829 act postulated that working only in the summer months (common for many agricultural labourers) was not sufficient - vagrants were obliged to work year all year round for those providing them with guardianship. Meanwhile, the 1852 act also allowed the Finnish Lutheran church to provide legal guardianship, thus lessening the economic nature of the bond.[513]

The Poor Aid Act strengthened (at least theoretically) the tie between independent agricultural households and those dependent on them by enforcing the obligatory employment, enacting strict limitations to within-country migration, and tightening the legal guardianship over the poor.[514] The strict controls imposed in this act proved to be short-lived, however. Already prior to its enactment there had been increasing demand for more liberal labour legislation, and in 1865 the service compulsion and movement restrictions were abolished from farm labour legislation.[515]

It is particularly unclear as to what effect service compulsion and legal guardianship actually had on rural labour markets, but the consensus seems to be that it would be an exaggeration to consider the system a form of serfdom. Finnish historians, however, remain quite divided on its significance and whether it was applied that stringently.[516] For instance, farmworkers with annual contracts remained highly mobile between contract seasons. In a study of worker contracts for the parish of Tuusula in Southern Finland, Rosenberg found that between 1828 and 1837, close to half of all workers with yearly contracts remained with the same employer for just a year and close to another half for two to four years and very few longer than this. Similarly about half the workers in Sääksmäki parish, Häme, changed employer after the first year during the early 1850s. It has also been suggested that female workers were more mobile, possibly because of more abundant work possibilities.[517] On the other hand, contracts that were made were considered highly binding, it seems, and often enforced accordingly.[518]

From MAP 9, we can see that a significant proportion of the population was engaged in agricultural labour (with or without annual contracts), which made it of prominent macro-economic importance. Vagrant and permanent farm labour made up close to 25% of the total population, and a substantially larger share of the working-age population. The largest proportions of labourers with annual contracts were in the coastal regions of Southern Finland, in

513 Haatanen (1968), 28; Nygård (1985), 37–43; Pulma (1994), 36–50; Markkola (2007), 210–213. The prevailing interpretation about the rationale behind the re-introduction of control over the landless population segments was the grown interest for social control in the wake of European political unrest in the late 1840s as well as the eager to deal with the alleged increase of poverty through patriarchal control.

514 Pulma (1994), 60–61.

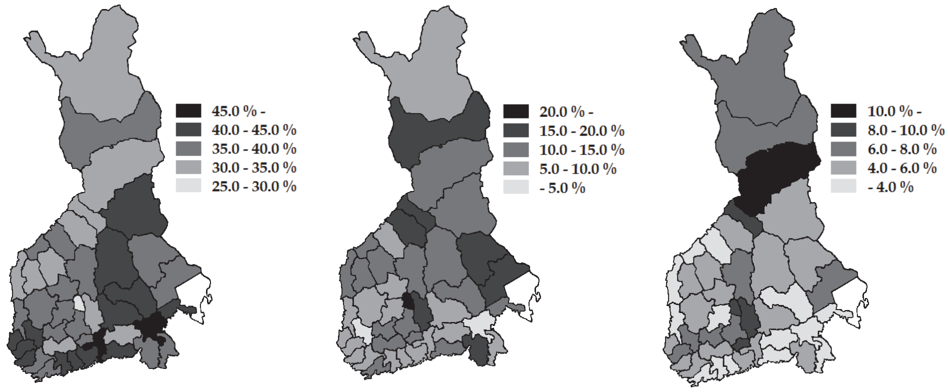
515 Pulma (1994), 59–61; Markkola (2007), 216; Häkkinen & Forsberg (2015), 111.

516 For a review see e.g., Frigren (2015), 78-82.

517 Jutikkala (1995); (2003d), 453; Rosenberg (1995), 114–117.

518 See e.g., Rahikainen (2006), 160-162, concerning the connectivity with poor aid, see e.g., Markkola (2007), 212-213.

Viipuri and in parts of Mikkeli and Kuopio. Vagrant labour percentages were especially large in Northern Ostrobothnia and Oulu, but also in Eastern Finland.



Farm labourers *Male vagrant labourers* *Female vagrant labourers*

MAP 9 Labor force in Finnish rural deaneries in 1865

Source: Deanery population tables (1865)
Note: Agricultural workforce includes adult sons and daughters living in farms, female and male workers with annual contracts, and female and male vagrant labourers. Workforce percentages are of the total population aged between 15 and 60 (left), male vagrant labourers of men aged between 15 and 60 (middle), and female vagrant labourers of women aged between 15 and 60 (right).

It is important to note, however, that on the basis of the deanery population tables, hired agricultural workers cannot be unambiguously identified. This is because official population tables do not make a distinction between employed members of a farmer's adult family, and live-in hired hands.[519] Based on the deanery data, there was an average of 2.15 workers per farm in 1815, and 2.32 in 1865; which means that during those 50 years there was an increase of c. 8 %. The number of actually employed live-in farmhands or servants was considerably lower. Depending on a household's socioeconomic position, the average number of live-in workers varied between 0.5 and 1 in Southwestern Finland from during the 1600s well into the mid-1700s, while it was for the most part between 0.2 and 0.5 in northern coastal regions.[520] This number was thought to have increased by the mid-1800s, but this may be due to various errors in the sources or erroneous interpretations.[521] Based on previous considerations about

519 Soininen (1974), 21; Pitkänen (1991a), 44.
520 Wilmi (1991), 77-89.
521 Niemelä (1989), 49-50 provides extremely high mean values: according to him there were on average about three contract servants per farm in the mid-1800s in parish of Punkalaidun (Southwest Finland). Similarly Väärä (1998), 166, 186, & 192–193, suggests that there were 3.6 male and 4.5 female hired servants under contract per farm in the parishes of Kisko and Suomusjärvi in Southern Finland. Much more reliable figures are provided by Kaukiainen (1980b), 53-56, who considers that, in the first

economic development prior to the mid-1800s, it is unlikely that the average number of hired workers grew to any significant extent, in fact the opposite may have happened. Kaukiainen has suggested that there might have been an increased tendency to use seasonal labourers instead of workers with yearly contracts, though he is unable to find any concrete evidence for it.[522] In terms of economic positions within the households the practice of registering the household workforce without differentiating the family members employed is problematic, as the actual relatives were likely to be in a much better position than the hired hands.[523]

In terms of *employment*, however, the statistics can be used with some degree of success for locating and assessing how the workforce was employed by the farming sector. Even if we bear in mind the ambiguities concerning the composition of vagrant labour, it has proven to be a coherent group in labour market terms (i.e., fit for work but underemployed for most of the year) that helps account for contextually defined unemployment in the rural Finland.

At the time when there were no unemployment security structures (in terms of direct cash transfers), one could hardly remain unemployed - in the sense of idle - for very long.[524] It is thus unclear whether vagrant labourers should be seen more as a measure of contextual unemployment rather than as the poorest of social groups. The former explanation would cover those who had been unable to secure a contract for that year's work and thus temporarily joined the vagrant labourers.[525]

It is important to bear in mind that vagrant labourers were not by definition crippled or old, and thus they did not belong to the 'deserving poor', who were entitled to basic subsistence (according to the pre-industrial moral economy).[526] While it is widely considered that their poverty stemmed from the lack of income resulting from an absence of work opportunities, there remains ample ambiguity about the development of the group's actual living standards.[527] This is worthwhile especially because in term of yearly working days, seasonal unemployment (or underemployment) was a widespread phenomenon that

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half of the 1800s, there was no increase in the number of live-in servants per farm in the parish of Lohja (Southern Finland).

522 Kaukiainen (1980b), 111-113. This is not the only commonly held belief on the topic: Soininen (1974), 38-39, suggests that the growth of the rural underclass also affected the position of croft farmers because it intensified competition during the 1800s. This implicitly incorporates an idea that freeholders were quick to take advantage of the changing conditions in rural labour markets, but there is a lack of quantitative evidence as to whether this was true or not.

523 See e.g., Laslett (1988), 160–161, compare with Soininen (1974), 372.

524 Mokyr (1985), 215-216.

525 In this sense, it is important to emphasise the general perception that farmworkers with annual contracts were the children of freeholders and crofters with little if any connection made between the worker groups and vagrant labourers.

526 Soininen (1974), 393; Arkell (1987); King (2002), 54; Vikström (2006), 227.

527 Soininen (1974), 390–394. As noted in FIGURE 7, there is no long-term decline in rural real wages. In *[1]* it is suggested that the downward social mobility in the 1800s may have reduced the representativeness of real wages as a living standard measure.

went beyond the agricultural sector.[528] It has been estimated that on average, workers in the sawmill industry worked for 127 days per year in 1860, while rural craftsmen may have worked less than 200 days.[529] In agriculture the unemployment was distinctively a winter phenomenon and a problem especially for those employed in work-intensive phases of the farming year. There is some sporadic information about agricultural working days from Eastern Finland from the late 1800s, which suggest that farmworkers were occupied for about 250-300 days of the year in various farm tasks.[530] The rest of the working year was often filled with various odd jobs provided by the rural community. Because of the lack of work opportunities, low-level wages, and seasonal character of the work, the living standards of vagrant labourers were highly vulnerable to fluctuations in labour demand.[531]

Inspecting more closely the socioeconomic determinants of labour vagrancy in the 1800s (seen by many as a sign of downward social mobility) should shed more light on the claim that rural poverty in Finland increased with population growth. Through analysing the development of the vagrant labourers with respect to rural labour markets, we can also study the possible institutional backgrounds of their vulnerability without a population growth flavoured Malthusian undertone. Furthermore, analysing the group in terms of labour market outcome would diversify the picture provided by the existing literature, which has mainly portrayed farm service as a positive phase of rural life, and as a means for gaining important work experience of the agricultural sector.[532]

To do this, a following fixed effects panel model was fitted to longitudinal data covering three cross-sections (1845, 1855, 1865) on the deanery level (n=40 per year).[533]

$$(10) \quad Y_{i,t} = a_0 + a_1 X_{1,i,t} + \ldots + a_k X_{k,i,t} + \textit{Time Fixed Effects} + \textit{Deanery Fixed Effects} + u_{i,t.}$$

Three different dependent variables have then been used in the analysis: (i) the proportion of the working age population (15-60 years) that were vagrant labourers (male and female); (ii) the proportion of working age men that were vagrant labourers; and (iii) the proportion of working age women that were vagrant labourers. The independent variables included in the analysis were first of all the proportion of farmworkers per working age population; and the number of farms (freehold farms and crofts) per working age population. These variables aimed to capture the availability of employers and livelihoods in a given

528 While it may be reasonable to talk about yearly underemployment, we would need daily data to talk meaningfully about seasonal unemployment, as labourers may very well have worked full hours on the days employed.
529 Hoffman (1980), 94; (1981), for general review see e.g., Kaukiainen (1981), 45-56.
530 Kaukiainen (1980b), 109-119; (1981), 47–48. These are roughly in line with estimates from Great Britain, see e.g., Mokyr (1985), 215-216.
531 Pitkänen (1992); Bengtsson (2004b), 141.
532 Moring (1996); (2003); Hemminki (2014), 64. Laslett (1988), 155, has suggested that life-cycle labour may have provided a quasi-remedy to economic problems on the household level, see also Rosenberg (1995), 109.
533 Four deaneries were merged into two for the analysis - Kalajoki with Raahe and Kemi with Lapland, as neither of these have data available for the whole period.

region, with a hypothesised negative coefficient implying a reduction of labour vagrancy in response to increased agricultural employment. There exists a commonly held belief among Finnish and Swedish economic historians that land-partitioning alleviated the build-up of rural poverty, but there have been few thorough inspections of the topic.[534]

Three additional variables that can be hypothetically associated with a decrease in labour vagrancy and improved alternative work opportunities were introduced. The first is the amount of industrial manufacturing in the deanery, proxied by the manufacturing workers per adult population. The second is the level of urbanisation, proxied by the share of urban population of the total deanery population. Though rarely explicitly stated, the conventional Finnish portrayal of interplay between the rural labour force, urban centres, and industrial employment are based on two-sector models such as the one suggested by Harris and Todaro.[535] The surplus of available agricultural labour has been seen as a cheap and abundant source for industrial labour required by a growing urban sector. Similarly, the growth of the urban sector has been assumed to absorb the excess labour supply from the surrounding countryside. If these safety valves were of any genuine socioeconomic value, the variables should load negatively in the models.

The third variable studied was the role of handicrafts, proxied by the proportion of working age males that were craftsmen. As only men were allowed to participate in official handicrafts the variable is not introduced for women.

Finally we have included yearly and deanery dummies, fixed effects, to capture various sources of heterogeneity. The yearly dummies control for variables that are constant between deaneries but vary in time (e.g., legislation), while the deanery dummies control for variables which are constant within each deanery in time (e.g., local conventions, soil, and climate) but vary between deaneries. While these considerably reduce missing variable bias, it is obvious that there might still remain a considerable number of factors which can vary in time within deaneries. Furthermore, it is important to note that the findings presented here apply only to the timespan in question - from the mid-1840s to the mid-1860s - and thus are unable to uncover processes that may have come to halt prior to the 1840s.

Regression models are run for both sexes separately and combined, with results presented in TABLE 9. In every model an increase in the percentage of farmworkers entailed a decrease in the percentage of vagrant labourers. The coefficient for both male and female vagrancy are roughly similar and highly significant. This provides tentative evidence that rural work force constituted a singular labour supply. Meanwhile, the proportion of freehold farms had no aggregate effect on labour vagrancy or on the proportion of male vagrants. This underlines the fact that there were no additional labour market externalities in

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534 See Jutikkala (1958), 238; Utterström (1957), 7; Haatanen (1968), 33; Lindgren (1984) 15–16; Gadd (2011), 138–143.

535 Harris & Todaro (1970). For Finnish consideration see Heikkinen (1997), 140-145, see also Todaro & Smith (2003) 336-345.

the freehold farms beyond the number of farmworkers. But the weak positive association between freeholder coverage and female labour vagrancy requires further investigation as to whether it designates for some form of labour market discrimination.

TABLE 9 Explaining the share of vagrant workers in rural deaneries, 1845-1865

Dependent variable: Share of vagrant workers per adult population			
Independent variables	Male and female	Males only	Females only
Farm labourers	-0.24 (<0.01)***		
Male farm labourers		-0.16 (<0.01)***	
Female farm labourers			-0.20 (<0.01)***
Freeholder farms	0.07 (0.659)	-0.01 (0.965)	0.21 (0.06)*
Croft farms	-0.74 (<0.01)***	-1.39 (<0.01)***	0.002 (0.987)
Industrial workers	-0.55 (0.323)	-0.09 (0.930)	-0.81 (0.048)**
Urbanization	0.06 (0.582)	0.24 (0.247)	-0.04 (0.642)
Handicrafts	0.25 (0.474)	0.37 (0.560)	
Constant	0.20 (<0.01)***	0.23 (<0.01)***	0.10 (<0.01)***
adj. R^2	0.83	0.76	0.85

Note: Longitudinal panel (1845, 1855, 1865), N=120. Estimated using OLS. Deanery and time fixed effects used. Farm labourers, farms, and industrial workers are proportioned to working age adult population (aged 15-60). Urbanisation rate for each deanery measured by dividing the urban population by the rural and urban population combined. Handicrafts were measured by dividing the number of rural craftsmen with the number of men aged between 15 and 60.

The share of croft farmers in relation to the working age population is in clear negative association with male labour vagrancy, which means an increase in crofts entailed a decrease in the share of vagrant male labourers, *ceteris paribus*. As the birth of new freehold farms was regulated by land usage laws (see below), rural population growth was channelled into a growing number of rental farms, mainly crofts (especially in Southern Finland). It is generally thought that in the early stages of the crofter system, rental farming increased the efficiency of land usage, allowed the formation of independent households at younger ages and stimulated population growth. The findings presented here concur that crofts were an important safety valve for the growing population and effectively hindered the growth of a rural underclass. The number of crofts grew until it peaked somewhere around 1865.[536]

The finding of negative association between labour vagrancy and rural employment and croft farms is important especially because of the resilient generalisation that surplus agricultural labour resulted mainly from natural growth within the lowest social classes themselves. The results here, however, suggest that vagrancy was (at least partially) due to a deficiency of labour demand and thus both supply *and* demand factors should be taken more fully into account. These findings also imply that downward social mobility may have already begun before the live-in service, though it is likely that the children of freeholders and of large crofts were favoured over children of lower social groups in terms of employment contracts (detailed further below). The available data does not allow, however, for a detailed analysis of labour market discrimination and it is duly noted that the direction of causality cannot be inferred from these figures (due to possible endogeneity of the variables). It nevertheless seems apt to consider that the inability of a person to secure a farmworker's position or croft contract was an important factor in determining the risk of labour vagrancy.

The extent of industrialisation and urbanisation and the prevalence of handicrafts do not have any significant explanatory power. Only in the case of women does the industrialisation of the region have a negative effect on the vagrancy rate. As we know that the number of women actually working in the factories was small, this effect either stems from a missing variable bias or from the fact that there were employment externalities which especially benefited women[537]. Generally it seems that industrial workers in the early stages of the industrialisation either came from somewhere other than the rural labour supply, or if they did come from there, then this route did not noticeably alleviate the rural unemployment problem. In this way, the findings concur with those of Heikkinen, who has suggested that the traditional portrayal of rural surplus labour finding work without any explicit skills in urban industry is excessively simplistic.[538]

One possible explanation for the lack of effect of urbanisation on labour vagrancy, is that prior to the intense urban growth, a sizeable proportion of urban-rural migration was seasonal and happened with temporary permits. Uotila has pointed out that, after the 1830s, large urban centres especially, such as Helsinki or St. Petersburg, attracted an increasing number of temporary

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536 Rasila (1961), 17-39; (1970), 13–14; (2003a). Haatanen (1968), 33, points out that the number of crofts increased between 1820 and 1850 by only about 15,000.

537 During this timespan only the town of Tampere had a clear female majority of industrial workers.

538 Heikkinen (1997), 142. A typical example is provided by Kaukiainen (1980a), 487, where he considers that the vicious circle of poverty for the lowest social classes was beneficial for industry and large-scale farming due to the subsequent excess labour supply that kept the real wage level low. See also Satokangas (2004), e.g., 79–80. According to her, there simply was no skilled labour available locally to be employed in the sawmills of Northern Finland. Hoffman (1974), 38, has claimed that shipping was an important alleviator of poverty stemming from an excessive labour supply in the coastal regions.

workers from the surrounding countryside;[539] but as they officially remained residents of their home parishes, the seasonal urban employment cannot be uncovered using this data.

Based on regression results, certain factors affecting labour vagrancy need additional discussion. First of all, *land partitioning legislation hindered the birth of new farms.* Starting from the early modern period, there was general fiscal requirement that freehold farms had to be large and economically viable enough to be able to pay taxes.[540] Over time this resulted in formalisation of restrictions concerning land partitioning. The initial law of 1747 remained effective with some correctives until 1852. The partitioning act of 1852 was a natural extension to tightening legislation and stipulated among other things that after partitioning, a freehold farm had to be able to provide livelihood for five adults, once taxes and the fodder required to feed the cattle had been deducted.[541] To give some estimate of the acceptable lower boundary, the partitioning act of 1895 set a minimum acreage of 5 hectares for the original estate and the individual partitions made from it. During the 1850s, there had also been a separate act concerning the acreage of crown-owned freehold farms in the province of Viipuri, placing the minimum size of field acreage to about 4 hectares. These size limits suggest that freehold farms had generally 4 to 5 hectares of field acreage, though the total size of the farm would have been bigger to include the pastures and forests owned too. Partitioning legislation began to gradually ease off from 1864 onwards, when the minimum number of adults that had to be provided for was lowered to three, followed with the gradual abolition of partitioning restrictions.[542]

One way partitioning legislation was avoided up to that point was through crofting. Traditionally, only nobility had the privilege of being able to rent out farms; but from 1697 this was extended to the cavalry estate; from 1743 freeholders could also; and after 1789 renting was effectively liberalised. By 1912, during the final stages of this system, the majority of crofters and whole farm renters were on peasant land (82%). Crofts were on manor estates usually for labour supply reasons, while on peasant lands they played an important part in inheritances. The crofters of the inherited estate were in secure position - the laws of 1767 and 1865 got round the partitioning legislation about freehold farms by granting the crofters a *de facto* ownership of their inherited crofts. Peasants took advantage of this and especially in the late 1700s new farms were abundantly set up in peasant lands with the sons and son-in-laws of peasants established as crofters.[543] During the 1800s, when the inability to obtain a freehold farm increased, many annually contracted farmworkers were allowed to set up a croft on lands of their former master. This also conveniently secured the labour demand for the farm, as crofters typically worked only a day or two

539 Uotila (2014), 311–313, see also (2015), 44, 66–69.
540 See e.g., Haatanen (1968), 32–33; Soininen (1980), 396–397; Mäkelä-Alitalo (2003).
541 The governmental land tax alone has been thought to range from 0.3 to over 1.0 hectolitres of rye per cultivated acreage in the 1870s, Soininen (1974), 379.
542 Jutikkala (1958), 301–306.
543 Rasila (2003a), 373–374.

per week at the master's farm.[544] This practice however favoured those who were already employed in the farming sector and could have caused increased segmentation of the local labour markets. With the croft established on peasant premises, the freehold farm could now meet its labour demand much more easily using its own sons and the workforce provided by the croft. Jutikkala has pointed out that landowners themselves ultimately played a crucial role in determining the land usage and its partitioning. They were also often reluctant to reduce their own land ownership and to let family-owned land move beyond their control.[545]

According to a Swedish account by Olsson and Svensson, in a roughly similar context, property rights seemed to matter to the economic performance of the farms in so far as freeholds were more productive than tenancies. Equally, in the discussion about landownership in Irish economic history[546], the secure property rights among freeholders have been thought to facilitate investments in crop production.[547]

A second issue affecting labour vagrancy is the fact that *labour market discrimination seems to have been practised.* The number of male farmworkers available in the deanery population tables is generally larger than that of female; which contradicts the basic finding from local studies confirming that the number of female farmworkers with contracts was in fact larger.[548] On the basis of this discrepancy, it can be shown that a larger share of farmers' sons than daughters were kept in the parental farm after they turned 15 years of age.[549]

It would thus appear that labour markets for men were partially segmented; farmers' sons crowded out external labour force. These kinds of practices most likely reinforced social structures that already existed, placing men born in the poorest social classes in highly disadvantaged positions in the rural labour markets compared to sons born to freeholder and crofter parents.[550] Curiously, this means that female labour markets functioned better than the male ones, and this may go some way to explain the observed positive association between female labour vagrancy and freehold farms – freeholder farms supplied female labour to the markets.

The fact that farmers favoured their own sons over external workers is to be expected on the basis of family ties, but there were quite likely other factors

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544 Rasila (2003a), 367.

545 Jutikkala (1958), 301-302. It is interesting to note that some contemporaries thought that partitioning legislation actually helped to keep poverty at bay; alleviating household formation would only encourage marriages among the poor and stimulate their population growth, see e.g., Rosenborg (1863), 19.

546 Mokyr (1985), 99.

547 Olsson & Svensson (2010). There are contemporary accounts from pre-industrial Finland claiming that manorial estates were actually harmful in terms of land management, see e.g., Voipaala (1941), 122-123.

548 This most likely is because of more abundant work opportunities for women (for lower wages), see e.g., Rosenberg (1995), 108, 115. This situation was similar in Sweden, see e.g., Harnesk (1990), 250-255.

549 See Appendix B.

550 Uotila (2015), 53-60 shows that the younger mobile labourers especially were mostly men.

at play too. Perhaps the most important of these was to do with inheritance arrangements where it was natural to keep (at least) the eldest son who ultimately inherited the parental estate after working in the farm.[551]

The third factor affecting labour vagrancy is that *movement restrictions may have contributed to a prolonged disequilibrium in rural labour markets.* As we have seen in MAP 9 above, there were substantial regional differences in the percentages of the workforce consisting of vagrant labour. Even if movement between regions was partially allowed for, parishes were not eager to let in vagrants from out of town and without any genuine livelihoods.[552] In principle, the labour legislation tied the landless to the guardianship of the higher social classes, and this may have segmented labour markets and caused persistent differences in regional unemployment rates.[553] Heikkinen has studied wage differentials between urban and rural labour markets in the latter half of the 1800s and suggests that migration did respond to wage differentials but the markets were slow to clear even after the abolishment of movement restrictions.[554]

The clearing of the rural labour markets may prove important because some recent studies have suggested that famines and nutritional crises can have long-term effects on individual labour supply and productivity.[555] Given the fact that harvest failures were generally concentrated in northern provinces (see previous chapter), the limitations of within-country migration may have resulted in prolonged provincial productivity differences. There is evidence suggesting that within-country productivity differences may have also resulted in between-country productivity differences and go some way to explain the economic success of some countries and failures of others.[556]

The fourth factor affecting labour vagrancy is that *the wage level of farmworkers contracted on a yearly basis may have been too high.* As was pointed out earlier, not all farms had paid live-in servants. In fact, there were parts of the country where it was considerably more common to not have one. There exists a historical tradition which suggests that during the 1800s, cheap vagrant labour increasingly crowded out those hired on a yearly contract,[557] but there is no genuine evidence backing this up. As the results presented in TABLE 9 may suffer from endogeneity problems, the direction of causality between farmworkers and vagrant labourers cannot be reliably inferred, and hence the results have no explanatory value here.

Live-in servants were paid partly in money, partly in food and lodging. But the only local information available covers the monetary side of these wag-

551 See e.g., Jutikkala (1958), 328-332. See also 237-239 for the strict, though short-lived, legislation imposed in the mid-1700s that aimed at preventing farmers using their own children as farmworkers.
552 See e.g., Markkola (2007), 212–213; Uotila (2015), 49. Lees (1998), 29-30 reviews the issue in the English case.
553 Haatanen (1968), 30.
554 Heikkinen (1997), 117-145. Some contemporary observers considered that the regulatory economic regime greatly contributed to the poverty problem, see e.g., Piirainen (1958), 82-86.
555 See subchapters 1.1 and 3.2 for further discussion.
556 E.g., Acemoglu & Dell (2010).
557 Kaukiainen (1980b), 111–113; Rahikainen (2006), 161–162.

es - in the southern parish of Tuusula in the mid-1870s, for instance a male farmworker was given a wage of 200 marks (worth of about 9 barrels of rye) and a woman 120 marks. In 1864 (Nousiainen, Southwest Finland), workers were only given 75 and 42 marks respectively. Meanwhile, Gadd reports the annual monetary wage in mid-1840s Sweden being the equivalent of 4 barrels of rye.[558] There are some indications that, based on local evidence, the wages of live-in servants grew considerably during the 1800s. Rosenberg suggests that the monetary wage of a male farmworker grew in real terms by some 50% from the equivalent of about 5-6 rye barrels in the 1830s to about 9 by the mid-1870s.[559]

According to the estimates presented in subchapter 1.3 and in *[2]*, which take into account food and lodging, the total yearly wages of farmworkers ranged from somewhere between 200 and 300 marks.[560] According to Jutikkala, 84.4% of income taxed farms (freeholders and crofts) had a yearly income of less than 1000 marks.[561] As discussed in subchapter 1.3, even if it is likely that incomes subject to taxation were somewhat downgraded, the fact remains that a substantial proportion of farms did not have hired hands or servants, quite possibly due to too low annual incomes. In terms of the functioning of the labour markets, the skewed income distribution meant that the vast majority of rural labour demand was concentrated in relatively few farms at the high-end of the income distribution, thus increasing the thinness of rural labour markets.

4.4 The Finnish poverty on the eve of the famine

It is commonly acknowledged among Finnish historians that rural poverty became a pressing problem during the 1800s,[562] but it is vastly unclear what they mean by this statement. Besides a growth in the number of people in the lower social groups, there is relatively little available evidence that actual poverty increased in this time. Furthermore there is virtually no assessment of the robustness of the conclusion to poverty measure.[563] In economic poverty studies, it is accepted that both qualitative and quantitative conclusions about the extent and

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558 Rosenberg (1995), 112-113; Vihola (1994), 85–88; Gadd (2000), 226.

559 See also Partanen (2004), 133. The growth of farmworkers' wages is interesting as there is no corresponding increase in the daily rates, see subchapter 4.1. This could mean that there were severe segmentations in the labour market. Officially it was not until the Hiring Act of 1865 that wage formation was left solely in the hands of workers and their masters, but it has been suggested that wages were paid on an individual basis prior to this already, see e.g., Pulma (1994), 61; Rosenberg (1995), 111.

560 Food and lodging was a larger cost than the actual monetary wage, see also e.g., Rahikainen (2006), 165.

561 Jutikkala (1991), 79.

562 Markkola (2007), 213.

563 In this subchapter an emphasis is placed on tax exemptions and income measures. There is no extensive micro-data or spatial data available regarding diets or schooling, for instance, even though existing sources would allow for the construction of such data, but it is beyond the realistic scope of this project.

nature of poverty may be sensitive as to whether the measurement was done in head counts, using some form of income gap measurement, or by using some other poverty index.[564]

The extent and nature of poverty is the single most important theme that macro-level famine studies have to address. This mainly stems from the fact that the incidence of poverty, which is often proxied using income indicators, forms a widely accepted measure for access to resources.[565] While not synonymous with income, wealth (and its pre-famine development) crucially shape individual and household vulnerability and affect the outcomes that result from further depletions of economic assets.[566] Income, wealth, property, and access to resources and livelihoods are all difficult to quantify and measure. The first three are ultimately mediated through property rights, while the latter two generally becomes measurable only under certain (typically crisis) conditions.[567]

It is widely held that poverty measures should meet certain axiomatic principals.[568] These include (i) anonymity, (ii) population independence, (iii) monotonicity, and (iv) distributional sensitivity. The *anonymity principle* states that the poverty measure is independent from other personal characteristics of the subject in question; *population independence* requires that the aggregate poverty measure does not depend on the size of a population;[569] *monotonicity* means that if an individual below the poverty line is given any extra income, all other incomes held constant, the resulting poverty should not be higher than prior to the transfer; *distributional sensitivity* stipulates further that, other incomes held constant, if income is transferred from poorer to richer person the resulting economy should be strictly poorer.[570]

These axiomatic principles leave a lot to be desired in historical studies, as measuring poverty needs to take into consideration the contextual binds. Individuals are defined in their contemporary space of norms, values, laws, and rights. This is what Sen aimed to capture with the influential 'entitlement concept': individuals' entitlement sets constitute the full range of goods and services (including food) that they can acquire by using their assets and resources (including labour power).[571]

This issue of *contextuality* stems from a wider discussion concerning pre-industrial poverty-metrics which criticises simplified monetary measurements

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564 A good overview of the older discussion is presented in Sen (1979). For problems associated with even more sophisticated measurements, see e.g., Shorrocks (1995). The assumption that a certain social group presents a uniform category of poor brushes aside within-class variation, effectively downgrades the inequality measures, and simplifies the complexity of contextual poverty, see e.g., Modalsli (2015).

565 Adger (1999), 252.

566 See e.g., Ravallion (1997a), 1213; Devereux (2007b), 80-81.

567 Adger (1999), 253.

568 See for example Fields (2001), 79-81.

569 This can also be extended to the measurement of income; i.e., poverty should not depend whether the income is measured in dollars or cents, stipulating that poverty should be independent from income scale.

570 This is also known as Pigou-Dalton principle, with considerable literature assessing its necessity, see e.g., Atkinson (1987), 759-760. For general consideration about the measurement of poverty see e.g., Todaro & Smith (2003), 195-258.

571 Sen (1981a); (1981b); Devereux (2007b), 67.

of welfare in situations where money did not necessarily have any importance. Historians such as Jütte and Arkell have stressed that the most important attribute of a historical poverty measure should concern how it is derived from contemporary sources. The problem with this, however, has been that if such a diversity of sources is used, it risks resulting in "impressionistic generalizations" rather than "systematic and comprehensive" accounts of pre-industrial poverty.[572] Furthermore there is a rather general attitude that pre-industrial sources only reflect local conventions and resources and are difficult to operationalise in terms of genuine comparable macro-level measures. For example, Stapleton notes that historical poverty can be perceived as cultural, in the sense that the state of poverty was defined by others in society - most notably government officials.[573]

Another significant ingredient in accounting for contextuality is the sample population, i.e., the population which the poor are supposed to form a percentage of. Knowledge about the nature of this population must come from contemporary sources, laws, and conventions, and may be different depending on the poverty measures. In the case of taxation, for instance, it is important to assess whether it is the individual or the household being taxed. The total population is rarely a suitable denominator, especially under-aged children and infants, as these can rarely be considered subject to taxation or poor relief.[574] In the Finnish case, for example, proportioning the number of those paying income tax to the total population gives 4.5% for 1865, while the proportion of the total population receiving poor relief was between 1.3 and 2.4% prior to the 1860s.[575] The former implies a generally poor country, while the latter suggests that there was hardly any need for poor relief. This apparent paradox is due to the erroneous treatment of measurements, as will be detailed later on below.[576]

The second historically important feature is *multidimensionality*. In current economic and social literature this arises from the general consensus that the welfare of a population depends on both monetary and non-monetary variables and that poverty cannot be attributed to any one single measuring variable. Income is mostly used as the primary candidate of interest, and while it is true

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572 Jütte (1996), 45.

573 Stapleton (1993), 339-340.

574 Finnish poor law legislation allowed giving relief to children, but how this was precisely carried out is unclear, see e.g., Piirainen (1958), 84. See also Pulma (1987), 25-28, 45-47, who considers that it is extremely difficult to obtain reliable information about the number of children supported by each parish. According to Kulmala (1967), 363-364, 370-372 children under 15 years of age made up some 30% of poor relief recipients in Masku, Southwestern Finland in the first half of the 19th century. While children were often the explicit reason for getting poor relief, it does not mean that they themselves were its subjects. It was typical for the pre-industrial population pyramid to be heavily skewed with an "excessive" amount of under-aged children. For example in Finland in 1850, 40.5% of children between 0 and 15 years of age were under 4. It ought to be apparent that people of this age could not have been recipients of poor relief, thus greatly reducing the poverty rates if included.

575 Myllyntaus (1978), 35; Pulma (1994), 64.

576 For the sake of comparison, Swedish and English poverty measures usually claim that about 20% of the adult population lived in contextually relevant poverty, see e.g., Lundsjö (1975); Söderberg (1978); Arkell (1987).

that an increase in income might have reduced the risk of poverty, at the same time markets for some non-monetary goods may not exist.[577] In historical instances the multidimensionality of poverty is caught up with the issue of contextuality. Based on the works of Arkell and King, for example, it is shown in *[2]* that different poverty measures may prove conditionally independent. It may, for instance, be unfeasible to construct a poverty measure which joins various tax exemptions and other measures such as lower social class in a linear fashion, even if there could be a priori positive correlation with poverty. Arkell dubs the phenomenon where different characteristics define different aspects of deprivation as "overlapping poverty". It has been widely noted that there are several occasions when people are considered poor and included in one measurement (e.g., a poor relief census) but left out of another (e.g., a tax exemption register). Arkell considers that this plurality of definitions was inevitable in societies where different degrees of need could affect any person at some stage of their lives. This suggests that different measures of poverty could be agglomerate to distinct phases of life, leaving us without an individual level measurement of well-being that is independent from the recipient's age, social class, and other variables inherently connected to certain phases of life. According to Arkell, overlapping poverty arose from different sentiments towards the poor, but legislation could equally have prohibited people accessing certain relief measures, which would have left them unaccounted for in the respective registers.[578] Laslett has importantly added that only a small proportion of people were in complete and permanent dependency upon the community. For the majority of those considered poor in some measurement, there were alternative sources of income to public poor relief.[579]

Bourguignon and Chakravarty have proposed that it is possible to take into account the multidimensionality of poverty by specifying a poverty line for each measurement dimension and to consider that a person is poor if he/she falls below at least one of these lines. This is naturally taking poverty to be indicated by some threshold income, but there are no objections to use qualitative variables if this seems apt in a historical context.[580] The traditional way of deal-

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577 Bourguignon & Chakravarty (2003), 26. Ó Gráda (2001), (2005) has pointed out that during famines, the markets even for monetary goods (especially food) may also cease to function.

578 See Arkell (1987), and also Stapleton (1993). In the Finnish case, some social groups, e.g., certain military ranks were exempt from certain taxes on the basis of law and regardless of their economic status. Similarly, if the appearance in the poor relief registers were dependent on local decisions governed by local conventions, power relations etc., the qualitative judgement about people's poverty might not have been actually connected to their welfare.

579 Laslett (1988), 164. Mokyr (1985), 15, suggests that poverty could be measured as the probability of a random individual dropping below subsistence level at a certain moment in time. While this proposition stands at the intersection of multidimensionality and contextuality, it still focuses on only absolute poverty. Sen (1981a), 39, has influentially pointed out that famine requires starvation to occur but starvation does not equal famine. Similarly, the presence of starvation necessarily implies the presence of poverty, but poverty does not necessarily lead to starvation.

580 Bourguignon and Chakravarty (2003). Rygel et al. (2006) suggest applying Pareto-ranking to various aggregate dimensions.

ing with perceived multidimensionality has been to use dimension reduction methods, such as principal component analysis to reduce the multivariate space down to preferably one grouping dimension. As will be noted in *[3]* and as has been emphasised e.g., by Rygel et al., dimension reduction procedures have several caveats, such as weighting problems for individual variables and pre-determination and possible anachronism in the perceived relations between the latent variable of interest and the component obtained.[581]

It is worthwhile noting also that there is an inherent risk of relativism in both of these two historically-aware requirements. Even if a historian should remain true to contemporary sources, no genuinely historical macro-analysis can be based on simply concluding that the information provided by the sources are inherently contextually embedded and thus cannot be applied more generally.

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While certain aspects of the macroeconomic character of Finnish rural poverty in the 1800s are unclear, one thing can be said for certain - regardless of whether the poverty actually increased or not, the rural poor were treated as a markedly official problem. By the mid-1800s, it was evident that the legislation which was meant to control the growing social underclass was not working.

Right up until the 1860s, poor relief was a locally funded system based on the Lutheran parish structure, though some groups also obtained relief from the state.[582] For hundreds of years the poor relief policy served also macro level social purposes, one might even argue as its primary function. Already the Swedish Church Law of 1686 stipulated that parishes were responsible for taking care of their own poor, and in 1788 the legislation effectively allowed for parishes to deny in-migration of potential recipients of poor relief.[583] The characteristic feature of vagrancy control embedded within was tied to another feature of the system - control of the labour markets through varying restrictions and compulsions levied on the landless labour force.[584]

The institutional framework tended to lag behind the prevailing social reality. Pulma has considered that poor relief policy was characterised by its reactions to acute crises,[585] but this seemingly holds only in terms of how poor relief policy changed in response to large-scale subsistence crises. The crop failures in the 1700s and 1800s resulted in substantial beggar vagrancy and changes to the poor relief policies. However, these reforms were generally only targeted at those parts of the old legislation which did not seem to be working.[586] In the

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581 Rygel et al. (2006), 755, consider that ”a higher score on any individual component indicates greater vulnerability”, see also Cutter et al. (2003). In *[3]* it is discussed why this may not be the case.
582 See e.g., Markkola (2007); Pulma (1994); Häkkinen & Forsberg (2015), 111.
583 Markkola (2007), 212-213; Pulma (1994), 48.
584 See previous subchapter.
585 Pulma (1994), 55.
586 See e.g., Piirainen (1958), 82–83; Pulma (1994), 47, 55–56; Markkola (2007), 215–216. See also Jutikkala (2003b), 513.

vast majority of the cases, the poor relief system was severely ill-equipped to handle large society-wide crises and, for example, during the 1860s the local management of relief has been considered collapsing already by 1866 - a whole year prior to the mortality surge.[587]

The growth of the social underclass and the increase in underemployment during the 1800s meant that large parts of the ideological basis of the old poor relief regime were quickly becoming obsolete. An obligation to help the "deserving poor", i.e., the sick, old and crippled was commonly accepted, but helping the growing rural underclass, the majority of whom were fit to work, was much more problematic.[588] Already the declaration on begging in 1817 had suggested that parishes should provide the able-bodied poor with equipment and designate a place for them to, for instance, manufacture handicrafts. This initial step of accepting that poverty and the ability to work should not be seen as mutually exclusive was ultimately codified in the Poor Relief Act of 1852. The fact that able-bodied people were granted the possibility of obtaining some form of poor relief obfuscated the once clearly delineated boundary between vagrancy and poor relief.[589]

The 1852 Act established compulsory local boards and accompanying taxation for relief, but more importantly it made it possible to obtain temporary relief if a poor person did not have access to any other means of relief - the Act emphasised neo-local conventions by stipulating that close family should be the first source of aid.[590] Furthermore the Forced Labour and Vagrancy Act that came in at the same time, allowed the poor to obtain not only relief but also legal guardianship from the Lutheran church. Like the majority of previous reforms to the poor relief system, the acts of 1852 also strove to control the poor and to strengthen the patriarchal bond between upper and lower social classes. Over the short term, the reform was able to lower the number of beggars but it also stipulated a clear increase in the number of poor relief recipients.[591] Contemporary critics considered that the increase was due to the reform *per se*, and not any genuine increase in rural poverty. The clear jump in number of poor aid recipients between 1850 and 1855 most likely did result from the 1852 Act that enabled people to obtain temporary relief. It is unlikely that the jump would have resulted from macroeconomic problems, as crops were relatively good during the first five years of the 1850s.[592]

Legislation remained unchanged after 1852 for the remainder of the inspection period of this study, which allows us to track the distribution of poor

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587 Bengtsson & Broström (2011), 123–124 suggest similar interpretation concerning the Swedish poor relief system. Häkkinen & Forsberg (2015), 111. Voipaala (1941), 172 demonstrates some manifestations of the stiffness of the old relief system.

588 Pulma (1994), 58, see also King (2002), 54; Arkell (1987); Vikström (2006), 227.

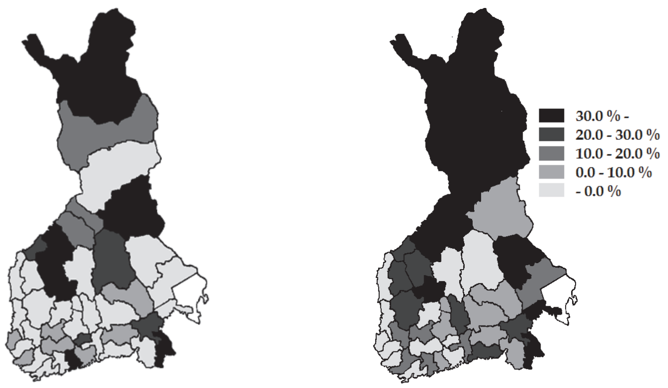
589 Pulma (1994), 56–57.

590 See subchapter 4.2; and Laslett (1988), 153, 156.

591 Piirainen (1958), 83–85.

592 Contrary to this, Markkola (2007), 215-216 suggests that economic problems in the early 1850s created a plausible explanation for this jump; while Kaukiainen (1980b), 126, considers that the increase may have been due to increased "efficiency" in the distribution of poor relief.

relief. The changes in poor relief distribution for adults (over-15s) at the deanery level are presented in MAP 10. Deanery population tables list the recipients of poor aid though they do not make clear whether eligible under-15s were included or not.[593] The majority of recipients were adults and therefore the denominator used is the number of over-15s. The number of recipients is a cross-sectional figure, not a yearly total and therefore it reflects the approximate situation at the turn of the year. As poverty had a yearly rotation, being at its lowest level during the high seasons of agricultural labour and worsening with the onset of winter, the figures from early wintertime, such as these, most likely lie close to yearly averages.



1855-1860 *1860-1865*

MAP 10 Growth rates of the recipients of poor's aid in rural deaneries, 1855-1865

Source: Deanery population tables (1855, 1860, 1865)
Note: Recipients of poor aid in relation to adult population (over-15s)

The patterns observed in the development of marital coverage (MAP 8) are roughly replicated in the poor relief rates. The share of recipients of poor relief increased in the whole of Northern Finland from the mid-1850s onwards and this growth spread southwards to the province of Turku and Pori by the mid-1860s. Simultaneously, with the increasing poor relief rates in the provinces of Vaasa and Oulu, there were substantial regions mainly in coastal areas in Southern Finland where poor relief rates actually dropped. Interestingly between 1860 and 1865 this happened also in the western parts of Kuopio, a region where it was traditionally considered that the crisis of the slash-and-burn

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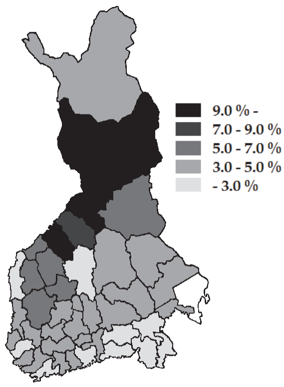
[593] Piirainen (1958), 84. According to Voipaala (1941), 173, in the administrative district of Ala-Sääksmäki in the Häme, the orphans under 14 years of age constituted about 5% of the total number of poor relief recipients and the vast majority of these were taken for foster care. The measurement could naturally be interpreted as the burden imposed on the working aged population by the number of poor relief recipients.

cultivation actually *increased* poverty.[594] The depletion of marital coverage and increase in poor relief percentage do not uniformly follow one another; especially in Southeast Finland there seems to be a significant increase in the share of poor relief recipients, with little decrease in marital coverage. This is not out of ordinary, however, as even with the increase of poor relief recipients in the 1860s, the province of Viipuri still had the lowest relief rates across the whole country, and granted that the eastern family system was theoretically followed there, marital development may have lacked sensitivity to economic fluctuations what was happening in other localities. Measured in these terms, poverty in the mid-1860s remained well under control in Southeast Finland (MAP 11).



MAP 11 Recipients of poor's aid in 1865

Source: Deanery population tables (1865)
Note: Recipients of poor's aid in relation to population over 15 years

Based on the development of marital coverage and poor relief rates, it seems that poverty was deepening mainly in Ostrobothnia and Northern Finland. By 1865, the share of poor relief recipients exceeded 5% in the northern parts of Turku and Pori (Satakunta), virtually the whole of Ostrobothnia, and the province of Oulu. In the deaneries of Raahe and Oulu, the share of poor relief recipients in relation to adult population clearly exceeded 10% with shares exceeding 9% evident also in the deaneries of Kemi and Kokkola. There exists only one detailed account on the pre-famine development of poverty prior to this that can be used as a reflective benchmark. According to Pitkänen, the initial step on the ladder towards a nationwide crisis was the crop failure of 1862. He considers that this led to incremental debt among peasants and an increase in rural unemployment. Nevertheless, the findings presented here suggest two important correctives to this perception. The impoverishment and worsening of

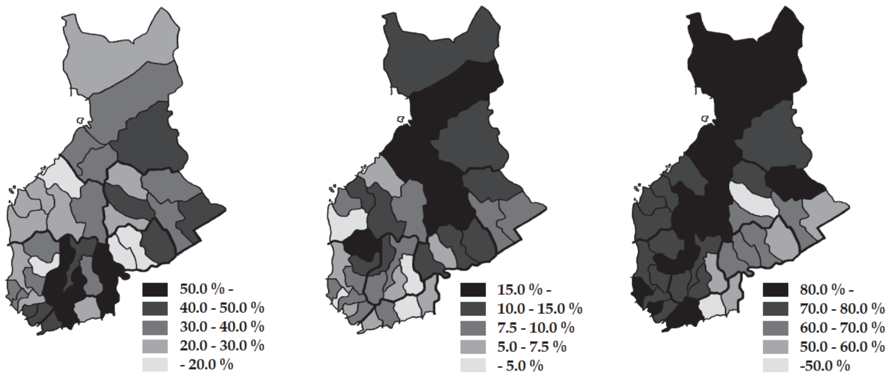
594 Soininen (1974), 382-394. The lack of short-term response in poor relief rates to crop failure in 1865 in Eastern Finland is interesting, see e.g., Pitkänen (1991a), 67–69; (1993), 54.

socioeconomic problems was first and foremost a problem of Ostrobothnia and Northern Finland and it had varying spatial temporal patterns. As is suggested in *[3]* it seems that the eventual famine outbreak in Eastern Finland was considerably more punctual than the drawn-out process that happened in Western Finland. The often cited "intolerable poverty"[595] of provinces in Eastern Finland is not evident in these measures. This may reflect the possibility that the previous considerations concerning the spatial distribution of poverty has been deducted in too straightforward a manner, solely on the basis of social class divisions and on the perceived decline of slash-and-burn agriculture.

There are however two possibilities that allow for the simultaneous existence of deep poverty with nevertheless a small number of poor relief recipients. First of all, local poverty may correspond to fewer local resources and so downgrade the possibilities of providing aid.[596] Secondly, even if the 1852 Act allowed for the possibility of obtaining short-term aid, the Finnish poor aid system was biased in helping the minority of the poor - sick, crippled and others in need of long-term permanent aid. Therefore the number of poor aid recipients may not accurately reflect the extensive poverty of the vagrant underemployed or unemployed.

The latter point highlights the problem of ambiguity in measuring historical poverty. As discussed earlier and highlighted in *[2],* the interpretations concerning welfare may prove qualitatively sensitive to the choice not only of the measuring variable, but also of the level of measurement (e.g., individual, household, parish). An alternative and widely applied historical poverty indicator is the exemption from certain taxes. The literature on this and the caveats with these kinds of measurements are thoroughly discussed in *[2]* and in subchapter 1.3. MAP 12 presents exemption rates for three different taxes for 1865: household tax (*käräjäkappa*), poll tax (*henkiraha*) and income tax (*suostuntavero*).

595 Pulma (1994), 65
596 See *[2]* and e.g., Arkell (1987), 39; Lees (1998), 29-30; Engberg 2006, 52–53; Vikström (2006), 225. This bears a resemblance to the so-called Robin Hood paradox, which postulates that the redistribution of income is lowest in poorer countries (i.e., where it is needed the most), see e.g., Lindert (1991), 226-230.



MAP 12 Spatial distribution of tax exemptions in Finnish rural administrative districts in 1865

Source: Poll tax registers (1865), Income tax registers (1866)
Note: From left to right: exemptions from household tax (per household), poll tax (per adult), income tax (per household).

Some 34% of rural households were exempt from household tax, though the exemption figures varied extensively between regions. The lowest figures were in the eastern parts of Turku and Pori, and in Eastern Finland where areas had well-under 10% of households exempt. Similar low exemption rates are evident in the coastal regions of Ostrobothnia. The household level determinants of exemptions from *käräjäkappa* are detailed in *[2]*; the exemptions have a clear structural gradient and are clearly connected with the social standing of the household - mostly cottager and lodger groups. A significant factor in this is quite likely to be the convention of paying taxes in grain, and it is likely that it was mostly the lower social classes that experienced grain deficits. So it is likely that household tax exemption makes a good proxy for determining the “viability” of agricultural livelihood. The exemptions are concentrated particularly in Häme, the southeast corner of Turku and Pori, and Western Uusimaa. These areas mark also the regions where agricultural proletarianisation was at its most intense and where the prevalence of cottagers and farmworkers with families was the greatest.

Poll tax exemptions follow roughly the spatial patterns of poor aid recipients, though poll tax exemption was generally more common than poor aid recipiency: 11.5% of tax-liable people were exempt, while 4.4% of over-15s received poor relief. On the basis of the analysis in *[2]*, it seems that poll tax exemptions mainly focused on people as individuals, so poll tax exemption is generally an unreliable indicator of the economic position of the household in which they lived. Poll tax exemption registers from the villages of Pirkkala and Ylöjärvi in the north-east part of Turku and Pori were studied in greater detail to uncover the basis for exemption.[597] According to the data, 178 households had at least one person exempt from poll tax. Of these households, 29.2% had enough children to grant them an exemption, though in no single case was the number of children the sole basis for exemption. Poverty in one form or another was cited as the reason in 85.4% of cases, while disability of some kind was cited in 56.2% of the cases. Taking care of an elderly or sick relative was also a legal basis for exemption, but there were only 4 cases of this (2.2%). The relative scarcity of this was also suspected in *[2]*.

TABLE 10 Sex-differences in poverty measures in 1865

	Poll tax exemption percentage		Poor relief recipiency percentage	
Province	Men	Women	Men	Women
Uusimaa	4.96 %	5.67 %	2.06 %	3.80 %
Turku and Pori	9.03 %	10.63 %	3.34 %	4.22 %
Häme	8.71 %	9.94 %	2.72 %	4.41 %
Viipuri			1.61 %	2.72 %
Mikkeli	11.59 %	14.69 %	2.73 %	4.37 %
Kuopio	10.13 %	13.88 %	2.89 %	4.28 %
Vaasa	7.24 %	10.21 %	4.79 %	5.96 %
Oulu	14.45 %	18.46 %	8.84 %	11.79 %
Average difference	2.48% (<0.01)***		1.57% (<0.01)***	

Note: Percentages which refer to those exempt from poll tax are in relation to eligible taxpayers, aged between 16 and 63; while those referring to poor relief recipients are in relation to over-15s.

There are two common features between households exempt from *käräjäkappa* and those accommodating individuals exempt from poll tax - a small household size and general lack of adult men.[598] The latter, i.e. the over-representation of women in poverty registers, have been widely observed phenomena both in the pre-industrial world and in modern developing countries. This is thought to have been partly because it was easier to consider women as "deserving poor".[599] Modern development studies highlight that women generally have lower incomes and earning potential than men and encounter discriminatory property rights - a likely condition in patriarchal social structures.[600] TABLE 10 provides gender specific data on poll tax exemptions and poor aid on the provincial level which points to a similar situation in pre-industrial Finland; on the basis of pairwise t-tests, women were found to be more often exempt from poll tax ($p<0.01$) and were more often recipients of poor relief ($p<0.01$).

597 Provincial poll tax registers (1865), digital, T86:1735-1739.
598 See *[2]* and also Arkell (1987), 45-46.
599 Partially this stemmed from the patriarchal social structure; it was typical for the pre-industrial discussion to consider that able-bodied men were voluntarily unemployed, see e.g., Thane (1978); Markkola (2007), 215-216; and *[2]* for wider discussion.
600 Todaro & Smith (2003), 230–232.

The relatively more common poll tax exemption suggests that some people were exempt from poll tax without receiving poor relief.[601] This is not surprising, however. In terms of tax revenue, poll tax exemption meant a loss of one mark for an adult woman, two for a man; while annual upkeep provided by poor relief could constitute couple of barrels of grain which in monetary terms meant an economic burden ten times greater. It is likely that if an individual needed aid, the help was given at the lowest possible cost.[602]

Currently there is no detailed analysis of the socioeconomic determinants for income tax. It is evident from MAP 12 that virtually everywhere across the country, the majority of households (excluding the district of Helsinki) were exempt from paying this tax; i.e., they had a yearly income of less than 500 marks. On the basis of some previous considerations the majority of peasant freeholders and rural gentry paid the tax, rural workers considerably rarely, and crofters falling somewhere in between. Two distinct patterns arise: one is that income tax coverage increases with the mean household size (MAP 6) and the second is that the region ranging from Northern Finland to Central Finland have the highest proportion of tax-exempt households.

The most important single conclusion from these tax exemption and poor relief figures is the presence of overlapping poverty. There is no clear connection between the household tax and poll tax exemptions or between household tax and poor relief rates. Similarly, income tax exemptions in Western Finland, for example, coexisted with a widely different exemption environment to that of Häme: in Vaasa, 15.4% of households were exempt from the household tax, while in Häme it was 44.0%. In terms of income tax exemptions, however, the provinces were however roughly on a par, with 79.2% and 73.9%, respectively.

These results highlight the traditional problems of poverty metrics. Coverage, often measured in head counts (the proportion of poor in relation to a given population) describes the incidence of poverty and the extent to which it affects social reality. The observed overlapping poverty is a likely result of a multidimensional measurement of poverty using dichotomous variables (in this case 'paying vs. exempt'), and it may partially reflect the same fundamental problems of metrics that are well-known to apply to headcount poverty measures on a more general level. The largest of these problems is that any head-count measure is fundamentally qualitative and indifferent to the distribution of welfare.[603]

Distributional problems are present in various other levels of measurement also. A household level measurement of poverty and income explicitly assumes a uniform within-household distribution of welfare and power. The importance of inequality treatment increases with the size of the unit of analysis; the smaller the unit (region/household/etc.), the more likely it is for the equali-

601 See also Arkell 1987, 32–38; King 2002, 48–50.
602 See also Pulma (1987), 69-73, concerning lowest-bid auctions of orphans and abandoned children.
603 Todaro & Smith (2003), 206; Sen (1976), 223; Atkinson (1999), 182.

ty assumption to hold.[604] It is important therefore to discriminate between household and individual poverty and also to consider that measures which target individuals (such as poll tax exemption) may prove useful in increasing our knowledge about the prevailing rural social structure.

The seriousness or depth of poverty, however, cannot be addressed with just the exemption and/or relief data. Income gap[605] quantifies the lack of resources (often income) below a poverty line, highlighting the fact that it is crucially a different thing whether the average income of the poor is, say for example, 200 or 300 marks. The application of income gap metrics in historical instances is hampered by two issues, however:(1) even the most extensive income sources do not extend to the lowest sections of income distribution,[606] and (2) the poverty threshold itself may be extremely difficult to determine.

Naturally the poverty threshold could be assessed using a budgetary approach to estimate a minimum yearly salary required, but this has two major problems. First of all, while income tax was levied on a household basis, no easily obtainable information about the size of the households paying income tax is available[607]; it is a widely different thing to see a family with an annual income of 500 marks as poor if it consists of 2 people or if it consists of 5. Secondly, income distribution as presented in tax registers would have to be correct in relation to prevailing prices. There are reasons to believe, however, that the earnings subject to income tax were generally downgraded.[608] As the relationship between the taxed and actual (unobserved) income is unknown, but the actual price level is known, the income distribution and the poverty-level cannot be corrected so that the two would align. If the correction is not done and the taxed income is less than the actual income, the result would indicate excessive poverty rates.

There are relatively few contemporary accounts of a typical poverty threshold. In the official statistics concerning income tax, the lower boundary of 500 marks was considered high enough to "exclude the majority of households", and Renvall went on to duly note that the households with yearly incomes of less than 1000 marks in 1875 were "without any wealth".[609] Drawing the poverty line at 500 marks would imply a poverty rate of 78.4%, while putting it at

604 Quite clearly the household income of one individual is an individual income. For further discussion on within-household distribution, see Sen (1979), 291-293; Todaro & Smith (2003), 231; Devereux (2007b), 76-77.

605 Income or (total) poverty gap is the sum of individual/ household income deviations from poverty line: $\sum_{i=1}^{P}(Y_p - Y_i)$, where P is the total number of poor, Y_p the poverty threshold income and Y_i income of the ith poor. This can be proportioned to the total number of poor, P, yielding the average poverty gap which can furthermore be divided by the poverty threshold income to yield a normalised poverty gap, see e.g., Todaro & Smith (2003), 206-207.

606 See subchapter 1.3 for discussion on Finnish income tax.

607 The income tax registers would have to be examined in conjunction with poll tax registers or parish registers on a household by household basis. While this kind of data could be compiled it would be no simple task.

608 See subchapter 1.3 for details.

609 SVT IV: 1 (1869), 7; Renvall (1900). Official statistics suggest that the average annual income of those below the taxation threshold was about 360 marks, SVT IV: 4 (1881), 11.

1000 marks it would mean 96.4% of all households - which backs up Arkell's 1987 critique, that this is much too high for any contemporary or practical meaning.

Information about income distribution is required to assess the depth of poverty, the level of average income, and the extent of income inequality. There is however no available data on income distribution among the poor, as the distribution obtained using income tax data is cut off below 500 marks. The distribution below this cut-off could be estimated, but unlike with anthropometric (normally distributed) data, there is no obvious distributional shape that is likely to apply in the case of *historical* income distribution, though the standard assumption is that incomes will follow a log-normal distribution.[610] The log-normal estimation can be done in a highly elaborate manner, but a considerably less computational method is also available and subsequently used here.[611]

The estimation procedure entails that the income tax register data is used here for two purposes: 1. to calculate the average income of the income taxed households and 2. to calculate the probability of taxation, i.e., the relation of taxed households to the total number of households. Using the observed income information, the whole distribution (not just the missing section) is estimated. This procedure not only fills-in the gap in the lower section of the distribution but it also results in a distribution with no income groupings.[612] This provides a partial solution to the problem of reduced variance in the original data, where taxed incomes were rounded to full hundreds, as the income lumping is shown to result in e.g., severely downgraded inequality measures.[613] Modelling of the whole income distribution through assumption of continuous log-normal distribution is sensitive to the rounding practice only to extent that

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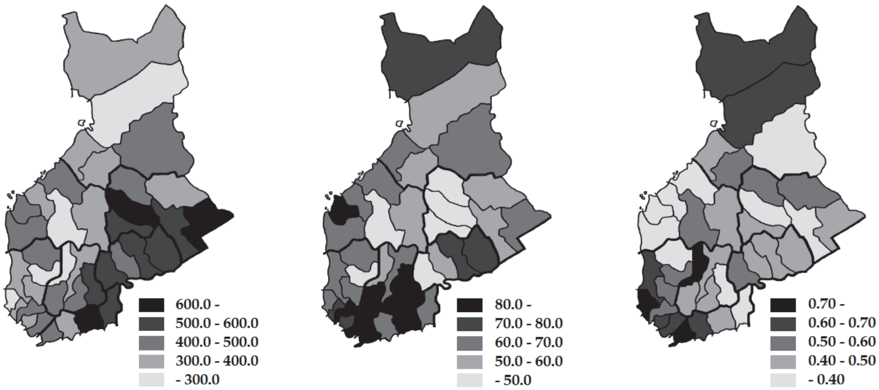
610 On income distribution, see e.g., Chotikapanich, Valenzuela, & Rao (1997); Atkinson & Bourguignon (2000); Milanovic (2002); Jäntti (2006), 254-255; Pinkovskiy & Sala-i-Martin (2009). See Soltow (1981); (1985) for application of log-normality in the case of property tax levied in Sweden and Finland in 1800. Cowell (2007), 145-146, points out that different functional forms are characteristic to different sections of income distribution. Assumption that a tax-exempt household would have zero income/wealth, e.g., Nummela (1995), is not only contextually incredible, e.g., Jütte (1996), 46; Milanovicet al. (2011), but it also yields excessively high Gini coefficients. See also Hjerppe & Lefgren (1974), criticised in Morrison (2000), 228-229.

611 Greene (2000), 896-901. See Appendix C for the estimation procedure. For a more sophisticated method see Greene (2012); Chotikapanich, Valenzuela, & Prasada Rao (1997); Tse (2006); Pinkovskiy & Sala-i-Martin (2009). In the case of a log-normal distribution, the Lorenz curve is symmetrical; see Damgaard & Weiner (2000), 1142. In *[3]* a different method was used to the one here - assuming tax-exempt households to be low-income households. As will be seen later on, estimated household income and per capita income are somewhat similar with the assumption used in *[3]* and with the log-normal estimation, but Gini coefficients differ substantially. A more elaborate version of the estimation in *[3]* was also tested. It provided roughly similar average income estimates but divergent Gini coefficients from the log-normal assumption. The difference is mainly due to the continuity of incomes under the log-normal assumption, in contrast to large uniform segments provided by the method in *[3]* and by its variants. For a critique of the income grouping approach see Modalsli (2015).

612 There were some substantial outliers, which were replaced with second largest observations. These were done in order to avoid erroneous interpretations concerning the economic fluctuations caused by the famine.

613 Modalsli (2015).

it hinders the detection of the true average income above of the truncation point (of those subject to the income tax).



MAP 13 Spatial distribution of estimated average income (in Finnish marks) and between-household income inequality (Gini coefficient)

Sources: Poll tax registers (1865), Income tax registers (1866)
Note. Estimates based on log-normal assumption. Left is estimated average income per household; middle is estimated average income per capita; right is estimated Gini coefficient for between-household inequality. See text and Appendix C for technical details.

The estimated average incomes on household level, on individual level and the between-household inequality measured with Gini coefficients are displayed in MAP 13. The highest estimated household incomes are in the region that stretches from Southern Finland to the eastern parts of the country. The lowest household-level average incomes are concentrated in Central Finland and the majority of province of Oulu. As is evident from the spatial distribution of income per capita, only in the southwest are the average incomes consistently high. Eastern Finland is considerably poor when assessed in term of per capita income. Consistently poor regions were eastern parts of Vaasa, where the estimated average incomes were low, both in terms of households and individuals.[614]

The between-household income inequality was measured here using Gini coefficients.[615] The possible Gini values range from 0 (perfect equality) to 1 (all income is concentrated in a single person/household etc.).[616] The Gini coeffi-

614 Jutikkala (1991), 80, points out that only in Eastern Finland (Savo) are there peasants with annual incomes exceeding 5000 marks in the mid-1860s.

615 Gini coefficient for a ranked group $\{x_1 \ldots x_n\}$, with $x_i \leq x_{i+1}$, is $\frac{\sum_{i=1}^{n}(2i-n-1)x_i}{n\sum_{i=1}^{n}x_i}$. The denominator can alternatively be presented in form $n\sum_{i=1}^{n}x_i = n\frac{n}{n}\sum_{i=1}^{n}x_i = n^2\frac{1}{n}\sum_{i=1}^{n}x_i = n^2\bar{x}$. See e.g. Sen (1973), 29-31, Damgaard & Weiner (2000), 1139.

616 Given n=2, the Gini coefficient designates the share of total income than has to be given from the richer to the poor in order to achieve uniform income distribution. In n=2 case the Gini can thus reach a maximum of only 0.50 and the achievable upper limit asymptotically approaches 1 when n → ∞.

cient is preferred here for a variety of reasons. First of all, it is easily the most widespread inequality measure and therefore produces comparable and easily interpretable results. Secondly, its application requires minimal subjective assumptions concerning the underlying social welfare function. Technically, however, Gini coefficients imply a welfare function which is the weighted sum of different people's income levels with the weights being determined by the rank-order position; and so on this basis it is not possible to unambiguously say that a lower Gini coefficient would imply lower inequality.[617] Thirdly, Sen has shown that Gini coefficients can be adjoined with average incomes to make an inequality corrected average, or real income. This property not only contextualises the level of average incomes in historical societies, but it also interprets the intertemporal variation in incomes in a nuanced manner.[618]

Between-household inequality, measured in Gini coefficients, is displayed in MAP 13 (on the right). The highest levels of Gini coefficients were concentrated in Southwest Finland, where the Gini coefficients exceeded 0.80 (such as in the administrative districts of Mynämäki and Vehmaa). These high figures were a result of the fact that in both regions, only about 10% of the households exceeded the 500 mark taxation limit, leaving a substantial section of income distribution below the cut-off point. The most equal distributions were in coastal Ostrobothnia, and in certain parts of Eastern Finland. Considered together with average incomes, this would suggest (as was noted in *[3]*) that in Ostrobothnia the average income was low, but on more equal level. There are regions of high inequality (with Gini coefficients ranging from 0.50 to 0.70) in Central Finland and in northern parts of Kuopio and Oulu.

As the multidimensionality has been continuously emphasised, more detailed aggregate analysis is appropriate. A principal component analysis[619] was

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617 Sen (1973), 30-32. Hicks (1997), 1288. The implicit existence of underlying welfare function in the Gini coefficient has led Atkinson (1970), 256-257, to point out that by definition the Gini coefficient places more weight on transfers affecting the middle of the distribution; a property which has a normative undertone. As noted by Hicks (1997), 1288, this property means that the Gini coefficient fails to satisfy the 'the principle of regressive sensitivity to transfer', which would mean that a transfer to a person at the bottom of the distribution would receive more weight. From the viewpoint of empirical application, the question about the social welfare function is less obvious in the case of Gini coefficient than in the selection of Atkinson (1970) index's ε, which requires explicit assumption on the degree of the inequality aversion prevailing in society, with ε values of 1.0, 1.5 and 2.0 commonly used. The implicit social welfare function in Gini coefficients outsource this choice. See Milanovic et al. (2011) on inequality extraction and the largest feasible Gini coefficient. The Lorentz-curve symmetry under the log-normal assumption, Damgaard & Weiner (2000), 1142, is also worth noting when interpreting the following results.

618 Sen (1976). See also Ravallion (1997b), (2001).

619 Principal component analysis (PCA) is a dimension reduction technique aimed at producing linear combinations (i.e., components) of correlated variables. The first of these components captures as much of the variance in the data as possible, the ones following it capture the maximum given the constraints of the previous component(s). PCA is an eigenvalue decomposition of the covariance or the correlation matrix. Components with eigenvalues exceeding one designate reduced variance from the original data set, and hence are typically centres of attention. Communality is the variable variance accounted for by the components, the component loadings are correlations between the original variable and the extracted component. Component

applied to a dataset of household and poll tax exemption data (MAP 12), estimated income distribution statistics (MAP 13) and average mean household size deduced from poll tax registers. Two components with eigenvalues over one were obtained, and they together explained a high 72.3% of total variable variance. The variable loadings and communalities are presented in TABLE 11 and spatial component scores estimated using regression method are shown in MAP 14.

TABLE 11 Estimated principal components from administrative district level data, 1865.

	Component one	Component two	Communalities
Household tax exemption percentage	**0.788**	0.028	0.621
Poll tax exemption Percentage	-0.216	**-0.724**	0.570
Household average Income	**-0.731**	**0.565**	0.853
Per capita average Income	0.434	**0.799**	0.827
Between-household Gini-coefficient	**0.729**	-0.295	0.619
Mean household size	**-0.915**	-0.112	0.849
Eigenvalue	*2.76*	*1.58*	
Variance percentage	*45.97*	*26.36*	

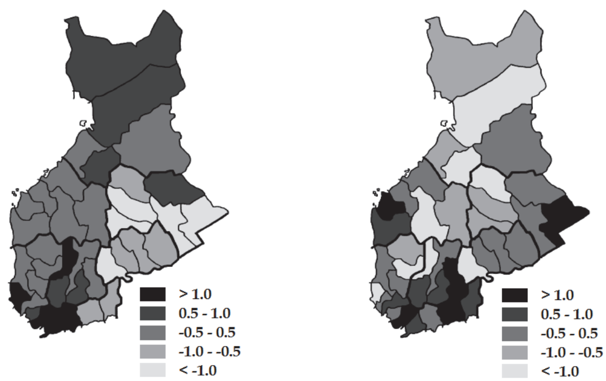
Note: Component loadings exceeding 0.500 on absolute value are presented in bold-face.

Household tax exemption percentage and between-household Gini coefficients load positively into the first component, while mean household size and household average income load negatively: the positive scores of the component reflect regions where there is large between-household inequality, and a high prevalence of tax-exempt households with a small mean size. The negative scores reflect regions with low between-household inequality and a prevalence of large, wealthy households. The component does not therefore constitute a linear poverty or inequality measure; as was noted on the extraction of similar component in *[3]*; instead the component describes two facets of pre-industrial economic inequality, those existing between and within households. The positive scores designate between-house, i.e., horizontal inequality and concentrate mainly on southern parts of the province of Turku and Pori, western parts of Uusimaa, southwest parts of Häme, and also Northern Finland. Meanwhile, Ostrobothnia and northern parts of Turku and Pori are evidently regions with low between-household inequality. The negative scores of the component are clustered in the Eastern Finnish provinces of Kuopio and Mikkeli. These regions

scores have a mean of zero and standard deviation of one. See e.g., Brown et al. (2012), 176–188.

are instead characterised by a high mean household size, suggesting the prevalence of within-household, i.e., vertical inequality.[620]

The second component shows positive loadings both in average household income and in average per capita income, while the poll tax exemption percentage loads negatively to the component. This suggests that the component measures poverty in terms of head counts and average incomes. Regions with positive high scores thus have both high household and per capita income and a low exemption rate from the poll tax. The negative scores on the other hand signify income-poor regions with a high rate of poll tax exemption. The positive scores are located in Southern Finland but also in parts of Eastern Finland. The poorest regions, according to this measure, range from northern parts of Turku and Pori and Northwest Häme to Central Finland and southern parts of province of Oulu. It seems thus that the high exemption rate for poll tax, and the wide distribution of poor aid (MAP 11) coincided with low average incomes. This means that the oft claimed idea that poor relief measures were only symptoms of a higher local ability to provide aid does not seem to hold.[621]



Component one　　*Component two*

MAP 14　Estimated principal component scores

Note: See text for details.

According to the principal component analysis, the Finnish welfare could be categorised with two dimensions and with three contextual spaces of vulnerability: *i)* regions with high between-household inequality that designate both social stratification and large proportion of poor, agriculturally unviable households, *ii)* regions with high within-household inequality, manifested in the large mean household sizes, therefore implying for concentrated labour demand and thin land markets and *iii)* regions with low average income and a high rate of individuals exempted from poll tax.

620　For more general discussion, see also Kaelble & Thomas (1991), 17-18.
621　See *[2]* for more elaborated discussion.

These results suggest that the within and between-household inequalities were mutually exclusive, and that an inherent trade-off existed in pre-industrial Finland concerning these two. Whether this implies for further dynamic properties is uncertain. It nevertheless seems that in low-income surroundings, high average household income was often only achievable by increasing the average within-household inequality. At some stage, and possibly with improved economic growth, the within-household inequality gave way to modern between-household and between-individual inequality.[622]

In terms of famine escalation, the crisis could have followed distinctly different paths in each of these regions. This is shown in detail in *[3]*. In the first causal group, the risks stemmed from the large number of subsistence farmers having difficulties obtaining livelihood even during normal harvest years. Given an income shock, the high inequality may have translated into insufficient aid and, due to neo-local practices, possibly even an unwillingness to provide aid. The risks for the second group lay in the labour market structure. As was noted in *[3]*, in an environment with highly concentrated labour demand, a negative demand shock could release a simultaneously large number of vagrant labourers without the possibility of reemployment. This would contribute to an increase in the number of vagrant beggars and could have facilitated the spread of contagious diseases. In the third group, the vulnerability stemmed from the "ripple that drowns" condition: large numbers of people living close to the subsistence level were pushed over the edge, and mortality increased. Low incomes would also have meant a lack of resources for giving and organising sufficient aid.

4.5 Conclusion: The Malthusian question

This chapter has attempted to portray Finnish living standards in the mid-1800s in terms of patterns of poverty and inequality prior to the famine of the 1860s. The Malthusian question nevertheless remains: was Finnish poverty in the 1800s thus a result of excessive population growth?

Population growth between 1815 and 1865 was greatest in the remote parts of the country; in fact, in those that were also the poorest. While not explicitly stated, the widely prevailing notion is that population growth was indeed the cause for diminishing living standards in this period.[623] Kelly and Ó Gráda have remarked that, while there are a variety of ways that a Malthusian economy can be understood, in terms of population growth, the Malthusian prediction is fairly straightforward. If Malthusian equilibrating mechanisms were truly at work, the population should have grown faster where living

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622 Sen (1992), 16, suggests trade-offs such as this might be a characteristic feature of trying to obtain equality in a number of human dimensions.

623 Klinge (1997), 95-96 states clearly that population growth increased poverty, Turpeinen (1986a), 24-28 suggests similar interpretation between the lines.

standards were higher.[624] This clearly does not apply to 19th century Finland - the remote regions were already poor in the early 1800s.[625] But an unchecked population growth was probably possible in these regions because there was always the possibility of new land to cultivate and for example forests for tar burning. However, at the same time this possible reason for population growth would have meant that one of the crucial constraints of the Malthusian economy (fixed land) was not in place.

There are other objections too: as demonstrated and discussed in *[1]*, Finland lacked several features considered indicative of a low-income Malthusian economy. The findings in *[1]* are based on using real wages as a welfare measure, but there is substantial doubt over whether or not labour markets were efficient enough to real wage level in 1800s Finland truly reflect the level of welfare.[626]

Even if the Malthusian framework is useful as a macro-economic benchmark model, it lacks several ingredients necessary for contextual consideration. These include the prevalence and nature of economic inequality, how that inequality resulted from the socio-institutional setting, and how it affected the chances for individuals to obtain secure livelihoods. The role of the household system in safeguarding against economic stress really needs to be considered more thoroughly in future research. Individual poverty would not have existed outside the context of each household's social position and its residents' position in the labour markets. But as we have seen, household poverty does not equal individual poverty without explicit treatment of the resource distribution within the household, or without looking at the question of land ownership.

Poor relief in Finland grew at visibly different rates - less in the eastern regions where households were generally larger, and more in the west where they were smaller. And yet whether this stems from the fact that large households provided socioeconomic shelter during economic downturns is, at this stage, unclear. The results provided above in 4.3 suggest that control of land, whether owned or rented, was, however, crucial in determining the regional extent of underemployed vagrant labour.

There is no denying that pre-industrial Finnish agriculture exhibited low productivity, leaving the margin above subsistence often small. On the basis of chapter 3 and subchapter 4.3 it would appear, however, that more pressing problems than the low productivity of agriculture were (i) the unequal distribution of land, and (ii) the lack of employment in the wider economy (not just farming). The latter point is emphasising that agriculture was therefore not solely to blame. MAP 2 concurs with the findings of this chapter: those regions which had the highest poor relief rates, highest poll and income tax exemption figures, and some of the lowest per capita and per household incomes also happen to be those with practically no manufacturing industry, without an ur-

624 Kelly & Ó Gráda (2015).
625 Jutikkala (1953). The prevalence of endemic malnutrition as depicted in the third chapter also corroborates this.
626 For consideration concerning Ireland see e.g., Mokyr & Ó Gráda (1988).

ban sector, and with very little handicrafts either. This applies especially to Northern Ostrobothnia and to several regions in Central Finland.

On a wider scale, the findings presented here imply that a crucial factor in rural employment was the geographically delineated number of employers and the number of posts they offered - the greater the number of farms per worker the more likely it was that a randomly selected rural worker would not be part of the underemployed vagrant labour. The fact that the number of farms and number of contracted rural workers grew hand-in-hand at a constant rate of about 2.5 workers per farm (including live-in relatives) suggests that the availability of year-round employment remained tied to the number of farms offering it. It also means that pre-famine agriculture was quite ill-equipped to employ the growing lower social classes. Reduced labour demand after the crop failures of the 1860s emphasises how important it was that the labour markets function well; as was the case with the Bangladeshi famine of 1974-1975[627], the Finnish famine of the 1860s seems to have been associated with a sizeable shock to rural labour markets resulting from crop failures that reduced the need for agricultural employment.

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627 Ravallion (1997a), 1222

5 CODA: FINNISH FAMINE AS AN ECONOMIC CRISIS

With the publication of *Poverty and Famines* by Amartya Sen, and *Why Ireland Starved* by Joel Mokyr, the role of economic analysis in accounting for famine outbreaks became acceptable to the mainstream. Sen laid down the microeconomic foundations behind famine causation and also detailed the role of commodity exchange and income formation in it; while Mokyr introduced the apparata of neo-classical economics and econometrics to famine analysis. The two studies marked important shifts in research, prompting historians to investigate the economic nature of famines in more depth. Martin Ravallion argues that Sen showed that economics could offer a lot in terms of explaining and preventing famine, while Ó Gráda sees Mokyr as having changed the methodological framework of historical famine studies.[628]

This chapter closes the second part of this study by reviewing in a concise manner the chronology of the 1860s Finnish famine and the decade prior to it.[629] The aim is to provide an outline of the demographic patterns during the famine itself and reinvestigate some of the conclusions drawn in the previous literature. These mainly concern the length of the demographic crisis period and the ultimate population toll of the famine.

This chapter also deals further with the economic nature of the famine, but the focus is less on macroeconomic measures and more on household and individual-level poverty-metrics and inequality estimates. Using the sources and methodology outlined in the previous chapter, the development of household income and between-household income inequality during the crisis is uncovered; providing an exceptional opportunity to track the progress of the famine with detailed income data that was actually collected *during* a famine, possibly

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628 Ravallion (1997a), 1208; Ó Gráda (2015b)

629 The chronology of the 1860s famine is well-documented and because of the abundance of excellent references it is here covered only cursorily. Pitkänen (1992a); (1992b); (1993); Häkkinen (1992); Ó Gráda (2001); Myllyntaus (2009); Newby & Myllyntaus (2015); Häkkinen & Forsberg (2015) provides an account in English, e.g., Turpeinen (1986a); Häkkinen et al. (1991); Jutikkala (2003b) in Finnish.

for the first time in the case of historical mortality crises. The determinants of mortality in the light of the regional vulnerability structure mentioned earlier are discussed in more detail in *[3]* and so they are not dealt with in this chapter.

5.1 A concise chronology

After 700 years of Swedish rule, the Russo-Swedish war of 1808-1809 resulted in the annexation of Finland by Russia as an autonomous Grand Duchy. After a long period of being the peripheral and fiscally strained Eastern province of the Swedish Realm, Finland obtained a relatively independent status, and after 1816 the newly autonomous Finland was governed from the Senate in Helsinki under the control of a Governor General, who was the representative of the Russian Tsar in Finland.[630] The four ruling Estates (representing freeholder peasants, burghers, clergy and nobility) were summoned to the annexation Diet of 1809 in Porvoo, but it wasn't until the early 1860s that the Diet began to have regular meetings every five years. The absence of Diet conventions between 1809 and 1863 has been cited as a reason for Finland's underdeveloped economic and social legislation in the mid-1800s.[631]

Even during the Grand Duchy's nascent years in the 1800s, Finland kept its former socioeconomic regime with welfare very much dependent on the annual conditions prevailing in agriculture. Once the mortality surge in 1808-1809, caused by the war and simultaneous nutritional crisis had passed, Finland experienced fairly low mortality especially between the mid-1810s and the late 1820s. It was not until 1833 and 1836 that Finland had its first extensive peacetime famine since the early 1740s, after an agricultural downturn and crop failures.[632] The famine was followed by a twenty-year period of industrial and agricultural growth, until that was cut short by a small-scale famine in the mid-1850s.

The agricultural problems in the 1850s coincided with the Crimean war, which hampered foreign trade and effectively blockaded any exports that were not bound to either Sweden or Russia.[633] This war-induced shock on foreign trade left its mark on aggregate food consumption, as by the mid-1800s the role of imported food had grown in importance even though still at relatively low levels.[634] The speculation concerning a possible English invasion disturbed the domestic economy too. From the autumn of 1853 to the autumn of 1855, this economic uncertainty hampered the growth of the emerging banking sector, in so far as total funds deposited in Helsinki Savings Bank went down by some 25%

630 See e.g., Tommila (2009); Klinge (1997), 11-42. See e.g., Newby (2014) for a comparison to Ireland under the English rule.
631 See e.g., Häkkinen & Forsberg (2015), for details on the development of legislation and role of economic politics see especially Paloheimo (2012).
632 Pitkänen (1993), 44–46; Kauranen (1999); Pitkänen (2002); Häkkinen & Forsberg (2015).
633 Schybergson (1980), 451–452
634 Soininen (1974), 188–189; Kaukiainen (2006), 133.

in those two years. This withdrawal of deposits resulted in cancellation of loans and this fuelled the economic downturn further.[635] By what must have seemed like a stroke of good luck, Finland escaped crop failures during the Baltic phase of the Crimean war; the failure of 1856 was only after the war on the Finnish coast had ended.

Pre-famine socioeconomic development has its share of paradoxes. Even if the era is generally thought to be one in which poverty deepened (see previous chapter), it also marked an era of institutional reforms and the onset of society-wide economic change. First of all, although Finland was now part of the Russian empire, this did not mean exploitation, in fact it was quite the contrary. Industrial growth is thought to have started properly in the 1840s and was aided by a Russian customs policy which granted exports from Finland a competitive advantage.[636] The proximity of St. Petersburg was also important in terms of export markets and work opportunities, especially for those in Eastern Finland. Economic modernisation was especially visible in the initiation of construction of Finland's first railway from Helsinki to Hämeenlinna (finished in 1862), and with the construction of the extensive Saimaa channel in Southeastern Finland. Several authors have also pointed out that the pre-famine decades witnessed important legislative reforms marking the first steps towards a deregulation of Finnish economy: the use of steam-powered sawmills was allowed in 1857, rural commerce restrictions were removed in 1859, and the founding of joint-stock companies allowed in 1864. The liberalisation of the economy hastened considerably in the latter half of the 1800s, and especially after 1863 when the Finnish Diet assembled for the first time since 1809.[637]

Of all the economic reforms of this era, perhaps the one that has, in retrospect, garnered the most attention was the introduction of the Finnish mark (*markka*) as the new national currency. The process started in 1860, and ended in 1865 with bank notes being redeemed into silver. Even if the currency was initially pegged to the Russian rouble (at a quarter of its value, thus initially only changing the name of the currency), the tying of the Finnish mark to the value of silver in 1865 happened without simultaneous peg of rouble (silver peg of which was abolished in 1854 due to the Crimean war), thus resulting in "accidental"[638] segregation of the Finnish and the Russian monetary regimes.[639] Prior to the reintroduction of mark's silver peg, the rouble (and thus the Finnish mark) depreciated, meaning that when the mark was pegged to silver again in 1865, it effectively appreciated by some 20%. Several Finnish historians have considered that it was the overvalued currency, together with tight monetary and fiscal policy that caused an increase in bankruptcies even before the crop fail-

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635 Kuusterä (1995), 67-68. The majority of Finnish monetary policy was conducted via Finnish central bank, *Suomen Pankki,* which was constrained by legislation stipulating a bind between lending and exchange reserves, Kuusterä (1987), 44.

636 This applies especially to industrial production, see e.g., Myllyntaus (1980), see also Vihola (1991), 13-14.

637 Häkkinen & Forsberg (2015), 100, 102–104.

638 Kuusterä (1995), 69; Kuusterä & Tarkka (2011), 237–238.

639 See e.g. Myllyntaus (1980), 342; Kuusterä (1987), 46–49; (1995), 67–71; García-Iglesias & Kilponen (2006), 190–193.

ures.[640] The rather turbulent and prolonged currency transition translated itself into the central bank offering fewer loans, which proved problematic for business (until the 1870s the central bank of Finland remained the most important short-term lender).[641] But it was not just domestic issues that readied Finland for famine. The American Civil War was at its height at the beginning of the 1860s, while the already tight monetary policy which had globally prevailed since the late 1850s got even worse with the unexpected insolvency of the London bank, Overend, Gurney & Co., in 1866. The central bank of Finland defended silver parity of the Finnish mark by restricting lending and subsequently preventing the depletion of silver, which led to a substantial increase in real interest rates.[642]

With the recurrence of crop failures in the 1860s and especially the one of autumn of 1867, the economic policy aimed at maintaining the strong exchange rate resulted in a widely debated unwillingness to obtain foreign grain loans. The crop failures of the 1850s and early 1860s were countered with significant grain imports but the economic problems in the mid-1860s meant that grain imports as a response to harvest failure were met with growing reluctance. Based on the economic philosophy of J.V. Snellman, the Head of the Office of Financial Matters in the Senate, the official policy was now that gratuitous public aid should not be an option and that the state should shy away from taking further grain loans. However, after the extent and severity of the 1867 crop failure, it became undeniably evident that this would be required, and Snellman began arranging loan negotiations with M.A. von Rothschild from Frankfurt. Eventually Snellman was able to secure a loan of 5.4 million marks, corresponding to roughly 1.6% of the average annual GDP (for the years 1860-1866).[643] The grain imports began in late September, but a significant proportion of the already minimal grain loans never even reached the Finnish ports before the Baltic Sea froze over so that the ports were no longer accessible by ship. This meant that even if the imported grain was included (and it mostly only reached the coastal areas), the grain deficit was, at the aggregate level, still roughly one third of the minimum annual requirements.[644]

As noted by Häkkinen and Forsberg, frosts in late August and early September[645] were a substantially different exogenous shock from, for example, potato blight (*phytopthera infestans*), which prior to the 1840s was practically un-

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640 Kuisma (2003), 278; Kuusterä (1987); García-Iglesias & Kilponen (2006), 193. There is actual very little quantitative evidence available for such economic problems, though there are few reasons to question it. See also Kuusterä & Tarkka (2011).

641 Kuusterä (1987), 46–47; (1995), 69.

642 Kuusterä & Tarkka (2011), 249–251.

643 Hjerppe (1988), 223; Arola (2006), 72–74; Kuusterä & Tarkka (2011), 254,

644 Kuusterä & Tarkka (2011), 249–251. The role of policy failure / institutional guilt has attracted some attention. Those critical of the policy undertaken include e.g., Kuusterä (1987); Kuusterä & Tarkka (2011); Ó Gráda (2001). Kuusterä & Tarkka (2011), 254 criticise especially the fact that Snellman came to acknowledge the severity of the situation much too late, mainly because of ill-founded wishful thinking about the harvest of 1867. Older generations of historians have traditionally been more understanding of (especially) Snellman's actions, see e.g., Klinge (1997), 239.

645 For a meteorological account of the summer frosts, see Solantie (1987); (1997).

known to Irish farmers. Finnish farmers, on the other hand, were well aware of the risks of frost.[646] Crop failures in the mid-1850s marked the beginning of a string of crop failures, the next occurring in 1862, though rye crops were also poor in several locations the year before.[647] The 1862 crop failure was substantially widespread; covering virtually the whole of Kuopio, southern parts of Oulu and Vaasa in particular.[648] Fairly good harvests in 1863 and 1864 (especially in rye) were followed with very poor ones especially in Eastern Finland in 1865, as well as Turku and Pori in 1866, before the almost nationwide failure of both rye and barley harvests in 1867.

The failure of winter grain sown in the autumn of 1866 soon became apparent with the prolonged winter of 1866-67. While normally areas south of Lapland were snow-free by mid-May, in mid-June the ice was still thick enough to carry a horse and sled in Eastern Finland.[649] By this time it would have been clear that regardless of the success of the spring grain planted, the total amount of the harvest would suffer because of the poor winter grain.[650] Postponed spring sowing meant that grains would be scarcely ripened by the early autumn when frosts might well occur, which they did between 3-6 September in the provinces of Turku and Pori, Vaasa, Kuopio, and Oulu. Häme and Uusimaa also suffered albeit to lesser extent, while Mikkeli and parts of Viipuri escaped relatively unscathed by the damage.[651]

On the basis of provincial governor reports, Finnish rye production was averaging roughly 1,860,000 barrels of rye and 1,020,000 barrels of barley in 1860-1865.[652] The crop of 1867 resulted in harvests at about 60% of these figures, though in Kuopio the rye was down to 41% and barley 31%, while in Vaasa both grains were at roughly 50% of the pre-famine averages.[653] Figure 8 gives the official per capita harvests during the famine, with the average of 1859-1864 indexed as 100. At the initial stage, the failures were mainly in rye, leaving barley largely intact. This quite likely explains why there is little evidence for demographic response during the early stages. For example, Appelby has maintained that the apparent reason why England had no major subsistence crises between the mid-1600s and 1720s was the efficient intertemporal diversification of harvests into spring and winter grain. In a similar fashion, and as discussed

646 Häkkinen & Forsberg (2015), 106. Several large historical mortality crises have been attributed to unexpected exogenous events, such as large volcanic eruptions, e.g., Magnússon & Gunnarsson (1987), or diseases such as the Black Death or cholera in the 1830s, e.g., Baldwin (2005). Solantie (2012), 181-182 considers that the crucial ingredient in the threat of a famine was the higher risk of frost combined with the cultivation of marginal soils in the 1800s.

647 Johansen (1924), 108-109, 118-119.

648 In certain places the 1862 harvest failure seems to have been substantially more severe than the failure in 1867, see e.g., Salo (2008), 47-48.

649 For weather conditions see e.g., Turpeinen (1986a), 96–101.

650 Pitkänen (1991a), 58–60, 64; Turpeinen (1986a), 19.

651 Pitkänen (1993), 54–55.

652 One barrel equalling 165 liters, see chapter 3 for discussion.

653 Official figures quite likely understate the severity of the situation. According to the contemporary assessments conducted by senators Norrmén and Antell, e.g., in the province of Kuopio the 1867 harvest in rye was 78%, in barley 77% and in oats 85% below the normal levels, see e.g., Häkkinen (2012), 2427.

in chapter 3, Holopainen and Helama have claimed that co-movement of barley and rye harvests diminished between 1600 and 1800.[654] The smaller probability of both harvests failing at the same time increased food security; barley harvests were especially important for the poor.

Of all the provinces, Mikkeli fared the best during this period: not only did rye escape with less damage in 1867, but the local barley harvest was actually reasonably good in 1865 and 1866, and rye also fared well in 1866. But rye harvests in Vaasa, Häme, as well as Turku and Pori were well below average for the whole period of 1865-1868 (when compared to 1859-1864) and barley harvests poor in Häme. Harvests were also poor in Uusimaa, Häme and Viipuri still in 1868, and this is also reflected in the spatial distribution of excess mortality in 1869 (see MAP 16 below).

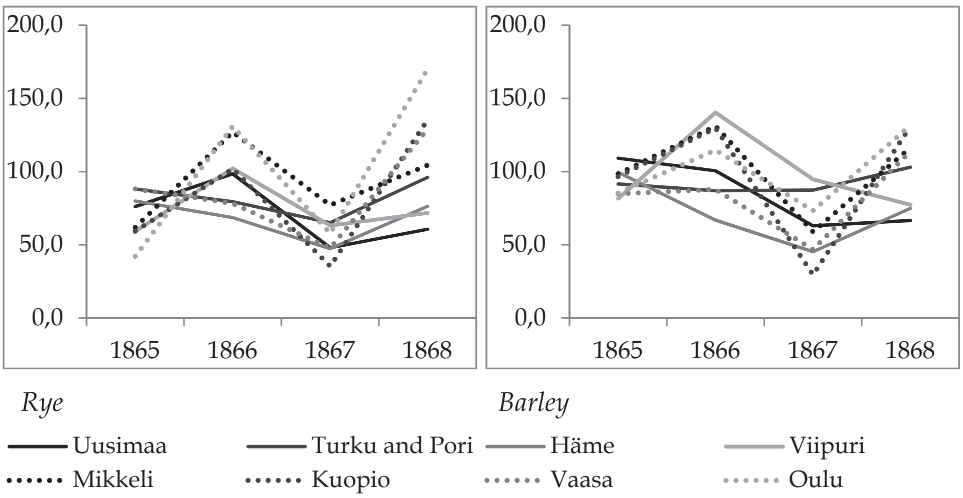

FIGURE 8 Rye and barley harvest per rural capita (average 1859-1864 = 100)
Source: Provincial governor's reports, SVT II:1, IV-V, SVT II:2, 50-51, Vattula (1983), 20.

The harvest outcomes were reflected in the prices. Both barley and rye prices increased from early 1861, and this continued until early 1863 when the prices levelled out before going down again so that by after the harvest of 1864 the prices were close to normal. Reasonable barley harvests in 1865 and 1866 tamed price increases, but after the crop failure of 1867 the prices quickly skyrocketed again, with rye exceeding 40 marks per barrel in March 1868 - double what it was in the early 1860s. The average rural price of rye reached its highest the following month at 42.12 marks per barrel, and barley a month later at 33.98. After these peaks, grain prices quickly dropped in the late summer, yet re-

654 Appelby (1979); Holopainen & Helama (2009).

mained high until the harvest of 1869. From this point onwards they finally settled to their normal pre-crisis level after the harvest of 1870.[655]

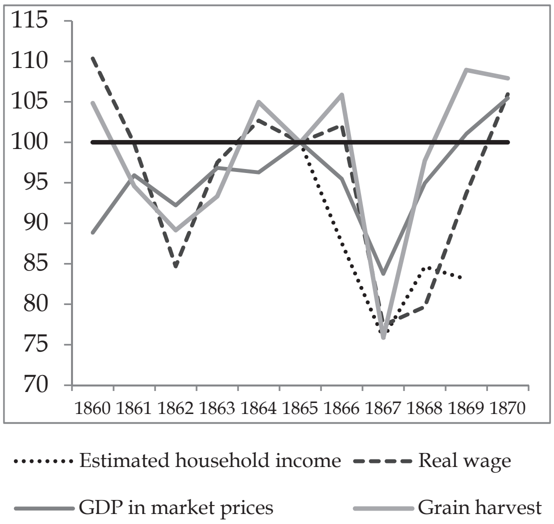

FIGURE 9 Development of selected Finnish macro-economic variables 1860-1870, (1865=100)

Note: Grain harvest includes rye, barley and oats.
Source: Heikkinen et al. (1987), Hjerppe (1988), 223, SVT II:1, 2, Provincial governor's reports (1860), Poll tax registers (1865–1869), Income tax registers (1866–1870)

As agriculture made up around 60% of GDP and 80% of employment in the 1860s, it is not surprising that harvest failures translated into other macroeconomic variables. Even for the alleged macro-economic difficulties in the early 1860s, GDP grew between 1860 and 1865. The growth happened in terms of market prices but also in real terms.[656] Over the corresponding period, real wages and harvests displayed no similar upwards trend, but were marked with extensive variation, the failure of 1862 in particular. Even if the harvests of 1864, 1865 and 1866 were, for the country, considerably better than harvests from the preceding three years, the estimated household income decreased between 1865 and 1866 (see previous chapter and Appendix C for estimation details). Similarly the GDP dropped in those years. The movement of real wages followed those of harvests, which is not surprising as the short-term patterns of real wages are mainly dictated by (grain) price changes, which in turn depend on the harvest. Nominal wages did not remain rigid during the 1860s, but contributed to the decrease of living standards by dropping 13.3% between 1863 and 1867, and a further 7.7% by 1868.[657] Given that the labour markets were competitive enough,

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655 Voipaala (1941), 193–194; Pitkänen (1992b), 92–96; (1993), 53–60. In certain regions (Northern Satakunta, Northern Savo) the price of rye barrel exceeded 45 marks.
656 Hjerppe (1988), 214, 223. The Geary-Khamis dollarization of the Maddison data suggests for stagnation of GDP between the years.
657 Vattula (1983), 441, see also Voipaala (1941), 144.

the decline in real wages was also stimulated by the decline in labour demand.[658]

The rebound from the 1867 drop happened fairly quickly. The total harvest output and GDP reached the highest value of the 1860s in 1869, while real wages recovered roughly to the level they were in the mid-1860s by 1870. According to these figures, the estimated average household income remained well below the pre-famine level until 1869. This is especially interesting for it is the only measure of these that is constructed purely from micro-data. As the data does not span the post-famine years, the long-term effect of famines on income level cannot be accurately assessed and therefore it is hard to say how long this disparity lasted.[659]

5.2 Demographic response

Historical famines are mostly considered to be demographic phenomena.[660] Ó Gráda has held that excess mortality or at least its threat is an organic part of any famine and that an excessive death toll (when compared to a certain non-crisis reference period) is the most popular measure of the size of a famine.[661] As was argued in chapter 2, strictly focusing on mortality surges delineates the crisis artificially abruptly and tends to result in treating famines as individual events. This however does not mean that mortality would not count. Large famines, such as those of Finland in the 1690s, Ireland in the 1840s, Ukraine in the 1930s and China in the 1950s and ’60s had long-lasting societal and demographic effects - the majority of these stemming from famine-related mortality.[662] This section reviews the demographic toll of the Finnish 1860s famine and reassesses the length of the famine period in terms of its demographic response. This is done through famine-induced demographic deviation - that is, excess mortality and deficiency of births.

The main difficulty in assessing demographic deviation is selecting a suitable reference period. Pitkänen has used 1861-1865 as a reference mainly due to availability of data.[663] This data published in official population statistics (SVT VI:1,2,4) is the only set available on the parish level which does not require laborious archival work. Based on annual data and life-table projections, Pitkänen estimates the excess mortality between 1866 and 1869 to be at around 110,000 and the deficit of births at roughly 46,000. Taken together, the population loss

658 Ravallion (1997a), 1222 notes that (seasonal) underemployment and famine-related temporary migration hamper the applicability of such models to modern developing countries.
659 According Kaarniranta (2001), 93, average incomes of grocers in Eastern Finland as evident in the income tax registers started to grow only in the mid-1870s.
660 See discussion in chapter 2.
661 Ó Gráda (2009), 92, see also Dyson & Ó Gráda (2002).
662 For general considerations concerning demographic effects of famines see e.g., Watkins & Menken (1985); Fellman & Eriksson (2001); Dyson & Ó Gráda (2002).
663 Pitkänen (1992a); (1993).

(assuming there was zero net migration) would thus have totalled 156,000 between 1866 and 1869.[664]

On the province and nationwide level, vital data is available from 1859 onwards on a monthly basis. This allows us to revisit the previous calculations made. The selection of 1861-1865 as a reference period has the problem that it includes both 1862-63, when childhood mortality rose in Southern and Southwestern Finland, and 1865, which some authors include in the famine timeframe.[665] Though the inclusion of both of these may bias the famine-induced excess mortality estimates downwards, there are naturally arguments also in favour of their inclusion; these maintain that mortality fluctuations were commonplace for pre-industrial societies and to disregard this would result in excessively high excess mortality estimates.

Even if the mortality increase of 1862-63 followed the crop failures of 1862 and displayed spatial patterns concurrent with the crop levels, Pitkänen has argued that the mortality increase during the early 1863 mainly resulted from increase of childhood diseases, e.g., measles, whooping cough and scarlet fever.[666] This suggests that the 1862-1863 mortality increase should be considered being "normal" background variation of pre-industrial vital rates and thus could be included in the reference period. In the following calculation the year 1865 is on the other hand left out, as to the extent possible, the early phases of the famine are attempted to distinguish.

Another possible factor contribution to previous population loss figures is the resorting to annual data. This however disregards the extensive seasonal (=monthly) fluctuations in the vital totals.[667] Pitkänen has previously acknowledged that the monthly and spatial variations in the famine mortality had distinct seasonal patterns and therefore even the famine pinnacle 1866-1868 does not make up a continuum.[668] Because of these, the time-period from 1859 to 1864 is selected as the reference period, and monthly data is used in calculating the excess mortality and lack of births.

Concluding on the population loss during the famine is difficult, not only because the measurement is sensitive to the choice of reference period and dating of the crisis but also because the population registration system most likely faltered during the famine. In principle, the deaths had to be reported to the home parish of the deceased but it is quite likely that especially during the pinnacle of the temporary migration this cannot have been possible.[669]

The population loss estimation is done in this study in the following manner: *i)* the comparison is done on monthly basis; the number of deaths and

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664 Pitkänen (1993), 89–92.

665 On 1862-1863 mortality increase see e.g., Pitkänen (1993), 81-82. For example Klinge (1997), 237; Vahtola (2003), 264; Virrankoski (2009), 527 consider 1865 part of the famine.

666 Pitkänen (1993), 70, 81.

667 Eriksson et al. (2008).

668 Pitkänen (1993), 83.

669 Pitkänen (1992b), 88

births in each month i is compared to average of a month i during 1859-1864, yielding the estimated deviation:

$$(11) \quad \hat{X}_{i,t} = X_{i,t} - \bar{X}_{i,1859-1864},$$

where $X_{i,t}$= {deaths, births} for month i in year t, $\bar{X}_{i,1859-1864}$ and average of births and deaths in month i during 1859-1864. A confidence interval is also constructed; *ii)* using the standard error of mean, the 95% confidence interval for the average of births and deaths for month i is defined as:

$$(12) \quad \hat{X}_{i,t,95\%} = \hat{X}_{i,t} \pm 1.96*(\frac{\sigma_{i,1859-1864}}{\sqrt{n}}),$$

Where n = 6 (the number of each months between January 1859 and December 1864), and $\sigma_{i,1859-1864}$ is the standard deviation of births/deaths in month i during 1859-1864.

The average deviation and confidence intervals for excess deaths and deficit of births are shown in FIGURE 10. Excess mortality peaked in spring 1868, the birth deficits seems to follow excess mortality with a lag of about nine months (this is quite certainly because of the time lag that exists between deciding to have a child and it ultimately being born), placing the trough of births between late 1868 and early 1869. Now, selecting the lower confidence bound for deaths and upper for births, a maximum population loss can be obtained and vice versa to obtain the minimum.

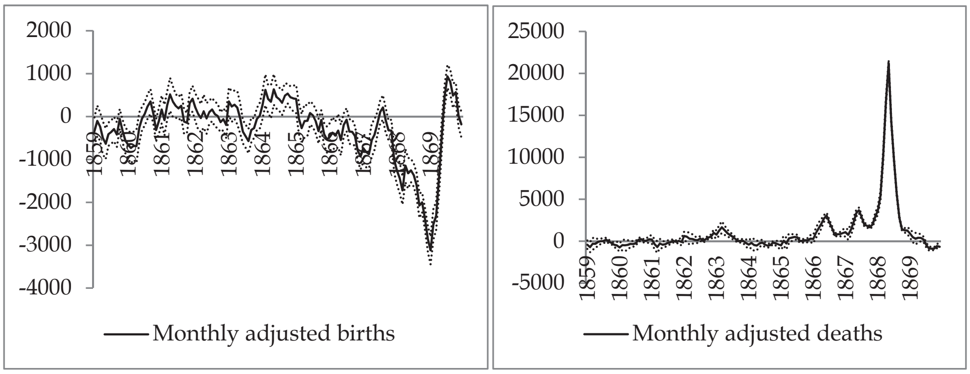

FIGURE 10 Deviation of births and deaths from the monthly averages of 1859-1864

Note: See text for technical details.
Source: SVT VI:2, XVI, XXVI, SVT VI:4, 18, 24.

Confidence minimum. Looking at the upper boundary of birth deficit and lower boundary of excess death, and setting the simultaneous existence of excess mortality and deficit of births as the requirement, the months from August 1866 to May 1867 and October 1867 to January 1869 would designate the *shortest* timespans defining the famine period. Allowing for continuing excess/deficit only in the other variable, the length can be increased, starting in February 1866 and ending in May 1869. By focusing on these two timespans, the excess mortality ranges from 104,402 to 123,313, and the deficit in births from 23,632 to 28,915. These suggest that the population loss ranges from 128,034 to 152,228, corresponding to 7.01 and 8.33% of the end-year population in 1864.

Confidence maximum. By comparing the lower boundary of birth deficit and upper of excess deaths, the maximum vital deviation is obtained. Once again focusing on the simultaneous existence of demographic deviations, the famine period is estimated to last from February 1865 to May 1869. Overall, however, the famine period is considerably more difficult to tell from the years preceding 1865, as 76.5% of the months between January 1859 and December 1869 show simultaneous excess mortality and birth deficits occurring. By focusing on the designated timespan, the excess mortality is estimated to range from 162,498 to 163,026 (depending on whether individual months without the simultaneity of demographic deviations are taken into account), and the birth deficits at 53,538. These figures mean the upper confidence band for population loss ranges from 216,036 to 216,564, corresponding to 11.82 and 11.85% of the pre-famine population.

Average. Following the estimated average monthly figures, the crisis started in August 1865 and lasted until June 1867, then started again in September 1867 and lasted until May 1869. So if the gaps in the excess/deficit are once again disregarded, the crisis spanned from February 1865 to June 1869. Allowing for variation in this period, the excess mortality ranges from 135,064 to 141,544, and birth deficits from 42,394 to 42,497. These constitute a total population loss of between 177,458 and 184,041 that correspond to between 9.71 to 10.07% of the population in 1864.

If we take the previous precautions into account, it is likely that the mortality figures in the official statistics are downward biased and so a suitable range would probably lie in the upper section of the confidence interval, giving about 10-12% for population loss, and 7.3-8.8% for excess mortality. These ranges upgrade Pitkänen's population loss estimate but still leave the 1860s famine well below the largest early modern West European famines.[670]

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670 E.g., the Irish famines of 1740s and 1840s have been estimated resulting in excess death of c. 300000 and one million, with corresponding excess death rates reaching 13 and 12 percent, respectively. The famines experienced in the USSR in the 1920s, 1930s and 1940s all fall behind the Finnish famine in terms of their relative population impact, but e.g. Ukrainian famine in the 1930s easily surpass the 1860s famine in terms of number of casualties. See e.g. Mokyr (1985); Kahan (1989); Ó Gráda (1999); (2015b); Ellman (2001); Vallin et al. (2002), for discussion on the famine intensity e.g. Howe & Devereux (2007).

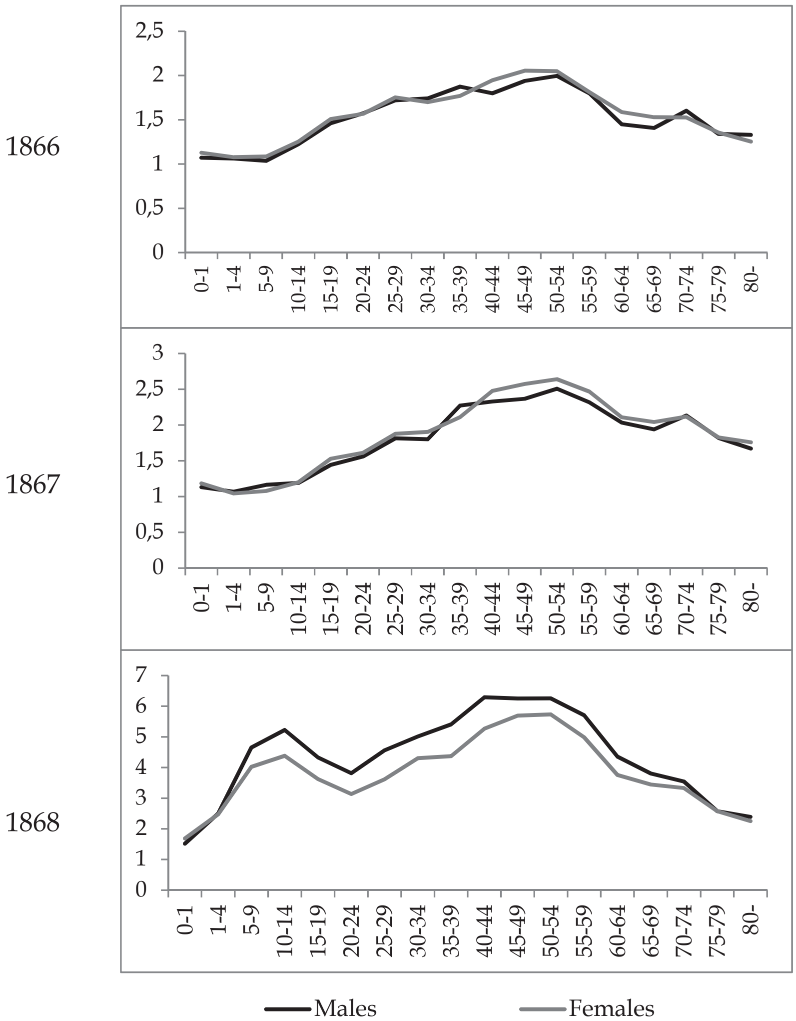

FIGURE 11 Proportional increases in age- and sex-specific mortality rates during 1866-1868 in comparison to averages of 1861-1865

Source: Pitkänen (1992a), 102.

On a macro-level, the mortality of this famine falls within the framework outlined by Hionidou, in so far as there is a typical pre-industrial spread of endemic communicable diseases in the wake of crisis migration.[671] In the case of Finland, the majority of famine deaths in the 1860s were caused by a disease dubbed *typhus*, which in retrospect is considered demarking a variety of diseas-

671 Hionidou (2002), 74-77.

es such as typhoid fever and relapsing fever.[672] There were relatively few reported cases of deaths due to starvation (about 2% of all deaths) though with all likelihood this greatly downplays the role of nutritional deprivation driving the crisis.

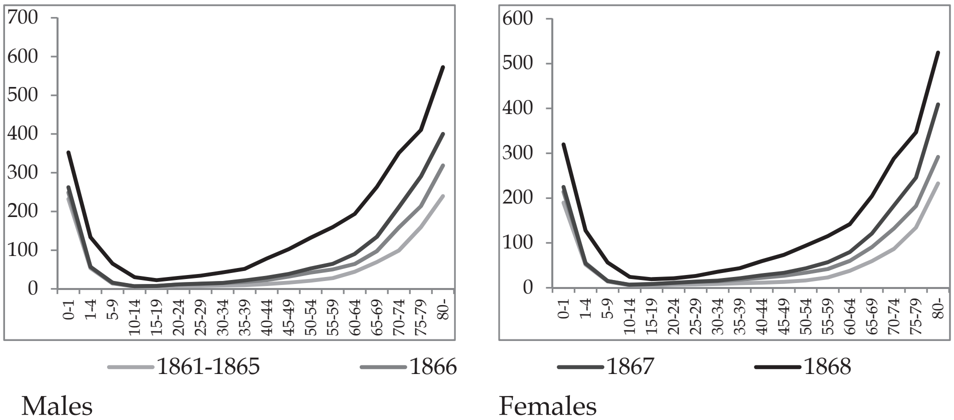

FIGURE 12 Age-specific mortality rates during the famine
Source: Pitkänen (1992a), 102.

It is typical that the mortality increase differs extensively between age-groups and possibly between sexes during a famine.[673] FIGURE 11 shows age and sex-specific mortality for 1866, 1867, and 1868 as compared to 1861-1865.[674] During the early stages, there was no pronounced increase in mortality among under-10s. The excess mortality starts to increase from age of 10 and peaks around ages of late 40s and early 50s. The pattern is close to identical for both sexes. In 1866, the largest proportional increase was among men aged 50-54 (2.00) and women aged 45-49 (2.05). In 1867, 50-54 year olds witnessed the highest proportional increases among both men and women with excess of 2.51 and 2.64, respectively. These patterns are partially spurious as the proportional mortality increase tends to get higher, the lower the baseline mortality is (FIGURE 12).

As is visible from FIGUREs 11 and 12, the 1867 mortality was clearly larger than in 1866, but the patterns evident in 1868 differ from the previous years in two important matters: first of all, the mortality increases in all age categories are substantial. The proportional curve shows a two-peaked profile: there is

672 Turpeinen (1986); Pitkänen (1992a); and Outram (2001). From the viewpoint of modern etiology (in terms of identifying diseases), knowledge on the actual causes of deaths were too rudimentary to allow for certainty, see Pitkänen (1992a); (1993). Even contemporary officials viewed the cause of death statistics with great suspicion, SVT VI: 2 (1871), 42.

673 "The evidence that females survive famine better than males is by now overwhelming" (Ó Gráda, 2009, 100). See also Macintyre (2002); Pitkänen (2002); Vallin et al. (2002); and Healey (2015).

674 While this departs from the earlier reference period and includes 1865 (thus probably yielding excess estimates that are too low), 1861-1865 is the only available reference for age and sex-specific mortality rates.

local maxima in the age categories 10-14 for both sexes, in 40-44 for men, and 50-54 for women. The second important distinction is that there is a considerable sex bias in the mortality: men exhibit on average 12.5% larger proportional increase than women, though the bias is virtually absent among under-5s and over-70s. There are thought to be two main reasons for the disproportionately high male mortality rates during large famines.[675] The first is physiological. As the male survival disadvantage is widely observed irrespective of culture or era, women's generally smaller body size, slower metabolism, and higher proportional fat percentage is considered, *ceteris paribus*, give women a survival advantage during periods of acute undernutrition.[676] The second reason given is that large subsistence crises resulted in widespread social breakdown which caused extensive temporary migration. It has been generally observed that during famines and corresponding crises, men have had a higher propensity to migrate than women.[677] Pitkänen has shown that based on records from temporary hospitals, men aged between 10 and 29 were excessively represented among temporary migrants.[678] Because of regularities such as these, it has been suggested that male mortality bias could be used to detect regions with either starvation-driven mortality and extensive social breakdown.[679]

The spatial distribution of this bias is shown in MAP 15, where annual age-standardised excess mortality rates of men and women are proportioned so that where the percentage receives positive values, men have a higher excess mortality than women. Several patterns are distinguishable. First of all, there are significant areas where no bias is evident, or the bias is extremely small: these include western parts of Viipuri, eastern parts of Uusimaa and central and eastern parts of Häme. Interestingly, the Häme areas nevertheless had substantial excess mortality rates during the famine (MAP 16), often considered a result from diseases carried by migrants working on the Riihimäki to St.Petersburg railway construction.[680] Secondly, the sex-bias is clearest in the northern parts of Turku and Pori and in southern parts of Vaasa. There is significant male bias in Kuopio's mortality rates too. Based on the assessment in the previous chapter, these regions were also some of the poorest in the years preceding the famine (MAPs 11, 12 and 14). Northern Finland also exhibits significant male bias, but the effect mainly stems from the low base rates. For example in the deanery of Lapland the male mortality rate in 1861-1865 was 22.2 per 1000 people, while for women it was 17.6. And in 1868 these rates were 27.1 and 17.2 respectively, which clearly do not designate a massive mortality crisis. Lastly, an interesting finding is that there is no automatically generalisable correlation between male or female excess mortality and regional sex bias; i.e. there are regions where

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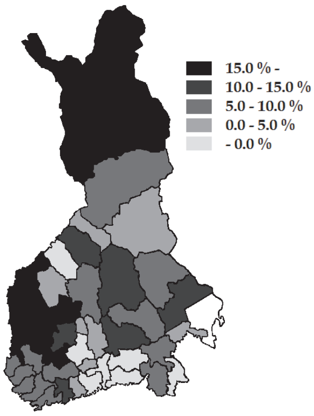
675 For a review see e.g., Healey (2015), 154-155.
676 See especially Rivers (1982); Macintyre (2002); Pitkänen (2002); Ó Gráda (2009), 100-101; Healey (2015), 155.
677 See e.g., Pitkänen & Mielke (1993), 24-26; Ó Gráda (2009), 83-84; Gray & Mueller (2012); Thiede (2014), 183-184.
678 Pitkänen (1992b), 105–108.
679 Pitkänen (2002); Ó Gráda (2009), 101.
680 Turpeinen (1986a), 221–224.

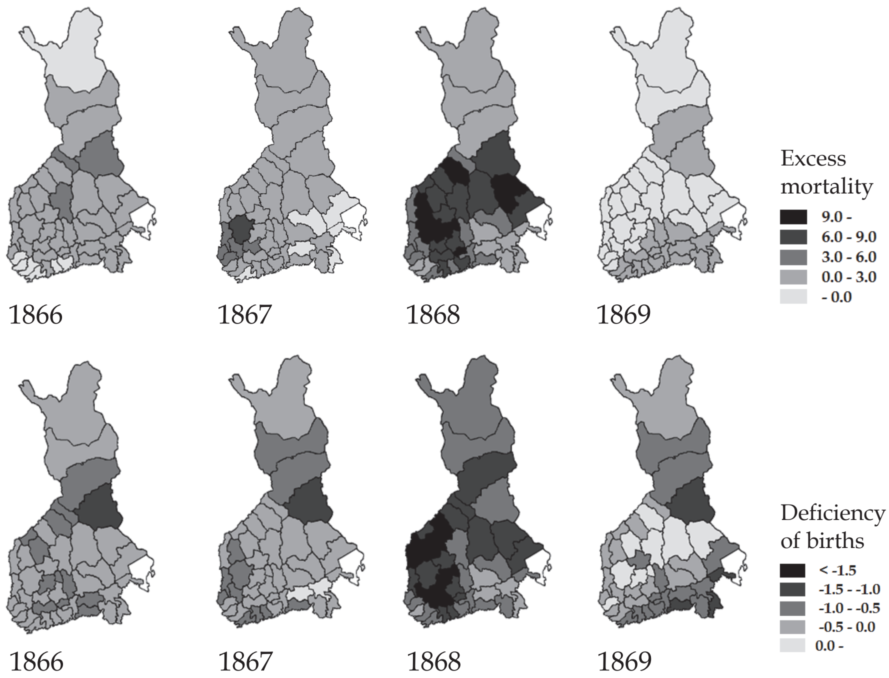
high excess mortality is associated with the bias, but also regions where this is not the case.



MAP 15 The male-bias in mortality in 1868
Note: Proportion of male and female excess age-standardized mortality (a proportion of 1868 to 1861-1865)
Source: Age-standardized mortality rates from Pitkänen (1993), 166-167.

The spatial development of excess mortality and deficit of births in MAP 16 compares averages for the years 1866-1869 with those of 1859-1864. As is evident, birth and death rates tend to have a negative correlation (between -0.558 and -0.812); the higher the excess mortality, the larger the deficit of births. In the initial stages the higher mortality predominated in the southern parts of Oulu and Central Finland. With the crop failures in 1866, this predominance switched to Southwest Finland, where the excess mortality rate exceeded 8% in the deanery of Tyrvää (in the northern part of Turku and Pori) in 1867. During the first two years, deaneries on the coast of Southern Finland and in the province of Viipuri witnessed crude mortality rates below the 1859-1864 averages. Births deficits exhibit roughly concurrent spatial patterns with excess mortality, but with some differences: the majority of Ostrobothnian deaneries show a decrease in birth rates of between 0.5 to 1% by 1866. A similar development is also evident in the eastern parts of Oulu in the first two years.

The spatial patterns of excess mortality in 1868 differ greatly from the two previous years. First of all, mass mortality with excess crude death rates exceeding 6% affected large parts of Uusimaa, the whole of Häme and Kuopio, the eastern parts of Turku and Pori, and almost all of Vaasa. Northern and Southern Ostrobothnia, Northern Häme, and Northeastern Kuopio exhibit the highest excess mortality rates (over 10%), and crude death rates as high as 13%. And in some places, the crude mortality rate was even greater. For instance, in Parkano, Satakunta, the crude mortality rate reached 23.2% in 1868, while crude mortality rates exceeded 16% in twelve other parishes. In spite of the clearly distinct 'horseshoe of death' pattern that is visible in MAP 16, there were several parishes even in the midst the high mortality region which had comparatively low mortality rates. For example, the crude mortality rate in the Ostrobothnian parish of Kaustinen reached 5.7% in 1868, while in neighbouring Ullava, the percentage was second highest of all rural parishes at 22.1%.[681]



MAP 16 Percentage point deviations at the deanery level (from the average of 1859-1864) in crude death and birth rates

Note: Measured in percentage point differences with respect to the deanery average of 1859-1864. That is, the mortality exceeds the pre-famine average by at least 9 percentage points in the worst affected regions. Source: Deanery population change tables (1859-1869), Deanery population tables (1860, 1865).

The spatial distribution of birth deficit differs somewhat from mortality's corresponding distribution. During the famine-pinnacle the deficit concentrated to Southern Ostrobothnia and to the western parts of Turku and Pori province. To some extent, the birth deficit follows closer the spatial poverty patterns than mortality which is understandable especially from the perspective of the Malthusian preventive check, dealt extensively in *[1]* and shown in the previous section to manifesting in the depletion of the marital coverage. Interestingly the birth deficit displays statistically significant negative correlation (-0.425, p=0.005) to male-bias in mortality in 1868; the larger the birth deficit, larger the male disadvantage in terms of mortality. This is in line with what Pitkänen has suggest-

681 Turpeinen (1986a), 123–137; Häkkinen (1994), 81, on local conditions see e.g., Alamäki (1993), 107–112.

ed about the "yard-stick" property of the male-bias - the bias appears to coexists both with measurements of deprivation and malnutrition but also with the extent of social disintegration.

The year 1869 constitutes the end-point of the famine. Mortality rates remained elevated in Southern Finland and in southern parts of the province of Oulu, while the provinces of Viipuri and Uusimaa witnessed substantial birth deficits. On the whole country level, adult mortality retained the elevated level still in 1869.[682]

International studies on famine-related determinants of regional mortality are surprisingly scarce. Ireland remains the most extensively studied, if not even over-presented. According to the results from the Irish data, higher per capita incomes seem to be in negative association with regional mortality rates, as do other measures of development, though with ample sway between statistical settings.[683] Spatial data of a reasonable quality is also available concerning the Chinese famine of 1959-1961. This particular famine differs from several pre-industrial mortality crises by its explicitly political nature. According to available evidence, a politically instigated running down of agricultural productivity, combined with bad weather resulted in a substantial decline in food production. The spatial patterns of famine mortality were driven not only by food availability but also by regional food procurements that were foisted on farmers to ensure food availability in urban locations, together with politically motivated overconsumption and inefficiency in the agricultural collective system.[684] Between-country studies assessing the role of political regimes and the role of democracy have, with a few reservations, concluded in favour of "Sen's law" that states that functioning multiparty democracy and free press safeguard against famines.[685]

While 'postmodern' famine theories tend to emphasise political action and downplay the role of aggregate food supply in famine causation; Ó Gráda has maintained that food availability decline (FAD) should be given considerably

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682 Pitkänen (1993), 81–82.

683 The Irish studies have been particularly interested in Malthusian questions, concerning whether, for instance, population pressure drove down pre-famine living standards; and the role of potato cultivation in predicting famine mortality, e.g., Mokyr (1985), 30–80, 261–277; McGregor (1989); Ó Gráda (1994), 40–49; (1999), 28–34; Kelly & Ó Gráda (2015). Different statistical units may account for the differences in suitable variable combinations detected. See e.g., Wilkinson & Pickett (2006) who argue that variables mediated by social conventions exhibit enlarging effects with an increase in spatial and population coverage. Fotheringham et al. (2013) show that the whole country effect between variables might provide misleading estimates of the actual variable relationship; the effect may be different in different localities and may even exhibit different signs between regions. The weighting of the respective regions might account for some of the peculiarities observed in the results in Mokyr (1985).

684 Clément (2012), see also Lin & Yang (2000).

685 Plümber & Neumayer (2009); Burchi (2011); Clément (2012). An interesting piece of research in this manner is Kidane (1989), as it was unable to find statistical significance between *any* of the variables of interest and regional mortality rates during the Ethiopian famine of 1984-1985. Notwithstanding the political nature of the crisis, (e.g., Marcus 2003), Kidane considers that the lack of significance shows a Malthusian character.

more room in famine accounts.[686] Looking at historical cases, famines have rarely happened without a simultaneous downturn in some macro-economic key variables (e.g., real wages, GDP, or harvest output). According to Edvinsson, for example, Swedish mortality surges in the 1670s, 1690s, 1710, and 1773 were preceded by considerably poor harvests and subsequent drops in GDP per capita.[687] Similarly several English and Italian pre-industrial mortality peaks coincided with either substantial drops in real wages or a rise in grain prices, or both.[688]

Whether the Finnish famine of the 1860s resulted from genuine FAD, is an open question. Lefgren suggests that during the 1867-68 harvest year the average supply of calories dropped to around 1,900 kcal - sufficient for subsistence if the food supply would have been equally distributed.[689] The problem with this calculation is that the weight of grain varied with the quality of the harvest; crop failures not only decrease the total volume of harvest but also the weight of the seeds and thus the nutritional quality. This variation is extremely difficult to account for in aggregate nutritional calculations.[690] Contemporary reports display that the food supply was in a dire condition in the northern provinces by early 1868; indeed, based on senator Antell's report, no one belonging to the landless population in the provinces of Oulu and Kuopio had enough food for subsistence. In January of 1868 it soon became apparent that roughly 250,000 people would starve in eastern and northern parts of the country.[691] Contemporary evaluations such as these have led Pitkänen to conclude that there was a genuine FAD background to the famine.[692]

Häkkinen has suggested that the manner in which aid on a local level was distributed greatly affected the subsequent mortality outcomes. Even if the information on local relief organisation is laborious and difficult to collect, it seems that a decentralised relief system was associated with lower mortality rates, while high mortality seems to be invariably associated with the existence of poorhouses that were established to control the movements of vagrant migrants. Häkkinen furthermore considers that the movement restrictions confined the problems to certain regions intensifying the spatial differences.[693]

Local government was reformed in the 1860s, separating responsibilities of municipalities and parishes and handing a large number of duties of the latter to the former. Among others, Häkkinen and Forsberg have suggested that the bureaucratic turmoil that this created would have contributed to inconsistent

686 Devereux (2007a); (2009); Ó Gráda (2008). For more on social aspects of famine see e.g., Ellman (2001).
687 Edvinsson (2009); (2013); (2015).
688 See e.g., Lee (1981); Malanima (2011); Klemp & Weisdorf (2012); Fernihough (2013).
689 Lefgren (1974). This caloric availability corresponds to the one prevailing during the Ethiopian famine in the early 1970s, see Sen (1981a), 88-93.
690 See e.g., Turpeinen (1986), 142; Pitkänen (1993), 62.
691 Häkkinen et al. (1989), 33–37.
692 Pitkänen (1991a), 43.
693 Häkkinen (1994). Laslett (1988), 161 considers that extended kin networks are thought to be supportive of the individuals.

and ineffective aid at the local level during the famine too.[694] This meant that the extensive harvest failure that struck in 1867 resulted in widely uncontrolled out-migration from the regions struck by the poor crops. According to Pitkänen, this migration was closely connected to harvest outcomes and had three distinct geographical features: *i)* vagrants moved from Oulu, Kuopio, Häme, and Vaasa to provinces in the south and southeast; *ii)* those leaving home-parishes up north travelled considerably longer distances, whereas beggars from southern provinces, such as Häme, mainly travelled to urban locations nearby and *iii)* there was substantial migration towards parishes where there was large-scale construction going on (especially the Riihimäki-St.Petersburg railway line).[695] As Finnish poor aid had traditionally only been set up to serve the local poor, the migration of vagrants during the famine (estimated at 100,000 people) was met with considerable resentment by landowners. Häkkinen has duly noted that freeholders as a group where rather reluctant in organising extensive aid.[696]

There are only two studies of the mortality determinants in the 1860s Finnish famine. According to cross-sectional regression results by Pitkänen, regional income and grain price differences typically explained excess mortality. Pitkänen is however unable to corroborate a significant number of hypothesised relationships; the social composition, amount of livestock, and urbanisation loaded only sporadically to the estimated models. When significant, population growth produced positive association to mortality but contrary to the Malthusian interpretation, population density loaded negatively.[697]

Influenced by the so-called 'vulnerability of places' approach[698], and as has been shown in the context of Irish famine recently by Fotheringham et al.[699], the results in *[3]* suggests that the relationship between dependent and independent variables may be regionally mediated by spatially delineated vulnerability structures; and that although there may not exist a general population relationship between variables, a sub-population relationship might exist. According to *[3],* there are substantial differences between different regions in terms of the independent variables explaining spatial mortality. Generally, the findings seem to vindicate Ó Gráda's observation that famines enforce social structures which already exist[700]; e.g. the exemptions from household and poll tax only associated positively with mortality in regions which featured a high number of exempted households (proxying for large agricultural social class

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694 Häkkinen & Forsberg (2015), 111, see also Pulma (1994), 68; Markkola (2007), 216–218. Concerning local aid, see e.g., Voipaala (1941), 175-190; Turpeinen (1986a), 171-179; Häkkinen (1994).

695 Pitkänen (1992b), 98–102

696 Häkkinen (1992), 164. See also Blomstedt (1981), 94; Viikki (1989), 27; Pitkänen (1991a), 72–73; Teerijoki (1993), 177; Ahtiainen and Tervonen (1998), 337–338; Häkkinen (2006), 43.

697 Pitkänen (1992), 92–94. The largest problem with this analysis is that it is based on a small number of statistical units, ranging from 11 to 21 and on annual cross-sections; thus no dynamics are assessed (via longitudinal data or collapsed time dimension).

698 Rygel et al. (2006), 744.

699 Fotheringham et al. (2013).

700 See discussion concerning vulnerability in subchapter 2.1; "famines have always brought out the best and the worst in human nature" Ó Gráda (2009), 47.

with unviable farming livelihood) or which were poor in terms of income (proxying for the lack of means to help the swelling numbers of poor), respectively.

Pitkänen does not detect evidence for a relationship between the number of crofts or freehold farms and regional mortality.[701] On the other hand, *[3]* gives reason to believe that an increase in the number of households did lower the regional excess mortality rates. The effect seems to have been most pronounced in low-income, low-inequality parts of Western Finland, where the local community had little means to provide aid and where individual mortality risk greatly depended on farming livelihood entitlements. This points out that regardless of the form of household (cottagers and lodgers included), if an individual had any type of (independent) household, their vulnerability to the risks that crop failure entailed was greatly reduced. Whether this was due to a greater ability to maintain some form of (cultivation) livelihood or whether it indicated one's connections within the local community is an open question.

In a similar fashion, the between-household Gini coefficient was observed displaying positive association to mortality only in Eastern Finland, where, as depicted in previous chapter, labour demand was concentrated in just a few large households. This and the negative association of households per capita suggest that those subject to unemployment stemming from the reduction in labour demand were in considerably greater mortality risk during the famine than those able to provide themselves with even just a meagre livelihood.

Another somewhat neglected topic in famine-related excess mortality, is the issue of social class. All the available evidence may seem to indicate that one was more likely to die the poorer one's class, but there was more to the demographic response than simply that.[702] The most detailed study of the relationship between social class and mortality response during this famine is by Pitkänen. He has collected information and compared the class differences in burials during the famine in regions with mild crop failure in 1867, and those where it was more severe. According to him the mortality rose disproportionately among vagrant workers. The effect persisted, though reduced as the ages of those compared increased. In terms of mortality, croft farmers and their families matched peasant freeholders, though on a slightly higher average.[703] While these results come with abundant sampling uncertainty, Kaukiainen has provided qualitatively similar results from the parish of Lohja (Southern Finland). According to him, the share of deaths from typhoid fever among gentry, peasant freeholders and craftsmen were well below their respective population shares, whereas crofters, farmworkers and vagrant labourers were above theirs.[704]

701 Pitkänen (1992a)
702 See e.g., Ravallion (1997a), 1213; Bengtsson (2004b); Bengtsson & Dribe (2005).
703 Pitkänen (1992a), 85. Pitkänen (2002) highlights that differences in mortality increase during a famine depend closely on pre-famine background mortality.
704 Kaukiainen (1980b). Linnanmäki (2005), 133, has shown that the socioeconomic mortality differences prevailed also during the Spanish flu epidemic in 1918-1920.

While it seems likely that the lowest social classes exhibited the highest mortality rate, the available figures are not adequate to draw any decisive conclusions. The Finnish parish death records would allow for a more detailed analysis on an individual level, but this would require painstaking (archival) work, especially to capture the dynamic properties of a famine; a mere cross sectional analysis would scarcely deepen the information Pitkänen has already provided, leaving the development in the social standings during the famine unaccounted for.

There remains another critical issue when using the parish death records as a source. Because the data focuses on burials, any socioeconomic information extracted is likely to underestimate the actual extent of adversity in the lower social ranks. This is because of the chaotic migration situation in the winter of 1867-68. Not only were a substantial proportion of deaths never reported back to the home parishes but the reporting itself would have been likely to vary greatly between social classes; a significant number of landless workers might have died while migrating in the middle of winter. In all likelihood, freeholders and those in institutionalized social positions were more probably included in the death registers. If the differences in death registering remain uncorrected, the estimated socioeconomic mortality differences are downward biased.

The problem with underestimating the bias is relevant, as future research ought to address the severity of the socioeconomic discrimination of mortality, not just its existence (which by now is pretty much self-evident). That the discrimination was severe is all the more likely because post-famine economic development was grossly unaffected by the high mortality among working-aged men. This suggests that the dearth of labour had little macro-economic importance after the famine, most likely because many of those who had died were of little importance to the workforce prior to the famine. An absence of long-term economic stagnation (at least in terms of GDP) in response to the famine also suggests that mortality targeted the dependent poor and vagrant, underemployed labour in particular.

5.3 Economic development during the famine

Whereas fairly little is known about the economic character of historical famines, considerably more is known about environmental shocks affecting the modern developing world. Similarly much more is known about the wealth effects than the income effects of pre-industrial shocks. This is mainly dictated by source materials; probate inventories and property taxes were fairly common in the pre-industrial period, whereas macro-level income information and income taxes were close to nonexistent.[705] The nature of income formation in pre-industrial economies is also problematic in an economy characterised by

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705 See e.g., Soltow (1981); (1985); Brenner et al. (eds.) (1991); Milanovic et al. (2011); Alfani (2015).

subsistence agriculture, where no clear distinction between income and harvest can be made. This means that in an environment populated by (subsistence) farmers, the FAD of crop failure can also correspond to an income shock.[706]

The economic character of the Finnish famine of the 1860s still remains unexplored for the most part, and the existing studies address the topic in only a cursory manner, or in general terms, i.e., by noting for the rise in grain prices, the increase in tax exemptions and arrears, bankruptcies, unemployment, and the drop in nominal and real wages.[707] Pitkänen has furthermore described the sequential worsening of rural poverty.[708]

But macro-level economic distress indicators may hide the plurality of local and household responses. As emphasised in vulnerability studies, households with a different socioeconomic status face a worsening economic environment in different ways. Ravallion has pointed out that credit markets, in particular, are important in transmitting aggregate shocks to the household level; while Devereux, who states that uninsured variability in harvests and production transmits to variability in income, concurs.[709] Not only are formal credit markets thin in famine-prone economies today, they were also thin in early modern Finland. The latter came down to two factors: *i)* the majority of institutional lending was conducted via Finland's central bank, which was constrained by monetary policies of the era (as discussed in section 5.1); and *ii)* social discrimination among local lenders was substantial - not only did this apply to individual lending in rural communities but also to lending from parish granaries. In other words, a loan was easier to obtain when the individual had collateral wealth and good reputation.[710] It is worthwhile to point out that even if individuals would have been able to secure a loan in response to idiosyncratic shocks, aggregate shocks greatly hampered the functioning of local credit markets.

While the popular assumption holds that poor and vulnerable households would be more affected by shocks than high-income households, there is a substantial amount of literature which shows that environmental shocks have an equalising effect on asset endowments.[711] Thiede has pointed out that whether or not environmental shocks flatten wealth distribution depends on liquidity and the demand for corresponding assets. He furthermore underlines the fact

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706 For disseminating factors see e.g., Ravallion (1997a), 1222; Devereux (2009), 26; Gray & Mueller (2012). For general treatment see Sen (1981a).

707 Voipaala (1941); Häkkinen et al. (1989), 34–35; Pitkänen (1991a), 50, 74; Kuisma (2003), Myllyntaus (2009).

708 Pitkänen (1993), 64–66.

709 Ravallion (1997a), 1223; Devereux (2009), 32. Dercon (2004) has displayed evidence of this from rural Ethiopia. In historical instances, this can also be inspected in terms of monocultural cultivation practices typically associated with the rural poor.

710 Markkanen (1977), 77–78; Heikkinen (1988), 104; Pitkänen (1991a), 49; Teerijoki (1993), 177; Hemminki (2014), 153–154; 159–166.

711 Thiede (2014), 181, considers that "[e]nvironmental shocks routinely threaten the livelihoods of poor and excluded households across the developing world". Reardon & Taylor (1996) and Thiede (2014) report on the wealth equalising effect of droughts in Burkina Faso and Ethiopia, respectively. Meanwhile, Valentina (1993) detects a minuscule inequality effect of droughts, but like Reardon & Taylor (1996) observes changes in the composition of household income. See also Ravallion (1997a), 1207.

that the resulting equality does not so much signify an increase in welfare, as an increase in vulnerability because, *i)* some households lose the baseline wealth that can be used as a last resort and *ii)* wealthier households are less able to distribute aid. Vennola has detected similar effect in the 1601-02 famine in terms of livestock distribution between households in Ostrobothnia. According to Nummela, crop failures during the late 1500s and the war of 1596-1597 also resulted in a heterogenous economic response, but generally to increased between-household inequality.[712]

In the previous section and in *[2]* the tax exemptions were studied from a structural point of view, i.e., which social groups and socioeconomic background factors contributed to being included in the exemption registers. Studying the intertemporal patterns of tax exemption could provide crucial information about the development of famine-related poverty, as structural characteristics affecting the probability of exemption are roughly constant over the short-term.[713] The endogenous relationship between tax exemptions and mortality is worth noting - mortality among those who would have obtained an exemption had they survived, cause a drop in exemption figures, *ceteris paribus*. This applies especially to the poorest segments of society and possibly biases tax exemption figures downwards.

FIGURE 13 shows the development during the famine years of the three provincial tax measures examined in this study. The share of households exempt from income tax increases towards the peak of the famine and in 1867, with the provinces of Mikkeli (in 1866) and Uusimaa (in 1868) being the exceptions. The rise in income tax exemption percentage is fairly modest - about 10 percentage points in several places, and a 20 percentage point increase only in Kuopio. The latter stems mainly from the fact that there was an apparent increase in the number of households during the famine; between 1865 and 1869 the number of households in Kuopio’s poll tax register grew a substantial 71.7% from 20,630 to 35,432. As was noted already in chapter 4, the considerably larger mean household size that was indicated by the poll tax registers (when compared to the deanery population tables) most likely resulted from taxation practices - especially with regard to wage contracts. This meant that if a freeholder peasant employed the residents of certain rural households and payed their taxes, the severance of these employment arrangements would have then been reflected in an increase in the overall number of independent households.

The development of household and poll tax exemptions show somewhat different patterns to income tax: even if all three measures did increase. In some instances the exemption peaks do not correspond to harvest failures, nor do they decrease after the famine. Quite the contrary in fact: the poll tax exemp-

712 Vennola (1900); Nummela (2011).

713 In the Nordic countries, there is a long tradition of scrutinising the connectivity of pre-industrial tax exemptions and harvest fluctuations, see e.g., Lundsjö (1975); Söderberg (1978); Mäntylä (1988); Kujala (1999).

tions seems to progressively increase in all provinces right up to 1870.[714] It seems that household tax had the most obviously cyclical nature.

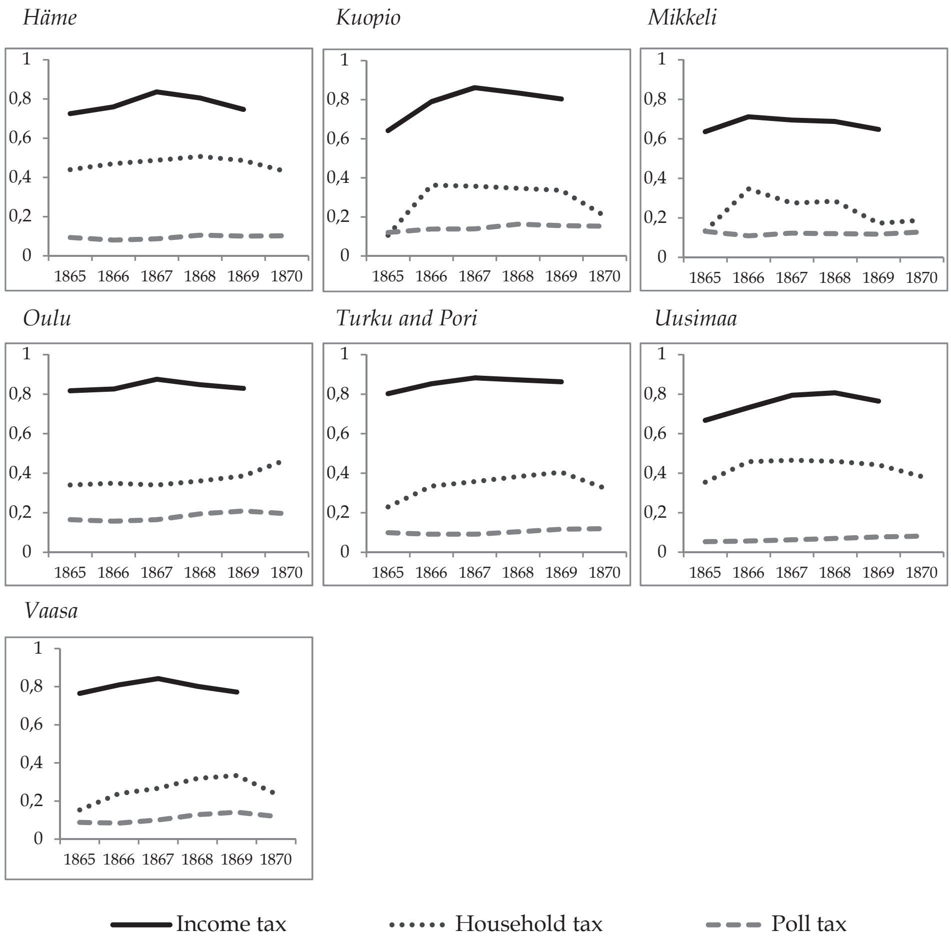

FIGURE 13 The provincial development of tax exemption rates, 1865-1870
Sources: Poll tax registers (1865-1870), Income tax registers (1866-1870)

With few exceptions (household tax in Häme, and poll tax in Mikkeli), all tax exemption rates were at a higher level in 1869-70 than they were in 1865. While these quite likely reflect local economic conditions and hardship beyond a strictly delineated famine-period, these may partially stem from the taxation practices. It was noted in official income tax reports from 1871 that even if mac-

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714 It has been widely considered that the famine resulted in an increase in communal poor relief, see e.g., Kilpi (1913), 137-140; Pulma (1987), 46; (1994), 64-65; see also Häkkinen (1987); (2006), 43. Piirainen (1958), 85-86, points out however that the increase in poor relief recipients was roughly similar in Sweden, which experienced considerably milder economic hardships in the 1860s, see e.g., Nelson (1988); Engberg (2006).

ro-economic conditions had markedly improved, a large number of households would remain exempt due to economic difficulties.[715] This highlights important facets of taxation practice in pre-industrial Finland. Economic status seems to have been assessed in its entirety; so that even if income tax concerned chiefly income, in practice it also took into account also for example wealth (see chapter 1). Therefore an increase in the rate of tax exemptions may have reflected short-term social-security responses.[716]

Furthermore, it is important to highlight that the tax measures were essentially ”pre-taxes”; no follow-up of the actual payment was conducted in this study and so tax arrears were not uncovered, which partially explains the somewhat moderate response in tax exemption figures. Finnish historians have generally considered pre-industrial tax collection as not being particularly elastic; the taxpaying ability of farms and individuals was fiscally very important.[717] Because of this, the officials were generally reluctant to grant *a priori* exemptions. Occasionally, however, taxes were not paid due to economic conditions, leading to arrears. The extent of arrears are not clear, however, and so to find out more, an illustrative inspection of the income tax registers from the province of Häme was carried out. Of the levied income taxes in 1866 and 1868, only 3.3% ended up in arrears, but of the income taxes levied in 1867, 21.0% were not paid on time. If arrears would be included with those who were tax-exempt, then the percentage of households not paying income tax in Häme in 1867 would rise from 83.7 to 87.3.[718]

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715 SVT IV: 2 (1875), 9.

716 If tax exemptions are to be considered as a form of social security, they are forms of *negative social security* (temporary renouncements of claim) instead of *positive social security* (e.g., an entitlement to income).

717 See for example, Jutikkala (1958), 117–118; Pitkänen (1991a), 50; Mäkelä-Alitalo (2003).

718 For the economic conditions in Häme, see especially Voipaala (1941), 196-201. For a Swedish perspective on tax exemption and arrears see Lundsjö (1975); Söderberg (1978).

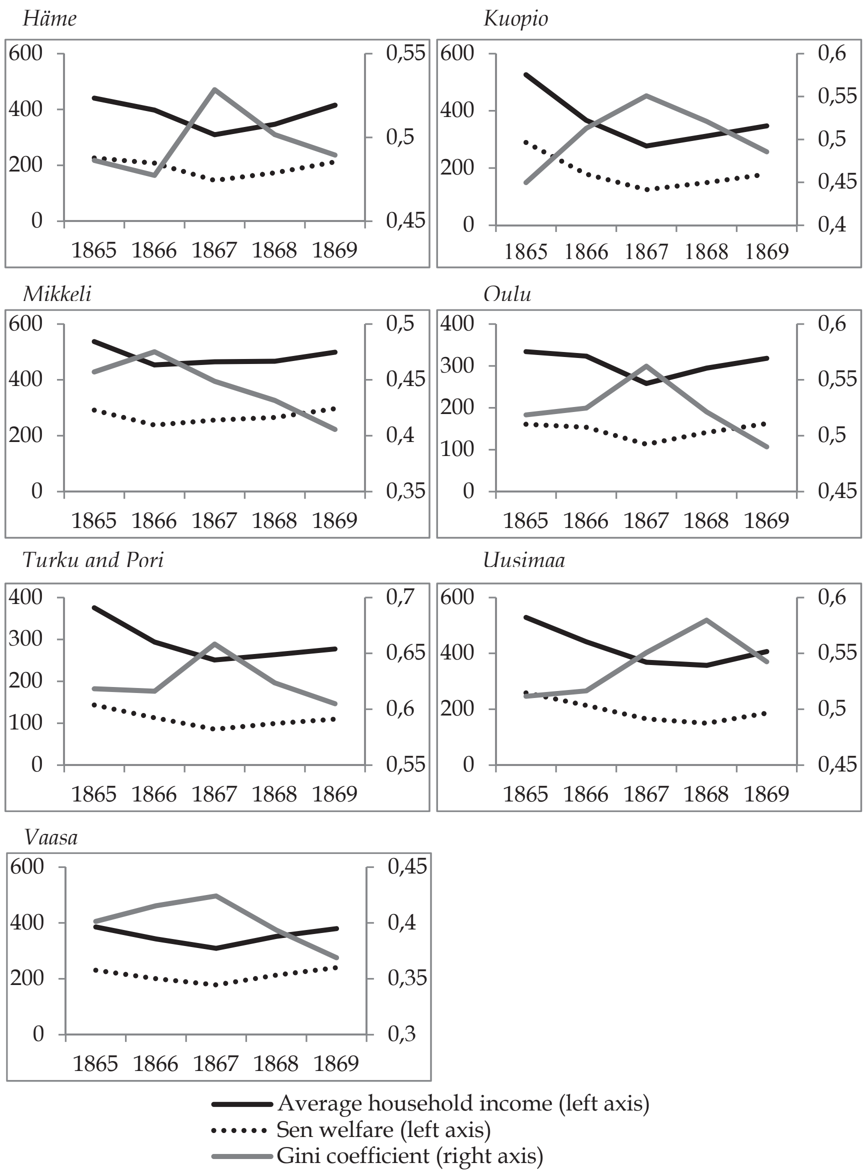

FIGURE 14 Provincial development of average household income and income inequality, 1865-1869

Sources: Poll tax registers (1865-1870), Income tax registers (1866-1870)

The income tax registers can be used to track the development of average income and income inequality during the famine. For each province, the estimated average-household income, the between-household income inequality (measured in Gini coefficient), and the Sen welfare measure[719] are presented in FIGURE 14. Because a decrease in the population happened at the same time as a decrease in average income, per capita income is not displayed, as it could reflect spurious growth during the famine.[720] The general observation is clear: there was a perceptible drop in household-level incomes during the famine. The drop was especially pronounced between 1866 and 1867. Only in Mikkeli was there an income-growth during those two years. In several places, the income level decreased between 1865 and 1866 too (especially in Kuopio, and Turku and Pori). In both of these provinces, the further decrease between 1866 and 1867 is milder. On average provincial household income in 1867 was roughly 24% lower than in 1865, though there was substantial regional variation. In Mikkeli the income level was only 13.6% lower in 1867 than in 1865, while in the province of Kuopio the average income was 47% lower than before the famine. Substantial drops are also evident in Turku and Pori and in Uusimaa.

The spatial changes in household incomes with respect to the pre-famine level of 1865 are shown in MAP 17. There are certain regions where between 1865 and 1866 the estimated income increases, most notably in northeastern parts of the province of Oulu (the districts of Kainuu, Oulu and Kemi), but also in places in Central Finland (districts of Laukaa and Mikkeli). The severe drop in household income in the province of Kuopio is particularly evident, with regional decreases well over 30% in several districts. The income decrease induced by the crop failure of the 1867 has several interesting spatial dimensions. The income decrease was particularly harsh in Southern and Northern Ostrobothnia (especially the district of Haapajärvi, with average household income falling to a mere 83 marks in 1867), but this was also the case in Häme, as well as Turku and Pori. The district of Mikkeli is the only region showing income growth between 1866 and 1867. Districts in the eastern parts of Vaasa also escaped with considerably shallower drops in income, though these regions already had a lower standard of living prior to the famine.

Previous Finnish literature has highlighted that the mediocre harvest in 1868 and the abundant one in 1869 quickly ended the subsistence crisis. But then there are also accounts of there being a long-lasting economic depression.[721] These results show that in no province and only a handful of administrative districts was the average household income higher in 1869 than it was in 1865. Northern Häme, Western Mikkeli and Eastern Vaasa show an increase in average household income, as do some places in Northern Finland. But the provinces of Uusimaa and Kuopio remained at a considerably lower income level in 1869.

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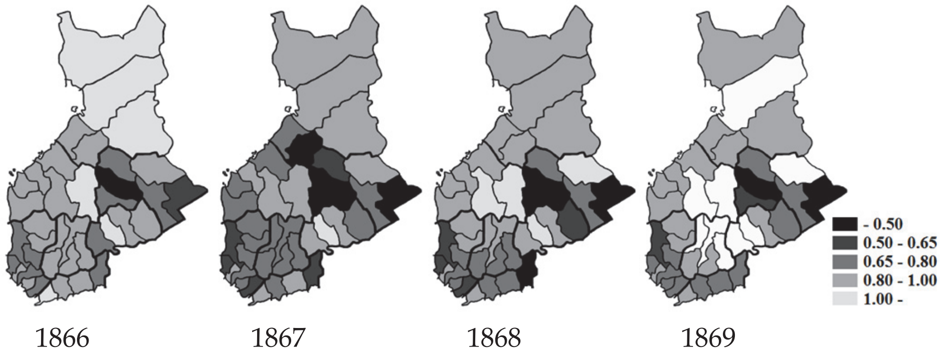
719 See Sen (1976) and section 4.4; Sen welfare function is a product of average income y and the Gini coefficient, G, of the corresponding income distribution; Sen welfare = y(1-G), see also Atkinson (1999), 181.

720 See Clément (2012), 107 for similar considerations concerning per capita grain production in the case of the 1959-1961 Chinese famine.

721 See e.g., Häkkinen (1987).



MAP 17 Change of average household income in comparison to 1865

Source: Poll tax registers (1865-1869), Income tax registers (1866-1870)

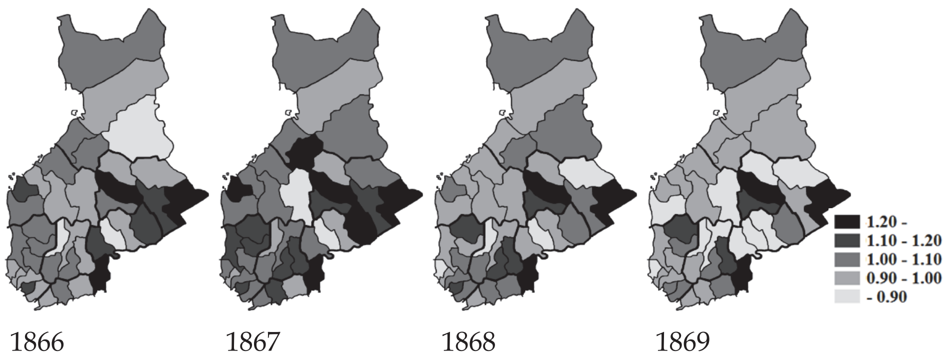
The correlation between pre-famine income level and average household income in 1869 to 1865 is -0.466 (p<0.01), showing that income increase was highest in those regions that were poorest prior to the famine. This tallies with some aspects of stylised Malthusian models;[722] but when the income change between 1865 and 1869 is regressed with the principal component scores (TABLE 11, MAP 14), no such correspondence is detected (correlation coefficients of the principal components one and two with income change are 0.299 and -0.173, with p-values 0.065 and 0.291, respectively). Even if the latter correlation coefficient has the right sign to be consistent with the Malthusian interpretation, its low level and statistical insignificance does raise questions about the robustness of the Malthusian rebound effect; the income rebound cannot be corroborated when poverty measures are altered and especially when more nuanced measures are introduced.

FIGURE 14 also presented the development of the income inequality measured in Gini coefficients during the famine, and the calculated inequality corrected average income (the so-called 'Sen welfare index'). Generally it seems that inequality and average income have a negative association; in other words, a drop in average household-income translates to an increase in between-household inequality. The skewing of the income distribution is particularly pronounced in 1867, when in some provinces (especially Turku and Pori and in Uusimaa, for instance) the Gini coefficients surpassed 0.70. This means that the highest inequality figures were found in the most developed parts of the country during the peak of the famine. The district of Haapajärvi marks an exception to this, however, as the drop in average income to a mere 83 marks corresponded with the rise of Gini coefficients from 0.55 in 1865 to 0.88 in 1867.

As is displayed in the Sen welfare measure, the skewness of the income distribution and the increasing inequality during the famine worsened the economic conditions, though in some places taking the inequality into account re-

722 For similar consideration in the Irish context, see e.g., Ó Gráda (1999), 30-34.

duces the income variance during the famine.[723] A few remarks are in order. First of all, the Gini coefficients increase the most in regions where mean household sizes were largest. In *[3]* it is shown that these are also the regions where Gini coefficient was associated positively with excess mortality during the famine. Secondly, Ravallion has highlighted that the inequality of income distribution matters in how poor benefit or hurt from changes in average incomes. High inequality reduces the benefits of income growth on poverty, but also hampers the adverse effect on the poor during a general income contraction.[724] This kind of non-linearities need to be taken into account in the future when more detailed inquiries are made concerning the relationship between income inequality and mortality during the famine.



MAP 18 Change of between-household Gini coefficient in comparison to 1865

Source: Poll tax registers (1865-1869), Income tax registers (1866-1870)

It seems that in the vast majority of regions where, by 1866, income inequality was already on the rise (Turku and Pori, Kuopio, and regions in the south of Oulu and Vaasa provinces), a further increase followed the harvest failure of 1867 with increases of over 10% detected in several locations. What is interesting, however, is that short-term recovery is in the opposite direction: in many regions already in 1868 the inequality was at a lower level than what it had been in 1865. By 1869 this equalisation had happened virtually everywhere (except Kuopio). Adding to the previous studies which scrutinise the inequality response due to environmental shocks, these results highlight that inequality can respond substantially differently over various time-periods. In 1860s Finland, it seems that the immediate response to the crop failures was greatly increased inequality, but over a couple of years the famine and crop failures led to a greatly equalised income distribution.

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723 Ravallion (1997a), 1218 points out that "famine mortality may be quite sensitive to changes in interpersonal inequality" but also points out in 1216-1217 that an equal resource (i.e. food) distribution does not necessarily minimize expected mortality.

724 Ravallion (1997b), 56.

The highly skewed pre-crisis income distribution goes some way to explain this observation. Holding the standard deviation constant, a reduction in average income forces an excess proportion of households below the poverty line. This is visible in the fact that average *taxed* incomes tend to increase during the famine. In other words, there were significant numbers of households close to the taxation threshold that dropped below the lower limit of 500 marks. While this triggered the growth of inequality through increased poverty, the possible income-effect of rising grain prices is also worth noting. Even if there are seemingly regions for which no price-data is available during the famine, market prices are generally available, suggesting that there was sufficient supply of grain for there to be a price at all. Ó Gráda has emphasised that the Finnish rye markets functioned even better during the famine than in normal times, pointing out that net-producing freeholders and farmers of large crofts most likely actually benefited from the rising grain prices. This is another channel through which the inequality may have risen.[725]

There was reasonable rebound among the households roughly in the middle of the income distribution in 1868 and 1869, but it was considerably milder among the richest.[726] Putting this evidence together, it seems likely that the crop failure of 1867 and the famine cut down the highest of incomes, which over the short-term did not recover as quickly as the lower incomes did. The background factors and detailed dynamics of this response require considerable future research.[727]

5.4 Conclusion

This chapter provided a general demographic and economic inspection of the famine years. Three findings are worthy of further emphasis. First of all, the duration of the demographic crisis is presented in more detail and lengthened from previous assessments.

Based on monthly deviations from pre-famine births and deaths, the demographic crisis is considered to have begun in the spring of 1865 and continued through to the summer of 1869. The recalculation of excess mortality and deficiency of births suggests that the total population loss is larger than was previously considered, at roughly 10 to 12% of the pre-famine population. The inclusion of the 1862 crop failure and mortality response in the winter of 1863 to the famine period is disputable. Pitkänen has noted that the increase of mortali-

725 Pitkänen (1993), 53–60; Ravallion (1997a), 1213; Lindeboom et al. (2010); Ó Gráda (2001). While the net incomes of the richest may also have fallen, their income shares may have risen.

726 The fact that inequality was measured here with Gini coefficients emphasises the fact that the income turbulence took place in the middle of the income distribution. As was discussed in section 4.4, Gini coefficients are sensitive to income transfers affecting the middle section of the distribution.

727 As highlighted by Ravallion (1997b), 57, sufficiently high inequality can translate into increased poverty even amidst a reasonable growth in average income.

ty in the early 1860s was mainly a result of communicable childhood diseases, but then again the excess mortality mainly falls upon the late winter and spring of 1863, designating a typical temporal spacing for famine mortality. The favourable demographic regime after the good harvest in 1863 however clearly distinguishes the demographic loss of 1862-63 from the cataclysm that was to fall in the latter half of the 1860s. Furthermore as is evidenced by the macroeconomic variables (real wages, prices, GDP), the mid-1860s does stand out in terms of economic performance from the rest of the decade. So, if the early 1860s is included within the appropriate time span, then the famine should be seen as having twin peaks, with a lull in the middle of the decade.

Secondly, the famine was clearly associated with substantial impoverishment, as we can see that, on the household level, the famine corresponded to a significant decrease in income levels which still prevailed after the famine had come to an end. Tax exemption figures reinforce this conclusion: exemptions from the three taxes studied in this chapter greatly increased at the height of the famine and generally remained at a higher level in 1870 than what they had been in 1865.

The third crucial observation is the apparent short-term increase in income inequality and its subsequent decrease after the famine. Unfortunately, it was beyond the scope of this study to investigate further the micro-level nuances of this process, so they remain as yet uncovered. The decrease of wealth at the high-end of the distribution as a response to environmental shocks is a common finding in modern development studies. These have been thought to stem from the wealthier households' possession of assets and from their ability to liquidate them; but further research is needed to unearth the heterogeneous dynamics behind the income response to the crop failures of the 1860s in Finland.

6 CONCLUSION AND FUTURE RESEARCH

This study has provided a structured look at the 19th-century economy of Finland and the socioeconomic forces and institutions which increased societal, local, and individual vulnerability to harvest failure. The aim has been to show more fully how these contributed to the poverty and inequality which prevailed in rural Finland prior to the famine of the 1860s. As was noted in the introduction, it has remained fairly typical for Finnish historiography to treat famines as punctual mortality surges caused by an anomaly in the weather that jeopardised the livelihoods of a sizeable share of the poor population. By overly focusing on excessive mortality crises, Finnish historians have not coherently addressed the actual extent and contextual meaning of poverty and social risk prevailing in the pre-industrial era. The most important sector of the economy, agriculture, has been given a rather monolithic treatment. It has been customary to consider that the agriculture was plagued with recurrent crop failures and farmers were unable and unwilling to modernize and develop their livelihood, leaving famines built into the backward cultivation economy.

International famine research in the last 30 years has received little attention in Finland. This has meant that power relations, the functioning of markets (e.g., food and labour), pre-famine development of vulnerability and political and economic constraints that upheld and shaped the poverty and inequality have received little genuine interest. The blind spots in the research have partially resulted from the fact that Finnish famines have often been seen as population and agricultural phenomena without the need for an explicit socioeconomic treatment. The researchers who initiated the paradigmatic shift in disaster literature in the 1970s and ’80s, and those who developed the theoretical premises for the social determinants of hazards have stressed that the embeddedness of disasters in the pre-crisis society should be taken seriously, diversely, and contextually. Famines should not be separated from their historically specific determinants, and from local economic and political processes.

The 1860s famine and the Finnish famines that preceded it had several similarities with other European famines in the past, and to famines that have happened more recently in the developing world. While modern famine studies acknowledge the catalytic role of exogenous shocks, they also suggest that vulnerability to these shocks does not simply fall from the sky, but is an outcome of the political and economic structure prevailing in the society in question. As the Swedish experience in the 1860s, and several cases in Africa and Asia since the 1970s have shown, the institutional framework does matter whether or not a shock translates into a full-blown socioeconomic cataclysm. It has been emphasised that it is a crucially different thing to ask why a famine happened in a certain place in a certain time than asking more generally why a certain region, social groups etc., were famine-prone and vulnerable to exogenous shocks.

The first chapter of this study described the existing Finnish research tradition with four generalisations. Now, as this work draws to end, it is time to revisit these typologies by answering the questions posed at the beginning. To avoid ambiguities arising from the sectoral treatment of the causality, the four points should come together to cogently provide an answer as to why the 1860s Finnish famine occurred; starting with exogenous structural features to imminent endogenous social and political factors.

Aggregate dependency on low-yield grain cultivation

Low average level and high proportional variance of grain yields was a fact of life well assimilated in pre-industrial societies. Taking into account the basic facts of these economies (e.g., the monocultural role of agricultural products in diets, and the dominant role of the cultivation sector in GDP), there was clearly a built-in food security risk. The crop failures were naturally crucial and ultimately necessary in creating the famine in the 1860s, just as they had been in the 1830s and in the 1690s. And just as the failed grain harvests were vital triggers of the Finnish famines, so was a food supply shock the imminent causal factor in the Irish famine of the 1840s, the Bengal famine of the 1940s, and the Great Leap Chinese famine in the 1950s. Even for its retrospective importance, it is necessary to acknowledge that drawing a connection between crop failures and mortality surges provides little analytical insight to the wider causal mechanisms: the negative outcomes of crop variability do not arise spontaneously. By placing the crop failure explanation at the forefront in accounting for the famine outbreak, several assumptions concerning pre-famine society are implicitly made. The most important ones are an assumed passivity in the face of worsening economic conditions; a paralysing poverty that was equally widespread; and the lack of buffer institutions.

Even for the rapid population growth experienced during the 1800s, it would be overly pessimistic to portray the Finnish 19th-century rural economy as grinding towards an ultimate standstill. Contrary to general perception, no long-term decline in grain productivity was observed and those temporary declines that did happen were seemingly connected to crop failure and thus weather conditions. In fact, Finland exhibited several processes typical to early industrialisation: a gradual growth in urban population and in industrial workforce and a nascent division of labour happening at the same time as a simultaneous increase in grain output at the farm-level.

The critical detail was that this increased productivity was not shared out equally. Freeholders, crofters, and workers with annual farm contracts were the main beneficiaries from the increases; though in northern regions, where the labour intensive slash-and-burn agricultural methods still prevailed, the increased grain output benefited vagrant labourers too. It also appears that rural inequality grew more in Western Finland than in the eastern parts of the country, but the majority of this happened only after the mid-1830s.

Poverty and inequality

Previous research has suggested that poverty in the 1800s was widespread, deep and hereditary and that the conditions of the rural poor were compromised by population growth, which forced people to compete for the few employment opportunities that remained, and drove down aggregate living standards. Generally it does hold that pre-industrial Finland was very poor by contemporary standards, inequality was pronounced, and endemic malnutrition was widespread; yet there is still a lot lacking in this depiction.

According to the present study, the contextual poverty was multidimensional and distinctly different on the individual and household levels. Generally the so-called overlapping poverty phenomenon was observed: different measures yielded different qualitative interpretations of the subject's poverty depending on the level of the measurements (e.g., household/individual). In the previous research concurrent findings have led to the widely reiterated argument that the low number of poor relief recipients in pre-industrial populations would seem to reflect the scarcity of (local) resources for aid. This would suggest that income and the extent of poor relief and various other forms of poverty would be in a positive association between communities. In a macro-inspection detailed in subchapter 4.4 a negative association was uncovered, however. This means that individual poverty measures were in negative association with per capita income and that the differences in the coverage of various poverty measures merely reflect the different levels of deprivation that were needed in order to receive poor relief or tax exemption. For example, it was shown that the number of those exempt from poll tax was much higher than the number of people receiving poor relief. This is not surprising; poor relief recipiency was a considerably larger economic burden for the community than an individual's tax exemption; and it would make sense that help was given at the lowest possible (effective) cost.

The poverty created several constraints on an individual level. The Finnish marital system confirms that Malthusian preventive check was at work; births were seen to be highly sensitive to marriages on an aggregate level. Finnish household formation seems to have followed the Western European marital pattern and the formation of large households seemed to result primarily from the inability of individuals to establish their own independent households. This process evidently contributed to a trade-off between within-household inequality and average incomes: high average household incomes were possible only with the increased household size while lower household size resulted in greater between-household inequality and lower average household incomes. Even for the preventive check, the Finnish economy of the 1800s cannot be considered Malthusian in any strict sense of the word. Most importantly, population growth did not result to increased poverty through diminishing returns. Rather, poverty was greatly influenced by the rigid social structure and legislation that gave rise to the rural inequality over access to land and resources.

According to the results presented here, it seems that in Ostrobothnia and the province of Oulu, especially, the number of poor relief recipients increased and the number of married adults decreased after the mid-1850s. This suggests that particularly in these parts the economic downturn happened well before the extensive crop failures of the mid-1860s.

The famine-inducing crop failures resulted in a substantial increase in the number of tax exemptions, both on individual and household levels. Using a log-normal estimation, the distribution of household incomes appear to have skewed considerably in 1866 and in 1867, but by the end of the famine, the between-household income inequality had generally dropped to below the pre-famine level. Simultaneously, however, average household incomes did not rise above the pre-famine level. This appears to result from the fact that in the immediate aftermath of the famine the highest incomes had a smaller rebound than incomes roughly in the middle of the distribution.

Thin markets

Markets for various goods were widely existent in the pre-industrial world, and in pre-industrial Finland too for that matter. According to Ó Gráda, the Finnish food markets functioned well during the 1860s famine, even if the data where regional and monthly gaps were interpolated may provide too smooth a rendition of the functioning of the markets.

In several instances, however, the markets were either absent or heavily socially segmented, and many of them were important for guaranteeing individual entitlements to food security. While the thinness of the markets may have hampered and depleted individual welfare and the ability to participate in market exchange on a general level, the symptoms of thin markets are considered to have most acutely affected the poor and vulnerable. This is most evident in how the credit markets malfunctioned: it is customary to consider that uninsured variability in production transmits fluctuations in harvests and variability in income. Not only are formal credit markets thin in famine-prone economies today, they were also thin in early modern Finland. The latter was due to two factors: *i)* the majority of institutional lending was conducted via Finland's central bank, constrained by monetary policies of the era and *ii)* social discrimination in local lending was substantial - generally an individual's wealth and reputation was crucial in allowing access to credit markets in the first place. Freeholders were thus important actors (both as creditors and debtors) in the local credit markets, and were reasonably able to weather idiosyncratic shocks but vulnerable to aggregate shocks such as extensive harvest failures.

This social discrimination was not confined to credit markets. Another important, yet segmented market was that of labour. In general terms, the need for agricultural labour markets is determined by the extent of individuals' access to agricultural land: with low land inequality, there is no substantial need for rural labour markets and labour markets are of little economic importance. Conversely, with a certain amount of land inequality, labour markets can prove important mediators of economic shock on the rural poor.

According to this study, the growth of the landless rural social classes and especially the growth in the number of vagrant rural labourers was important in shaping pre-famine rural vulnerability, but the growth of these population segments was not solely 'natural'. The fourth chapter here emphasised that labour vagrancy was partially a labour market outcome and especially for men, it resulted from an inability to obtain the post of contract farmworker or crofter. The insecurity in rural labour markets was reinforced by the fact that farms were limited in their ability to employ live-in servants even during normal harvest years.

Freeholders and crofters most likely kept their own sons working in farms, thus lessening the demand for external labour. In line with the hereditary conventions and also due to the lower wages for female servants, sons were more likely to be kept than daughters. Even when external labour demand was required, it was often hired on a seasonal basis and so the need for external labour remained sensitive to harvest fluctuations. In terms of the functioning of labour markets, the skewed income distribution meant that most of the demand for rural labour came from relatively few farms at the high-end of the income distribution, which again contributed to increasing the thinness of rural labour markets.

One important feature of 19th-century markets was how adverse market outcomes accumulated: success in one market would most likely enhance an individual's position in another. Access to any market depended heavily on one's wealth, income and social status. The disadvantaged position that an individual was placed under by the wider social structure meant it was easy to get into a vicious circle where adversities piled up for certain population segments.

Absence of coordinated social response and regional economic policy

Economic inequality and poverty grew rather unchecked in the rural regions, as there seems to have been no genuine large-scale alternative to employment in the agricultural sector. Industrial production in the 1860s employed only about 20,000 people, the urban centres were small, and domestic demand for handicrafts was not great enough to turn it to a general livelihood. The differences in regional development were not random; lack of industrialisation, low average income, a high percentage of tax exemptions, and no urban sector had clustered in certain parts in the country. Many of these regions were located between the 62nd and 66th parallels north, and they were subject to recurrent adverse climatic conditions. The poorest regions of the country extended from the northern parts of the province of Turku and Pori to Central Finland and from the north-east parts of Vaasa to southern Oulu. This and results concerning slash-and-burn cultivation suggests that the most problematic regions in terms of economic deprivation were not the provinces in Eastern Finland (typically portrayed as poor) but actually the western parts of the country.

The modern food security literature stresses that in most cases, entitlement to food is a public service, requiring social security and employment protection. The crucial property increasing famine-risk in 1800s Finland (and in the majority of pre-industrial world, for that matter) was the local nature of poor relief. The first source of help was considered to be family and relatives, parish institutions followed, only if the former was unable to deliver. Furthermore, many decisions that affected individuals' entitlement to food security and defined their vulnerability to shocks resulted from local practices, for example from land partitioning conventions - landowners were ultimately left to decide how the land-access evolved with time.

The long-held convention that parishes should take care of their own poor, was enforced through legislation which allowed parishes to deny in-migration to people who were suspected of having to resort to poor relief. When conventions such as these were added to geographically aggravated climatic risks and the general sociopolitical tendency to react to only acute crises, poverty and risk of destitution were becoming more regionally embedded through the course of the 19th century.

This build-up of adversity is then a natural source for the temporary migration that the crop failures induced in the mid-1860s. It also provides an explanation to the regional determinants of the temporary migration largely unprovided in any cogent manner in the existing Finnish literature. After the temporary migration was initiated, the local economic policies affected the course of the famine one more time: with the absence of a coordinated macro-social response, the parishes were generally left to take care of the migrants as they saw fit. It has been previously suggested that in a more concentrated manner (e.g., in poor's houses) the beggars were treated, the higher the subsequent mortality.

The typical Finnish famine narrative has emphasised the role of temporary migrants in spreading contagious diseases and that the regional distribution of crop failures roughly designates the regions hardest hit by the famine. More elaborate studies have shown that economic variables such as grain price were important in explaining the regional mortality response and that the lower the pre-famine social position, the higher the mortality risk during the famine.

This study diversifies the picture substantially. First of all, it was detected that regions differed in terms of which background factors had an impact on regional mortality rates. The differences were in line with underlying vulnerability structures: tax exemptions were important where abundant and income inequality was observed explaining the mortality rates where the household structure was unequal and coexisted with concentrated labour demand. The extent of the crop failures was not solely sufficient in explaining the mortality patterns. Secondly, the famine escalated differently in different parts of the country. In Western Finland the process was considerably more drawn-out than in Eastern Finland. The relatively mild socioeconomic response (in marriages and in poor relief) observed in Eastern Finland prior to the famine could suggest that local economic structure dominated by large households was able to mitigate economic downturns better than their counterpart in Western Finland.

Overall it seems that the famine intensified those socioeconomic problems that existed prior the famine. The economic development in the late 1850s and in the early 1860s adjoins with some typical patterns of pre-industrial socioeconomic adjustment, such as a decrease in marital coverage in response to economic stress. It was not just however the continuous economic decline that ultimately triggered the famine; the crop failure of 1867 was much too severe especially in the poor inner parts of the country for the contemporary local social structures to withstand without disintegration.

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Even if this study has uncovered a variety of topics, the treatment I was able to give them was limited and in order to confirm the observations outlined here, a considerable amount of future work is needed. As a conclusion, some additional directions and questions are presented in the modest hope that they would provide guidelines for future research.

First of all, agricultural production and productivity requires a more detailed analysis. The calculations presented in the third chapter could, for instance, be augmented with additional calibrated variables. More importantly, however, we should produce alternative agricultural output series to the official series obtained from the governors' reports. A detailed calculation of the 1800s Finnish grain production is crucial for future estimates of GDP and in order to assess the economic growth prior to the 1860s. As the official grain production figures are most likely too low, future revisions to the agricultural output can fundamentally alter our perceptions concerning the economic development also in the latter half of the 1800s.

Secondly, the functioning of the rural labour markets needs to be uncovered in greater detail. Especially interesting topics would be whether the growth of rural vagrant labour was in any way connected with farm level productivity. It is possible that the increased productivity of the annual workers resulted in labour release from the agricultural sector and thereby increased the number of the underemployed. There are vague suggestions in the literature that during the 1800s freeholders increasingly turned to vagrant labourers when in need of external workforce instead of using expensive year contract workers. The development of wages and employment of live-in servants should thus be investigated in detail too.

Thirdly, in *[1]* it was suggested that the Finnish economy-demography regime did not feature the Malthusian positive check. The robustness of this interpretation should be reviewed in future studies. Future analysis should pay attention to alterations in the living standard measures and study the robustness of the results with regard to the methodological framework applied. To the extent that it is possible, regional inspections should also be undertaken.

Fourthly, the within and between-household inequality and income formation should be assessed. This study suggested that there was an inherent trade-off between high household income and household inequality. Detailed macro-level analysis is required in order to uncover the regional development of household structure and in what kind of relationship it was to the local socioeconomic conditions. Whether the large households were able to buffer against the economic downturn during the late 1850s and early 1860s is an open and highly important question. While the importance is in terms of the contextual economic constraints and inequality, the possible linkage to the prevalence of the Western European marital system and neo-local conventions also need to be addressed.

The last but not least of the major themes that should be given priority in the future is whether there was a connection between income inequality and the spatial/regional patterns of mortality during the famine. Even on an international scale, the Finnish income tax register data may provide the unique possibility for tracking the role of income inequality *during* a historical famine. Besides the inequality measures, the extensive panel data gathered during this study may prove highly useful in future research into the determinants of famine-related mortality.

FINNISH SUMMARY

Köyhyys, eriarvoisuus ja Suomen 1860-luvun nälänhätä

Tutkimuksen lähtökohdat

Tämä tutkimus käsittelee Suomen 1860-luvun nälänhädän pitkän aikavälin sosiaalista, yhteiskunnallista ja taloudellista taustaa. Työ koostuu laajasta johdanto-osiosta ja kolmesta vertaisarvioidusta tutkimusartikkelista.

1860-luvun nälänhätää eli niin kutsuttuja ”Suuria Nälkävuosia” on tutkimuksessa käsitelty yllättävän vähän. Itse kriisiä koskevia teoksia ja artikkeleita on vain muutamia, ja muu tutkimus suo nälänhädälle lähinnä kaavamaisen ja luonnehtivan käsittelyn. Tämä on korostunut erityisesti viime vuosina, kun 1980- ja 1990-lukujen nälänhätähankkeen puitteissa tehdyt havainnot ja tulkinnat ovat jääneet ilman laajaa jatkotutkimusta.

Nälänhätä on useassa yhteydessä hahmotettu kansallisen viitekehyksen kautta. Tämä on tarkoittanut vertailua korkeintaan muihin suomalaisiin nälänhätiin ilman ilmiötason kansainvälistä reflektiota. Teoreettisen ja kausaalisempiirisen tutkimuksen puuttuminen on jättänyt huomattavia aukkoja laajempaan ymmärrykseen kriisin taustatekijöistä sekä nälänhädän sosiaalisesta ja taloudellisesta luonteesta. Suomen 1860-luvun nälänhätä tarjoaa kuitenkin myös kansainvälisesti merkittävän tilaisuuden tutkia historiallista nälkäkriisiä mittavalla sosiaalisella, taloudellisella ja väestöllisellä aineistolla.

Tämä tutkimus monipuolistaa olemassa olevaa kuvaa 1860-luvun nälänhädästä vastaamalla seuraaviin kysymyksiin: *(i)* mitkä tekijät lisäsivät kadoille haavoittuvuutta Suomen maaseudulla 1800-luvun kuluessa, *(ii)* kuinka laajaa köyhyys oli maaseudulla nälänhädän alla ja mitkä tekijät vaikuttivat sen mittakaavaan, *(iii)* miten nälänhätä ilmeni taloudellisesti kotitalouksien tasolla ja *(iv)* mitkä tekijät selittävät kuolleisuuden alueellisia eroja?

Tutkimuksessa painottuu kehitystaloustieteiden, sosiologian ja antropologian piirissä kehitetty haavoittuvuuden käsite. Haavoittuvuuden avulla kuvataan niitä yhteiskunnallisia, paikallisia, sosiaalisia ja taloudellisia prosesseja, sekä niitä instituutioita ja rakenteita, jotka jättivät tietyt väestönosat toisia heikompiin asemiin suhteessa eksogeenisiin ja endogeenisiin häiriöihin. Tältä osin tutkimus poikkeaa aiemmasta suomalaisesta historiankirjoituksesta, joka on nähnyt maaseutuköyhyyden ensisijaisesti sisäänrakennettuna osana esiteollista yhteiskuntaa ja nälänhädät luonnollisina seurauksina satotasojen vuotuisesta vaihtelusta.

Aineistot ja menetelmät

Tutkimus on tilastollinen analyysi nälänhätää edeltävästä ja sen aikaisesta yhteiskunnasta, jossa aluesidonnaiset tekijät rajoittivat yksilöiden elintasoa ja toimintaedellytyksiä. Näihin kuuluivat muun muassa muuttoliikerajoitteet, teollisuus- ja kaupunkielinkeinojen agglomeroituminen tiettyihin maanosiin ja ilmastohäiriöiden muodostamien sosioekonomisten riskien alueelliset erot, mikä tarkoitti sitä, että sosiaaliset ja taloudelliset rajoitteet olivat alueiden sosioekonomisten kontekstien määräämiä. Tämän takia tilastoyksikköinä käytetään pääsääntöisesti spatiaalisia yksiköitä, kuten läänejä, kihlakuntia, rovastikuntia ja seurakuntia. Tiettyjä aluerajauksia on tehty aineiston saatavuuden perusteella.

Tutkimuksen perusaineiston muodostavat kirkolliset väestörekisteriaineistot, henkikirjat ja suostuntaverorekisterit. Lisäksi työssä käytetään mittavasti erilaisia tilastollisia virallislähteitä. Väestönrekistereitä käytetään tutkimuksessa kahteen tarkoitukseen. Vuotuiset väestönmuutostaulut mahdollistavat ensinnäkin väestörekonstruktiot, joiden pohjalta on luotu väestölliset pohja-aineistot useaan tutkimuksen alaosioon. Nälänhädän ajan väestömuutostilastot on julkaistu koostetusti teoksissa Turpeinen (1986a) ja Pitkänen (1993), joita molempia käytetään tässä tutkimuksessa tilastolähteinä. Viisivuosittain kerätyt sosiaali- ja ammattijakaumat mahdollistavat maaseudun sosioekonomisen rakenteen tilastollisen tutkimuksen ja spatiaalisen kartoituksen. Tutkimusta varten kerättiin vuodet 1845–1865 kattava rovastikunnittainen monimuuttujainen pitkittäispaneeli.

Tutkimuksessa käytetty henkikirja-aineisto on seurakunnittainen. Se kattaa Viipurin lääniä lukuun ottamatta kaikki Suomen maaseurakunnat vuosina 1865–1870. Henkikirjat antavat ainutlaatuista tietoa seurakuntien väestörakenteesta ja elintasosta. Tässä tutkimuksessa henkikirjoista kartoitetaan erityisesti henkirahan ja käräjäkappaveron maksamista.

Kolmannen lähdekokonaisuuden muodostavat suostuntaverorekisterit. Suostuntavero, jota kerättiin vuosina 1865–1885, oli Suomen ensimmäinen progressiivinen tulovero. Verotiedot koostettiin suostuntaveropiireittäin (usein seurakunta) tilikirjoiksi, jotka mahdollistavat paikallistason tulonjakotietojen keräämisen kattavaksi spatiaaliseksi dataksi. Veron alarajan ollessa verrattain korkea (500 markkaa), suurin osa maaseudun kotitalouksista jäi verotuksen ulkopuolelle. Tässä tutkimuksessa on tehty oletus, että tulojakauma noudattaa log-normaalia muotoa. Oletukselle löytyy verrattain paljon tukea niin kotimaisesta kuin ulkomaisestakin tutkimuksesta. Näin saadun estimaatin avulla pystytään arvioimaan keskituloa ja tulonjakoa koko väestön tasolla, ei pelkästään tulojakauman yläpään osalta. Tutkimusta varten suostuntaverotilastot on kerätty vuosilta 1864–1869, ja aineisto koostuu noin 350,000 tuloverotiedosta.

Työssä käytetään monimuotoisesti tilastomenetelmiä, joista keskeisimmät ovat aikasarjamenetelmät, frekvenssiaineistojen analyysimenetelmät, monimuuttujaiset aineistojen tiivistysmenetelmät sekä erilaiset poikkileikkausaineistojen regressiomenetelmät.

Maatalouden tuottavuus kasvoi 1800-luvun kuluessa

Maatalouden alentuneen tuottavuuden on Arvo Soinisen tutkimuksen myötä katsottu oleellisesti leimanneen Suomen 1800-luvun talouskehitystä. Havainto perustuu monelta osin epäsuoraan peltoalojen, karjamäärän ja niittyjen suhteen muutoksiin ja näistä, niin sanotun Postanin hypoteesin hengessä johdettuun päätelmään, että pienentyneet niittyalat Länsi-Suomessa ja ylikäytetyt kaskipellot Itä-Suomessa olisivat johtaneet viljantuotannon tuottavuuden laskuun 1800-luvun puoliväliin tultaessa.

Tässä tutkimuksessa estimoitiin viljantuotantosarjat 1800-luvun alkupuoliskolle kuvernöörien kertomusten sato- ja kylvötietojen sekä saatavilla olevien subjektiivisten satoarvioiden avulla. Näiden sekä saatavilla olevien jyvälukujen ja työvoimapanostietojen pohjalta arvioitiin tuottavuuden kehitystä. Nämä arviot eivät puolla näkemystä rakenteellisesta tuottavuuden laskusta ennen 1860-luvun nälänhätää. Tuottavuusmitoista jyväluvut ja tuotanto suhteessa maaseudun työvoimatarjontaan näyttävät stagnaatiota ja tuotanto suhteessa tiloihin ja tilojen työvoimaan kasvua. Toisistaan eroavat tuottavuusmitat tarkoittivat mitä luultavimmin kasvaneita tuloeroja 1830-luvulta alkaen. Eri tuotantopanosten tuottavuussarjat kehittyivät selvemmin yhdessä Itä- kuin Länsi-Suomessa. Tämä havainto heijastelee luultavasti työvoiman kysyntäeroja ja kysynnän enemmyyttä työvoimavaltaisella kaskiviljelyalueella.

Maatalous oli matalatuottoinen keskimääräisten jyvälukujen asettuessa neljän ja kuuden väliin. Tämä korosti katojen haitallisuutta. 1860-luvun nälänhätää edelsi toki tuottavuuslasku, mutta käytännössä juurikin kadoista johtuva. Merkittävä havainto on myös, että 1830-luvun nälänhätää edelsi 1850- ja 1860-lukujen kaltainen lyhytaikainen pudotus tuottavuudessa. Tämä korostaa esiteollisten nälänhätien kausaalista taustaa. Koska nälänhädät eivät tyypillisesti tapahtuneet vasta kuin useiden perättäisten, pääsääntöisesti huonoista sääolosista johtuneiden katojen jälkeen, nälänhätiä edeltävät lähes määritelmällisesti tuottavuuden notkahdukset. Tutkijoiden ei tule sekoittaa tätä rakenteelliseen, rajatuottoperusteiseen tuottavuuden alenemiseen.

Maatalouden tuottavuuden kasvusta on runsaasti esimerkkejä jo 1700-luvulta muun muassa Englannista ja Ruotsista. Molemmista maista on esitetty myös merkittävää todistusaineistoa tuottavuuskasvun hyötyjen epätasaisesta sosiaalisesta jakautumisesta. Tässä työssä lasketut Suomen sarjat näyttävät puoltavan samankaltaista kehitystä.

Lainsäädännölliset ja institutionaaliset tekijät ylläpitivät ja voimistivat maaseudun eriarvoisuutta

Suomen maaseutu oli ajanjaksolla hyvin eriarvoinen: suostuntaveroaineistosta arvioiduista tuloista lasketut Gini-kertoimet osuvat tyypillisimmin 0.40–0.60 väliin. Niiden mukaan Suomi sijoittui nykyisten kehitysmaiden tasolle tulonjaon vinoudella mitattuna. Paitsi eriarvoinen, maaseutu oli köyhä, myös aikalaisella mittapuulla.

Köyhyys ja eriarvoisuus eivät kuitenkaan ilmaantuneet tyhjästä. Aikakauden yhteiskunnassa oli monia köyhyydelle ja eriarvoisuudelle altistavia sosiaalisia ja taloudellisia rakenteita.

Maanhallinta oli maanomistajien käsissä, ja on syytä uskoa, että maahan oli mahdollista päästä käsiksi lähestulkoon ainoastaan perimisen, avioliiton tai torpparisopimuksen kautta. Näissä olosuhteissa työmarkkinat muodostivat merkittävän osan maaseudun maattoman väestön elintason perustasta.

Rengiksi tai piiaksi lähtemistä on pidetty normaalina osana maaseudun ihmisen elämänkaarta. Tämä tutkimus antaa aiempia tutkimuksia huomattavasti pessimistisemmän kuvan maaseudun työmarkkinoiden toiminnasta. Monet tilat olivat ensinnäkin verrattain köyhiä palkatakseen edes normaalien satovuosien aikana tilan ulkopuolista vuotuistyövoimaa. Toiseksi kyse oli siitä, että matalatuottoisen maatalouden työvoiman kysynnässä oli merkittäviä heittoja vuosien välillä, eikä työvoiman kysyntä tilaa kohti laskettuna käytännössä kasvanut. Keskimääräinen maatila näyttää työllistäneen yhtä paljon 1800-luvun alkupuolella kuin puolivälin tienoilla. Työvoiman kysyntä on itse asiassa saattanut laskea - maatalouden tilatason tuottavuuden nousu on voinut vapauttaa työvoimapanosta 1800-luvun kuluessa.

Maaseudun ongelmia korosti matala kaupungistumis- ja teollistumisaste. Alikehittyneet ja hitaasti modernisoituneet talouden muut osa-alueet eivät kyenneet riittävässä määrin tarjoamaan kasvavaa ja maatalouden vuotuisvaihteluista irrallaan olevaa elinkeinoa, eivätkä ne siten pystyneet sitomaan maatalouden irtainta väestöä.

Maaseudun työmarkkinat näyttävät toimineen paremmin naisten kuin miesten osalta. Tähän vaikuttivat naisten matalampi palkkataso ja miesten työmarkkinoita segmentoineet perintökäytänteet, jolloin talojen poikia oli perusteltua pitää työvoimana. Havainnot puoltavat merkittävää työmarkkinoiden diskriminaatiota, joka muodostui mitä ilmeisimmin ongelmaksi erityisesti matalampien sosiaaliluokkien miespuolisille edustajille.

Elintason alueelliset erot olivat huomattavia

Maanhallintaerot ja vaihtelut maaseudun työmarkkinoiden toiminnassa olivat merkittävässä roolissa selitettäessä köyhyyden kontekstuaalista mittakaavaa. Esiteollinen köyhyys riippui kuitenkin oleellisesti tarkasteluyksiköstä, sillä kotitaloustulot kasvoivat kotitalouskoon funktiona. Pienet kotitaloudet olivat tyypillisesti köyhiä, vapautettu veroista ja useassa tilanteessa ilman aikuista miestä. Kotitalouksien väliset tuloerot olivat suurimmillaan maan länsiosassa, jossa kotitaloudet olivat tyypillisesti pieniä. Korkea eriarvoisuus oli laajalti seurausta erityisesti pienien ja köyhien talouksien suuresta määrästä. Esimerkiksi Hämeen läänissä käräjäkappaverosta vapautettuja ruokakuntia oli monin paikoin miltei 50 prosenttia kaikista maaseudun talouksista.

Köyhyys ja heikko-osaisuus ei suinkaan ollut samanlaista joka puolella maata. Sosiaalisessa rakenteessa piilevä haavoittuvuus oli sitoutunut merkittävästi erilaisiin tekijöihin alueesta riippuen. Tutkimuksessa havaittiin kolme erilaista spatiaalista haavoittuvuusrakennetta. Ensinnäkin Etelä- ja Pohjois-Suomessa kotitalouksien välinen eriarvoisuus oli suurta, ja näillä alueilla myös pienten köyhien kotitalouksien osuus oli merkittävä. Itä-Suomessa oli ominaista verrattain tasainen tulonjako varakkaiden tilojen välillä. Näissä osissa maata eriarvoisuus oli pakkautunut kotitalouksien sisäiseksi, sillä keskimääräinen kotitalouskoko oli monin paikoin puolet suurempi kuin läntisissä osissa maata. Siirryttäessä tarkastelemaan yksilötason köyhyyttä matalimman tulotason alueet sijoittuvat Sisä-Suomeen eli pohjoisesta Satakunnasta Vaasan läänin itäosien ja nykyisen Keski-Suomen kautta Pohjois-Pohjanmaalle.

Kotitaloudet muodostivat merkittävimmän yksilöiden aikalaiskontekstin. Tässä tutkimuksessa tarkasteltiin myös kotitalouksien ja avioliittojen yhteyttä pyrittäessä kartoittamaan missä määrin Itä- ja Länsi-Suomen kotitalouksien keskikoot todellisuudessa heijastelivat usein esillä pidettyjä eroja perhekulttuureissa. Tämän tutkimuksen havaintojen mukaan 1800-luvun Suomessa vallitsi suurelta osin yhtenäinen avioliittokulttuuri eli suurten kotitalouksien alueella avioliittoja suhteessa väkilukuun oli merkittävästi läntistä Suomea vähemmän. Tämä puoltaa rakenteellisten tekijöiden merkitystä avioituneisuuden ja kotitalouksien muodostumisten rajoittajana. Havaintoa vahvistaa työssä osoitettu voimakas makrorelaatio reaalipalkkojen ja avioituneisuuden välillä, minkä mukaan suomalainen väestödynamiikka oli voimakkaasti avioliittojen ja syntymien muovaamaa.

Nälänhädän pahimman vaiheen liikkeelle sysänneellä syksyn 1867 kadolla oli merkittäviä tulonjakovaikutuksia

Syyskuussa 1867 iskeneet voimakkaat hallat aiheuttivat massiivisen kadon miltei koko Suomessa. Ainoastaan Mikkelin lääni, jotkin Viipurin läänin osat sekä paikoin rannikkoseutu säästyivät. Kadot olivat vaivanneet maata jo 1850-luvulta alkaen, mutta mittakaavassaan syksyn 1867 kato oli poikkeuksellinen. Kato aiheutti voimakkaan tuloshokin, jonka seurauksena keskitulot laskivat merkittävästi monissa osissa maata. Pohjois-Pohjanmaalla ja monin paikoin Itä-Suomessa tilakohtainen keskitulo puolittui vuoden 1865 tasosta. Samanaikaisesti tulonjako vinoutui, paikoin huomattavasti. Nälänhädän jälkeen keskitulot eivät juuri missään yltäneet kriisiä edeltäneelle tasolle, mutta tulonjako tasoittui nälänhätää edeltäneestä tilanteesta merkittävästi.

Alueelliset kuolleisuuserot riippuivat sosiaalisista makrorakenteista. Verovapautusten havaittiin lisänneen nälänhätäkuolleisuutta niillä alueilla, joissa joko köyhiä kotitalouksia oli jo valmiiksi paljon tai joilla paikalliset resurssit olivat jo ennen nälänhätää vähäiset. Itsenäiset kotitaloudet suojasivat yksilöitä nälänhädän aikaista sekasortoa vastaan, riippumatta kotitalouden sosiaalisesta asemasta. Vastaavasti työnkysynnän keskittyminen harvoihin suuriin kotitalouksiin tarkoitti sitä, että tuloerot lisäsivät kuolleisuutta erityisesti suurtalousalueella Itä-Suomessa.

SOURCES

PRIMARY SOURCES

I. ARCHIVAL SOURCES

a. National Archives

Provincial poll tax registers, 1866–1869 (*Henkikirjat*)
Häme (H:35–40)
Kuopio (K:60–68)
Mikkeli (M:58–64)
Oulu (Ou:58–65)
Turku and Pori (T:87–98)
Uusimaa (U:58–64)
Vaasa (Va:80–90)

Population tables (*Väkilukutaulut*)
1840-1845 (K01A:6)
1850-1855 (K01A:7)
1860-1865 (K01A:8)

Provincial governor's reports (*Kuvernöörien kertomukset*)
Häme, 1851-1883 (K19C:36)

b. Hämeenlinna Provincial Archives

Häme provincial income tax registers (*Suostuntaverojen tilit*)
1866-1869 (I Gac: 2-5)
Uusimaa provincial income tax registers (*Suostuntaverotilitykset*)
1866-1869 (C I c:2-5)

c. Joensuu Provincial Archives

Kuopio provincial income tax registers (*Suostuntaverotilit*)
1866-1869 (Gaf:2-5)

d. Jyväskylä Provincial Archives

Laukaan kihlakunnan kruununvoudin arkisto
Taxation registers (*Valtioverojen kantokirjat*)
1866 (Gba:107)
Laukaa districtional income tax registers (*Suostuntaveroluettelot*)
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Provincial governor's reports (1840-1865)
Microfilms JKK 146–149, JKK 149a
Deanery population tables (1845, 1855, 1865)

Microcards, 70-74, 88-92, 105-107, 109

Population change tables (1815-1870)

Microcards, 20–243.

e. Mikkeli Provincial Archives

Läänintilien arkisto

Mikkeli provincial income tax registers (*Suostuntaverotilit*)

1866–1869

f. Oulu Provincial Archives

Oulu provincial income tax registers (*Suostuntaverotilit*)

1866–1869 (Ge4:20–23)

g. Turku Provincial Archives

Turku and Pori provincial income tax registers (*Suostuntavarojen tilit*)

1866–1869 (IGak:2-5)

h. Vaasa Provincial Archives

Vaasa provincial income tax registers (*Suostuntaverotilitykset*)

1866–1869 (GIc:2-5)

II. DIGITAL SOURCES

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Provincial poll tax registers, (*Läänien henkikirjat*)

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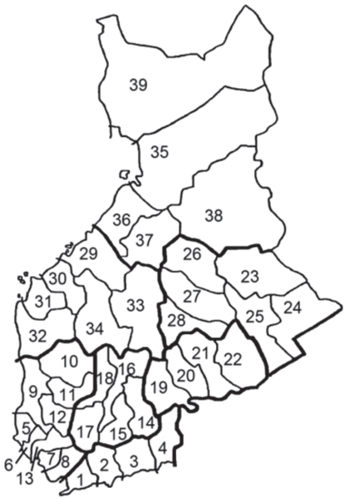
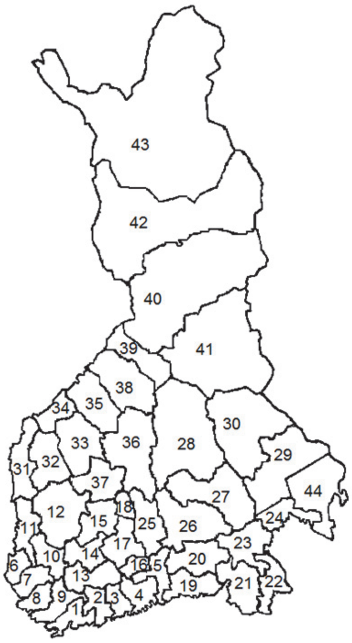
APPENDICES

APPENDIX A1: The principal region of investigation. The administrative districts (*kihlakunnat*) in Finland during the 1860s (The province of Viipuri and district of Lapland not included). Source: Pitkänen (1993).



DISTRICT	
Province of Uusimaa	
Raasepori, western	1
Raasepori, eastern	2
Helsinki	3
Pernaja	4
Province of Turku and Pori	
Vehmaa	5
Mynämäki	6
Piikkiö	7
Halikko	8
Lower Satakunta	9
Upper Satakunta, northern	10
Upper Satakunta, middle	11
Upper Satakunta, southern	12
Masku	13
Province of Häme	
Upper Hollola	14
Lower Hollola	15
Upper Sääksmäki	16
Lower Sääksmäki	17
Satakunta	18
Province of Mikkeli	
Heinola	19
Mikkeli	20
Juva	21
Rantasalmi	22
Province of Kuopio	
Pielinen	23
Ilomantsi	24
Liperi	25
Iisalmi	26
Kuopio	27
Rautalampi	28
Province of Vaasa	
Pietarsaari	29
Lapua	30
Korsholma	31
Ilmajoki	32
Laukaa	33
Kuortane	34
Province of Oulu	
Oulu	35
Saloinen	36
Haapajärvi	37
Kajaani	38
Kemi	39

APPENDIX A2: The rural deaneries (*rovastikunnat*) in Finland during the 1860s
Source: Turpeinen (1986).



DEANERY	
Raasepori, western	1
Raasepori, eastern	2
Helsinki	3
Porvoo	4
Iitti	5
Vehmaa	6
Mynämäki	7
Turku	8
Perniö	9
Pori, lower	10
Pori, upper	11
Tyrvää	12
Hämeenlinna	13
Hattula	14
Tampere	15
Häme, East	16
Häme, West	17
Jämsä	18
Hamina	19
Lappeenranta	20
Viipuri	21
Käkisalmi, south	22
Käkisalmi, north	23
Sortavala	24
Heinola	25
Savo, south	26
Savo, north	27
Kuopio	28
Karjala, lower	29
Karjala, upper	30
Vaasa, lower	31
Vaasa, upper	32
Lapua	33
Pietarsaari	34
Kokkola	35
Jyväskylä	36
Keuruu	37
Kalajoki	38
Raahe	39
Oulu	40
Kainuu	41
Kemi	42
Lappi	43
Salmi (Greek orthodox)	44

APPENDIX B. Labour market discrimination.

According to deanery population statistics, the number of male farm workers generally exceeded that of female farm workers (the number of workers includes farmers' children over 15 years of age and external labour with annual contracts). Based on previous literature, women had the majority of annual farm contracts, however. It can thus be shown that there existed discrimination in the rural labour markets; i.e. when it came to men, farmers preferred their own children over external labour.

Let us use the following symbols: the number of male farm workers with annual contracts, r, the number of female farm workers with annual contracts, p, the total number of farmers' male children, b, the total number of farmers' female children, g, the share of boys that remain in the parental farm, β, the share of girls that remain in the parental farm, γ. Furthermore, $r, p, b, g > 0$, $0 \leq \beta \leq 1$, $0 \leq \gamma \leq 1$. This means that the total number of male farm workers is $r+\beta b$ and the total number of female farm workers is $p+\gamma g$.

From the deanery data it appears that male farm workers often outnumbered female workers (when those with annual contracts as well as sons and daughters of farmers are included), and hence:

$r+\beta b > p+\gamma g$

For analytical convenience, let us assume that the number of boys and girls born and who survive are identical, $b=g=c$. Then,

$r+\beta c > p+\gamma c \Leftrightarrow \beta c-\gamma c > p-r \Leftrightarrow c(\beta-\gamma) > p-r$.

It is, however, known from the literature that the number of women with annual contracts was higher, i.e., $p-r > 0$ (see section 4.3). Therefore, the final inequality can only hold, if $\beta > \gamma$. Hence a greater share of farmers' sons than daughters was kept as farm workers. □

APPENDIX C. Estimating average income and Gini coefficient for truncated log-normal distribution.

The following presentation is based on Greene (2000), 896-901, esp. 900-901. In Greene (2012), 876-877 a more sophisticated estimation is outlined.

Variable X is said to follow a log-normal distribution, if $Y = ln(X)$ follows normal distribution. Assume that we have a truncated log-normal distribution, with truncation point τ (in the case of income tax registers this corresponds to annual income of 500 marks). Percentage of observations lying above this point is t (in the case of income taxation, the percentage of households income taxed). Furthermore, let $\overline{x_t}$ be the average income of taxed households, Φ is cumulative distribution function of standard normal distribution and ϕ its probability density function. Now:

1) $E[y \mid y > \ln \tau] = \ln \overline{x_t}$, and

2) $P(y > \ln \tau) = t$.

Using inverse Mills ratio, it can be shown that

3) $E[y \mid y > \ln \tau] = \mu + \frac{\sigma\phi(\alpha)}{1-\Phi(\alpha)}$, where

4) $\alpha = \frac{\ln \tau - \mu}{\sigma}$

We know that

5) $\Phi(\alpha) = 1 - t$, and then

6) $\alpha = \Phi^{-1}(1-t)$.

We therefore can construct a first equation on the basis of 4):

7) $\Phi^{-1}(1-t)\,\sigma = \ln \tau - \mu$.

In addition, on the basis of equations 1), 3), 5) and 6)

8) $\ln \overline{x_t} = \mu + \sigma \frac{\phi[\Phi^{-1}(1-t)]}{t}$.

Now, from equations 7) and 8) μ and σ can be solved, for t and $\ln \overline{x_t}$ are known from the data. The solved μ and σ are:

9) $\sigma = \frac{\ln \tau - \ln \overline{x_t}}{\Phi^{-1}(1-t) - [\frac{\phi[\Phi^{-1}(1-t)]}{t}]}$, and

10) $\mu = \ln \overline{x_t} - \sigma \frac{\phi[\Phi^{-1}(1-t)]}{t}$.

The corresponding log-normal values are:

11) $E(X) = e^{\mu + \frac{1}{2}\sigma^2}$, and

12) $SD(X) = E(X)\sqrt{e^{\sigma^2} - 1}$.

There is a well-known correspondence of the Gini-coefficient of log-normal distribution and σ[728]:

13) $G = 2\Phi\left(\frac{\sigma}{\sqrt{2}}\right) - 1$.

Some remarks concerning the truncation point are in order. Technically, as was noted in section 1.3, the income tax boundary was set at 500 marks. The deduction of 500 marks and practice of rounding to full hundreds means, however, that the lowest incomes presented in the registers are 600 marks. Which one of these then is the appropriate truncation point, 500 or 600 marks? The problem is that we do not know how e.g. an income of 501 marks was treated. In principle one should have paid 0.8 % income tax for the 1 mark exceeding the threshold. In practice of course this did not happen.

It ought to be obvious that for a continuous distribution without upper boundary it should hold that:

14) $E[y \mid y > \ln 500] < E[y \mid y \geq \ln 600]$.

In the case of the income tax registers this is not, however, the case, as only incomes rounded to hundreds are present, thus implying that

15) $E[y \mid y > \ln 500] = E[y \mid y \geq \ln 600]$

There is no documentation of the rounding practice; whether or not it was done to closest full hundred is unclear.[729] Furthermore, it is unclear how accurately incomes could have been assessed at all. Due to the income tax legislation that stipulated that incomes *exceeding* 500 marks are subject to taxation, it seems plausible that incomes were set in a dichotomical manner; if exceeding the 500 mark lower limit, annual income of 600 was duly given. Because of this, and because of the fact that the procedure outlined here is not simply trying to estimate the missing section of the distribution but replace the whole distribution on the basis of its upper tail, and because of 15), the truncation is set according to the legislation, at 500 marks.

Importantly, altering the truncation point creates no qualitative differences in the results, but it does yield level shifts: selection of truncation at 600 marks provides higher average incomes and lower inequality estimates, and vice versa for the selection of truncation at 500 marks. Robustness checks about the distributional characteristics should be given explicit room in future applications of the income tax data.

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728 E.g. Aitchison & Brown (1957), Liberati (2015), 99. See also Floud et al. (2011), 87-88.

729 Imperial Statute (2.3.1865) 2:20 did stipulate that rounding had to be done to closest full hundred, yet the appearance of incomes at precision of 25 and 50 marks in the tax registers suggests ambiguity with respect to the statute's order. SVT IV: 4 (1885), 1, considers the threshold at 550 marks.

PART III: Articles

[1]

Malthusian checks in pre-industrial Sweden and Finland. A comparative analysis of the demographic regimes

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Malthusian checks in pre-industrial Sweden and Finland: a comparative analysis of the demographic regimes.

ABSTRACT. In this article the existence of the Malthusian preventive and positive checks in pre-industrial Sweden and Finland are studied using demographic and economic data from circa 1750-1860. By applying time series analysis, we are able to identify strong preventive and positive checks for Sweden. The preventive check is considered to work both directly through births and indirectly through marriages. Although the Finnish data also indicates the existence of the preventive check, the positive check is only detected with differenced data. Our findings contradict the initial hypothesis that, due to poverty, Finland would display a higher sensitivity of mortality to living standards than Sweden. Instead, the finding of a pronounced marriage-driven preventive check in Finland casts new light on the macro-level determinants of the check mechanisms and on their connectivity to wider societal conditions.

Introduction

Some of the recent contributions to the literature scrutinizing the relationship between demographic vital rates and living standards have casted doubt on whether the demographic response to living standards takes place mainly through mortality in low income countries, and through nuptiality and births in high income countries. In this article we assess the workings of the so-called Malthusian demographic regime using pre-industrial data from Sweden and Finland ranging from the 1740s to the mid-1800s. More specifically, we study the interactions between demographic vital rate series and living standards measured in real wages. By comparing two countries, one clearly poorer in economic terms than the other, further light is aimed to shed on the prevalence and the nature of the Malthusian regime in the pre-industrial world.

According to the standard Malthusian interpretation, the stagnant living standards prior to the Industrial Revolution were a result of the propensity for the population to grow with the slightest increase in welfare. This positive effect of standard of living on population growth combined with diminishing labour productivity kept the long-term level of income per capita close to subsistence level, creating the "Malthusian trap". According to the standard interpretation, improvements in living standards were channelled into population growth and subsequently depleted through two mechanisms, the preventive and positive checks, which then restore the long-term equilibrium.[1]

The term *preventive check* describes the positive relationship between birth rates and living standards. In the event of a negative shock, the relationship is considered to manifest in delayed marriages and avoided pregnancies, which consequently decrease the number of births. According to the Malthusian narrative this relieves the population pressure on the resources available. In the standard vocabulary the conditions where preventive check is sufficient to remove the emerging disequilibrium, is dubbed low pressure equilibrium.[2] On the other hand, 'high pressure equilibrium' results from the

[1] See e.g. Mokyr/ Voth, 'Growth' (2010), 13–15.
[2] E.g. Weir, 'Life' (1984).

positive check, which describes the negative relationship between living standards and deaths whereby a decrease in living standards should result in an increase in mortality.

This study, on whether Malthusian mechanisms were at work in the European periphery during the 1800s (i.e., late in the continental context), is motivated by the fact that all the Nordic countries lagged behind the industrialization of Western Europe. While Sweden has been studied extensively, virtually no research has been conducted with Finnish data. The absence of studies on Finland is interesting especially because the country was one of the poorest in the Western world. Even famine-stricken Ireland, the economic history of which is often told through the Malthusian narrative, fared better in GDP per capita terms. In 1820, Irish GDP per capita was higher than its Finnish counterpart by 12.3%, and in 1870 by 55.7%.[3]

The comparative setting is not only pronouncedly alleviated but also encouraged by the high-quality data. Finnish and Swedish population statistics are some of the best available for pre-industrial period for they are systematic and well-crafted national enquiries instead of parish-level reconstructions. In addition, the real wage series used in this study are directly comparable because they are constructed from roughly identical materials, produced by nearly identical legislation. Similar sources thereby facilitate assessing the role of economic development in creating the observed demographic regime. In addition, they also aid in cross-checking the results through comparison and shed light on the quality of the data. Importantly, this study contributes to the wider discussion by analyzing peripheral Finland for the first time within the modern Malthusian framework.

The article is structured as follows. Section two discusses previous literature on the topic; section three presents a primer for comparative analysis and two possible hypotheses based on the literature; the fourth section summarizes the data sources and presents relevant source criticism; the fifth the methodology; and the sixth the empirical results. We discuss the results in the seventh section, and finally conclude in the eight.

Previous literature

Conventionally, researchers have detected short-term demographic responses to variations in pre-industrial living standards regardless of the region being studied.[4] Influenced by the so-called unified growth theory[5], the more recent debate concerns the question of whether or not pre-industrial time series support the existence of a pure Malthusian economies marked by stationary wage and vital rate series. Generalizations are hampered by the fact that the vast majority of evidence is based on English data, the representativeness of which has often been questioned.[6] Recently Møller and Sharp have presented cogent evidence that disputes the stationarity of English demographic

[3] Bolt/ van Zanden, 'Update' (2013).
[4] E.g. Lee, 'Variation' (1981); Eckstein et al., 'Fluctuations' (1984); Galloway, 'Patterns' (1988).
[5] E.g. Galor/ Weil, 'Population' (2000); Galor, *Growth Theory* (2011).
[6] E.g. Fernihough, 'Dynamics' (2013), 312; Klemp/ Møller, 'Dynamics' (2015), 2.

and real wage series and subsequently ranges them against the stagnation interpretation.[7]

The English data generally fails to corroborate the existence of the positive check, whereas a reasonably strong preventive check have often been found operating, at least until the mid-eighteenth century, or possibly longer. Lee's seminal contribution shows that the positive check varied in time and weakened considerably by the 1700s, whereas the preventive check remained strong until the 1800s. According to Kelly and Ó Gráda, the positive check was present in late medieval times, but declined considerably by the 1650s; the preventive check existed both in medieval and early modern England.[8]

Using distributed lags models and cointegration respectively, Weir and Murphy each provide evidence for the positive check in France during the eighteenth and nineteenth centuries.[9] Fernihough has been able to establish both checks with North Italian data spanning the years 1650-1881. Interestingly, the Italian evidence also supports a long-term negative relationship between population level and real wages.[10] Nicolini, on the contrary, considers that the English evidence provides only limited support for the impact of birth and death rates on real wages (via population size and declining marginal productivity of labour).[11] The conclusion about the Malthusian character of pre-famine 1800s Ireland, often considered to be the clearest case of pre-industrial overpopulation, is mainly built on cross-sectional evidence. The evidence seems to support a positive association between famine mortality and post-famine living standards, and a negative association between pre-famine population growth and regional living standards; and yet it does not corroborate an increase in pre-famine mortality due to alleged overpopulation.[12]

Research with Nordic data is scarcer, but there is a reasonable amount of work done with Swedish data. This research fairly unanimously argues for the existence of both preventive and positive checks. Eckstein et al., Hagnell, as well as Bengtsson and Broström have all applied vector autoregression (VAR) to model the interactions in Sweden. Using data covering the years from 1750 to 1869, Eckstein et al. detect a short-run positive reaction between fertility and an increase in living standards, measured both in terms of real wages and harvests. In addition, they also identify a similar response to an increase in temperatures. Furthermore they find a negative relationship between living standards and mortality; a finding that is also corroborated by Bengtsson and Broström. Bengtsson further considers that the Swedish population growth during the latter half of the nineteenth century did not result in a decrease in

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[7] Møller/ Sharp, 'Malthus' (2014).

[8] Lee, 'Variation' (1981); Lee/ Anderson, 'Malthus' (2002); Nicolini, 'Malthus' (2007); Crafts and Mills, 'Malthus' (2009); Kelly/ Ó Gráda 'Preventive Check' (2012); Møller/ Sharp, 'Malthus' (2014); Kelly/ Ó Gráda, 'Living Standards' (2014).

[9] Weir, 'Life' (1984); Murphy, 'Persistence' (2010).

[10] Chiarini, 'Malthus' (2010); Fernihough, 'Dynamics' (2013).

[11] Nicolini, 'Malthus' (2007), 114–115; Chiarini, 'Malthus' (2010); Fernihough, 'Dynamics' (2013).

[12] Grigg, *Population* (1980), 139; Mokyr, *Ireland* (1985), 38–60; McGregor, 'Pressure' (1989); Ó Gráda/ O´Rourke, 'Migration' (1997); Ó Gráda, *Famine* (1999), 28–34; See also Persson, 'Malthus' (2008), 168, for cross-sectional investigation.

real wages. Hagnell, using two different methods in a setting comparable to the present one detects both preventive (direct and indirect) and positive checks in Sweden during the period 1751–1850. He also finds real wages to be exogenous to the demographic variables. Moreover, the existence of both preventive and positive checks in Sweden is also identified by Klemp and Møller using cointegrated VAR (CVAR) models, as well as by Edvinsson using VAR analysis with a dataset starting from the seventeenth century. Dribe et al., on the other hand, use regional longitudinal panel data from South Sweden from the period of 1749 to 1859 and conclude that high grain prices resulted in a decline in fertility and an increase in mortality during and after a price shock.[13]

Using eighteenth and nineteenth century data, Klemp and Møller find the preventive check in Norway and both checks in Denmark. The non-causal tradition in Finnish population research, however, leaves us with few comparative works. The sole exception is a time series study by Kaukiainen, who is able to establish a crude positive check relation by showing that yearly changes in Finnish wheat prices and mortality rates correlated during the 1800s.[14]

Comparing Finnish and Swedish demographic regimes

For comparative purposes the long entwined history of Sweden and Finland is convenient. We are dealing with roughly identical source materials as well as economic, social, and cultural backgrounds. In economic terms, Finland was the poorer of the two during the early modern period: Finnish GDP per capita was 12% lower than in Sweden in 1820, which in turn was roughly 50% lower than GDP per capita in the United Kingdom (the leading economy of the world at the time). Sweden's GDP per capita started to grow somewhere around the 1820s, while in Finland it only began increasing from the 1870s onwards.[15] Lack of capital inputs, an excessive dependence on agriculture in adverse climatic conditions, low connectivity to European trade, and the prevalence of famine and wars during the early modern period are considered key factors in explaining the absence of growth and low average level of income in Finland. While Sweden exhibited a decrease in age-specific mortality rates in the 1800s, Finland witnessed an increase in mortality for various age groups. Postponed industrialization denoted that Finland fell behind other Nordic countries in economic terms in the mid-1800s.[16]

Previous literature points to two possible hypotheses for the demographic regimes. According to the first hypothesis, as a country of lower average income, Finland ought to display a higher sensitivity of mortality to living standards than

[13] Eckstein et al., 'Fluctuations' (1984); Hagnell, 'Time Series' (1991); Bengtsson/ Broström, 'Time-Series' (1997); Bengtsson, 'Mortality' (2004), 148; Dribe et al. 'Manorial' (2012); Edvinsson, 'Population' (2014).

[14] Kaukiainen, 'Harvest' (1984); Klemp/ Møller, 'Dynamics' (2015).

[15] Hjerppe, *Suomen* (1988); Eloranta et al., 'Road' (2006), 27; Schön/ Krantz, 'Economy' (2012), 544–546; Bolt/ van Zanden, 'Update' (2013).

[16] Soininen, *Maataloutemme* (1974); Pitkänen,' Väestörakenteen' (1980), 375–377; Bengtsson/Ohlsson, 'Mortality', (1985); Kaukiainen, *History* (1993), 17–58; Sandberg/ Steckel, 'Industrialization' (1997); Eloranta et al., 'Road' (2006), 16.

Sweden, i.e., *the positive check should dominate the Finnish system*. Studying short-term responses, Galloway suggests that, in the period 1750–1870, the more developed the country was, the more likely it was for the population dynamics to be governed by the preventive (e.g., England and the Netherlands) rather than the positive check (e.g., France and Sweden).[17] This reflects the standard analogy used to describe pre-industrial livelihood shocks as "ripples that drown"; Mokyr, for example, claims that 'lower wealth per capita implies higher vulnerability to any kind of disaster', while Fernihough suggests that 'the lower purchasing power […] put a greater proportion of […] population at the edge of biological survival'.[18]

There are, however, empirical objections to the argument that poverty equals a higher sensitivity of mortality. According to Kelly and Ó Gráda, the English positive check had certainly declined considerably by the 1650s, but instead of resulting from economic growth this could have been due to the development of social welfare institutions. Similarly Fernihough suggests that, among other factors, the existence of a nationwide system of social security in England may explain the difference between the demographic regimes of England and Italy.[19] Weir, on the other hand, asserts that even though France is considered having a high pressure equilibrium, the French and English marriage rates responded similarly to economic shocks between 1670 and 1830. Similarly, Klemp and Møller show that the Norwegian data displays a strong preventive but no positive check, even though Norway was poorer than Denmark and Sweden where the positive check prevailed. Finally, on the basis of data from 39 European countries, Dennison and Ogilvie claim that there were several countries poorer than England and Holland where a more "extreme" form of European marriage pattern prevailed. This contrasts with the widely held belief that the wealth of the North Sea region was tied to their marriage systems.[20]

Both Sweden and Finland experienced substantial population increase among the rural underclass during the 1800s, though in Finland the trend was more pronounced. In the first decades of the nineteenth century the number of crofts had surpassed the number of freeholder farms in Western Finland. Simultaneously, the number of landless rural labourers increased. A genuine downward social mobility can be held mostly accountable for the growth of the rural underclass in both countries during the 1700s. The natural growth within the class itself increased during the 1800s.[21]

The lower social classes in both countries tended to have smaller household sizes due to a higher age at first marriage. Analyses of fertility trends indicate that the decline in Finnish fertility during the late eighteenth century was mainly the result of an increase in the age at first marriage and a decline in the proportion of married women

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[17] Galloway, 'Patterns' (1988), 291–298.

[18] Mokyr, *Ireland* (1985), 262; Ó Gráda, 'Ripple' (2008); Fernihough, 'Dynamics' (2013), 329.

[19] Fernihough, 'Dynamics' (2013), 329; Kelly/Ó Gráda, 'Living standards' (2014); See also Pitkänen, 'Patterns' (1992); Dribe et al. 'Manorial' (2012).

[20] Weir, 'Life' (1984); Dennison/ Ogilvie 'Marriage' (2014); Klemp/ Møller, 'Dynamics' (2015).

[21] Haapala, 'Maaseudun' (1983); Pulma, 'Vaivaisten' (1994), 54–55; Gadd, *Jordbrukets* (2000), 228–229; Dribe/Svensson, 'Social Mobility' (2008).

at reproductive age. Weir points out that as newlyweds were likely to compose only a small fraction of all marriages, the variation in marriage rates should have only a small influence on birth rates. However, Moring considers that Finnish society in the southern parts of the country approached the West European marriage pattern probably due to the agricultural proletarianization process. Instead of considering the marriage system to represent a prudent "Malthusian forethought", she asserts that the critical determinant of an average household's structure during the eighteenth and nineteenth centuries was the increasingly limited chances of marriage.[22] Similarly, Guinnane and Ogilvie present evidence from pre-industrial Württemberg to show how social and institutional controls affected not only nuptiality but also illegitimacy and infant mortality rates, resulting in a particularly severe version of the preventive check regime.[23]

These observations lead to the second hypothesis. The downward social mobility could have resulted in a contraction of the marriage pool (the number of existing marriages in a given moment) and subsequently in an increase in the proportion of newlyweds among all marriages[24], thus strengthening the role of the preventive check in the population dynamics. Namely, instead of mortality's dominance in Finland, we may actually detect the somewhat opposite - i.e., *a preventive check strongly driven by marriage rates.* The applicability of the two hypotheses is an empirical question and this will be scrutinized in the following sections.

Data

Even though there is data available for both Sweden and Finland from the early 1700s[25], the markedly abnormal demographic regime at the start of the century limits the applicability of this information. This was due to war, famine, and their subsequent rebound effects. War also resulted in gaps in the Finnish real wage data in the early 1740s. As we are seeking to establish whether Malthusian mechanisms were in operation in a pre-industrial time that allows for comparison, we confine our analysis to a period starting from 1745 (after the Russo-Swedish war of 1741-1743) and ending in

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[22] Haatanen, *Suomen,* (1968), 62–63; Lundsjö, *Fattigdomen,* (1975), 61–66; Pitkänen 'Väestörakenteen' (1980), 375-376; Lee, 'Variation' (1981), 400; Weir, 'Life' (1984), 39; Pulma, 'Vaivaisten' (1994), 64–65; Moring, 'Marriage' (1996); Gadd, *Jordbrukets* (2000), 221–230; Moring, 'Nordic' (2003); Pitkänen, 'Contraception' (2003), 189.

[23] Guinnane/Ogilvie, 'Institutions' (2008); Guinnane/Ogilvie, 'System' (2014).

[24] Technically we should focus on the *stock of fertile marriages*, see e.g. Møller/ Sharp, 'Malthus' (2014), 111, 116. It is worth noting that the contraction may also result from the increased volatility of the marriage pool. As divorces were technically non-existent, the dissolution of marriages took place mainly through mortality. According to Pitkänen 'Väestörakenteen' (1980), 375–377, adult mortality increased in Finland during the 1800s.

[25] For Sweden the vital rate data extends all the way back to the 1630s and a continuous real wage series is available from the mid-1500s. In Finland the vital rates are available from 1722 onwards, and real wages starting from 1732.

1865; as up to this point fertility transition had not yet taken place[26], and it is a period which yields stable results in the subsequent analysis.

For comparative purposes, the similarity of the two countries' demographic and real wage source materials is extremely convenient. Finland was a part of the Kingdom of Sweden and had identical legislation until 1809. In 1749 a systematic, nationwide collection of population information was initiated. In this article we use the official statistics for crude vital rates for Finland from 1749 onwards and a parish-level reconstruction by Jutikkala, for earlier years. Similarly, we use the official statistics for Sweden from 1749 onwards and Edvinsson's corrections to Lennart Andersson Palm's crude rates for previous years.[27]

The real wage series we use for Sweden is calculated using Edvinsson's and Söderberg's consumer price index and nominal wages reported by Jörberg. The underlying data is identical in legislative terms with its Finnish counterpart, which was initially reported by Johanson and converted into a real wage index by Heikkinen et al.[28] In terms of consumer price indices, the Finnish series is less extensive, though the underlying commodity basket (rye, barley, butter, and salted herring) does rather accurately reflect the scarcity typical for a rural Finnish household during the nineteenth century.[29] The prices used are conversion prices, 'market price scales' (*markegångspris*), compiled originally to provide crude macro-level information about the relative value of products and agricultural wages and to give a value to various payments made in kind. Conversion prices have been found to display roughly identical patterns as those of other price data and are generally considered to be reliable.[30] The Finnish and Swedish nominal wages are based on daily rates and are identical in terms of the statistical unit - a male agricultural labourer. Right up until the late 1800s at least 75% of the Finnish labour force was in agriculture, with similar figures up to the mid-1800s in Sweden. Close to a half of all the Finnish men working in agriculture were agricultural laborers, whereas in Sweden the agricultural proletarianization seems to have been less severe. While it is difficult to confidently assess the percentage (e.g., which social groups are included), it is likely that up to 30% of the agricultural population in both countries consisted of rural wage earners.[31]

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[26] The decline in birth rates starts around the 1870s in Sweden and around the 1890s in Finland.

[27] Jutikkala, *Bevölkerung* (1945); *Historisk Statistic för Sverige* (1969), 90–94; Vattula, *Suomen* (1983); Pitkänen, *Väestöntutkimus* (1988); Pitkänen et al. 'Smallpox' (1989), 97; Palm, *Livet* (2001); Edvinsson, 'Pre-census' (2015). Data quality has been discussed e.g. in Drake, *Population* (1969); Pitkänen, 'Finlands' (1979); Pitkänen, *Deprivation* (1993), 31; Edvinsson, 'Pre-census' (2015).

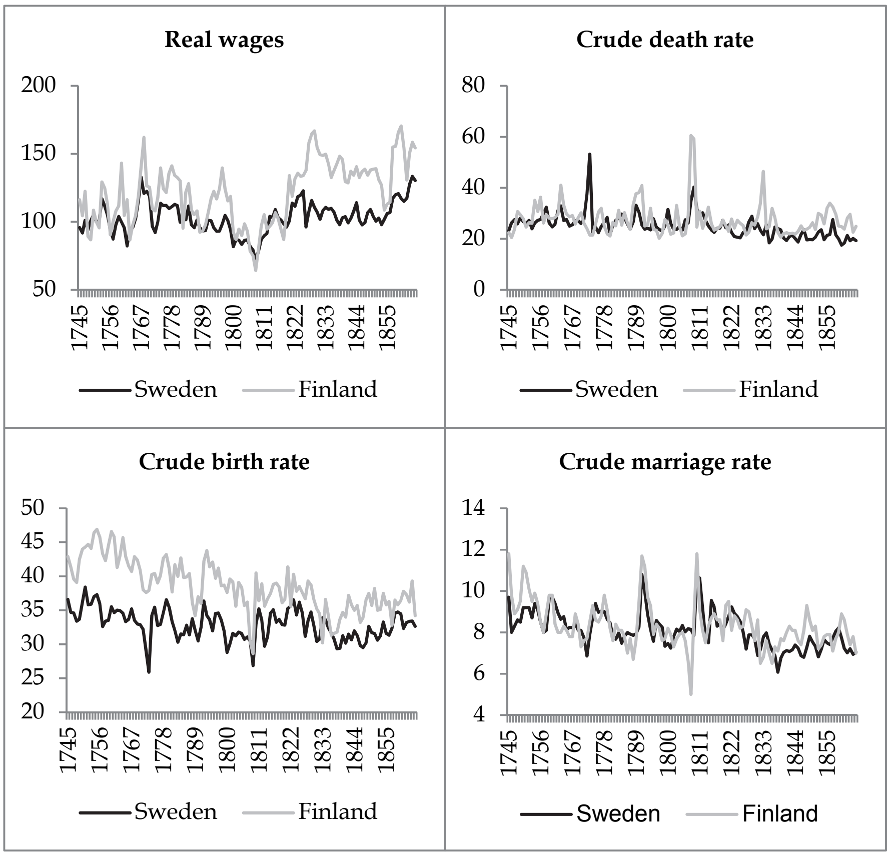
[28] Johanson, *Verohintoja* (1926); Jörberg, *History* (1972a&b); Heikkinen et al., 'Levnadsstandarden' (1987); Edvinsson/Söderberg, 'Evolution' (2011); Edvinsson/Söderberg, 'Consumer price index' (2011).

[29] Heikkinen et al., 'Levnadsstandarden' (1987), 69.

[30] Jörberg, *History* (1972a), 16–77; Heikkinen et al., 'Levnadsstandarden' (1987); Edvinsson/ Söderberg, 'Consumer price index' (2011), 272–273.

[31] Kilpi, *Suomen* (1913), 99–101; Hjerppe, *Suomen* (1988), 59; Gadd, 'Revolution' (2011); Morell et al. 'Appendix' (2011), 289; Edvinsson/ Söderberg, 'Consumer price index' (2011) provide an alternative series.

Figure 1 Time series of interest, 1745–1865



Note: Crude rates per 1000 inhabitants, real wage series presented in index form, 1751=100.

The literature so far has favoured the use of real wages as a measure of pre-industrial living standards mainly for practical reasons, as they are the only means of measurement that are widely and systematically available and thus make it easier to compare results from different countries. However, there is a widespread debate over whether or not real wages accurately reflect the development of living standards in the pre-industrial world. Gregory Clark is the main advocate for using real wages as a welfare measure, while Angus Maddison has criticized several long-term wages series for their lack of representativeness - considering them micro rather than macro variables. Moreover, Rodney Edvinsson points out that conclusion about the Malthusian regime may change when measures of living standard are altered. From a contextual perspective, Jörberg raises doubts about the decline in Swedish real wages providing any information on the general economic situation prevailing in agriculture in the late 1700s.[32] However, as we are interested in processes over a hundred-year period, short-term divergences should not be a problem. We thus follow the tradition and use time series of real wages as a proxy for living standards despite their possible

[32] Jörberg, *History* (1972b), 343; See also Tornberg, 'Ilmaston' (1989), 77–78; Gadd, *Jordbrukets* (2000), 345–346.

drawbacks - after all, real wages are the only welfare variable that is uniformly available from the countries of interest. This choice will be discussed further in the conclusion.[33]

Figure 1 plots the vital rates and real wages for the respective countries, with the year 1751 indexed as 100 in the latter. Two noteworthy issues arise from the vital series. Firstly, on average the crude vital rates are higher in Finland. Secondly, the variation in the Finnish data is also clearly higher than in the Swedish data (especially when it comes to crude death rates). In terms of mortality development, the two countries follow one another quite closely until the early nineteenth century, when the Swedish long-term decline in mortality sets in. Finland, on the other hand, remains in the same mortality regime until the latter half of the 1800s. The Nordic mortality surges are often attributed to wars (e.g., in the 1780s and 1790s, as well as 1808-1809) with a couple of marked famine-related disease outbreaks, most notably dysentery in Sweden in 1773 and cholera in Finland during the 1830s. Finland exhibited a long period of high population growth during the late 1700s, which is mainly attributed to a rebound from population catastrophes during the Great Northern War (1700-1721) and a major famine (1696-1697).[34]

So far most Malthusian analyses have worked on the basis of scrutinizing the relationship between crude birth and death rates and real wages.[35] This may, however, result in significantly distorted results: only a small proportion of children were born out of wedlock in the pre-industrial world. In Sweden the percentages were 2.7% in 1770, 6.2% in 1830 and 9.3% in 1865, Finland “catched-up” from 1.8% in 1770 to 6% in 1830 and to 9.1% in 1865.[36] The inclusion of marriage rates allows us to differentiate between the two sides of the preventive check. These are the direct effect (avoided pregnancies, stillbirths and miscarriages), and the indirect effect (postponed marriages). Following the formulation by Møller and Sharp we assume that the propensity to marry was tied to expectations of long-term income, where expectations were formed rationally on the basis of current income level.[37] This enables us to model marriage rates as a linear function of the current real wage. Møller and Sharp emphasise that in the case of England the statistical properties of the birth rate equation are considerably

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[33] Clark, ‘March’ (2007); Maddison, *Contours* (2007), 308; Clark et al., ‘Malthus’ (2012); Edvinsson, ‘Population’ (2014). Furthermore, it is important to note that different population segments face real wages differently, e.g. real wage movements reflect the economic situation of the labourers but not necessarily that of the farmers who hire the labour, see especially Weir, ‘Life’ (1984), 44; Lindeboom et al., ‘Effects’ (2010).

[34] Muroma, *Suurten Kuolovuosien* (1991); Castenbrandt, *Rödsot* (2012).

[35] Crude marriage rates are included among others by Weisdorf / Sharp, ‘Checks’ (2009); Murphy, ‘Persistence’ (2010); Møller/ Sharp, ‘Malthus’ (2014). Importantly it has not been included in prominent VAR analyses, e.g. Nicolini, ‘Malthus’ (2007); Crafts and Mills, ‘Malthus’ (2009). Marriage rates have not been taken into account in several previous Nordic inspections, e.g. Klemp/ Møller, ‘Dynamics’ (2015). Edvinsson, ‘Population’ (2014) analyses marriage rates without simultaneous inclusion of crude birth rates.

[36] *Suomen virallinen tilasto IV: Väestö*, 33, 138–139; *Historisk Statistic för Sverige* (1969), 90–94.

[37] Møller/ Sharp, ‘Malthus’ (2014), 111–112.

improved when marriage rate is included in the analysis. This was also confirmed in the initial data inspections in this study.

Real wages show a fairly uniform development for both countries, although once again Finland exhibits a wider variation. The lowest point in living standards in both countries, as regards real wages, was during the Swedish-Russian war of 1808-1809. Real wages seem to have decreased during the last quarter of the eighteenth century, with this being more apparent in Sweden.

Table 1 Results from the unit root tests

		Augmented Dickey-Fuller		Phillips-Perron		KPSS	
		Constant	Constant and time trend	Constant	Constant and time trend	Constant	Constant and time trend
Sweden	Crude birth rate	-3.90 (-2.89)***	-4.35 (-3.45)***	-5.23 (-2.89)***	-5.63 (-3.45)***	0.50 (0.46)**	0.10 (0.15)
	Crude death rate	-5.11 (-2.89)***	-6.82 (-3.45)***	-5.08 (-2.89)***	-6.55 (-3.45)***	1.15 (0.46)***	0.19 (0.15)**
	Crude marriage rate	-3.05 (-2.89)**	-6.81 (-3.45)***	-4.89 (-2.89)***	-5.74 (-3.45)***	0.87 (0.46)***	0.10 (0.15)
	Real wages	-3.70 (-2.89)***	-4.01 (-3.45)**	-3.85 (-2.89)***	-4.16 (-3.45)***	0.29 (0.46)	0.16 (0.15)**
Finland	Crude birth rate	-4.31 (-2.89)***	-6.96 (-3.45)***	-3.99 (-2.89)***	-6.97 (-3.45)***	1.10 (0.46)***	0.11 (0.15)
	Crude death rate	-6.56 (-2.89)***	-6.62 (-3.45)***	-6.38 (-2.89)***	-6.31 (-3.45)***	0.15 (0.46)	0.04 (0.15)
	Crude marriage rate	-6.14 (-2.89)***	-7.01 (-3.45)***	-5.16 (-2.89)***	-5.56 (-3.45)***	0.70 (0.46)**	0.08 (0.15)
	Real wages	-3.72 (-2.89)***	-4.50 (-3.45)***	-3.72 (-2.89)***	-4.50 (-3.45)***	0.52 (0.46)**	0.14 (0.15)*

*Note: Series in logarithms. Test statistics for unit root tests reported, 5% critical value in parentheses. *** - denotes statistical significance at 1%, ** - at 5%, * - at 10% level. Null hypothesis for ADF and PP tests is the existence of unit root, stationarity for KPSS test.*

In order to take the analysis further, the long-term properties of the series need to be assessed - namely, the stationarity and the cointegration structure. We thus proceed to test for the existence of a unit root in a univariate setting, by employing the augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests (unit root as null), as well as the KPSS-test (stationarity as null). The optimal number of lags is determined by using the Schwarz information criterion for the ADF test, and the Bartlett kernel for the PP and KPSS tests.[38] The results for the logarithmic values of the series are reported in Table 1, with 5% critical value reported in parentheses. The tests unanimously indicate that the Finnish crude death rates are stationary. Crude birth rates and crude marriage rates in both countries display evidence of non-stationarity only when the KPSS test is used

[38] See e.g. Nicolini, 'Malthus' (2007) 104–105; Fernihough, 'Dynamics' (2013), 323.

without the trend component. The trend is actually statistically significant in all equations and thus should not be removed. Crude birth and crude marriage rates are also highly likely to be stationary.

Methodology

Besides time series stationarity, the selection of the statistical method has to take into account the endogeneity of the variables. In the Malthusian setting, endogeneity arises from the assumption that birth and death rates, as well as real wages, are all determined through their interaction with one another. In recent literature it has become customary to model these interactions with vector autoregressions in which all variables are assumed *a priori* to be endogenous.[39]

Nicolini was the first to model variable interactions using a structural VAR (SVAR) framework. Møller and Sharp have, however, criticized the application of stationarity assuming SVAR models to English pre-industrial data on the grounds that the stationarity only seems applicable if a relatively small number of outliers from the mid-1500s are included. They consequently apply CVAR which has recently also been applied to French and Nordic data.[40] One should nevertheless point out that the qualitative results have been fairly stable and similar regardless of the country and the empirical model specification in question. Furthermore, any divergence in results is only in terms of 'how long', rather than 'what kind' of a relationship existed.[41]

On the basis of unit root tests, and as will be argued further on, we assume that interactions between variables can be specified as a stationary VAR-model, where each element of Y_t depends on lagged values of its own and of all the other variables. Following in Nicolini's footsteps, to estimate the parameters of interest, the system of the variables[42] is presented in the following form:

(1) $Y_t = \sum_{i=1}^{n} \Phi_i Y_{t-i} + \varepsilon_t$,

where

(2) $A_0^{-1}u_t = \varepsilon_t$

(3) $A_0^{-1}A_i = \Phi_i$

and

(4) $E(\varepsilon_t \varepsilon_t') = \begin{cases} \Omega, & if\ t = \tau \\ 0, & otherwise. \end{cases}$

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[39] Eckstein et al. 'Fluctuations' (1984); Bengtsson/ Broström, 'Time-Series' (1997); Nicolini, 'Malthus' (2007). The less frequently applied setup is structural models introduced in Lee/ Anderson, 'Malthus' (2002). Also Crafts and Mills, 'Malthus' (2009); Fernihough, 'Dynamics' (2013). The older tradition of autoregressive distributed lags (ARDL) models, e.g. Galloway, 'Patterns' (1988), have problems especially with endogeneity, see e.g. Nicolini, 'Malthus' (2007), 101–102. For discussion on the ARDL and VAR models see also e.g. Bengtsson/ Broström, 'Time-Series' (1997). Qualitatively, however, the results deducted using ARDL models are roughly identical to the methods which model all variables as endogenous.

[40] Murphy, 'Persistence' (2010); Møller/ Sharp, 'Malthus' (2014); Klemp/ Møller, 'Dynamics' (2015).

[41] E.g. Møller/ Sharp, 'Malthus' (2014), 129.

[42] $A_0 Y_t = \sum_{i=1}^{n} A_i Y_{t-i} + u_t$

Φ_j and Ω can be estimated with OLS regressions but the estimation of A_0 is required to detect the variables' response to shocks. Lower triangularity of the matrix A_0^{-1} is sufficient to identify the system and to estimate parameters of interest. The lower triangularity of A_0^{-1} indicates that, given an ordering inside the vector Y_t, each variable is allowed to react within the current period to a shock in any of the variables that precede it, but it must be completely unresponsive to shocks in variables that are lower in the ordering. Nicolini also suggests that due to natural lag between the decision to have a child and its ultimate birth, crude birth rate (cbr_t) could be viewed as a natural candidate for being the first variable in the ordering. Furthermore, he considers that real wages (w_t) also affect the crude death rate (cdr_t) with a lag, and that marriage rate (cmr_t) does not influence the mortality rate or real wages within the same year, resulting in a vector:

(5) $Y_t = \{cbr_t, cdr_t, w_t, cmr_t\}$.[43]

The most common and illustrative way of presenting the results from VAR is via impulse responses, i.e., displaying the response over time for each variable in Y_t to a shock in each element of u_t. To avoid possible problems stemming from the ordering of variables in the VAR model we base our conclusion on generalized impulse responses as described by Pesaran and Shin[44].

As some of the recent literature has favoured using CVAR models, we further argue for the chosen methodology. As presented in Table 1, a clear majority of univariate unit root tests do not suggest the existence of unit roots in the series. As the results display some ambiguity, however, further evidence is required. Stationarity is also reflected in the roots of the VAR model's characteristic polynomial, although in a much clearer manner. The necessary and sufficient condition for the stability of the VAR model is that all moduli values of the inverse characteristic roots are less than one. In this event, the characteristic polynomial has a full rank and the variables included are stationary. For both of the countries this was the case[45], thus the autoregressive models should be considered dynamically stable and the application of a SVAR model justified.[46] Furthermore, SVAR framework can also be applied to infer the transitory nature of shocks through the impulse response analysis. If a time series variable features a unit root, the impulse response to its own shock should show persistence, i.e.,

[43] Nicolini, 'Was Malthus' (2007), 107. In the working paper version he also considers inclusion of crude marriage rate, Nicolini, 'Was Malthus' (2006), 10–11. See also Fernihough, 'Malthusian' (2013), 324.
[44] Pesaran and Shin, 'Impulse Response' (1998). For similar treatment of English data see Nicolini, 'Malthus' (2007), 116; Crafts and Mills, 'Malthus' (2009).
[45] The largest of the moduli were 0.747 and 0.838 for Finland and Sweden, respectively. Using model with differenced data (a clear rank = 4) with satisfying diagnostics (see footnote 59) the corresponding moduli were 0.721 and 0.841.
[46] Juselius, *VAR Model* (2006), 48–50; Møller/ Sharp, 'Malthus' (2014), 113.

the shock does not die out.[47] However, according to the impulse response analysis conducted in the next section this does not appear to be the case. All of the variables' own shocks die out by the end of the 10-period response window, and hence do not display the persistence which is mandatory to unit root processes. Indeed, the fact that these shocks lack persistence from one variable to another suggests a lack of cointegration. The eradication of shocks in these series is worth comparing to CVAR studies, some of which suggest considerably slow adjustment processes.[48]

Nevertheless, to increase the transparency of our results we ran trace tests to determine the cointegration rank.[49] The introduction of the restrictions presented in Møller and Sharp (2014) were statistically rejected, however.[50] This is not necessarily unexpected: in the study by Klemp and Møller, the restricted Swedish model (without marriage rates) was barely accepted with a p-value of 0.06.[51] All in all, model diagnostics and impulse estimations display no behavioural oddities when we treat the variables as stationary. The flexibility of SVAR analysis and its robustness to variations in the model specification is particularly convenient for a first time exploratory analysis of the Finnish demographic data.[52]

As it is difficult, in practice, to discriminate between stationary and non-stationary processes[53] we use the considerably less binding method of modified Granger causality to check the robustness of the qualitative results. This method is outlined by Toda and Yamamoto and also suggested by Dolado and Lütkepohl.[54] The time series variable X_t is said to Granger-cause variable Y_t, if lagged values of X_t are

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[47] E.g. Nicolini detected traces of unit roots in the English 1741–1840 sample, visible also in the impulse responses for the same period, Nicolini 'Malthus' (2007), 105, 121. The feature is even more evident in the working paper version which includes marriage rates, Nicolini 'Malthus' (2006), 26.

[48] See especially Chiarini, 'Malthus' (2010).

[49] As pointed out in Møller/ Sharp, 'Malthus' (2014), 123–125, outliers may distort the results, hence dummy variables were taken into account. We allowed for constants and trends in the cointegration relationships. Diagnostically well-behaving models can be obtained with various lag lengths, some of which imply for rank = 4 models. It is important to note, however, that if the variables are near-cointegrated (as most likely is the case in several empirical applications), rank tests are susceptible to favor spurious long-run relationships, see e.g. Elliott, 'Robustness' (1998); Gonzalo/Lee, 'Pitfalls' (1998); Hjalmarsson/Österholm, 'Cointegration' (2010).

[50] Both, the "Malthusian-based" hypothesis (equation 31, p. 120) and the "post-Malthusian" hypothesis (equation 32, p. 121) were rejected with $p<0.01$. Importantly, however, the qualitative results deducted from the following SVAR analysis were also corroborated in various CVAR specifications (especially no robust positive check was found with the Finnish data). See also Sharp et al. 'Determinants' (2012), 115–116, for choice of dynamic OLS over CVAR model.

[51] Klemp/ Møller, 'Dynamics' (2015).

[52] It is also worthwhile to note that in CVAR analysis when there are $r > 1$ cointegration relationships, r restrictions are needed (including the normalization) in every relationship in order to achieve identification. This may rule out the possibility for "non-standard" cointegration vectors, see e.g. Guinnane/Ogilvie, 'Institutions' (2008) for discussion concerning e.g. connection between mortality and nuptiality.

[53] Juselius, *VAR Model* (2006), 380–381.

[54] Toda/ Yamamoto, 'Inference' (1995); Dolado/ Lütkepohl, 'Wald Test' (1996). The method has been applied recently e.g. in Ljungberg/ Nilsson, 'Human Capital' (2009).

statistically significant, after controlling for Y_t's own lagged values. Traditional OLS-estimated Granger causality is, however, known to run into statistical problems when applied to non-stationary time series resulting in non-standard asymptotic properties of the joint-hypothesis Wald test[55]. The problem is especially acute if we are unable to safely assess the order of variable integration, or when the series are integrated in a different order. According to Toda and Yamamoto, joint hypothesis testing with non-stationary series is inappropriate even in error correction form[56] if the variables are integrated in a different order or completely non-integrated. The procedure that takes into account the possible cointegration of the variables is the following: consider a VAR (k) model where k is the number of lags for a single variable and

(6) $k = p + d,$

where p stands for optimal number of lags according to information criteria and d is equal to the maximum order of integration of the variables. Using the modified Wald test (MWald) we then consider the following system:

(7) $Y_t = A_0 + \sum_{i=1}^{p+d} A_i Y_{t-i} + \varepsilon_t,$

where $Y_t = \{cbr_t, cdr_t, w_t, cmr_t\}$ and $\varepsilon_t = \{\varepsilon_{cbr,t}, \varepsilon_{cdr,t}, \varepsilon_{w,t}, \varepsilon_{cmr,t}\}$ and study the χ^2 probability of the joint null hypothesis applied only to the first p lags. The remaining d lags ensure the asymptotic distribution of the test statistic in the case of cointegration between the variables. The results from these two methods are then compared in order to draw conclusions on the economic regime prevalent in pre-industrial Sweden and Finland.

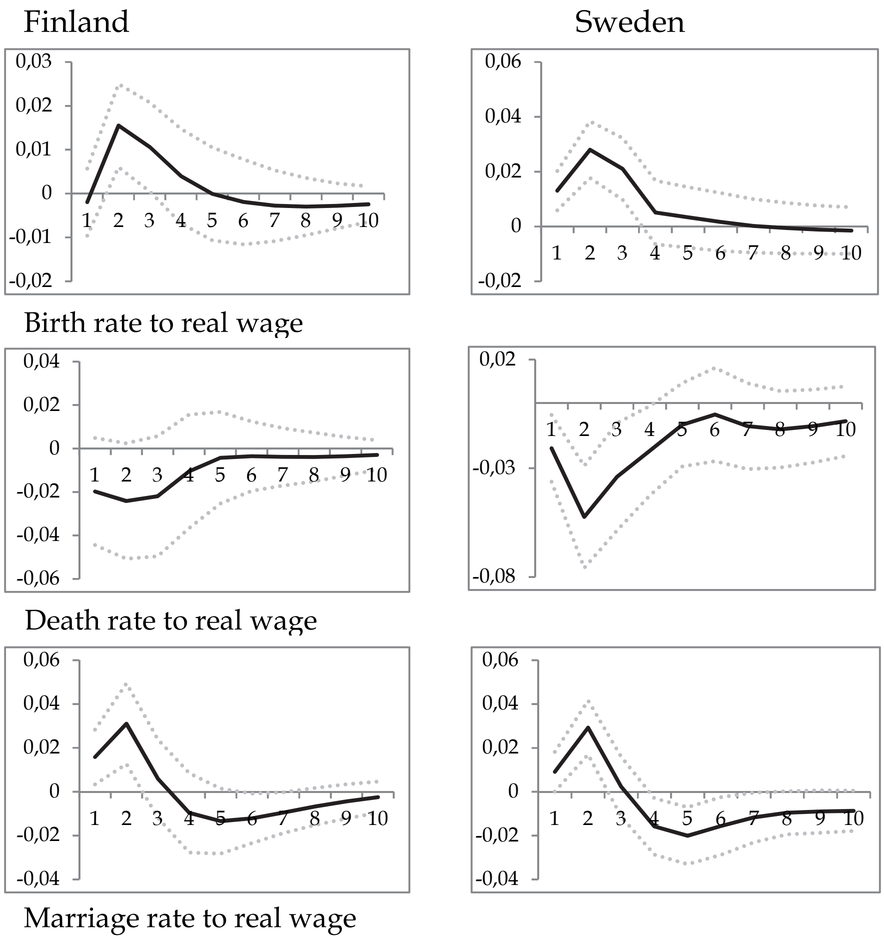
Results

The analysis was commenced by fitting a non-restricted VAR model to our four-variable data set using natural logarithms of the series that covered the years 1745-1865. Linear trends were allowed in each equation for both countries. We used information criteria (Akaike, Schwarz and Hannan-Quinn) as a guide for the optimal lag length and applied the data-oriented strategy of increasing the number of lags until the model passed diagnostic tests. For Sweden this was achieved with three lags, while only two were required for the Finnish data. Dummy variables were then introduced to account for outliers in the system. The normality of errors was thus achieved with the following dummies: 1773-1774, 1791, and 1815 for Sweden; and 1808, 1809 and 1832 for Finland. The 1773-1774 and 1832 dummies controlled for outbreaks of disease and famine; the 1808 and 1809 dummies controlled for the war between Sweden and Russia; and the 1791 and 1815 dummies were used to control the extremely strong rebound in marriages and births after the Russo-Swedish and Napoleonic Wars, respectively. The

[55] A test on whether all of the lags of the X_t are simultaneously different from zero.
[56] E.g. Arora, 'Health' (2001).

usage of dummy variables to obtain the underlying 'normal relationship' has been debated, however. E.g. Møller and Sharp recognize that although "a careful inclusion of dummies, to account for extraordinary exogenous events, is likely to improve statistical inference, it must be recognized that, in practice, finding the "best" dummy specification is difficult"[57].

Figure 2. Generalized impulse responses for Finland and Sweden.



Note: Pesaran and Shin (1998) generalized impulse responses with 95 % Monte Carlo confidence intervals reported. The vertical axis reports the estimated average response, traced through ten periods after the shock.

In Figure 2 we report the generalized impulse responses from real wages to crude birth, crude marriage and crude death rates, designating the preventive and positive check mechanisms. The 95% confidence bands obtained with Monte Carlo simulations are included. The Swedish data corroborates the existence of a strong preventive check, working both through delayed marriages and especially through avoided births.

[57] Møller/ Sharp, 'Malthus' (2014), 123. For similar treatment see e.g. Nicolini, 'Malthus' (2007); Weisdorf / Sharp, 'Checks' (2009); Fernihough, 'Dynamics' (2013).

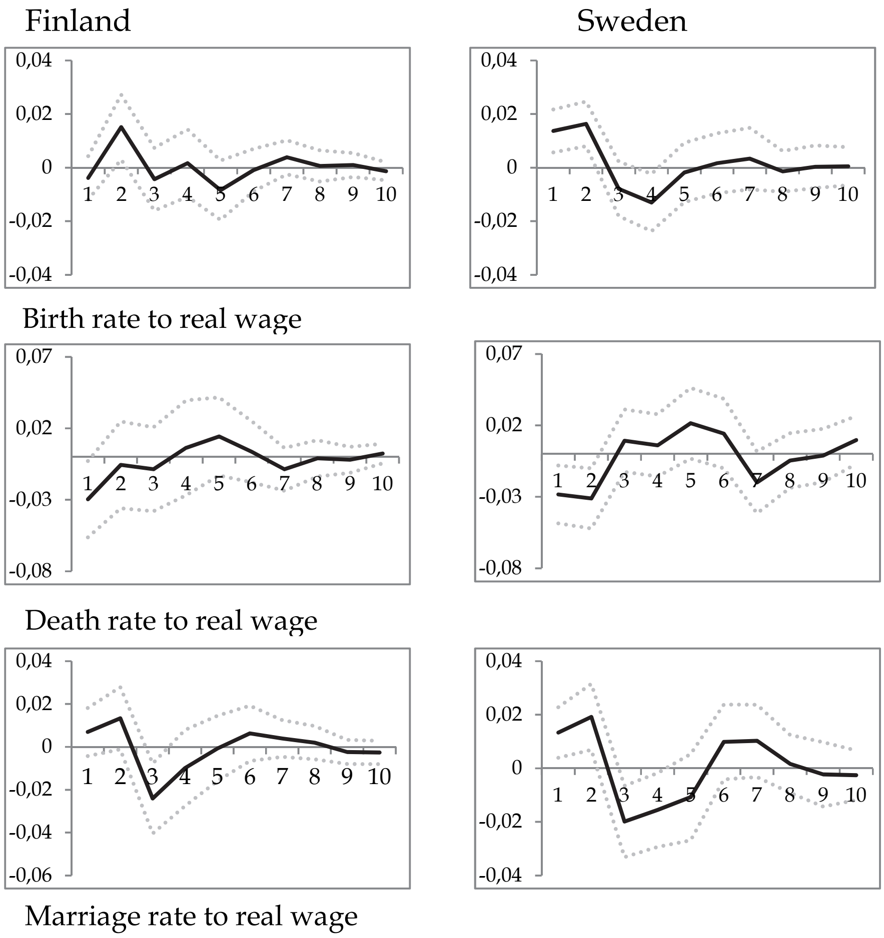
Marriage rates respond to a shock for two years, birth rates respond for three, while the mortality response takes up to five years to vanish. Similarly the Finnish preventive check is considered to work both through postponed marriages and an avoidance of births. Although the marriage response is similar in both countries, the direct preventive check through births is considerably weaker in Finland. At the 5% risk level, no positive check can be found for Finland in the corresponding analysis, even though the sign of the relationship is right. The results from variance decomposition after ten periods reflect these findings. In Finland, real wages explain a mere 2.4% of the variance in crude death rates, 14.6% of crude birth rate variance, and 22.1% of crude marriage rate variance. In Sweden the corresponding percentages are considerably higher: 17.8%, 18.4%, and 27.5% respectively. Nicolini presents similar figures for England, though he excludes marriage rates from his analysis. During the period of 1541 to 1840, the variation in real wages accounted for 13.9% of birth rate variance and 7.3% of death rate variance. However, in some of the sub-samples the percentages are higher, e.g., 31.2% for birth rates (1641–1740), and 23.3% for death rates (1541–1640).[58] As for differences in the check mechanisms between the two countries, variation in the crude marriage rate in Finland accounts for 21.5% of the variance in crude birth rate after ten periods, while in Sweden the percentage was considerably lower at 8.4%. The Finnish preventive check was thus clearly nuptiality driven.

While the results above reflect the sensitivity of vital rates to deviate from their long-term average as a result of a real wage shock, short-term responses of the vital rate to changes in real wages are also worth paying attention to. Short-term response has previously been detected, among others, by Galloway and Dribe et al. (for Sweden) and Kaukiainen (for Finland). We study the short-term interactions of the variables by replicating the analysis above but using differenced data.[59] The generalized impulse responses for these are reported in Figure 3. The Swedish relationships are similar regardless of whether we study data on levels or in differenced form: crude birth and marriage rates show the positive effect of real wage shock, and death rates the negative. In all cases, the effect persists for two years, with a negative echo at later stages. Similarly, the short-run analysis of the Finnish data also indicates that an increase in real wages led to a positive reaction in birth rates. The negative reaction in crude death rates corroborates Kaukiainen's findings. Crude marriage rate exhibits at the 10% level a positive reaction to a change in real wages and a negative echo in the third year after the shock.

[58] Nicolini, 'Malthus' (2007), 111.

[59] We used three lags and dummies for 1808, 1809, 1810 and 1832 on the Finnish data and five lags and dummies for 1773-1774 and 1791 for the Swedish data. All impulse responses are reported in Appendix 2. The considerations about the ordering of the variables and the nature of the time dependence of the responses also apply here. See e.g. Dolado/Jimeno 'Unemployment' (1997); Fernihough, 'Dynamics' (2013).

Figure 3. Generalized short run impulse responses for Finland and Sweden.



Note: See Figure 2 for details.

Even though the impulse responses do not suggest the existence of permanent level-shifts in response to a variable's own shocks (which would imply the presence of unit roots), or to shocks in other variables (which would imply the existence of cointegration) we double-checked the qualitative results using modified Granger causality of the Toda-Yamamoto framework to corroborate our findings.

Table 2. Results from the MWald Granger causality tests.

Lag length	Sweden W → CBR	W → CMR	W → CDR	Finland W → CBR	W → CMR	W → CDR
1+1	30.61 (<0.01)***	31.36 (<0.01)***	12.96 (<0.01)***	6.32 (0.012)**	9.22 (<0.01)***	0.001 (0.980)
2+1	25.75 (<0.01)***	34.16 (<0.01)***	17.24 (<0.01)***	**5.80 (0.055)***	**12.15 (<0.01)*****	**1.54 (0.464)**
3+1	**27.04 (<0.01)*****	**34.11 (<0.01)*****	**17.64 (<0.01)*****	8.79 (0.032)**	10.50 (0.0147)**	3.14 (0.370)
4+1	28.74 (<0.01)***	34.98 (<0.01)***	16.07 (<0.01)***	6.43 (0.169)	12.01 (0.0173)**	2.87 (0.579)
5+1	28.28 (<0.01)***	34.18 (<0.01)***	15.59 (<0.01)***	6.59 (0.253)	13.17 (0.0219)**	3.27 (0.658)

*Note: Chi-squared values for MWald test reported. Deterministic components applied in the unrestricted VAR are used. P-values in parentheses, *** - denotes statistical significance at 1%, ** at 5%, * at 10% level.*

The results of the modified Granger causality MWald test are reported in Table 2 and prove to be identical with the results from the SVAR analysis. In Sweden the development of real wages is reflected in changes to both crude birth ($p<0.001$), marriage ($p<0.001$) and death rates ($p<0.001$). Similarly, corroborating the Finnish SVAR results, the indirect preventive check through marriage is clearly observed ($p=0.002$), and the direct effect through births is also established at the 10 % level ($p=0.055$). However, no causality from real wages to crude death rate is established ($p=0.464$). We also checked the robustness of the MWald test for the specification of lag length, also reported in Table 2. We noted that the direct Finnish preventive check loses significance after lag length surpasses three, though lag exclusion tests do not support lag lengths of this magnitude; if we exclude statistically insignificant lags, the result is robust. All the Swedish relationships are extremely robust to the specification of lag length, as is the Finnish relationship between real wages and crude marriage rates.

Discussion

The results do not support the initial hypothesis that the Finnish system would have been dominated by the positive check; instead we detect a preventive check strongly driven by marriage rate in Finland. It is suggested that the marked downward social circulation during the 1800s raised the age at first marriage and made it economically difficult for an increasing number of individuals to establish a household.

The growth of a social underclass may also have led to the *level* of rural real wages becoming less representative as a measure of welfare. The short-term mortality response in Finland nevertheless does suggest that the growing rural underclass remained vulnerable to the annual variation in living standards. Perhaps the Finnish birth and death rates' response is weaker than those of Sweden's because a growing proportion of Finnish people became more dependent on communal aid for the poor, subsistence agriculture and daily wages paid in kind. This may have been enforced by the fact that the purchasing power of the Finnish real wages was lower than its Swedish counterpart to begin with. Meanwhile, the strong response to alterations of real wages in the Swedish data would suggest that the quality of the data is not the issue; the sources are practically identical.

Certain background factors that may have contributed to these results can be ruled out. Firstly, because of countries common history, differences in *formal* social institutions were largely non-existent. Geographical closeness and a long tradition of cultural exchange ensured that there were no large cultural differences (e.g., in cultural norms or women's position in society) between the two countries which might have resulted in demographic regime differences. The poor relief institutions were roughly identical. In both countries the legislation mainly provided long-term help for a minority of the deprived: e.g., in 1829 only 2.1% of the Swedish and 1.3% of the Finnish population received public poor relief. Sweden reformed poor relief in the late 1840s, and Finland in the early 1850s (most likely much too late to matter in demographic terms in the studied timespan).[60]

The results were deduced using level stationary VAR models after a number of pre- and post-estimation tests suggested that the variables could be considered stationary. However, we might deal with a somewhat unclear case. Future research ought to compare different methodologies for data sets where it is difficult to draw a definite conclusion about their stationarity. In this case, however, stationary SVAR models and generalized impulse responses provided a suitably flexible empirical framework for an exploratory analysis. Qualitative results were reproduced using a method that remained robust to the underlying statistical properties of the series. We wish to emphasise, however, that we do not want to rule out future investigations on the matter using CVAR models. In fact, we perceive them as highly plausible if data from after 1865 is used.

Conclusion

This article has examined the relationships between Swedish and Finnish crude vital rates and living standards measured in agricultural real wages. Our interest was in whether the Malthusian preventive and positive checks, i.e., a positive relationship of birth rate and negative of death rate to real wages prevailed on the European periphery, when the Industrial Revolution had already begun in Western Europe. The roughly identical source materials from the two countries made for a statistically comparable setting.

According to our results, Sweden exhibited both positive and preventive checks. The latter surfaced through both birth and marriage rates. The observation of both the checks is in line with previous Swedish accounts. However, studying the data on levels, the Finnish evidence could only corroborate the existence of the preventive check (both direct and indirect), but not the positive check. The direct effect through births was clearly weaker, making the Finnish preventive check markedly driven by marriage

[60] Pulma, 'Vaivaisten' (1994); Bengtsson, 'Mortality' (2004), 138–142; Bengtsson/ Broström, 'Famines' (2011), 123–124.

rates. Finnish birth and death rates seemed to react to changes in real wages in short-term, although the responses died out more quickly than in Sweden. Of the two countries analyzed here, Sweden seems to have displayed stronger Malthusian characteristics. A number of pre- and post-estimation tests suggest that the time series can be considered stationary, and hence the application of SVAR models is justified and the results obtained are robust.

It would appear that the difference in development of economic and social structures is critical in explaining the differences observed between the countries. The subtle response of birth and death rates to real wages in Finland can also reflect a society close to subsistence level, where the wage level is low, and there is a low adaptation rate of monetary economy (i.e. the living standards cannot be adequately measured in monetary terms). However, it should be stressed that this conclusion remains tentative for as long as the available evidence comes largely from the European economic leaders of the time. We therefore suggest that to arrive at better general conclusions about the existence and workings of the Malthusian world, more evidence is required from countries that industrialized later on, from economic backwaters and from different regions within countries. This could be done by using a number of measures for living standards, and through drawing comparisons that fully take into account the institutional and contextual features that affect how the checks operate.

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[2]

Poverty and tax exemptions in mid-nineteenth century rural Finland

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Poverty and Tax Exemptions in Mid-Nineteenth Century Finland

This article studies the nature and social character of Finnish rural poverty during the early stages of industrialization. Specifically, we study households exempted from two separate taxes in order to locate and study the rural poor. Contrary to several previous considerations deeming taxation sources unreliable in poverty studies, it is shown that under controlled settings tax exemption information does display promising features. These include a high exemption percentage of households without adult male members, small average household size of the tax exempted and a clear concentration of the exemptions on the lower rural social classes. Our findings also highlight that conclusions on the usability of the exemption information depend heavily on the selection of the tax studied. Taxes levied at individual level were not necessarily dependent on the households' economic status, and similarly household level taxes may have been independent of the inhabitants' social and economic conditions. On average, the exemption rates are in line with several accounts from pre-industrial Western Europe.

Introduction

This article studies the extent and social characteristics of the Finnish rural poor using household level micro-data. Through problematization of methodology and theory an attempt is made to assess the contemporary concepts of poverty and deprivation by focusing on one often used poverty measure, tax exemption. Using data from rural Finland in 1865, this article examines the nature of tax exemptions and the social standing of their recipients, seeking answers to the following questions: 1. Who were defined as poor in pre-industrial societies? 2. How uniformly is poverty presented in the various fiscal sources? 3. Is tax exemption a valid instrument for measuring poverty? Answering these questions serves to quantify and generalize what attributes were deemed important in defining an individual or a household as poor in the Nordic pre-industrial agricultural context.

In his seminal study Seebohm Rowntree defines poor as those whose incomes fall below the minimum required "for the maintenance of merely physical efficiency" (Rowntree 1901, 86). Contemporary to this study, the Finnish J.W. Rosenborg stated in his doctoral thesis that poverty is "lack of means of sustenance, resulting in inability to take care of life's basic needs" (Rosenborg 1863, 6). Both of these nineteenth century scholars define poverty in a manner reminiscent of today's capability failure, an idea most importantly put forward by Amartya Sen. This stance accentuates that individual welfare has to be understood in the context of capabilities, involving various functionings (achievements of a person, what he/she manages to do or be) what he or she can *potentially* achieve when the freedom to choose between different ways of living is acknowledged (Sen 1981, 1–8; Kuklys & Robeyns 2005, 10).

According to McIntosh, pre-industrial poverty was largely defined through one's (in)ability to work – highlighting the traditional dichotomy of supporters and supported (McIntosh 1998; Vikström 2006, 227; Pulma 1994, 49, 56–59; Kilpi 1913 and 1915). This was reflected in pre-industrial characteristics almost uniformly associated with poverty throughout Europe: sickness and incapacity were two of the most important variables attached to inclusion in the poor censuses (King 2002, 51–54). Accentuating this, Jütte stresses that even though tax exemption and poor census inclusion criteria varied, the role of sickness and old age was commonly accepted (Jütte 1996, 21, 24; see also Engberg 2006, 37).

By virtually any modern standard the pre-industrial world was wretchedly poor, although the very application of these modern conceptions of poverty in historical instances has aroused considerable debate. Estimates of the extent of the pre-industrial English poverty varied from "a third to a half [of the population]" (Beier 1983, 5) to accounting it as a "massive and permanent element" (Wrightson 1982, 148), whereas more positive estimates still yielded poverty rates between 15 and 25% (Hoskins 1957; Lindert & Williamson 1983). Arkell downgraded these estimates: according to his revised figures, British pre-industrial poverty extended to about "one quarter" in general and about 15% of the population lived in the destitution of absolute poverty (Arkell 1987, 47).

According to Swedish tax exemption figures, depending on the geographic region, some 10 to 30% of the Swedish adult population were exempted from the lowest of personal taxes during the 1800s (Söderberg 1978; Lundsjö 1975). Juxtaposing these figures with official Swedish poor relief rates yields results aligning with the general consensus that fiscal sources (i.e. tax exemptions) tend to suggest higher historical poverty levels than what can be obtained from poor relief censuses (Jütte 1996, 47; Engberg 2006, 39): only a few percent of the Swedish population were entitled to poor relief during the 1800s (Bengtsson 2004, 138–42). In Finland the proportion of the population eligible for poor relief was roughly similar, c. 3% in 1865, ranging from some 2% in the southern parts of the country to 6.3% in the province of Oulu (Kilpi 1913 and 1915).

This paper introduces further Finnish evidence to the discussion. The structure is as follows: the next section presents the context of nineteenth-century rural Finland and reviews the literature concerning the living standards of different rural social groups. The third section presents some international literature on the usage of tax exemption data in poverty studies and the fourth section presents the source material and necessary source history in order to assess them critically. In the fifth section regression models are run in order to explain the emerging patterns of exemption, leaving it for the sixth section to conclude.

Social Structure and Living Standards in Rural Finland in the 1860s

Finland remained an undeveloped agrarian country right until the early 1900s. Scarcity of production factors, excessive dependence on agriculture in adverse climatic conditions and low connectivity to European trade are generally considered to explain the absence of growth and the low level of average income in Finland in comparison to the rest of the Nordic countries. Late industrialization meant that during the mid-1800s Finland fell behind the other Nordic countries in economic terms. Finnish GDP per capita in 1820 was 12% lower than Swedish, which in turn had circa half of the GDP per capita of the leading economy of the world at the time, the United Kingdom. The

Finnish disparity to Sweden and to the rest of the Scandinavia grew during the 1800s: by 1870 the Finnish GDP per capita was 15%, by 1900 20% lower than that in Sweden (The Maddison-Project 2013; see also Eloranta, García-Iglesias, Ojala and Jalava 2006, 27). The Finnish urbanization rate exceeded 10% only as late as the early 1890s, reflecting the predominance of the agricultural sectors of society. Similarly, up to 75% of the labor force was tied to agricultural livelihoods until the late 1800s (Vattula 1983; Hjerppe 1988). Because of the persistence of rural living, the macro social structure in Finnish society changed relatively little during the 19th century.

Traditionally, Finnish social and agricultural historians have claimed that the single most crucial divide in the agrarian society lay between the rural landowners and the rest of the agricultural population and Haatanen, for example, states that 'let it be a cottage or a piece of land . . . telling poor from poorer' (Haatanen 1968, 40). The landowning group can be divided into different cadastral categories (see e.g. Gadd 2000; Jutikkala 2003) but it has been typologically customary to treat the landowners as a monolithic group forming the highest of the agricultural classes. Its actual composition varied from landowning nobility to small-scale independent farmers. The rural gentry, consisting of the nobility and high ranking officials, were typically landowners, even if the proportion actually engaging in agriculture was low (Soininen 1974, 28–29, Wirilander 1974, 119–24, Jutikkala 2003, 447). The size of the uppermost social segment was small: of the c. 1.8 million people living in Finland at the time only 2% (including children) can be considered to have been part of the gentry (see Table 1). The considerably more visible group among the landowning segments were the freeholder peasants. The Finnish freeholder peasants cultivated the land they owned or over which they had legal control. In the taxation registers, the landowners can be located using the *mantal* subscription. *Mantal* was the major assessment for taxation in Finland until the 1900s (Huuhka 1999, 65–75; Lappalainen 2006, 161–63). Like the English *hide*, it was conceptually the amount of land needed to support a peasant family, thus it was a unit of land assessment for purposes of taxation. The acreage constituted by a *mantal* varied according to e.g. geographical location and the quality of the land, but generally, the freeholder peasant farms' *mantal* rates rarely exceeded one, while manorial demesnes could be assigned substantially larger *mantal* rates (Olsson and Svensson 2010, 283).

Table 1. Social structure in rural Finland in 1865

	Gentry	Freeholder peasants	Whole farm renters etc.	Croft farmers	Rural labourers	Farm servants	Lodgers
Percentage of total population	2.0	38.4	4.0	21.0	15.9	5.4	4.6
Total number (in thousands)	36	694	72	378	286	97	83

Source: Modified from Rasila (2003).

The remainder of the farmer population constituted the rental class. The so-called whole farm renters (Finnish: *lampuodit*) rented a *mantal* farm in its entirety. A significantly larger and the more prominent in the rental class were the crofters (Finnish: *torpparit,* Swedish: *torpare*), cultivating some section of a *mantal* farm. The lowest of groups within the rental population were the cottagers (f. *mäkitupalaiset,* s. *backstugusittare)* who, unlike crofters, had no real arable land but instead small plots for staple crops. It has traditionally been considered that the wealthiest of the rental farmers were in economic terms on par with many of the freeholder peasants, some being even wealthier. At the lower end there are difficulties drawing a sharp boundary between the cottagers and crofters, especially as there was cottagers owning their housings and crofters cultivating extremely scarce lands, respectively.

The so-called life-cycle service (e.g. Moring 2003) was typical throughout the Nordic countries. The most significant feature in this system was that young unmarried sons and daughters signed up by the year to work as farm laborers. For the contract year, these people were employed full-time and received the bulk of their wages in kind. With the increase in downward social mobility during the 1800s, a growing proportion of people remained as farm laborers even after marrying and starting a family *(*f. *muonamiehet,* s. *statare)*. Their tenures as farm laborers became lifelong instead of constituting merely a phase in their lives. The lowest segment of the rural society was constituted by the lodgers (f. *itselliset,* s. *inhyseshjon),* a highly heterogeneous group of people, the majority of whom lived in small huts or spent an unsettled life traveling from one house to another and mainly working as a seasonal laborers on farms. A clear distinction between cottagers and lodgers is difficult to make: e.g. in the rural municipality of Leppävirta in Eastern Finland, the early 1900s lodgers were considered to include everybody with a house or room of their own to live in, but with no distinct acreage to cultivate (Haatanen 1968, 45. For examples of the lodger group and its economic situation see Anu Koskivirta's article in this issue).

It is important to note that the social class division as presented in the pre-industrial fiscal sources is mainly indicative. Three critical points are worth highlighting: 1. The legislation concerning the rural underclass was reformed in the early 1850s, increasing the number of people subject to so-called legal guardianship, placing landless population segments with no permanent source of income under the supervision and employment of the landowning classes (See the Introduction to this issue). In practice, however, few landowners needed these new laborers. Instead of these people being entered in the taxation records with their actual social class, the legislation was often circumvented by registering these people as farm laborers and crofters in the tax registers (Pulma 1994, 61). 2. Terms used to denote different social groups most likely had regional variation, and therefore the concepts used in the registers did not unambiguously indicate the actual ownership and social status (see e.g. Rosenberg and Selin 1995, 118). 3. Not all those people listed as belonging to a household were necessarily actual residents; households were partly compiled for taxation purposes and may not reflect the actual prevailing family structures.

The division described above reflects the generally accepted ordering within the Finnish agricultural sphere. There are, however, relatively few studies trying to assess rural welfare beyond these formal categories. On the basis of probate inventories, Markkanen (1977) places gentry and freeholder peasants well above the rest of the rural population segments in terms of wealth (see also Rosenberg and Selin 1995, 119–20). The only available uniform source to assess income levels between social groups in the 1860s Finland is the income tax *(suostuntavero)* collected from 1865 to 1885. The lower income boundary for the mildly progressive tax was set at 500 Finnish *markka* (marks), which has been considered being quite high, duly corresponding to c. 2.7 times GDP per capita. The taxation information has raised very little interest and because of this we lack detailed studies on social group specific incomes (see however e.g. Jutikkala 1991; Kaarniranta 2001). Some rough data has been published and these would suggest that a majority of farmers and practically all the gentry were indeed taxed (Jutikkala 1991; Pitkänen 1992); that is, their yearly income exceeded the lower limit of 500 marks.

In a society close to subsistence level, with low wage level and with low adaptation rate of monetary economy, income is rather difficult to operationalize as a welfare measure. A comparative benchmark is needed. Vihola (1994) has presented information on the yearly wages of male and female farm laborers in South-West Finland in the 1860s. A wage paid in kind consisted of grain, dairy products, meat, and fish, but an additional monetary wage was also provided. On average, a male laborer received a yearly income of c. 250–300 marks, women c. 70% of this. Thus in a farm laborer's household the yearly income might range between 430 and 520 marks. Due to the common history of Sweden and Finland, the 1845 Swedish wage recommendation for a *statare,* a farm laborer with a family, is a practical point of comparison (Gadd 2000, 226). When converted into Finnish prices at the 1865 price level using the market price scales published in Vattula (1983), we end up with a yearly household income of c. 450 marks. A later Finnish assessment is provided by Vennola (1909), suggesting a yearly income for a male agricultural laborer with a family of 922 Finnish marks during the period 1907–1908. When this is back-projected with real wage index provided by Heikkinen et al. (1987) to 1865 we end up with yearly income of c. 480 marks.

To shed light on this, income tax registers of the parish of Saarijärvi in Central Finland were inspected as an example. Of the 436 households taxed in 1865, 78.2% were freeholders and 12.6% were crofters. Only two households of rural laborers with family were taxed (0.5%) and only one lodger household. Thus it would appear that normally the lowest of the agricultural social classes dropped below the 500 marks of yearly income. According to Haatanen (1968, 43), laborers with family occasionally received higher wages, reflected in their appearance in the income tax registers. Taken together, however, these considerations suggest that even if we are able to gauge the yearly income with some confidence for certain social groups, the income tax registers represent much too high yearly incomes to be useful in a study interested in the lower end of the income distribution.

Methods: Using Tax Exemptions in Poverty Studies

The currently available Finnish poverty measures are insufficient for describing the extent and nature of actual rural poverty. Income tax registers fail to include the lowest end of the income distribution, local poor relief registers are too inclusive and include only the most clear-cut cases of poverty and usage of contemporary social groups as they are presented in various fiscal sources risks enforcing historical stereotypes and disregarding intra-class variation in economic conditions. Finnish social and economic history has made scarce use of tax exemption data, scrutinized here in greater detail.

Poverty and tax exemptions not only have a long historiographical linkage (dating as far back as Gregory King), but taxation data has been deemed favorable for a variety of reasons in its own right, most importantly because tax records are generally compiled systematically, helpful in the construction of large data sets. Although tax exemptions could be easy to operationalize as a welfare measure, the dichotomous nature of their (assumed) information (poor/not-poor) may yield an overly simplistic picture of a heterogeneous rural reality.

Had the exemption criteria been transparent and the procedure clearly documented, the tax exemption data could easily be turned into a measure of social structure and welfare. Unfortunately this rarely is the case. The grounds for tax exemption were typically discretionary even *de jure*; i.e. very few taxes were so clearly based that the contemporary state could actually exercise "total" control over the contributors. If not sex-based (as even age could be contentious, e.g. Sirén 1999, 176), the most explicit of bases, such as income levels in income taxation could hardly be more than estimates and agreements by both parties, the tax authority and the taxpayer. The extent to which these peculiarities have been considered to pose real problems varies from one research setup to another. On the one hand, Jütte has considered that strict concepts deduced from economic theory and modern poverty measurements are "unrealistic and lack a consistent historical perspective" and that measuring historical poverty "must proceed within the context of contemporary sources and not within a general theory of basic needs [...]" (Jütte 1996, 45, 46).

Macro (economic) studies in particular have often been less sensitive to the local aberrations of the fiscal sources. In the Swedish case, Lundsjö and Söderberg used directly the inability to pay the smallest of personal taxes (the hospital tax, s. *kurhusavgift*) as an indication of poverty. According to Söderberg, the exemption from the hospital tax "constitutes a precise operational definition" for rural poverty (Söderberg 1978, 13), Lundsjö makes the reservation that while the whole group of the exempted may not be considered deprived, the genuine poor of interest have to be included "among the exempted" (Lundsjö 1975, 48). A more recent Swedish application of a similar approach is that by Engberg, asserting that the poor were those "whose economic situation was so bad that they could not pay even the most basic taxes", although pointing out that it is difficult to draw any sharp boundaries between different types of poverty presented in different sources (Engberg 2006, 32, 48). Taking a more cautious approach, Castenbrandt considered the Swedish local poor relief registers far more applicable in measuring poverty than tax exemption records (Castenbrandt 2012, 160–62) while a combination of sources was used by Schellekens, who strives to locate "poor low-class households" with the poll tax and poor relief records in eighteenth and early nineteenth-century Holland (Schellekens 1995).

In addition to the question whether the tax exempted were actually poor, four contextually important source critical issues encountered by research using taxation data are recognized: First, due to the modern perspective, taxpaying is often seen as a personal endeavor, disregarding the possibility that someone else may be paying taxes that the historian may consider to be subjective (in connection e.g. with wage arrangements, see e.g. Wilmi 2003, 230; Sirén 1999, 177–78).

Second, studying the taxpaying ability of a household and its eligibility for poor relief through a single measure overlooks the phenomenon of an overlapping poverty explored among others by Arkell and King. Arkell argues that different definitions were applied to people unable to pay different kinds of taxes, whereas King points out that in seventeenth century Bolton, England, there was a substantial proportion of the population not paying taxes and still not appearing in the poor relief registers (Arkell 1987, 32–38; King 2002, 48–50; see also Hoskins 1957, 202; and Johanna Annola's article in this issue). It has also been observed that late-seventeenth century British poor censuses omitted a significant number of families with large numbers of children, which were not considered poor enough to be included (King 2002, 54), highlighting what Engberg labels "living on the edge" (Engberg 2006).

Third, taxation records are likely to be skewed to include upper income groups and subject to deficiencies at the lower end for a variety of reasons. It is important to acknowledge that tax registers display contemporary perspectives concerning a sort of institutionalized social status thus reflecting expected ability to pay taxes instead of actual ability. King argues that social ties (i.e. "local social citizenship") to the community were important for people to be listed in the poor relief registers, aligning with Arkell's interpretation of the nature of the "deserving poor" (King 2002, 54; Arkell 1987; Vikström 2006, 227). The old Finnish tax legislation also reflects this phenomenon: people not paying taxes could effectively be categorized in two ways, those included in tax registers, but exempted and those not included at all.[1] Thus people like vagrant beggars are generally not recorded in the registers, contributing to an underestimation of the full extent of poverty and making the data deficient at the very lowest end (Sirén 1999, 177; Vikström 2006, 232). Jütte has added that the majority of taxation records from the pre-industrial period reflect the wealth rather than the yearly income of taxpayers and thus the exempted should not automatically be considered to have zero income (Jütte 1996, 46). To make things more complicated, taxation registers may also display errors due to moral hazard embedded in the implementation of taxation: for example, in the old Swedish law poll tax collectors (*mantalsskrivar*) were entitled to keep 1% of the taxes collected, possibly increasing the willingness to include poor people among the taxed (Lext 1967, 249).

Fourth, while poverty has often been an explicitly stated criterion for tax exemption, generally no effort has been made to assess whether or not the contemporary *concept* of poverty varied between regions and subsequent socioeconomic

[1] Von Bonsdorff 1833, 618, where he cites the Swedish law of 1743 that "…så torftigt tillstånd, att det icke i Mantalslängderne äro oppförde…" (…in such poverty that they are not included in poll tax registers…"). The topic requires closer scrutiny. See also Jutikkala 1957, 158.

contexts; whether or not people with similar characteristics were treated identically and independent of the region of residence. In the English context, Arkell states that although England had a nationwide establishment of poor relief, decisions on who were helped and who was not were often made inconsistently and generally in an attempt to match local resources to local poverty (Arkell 1987, 39; see also Lees 1998, 29–30). Arkell argues that poor relief and tax exemption data provide information concerning poverty serious enough to be deemed locally to be in need of alleviation (Arkell 1987, 39; Engberg 2006, 52–53), or, as Vikström puts it, at least being given priority (Vikström 2006, 225).

If the tax legislation was vague, it is tempting to believe that local communities exercised their own judgement and used their experience in classifying an individual as poor. As Engberg puts it, "(i)n the absence of formal criteria to determine who was entitled to exemption [...], the decision seems to have been a matter solely for the local fiscal authorities" (Engberg 2006, 37–38). Kuusterä has emphasized that the formal legislative frames of Finnish state taxation remained largely intact throughout the era of Russian rule (1809–1917) (Kuusterä 1989, 147) and this relative stagnation of the tax legislation may have emphasized local conventions in the application of the tax code. On the basis of the seventeenth-century British sources, King suggests similarly a slow adaption to formalizing the poor law system (King 2002, 51), Engberg showing clear discontinuities resulting from the Swedish tax reforms in the nineteenth century (Engberg 2006, 43).

In light of these accounts it would seem reasonable to believe that local sources tell more about local administrative decisions and conceptions concerning poverty than about the actual poverty level in society (Lees 1998; Jütte 1996, 46). Shortcomings such as these have led Jütte to argue for using taxation data mainly to order regions in relation to one another (Jütte 2006, 47). King has pointed out that the process of the eradication of regional peculiarities is relatively unknown (King 2002, 43), bringing about the crucial need for a regionally comparative study of tax exemptions: no one region or even several are representative enough if exemption criteria varied extensively between regions (see also Goose 2001, 45). Although laborious, the task is not as problematic as suggested by Jütte, who concludes that we should give up the idea of estimating the national extent of poverty from local sources (see also Arkell 1987, 45; Jütte 1996, 50; Goose 2001, 58), as the following sections endeavor to demonstrate.

Sources and Data

In order to understand the logic of exemptions and their association with poverty, we undertake a quantitative assessment of their nature and study the exemption processes of two different direct state taxes, one levied on the household, one on the individual, both recorded in annually compiled poll tax registers. The usage of exemptions from two different taxes will not only reveal patterns and similarities, but may also unearth inconsistencies shedding light on the contemporary conceptions of economic well-being.

In international comparison, it is justified to say that Finnish poll tax registers have reasonably extensive coverage. According to valuations conducted by Kaukiainen, poll tax registers are fairly incomplete before the 1820's, but after that they seem to converge in information with general population registers, which are considered reliable: using the municipality of Lohja as an example, he shows that poll tax registers display a deficit of 7% in comparison to population registers in 1830, but of only 2.5% in 1850 (Kaukiainen 1979, see also Jutikkala 1957 and Palm 1993, 90–91). Kilpi shows that at the level of the whole country poll tax registers lacked c. 19% of people included in the church registers in 1805, but only 5.8% and 4.9% in 1830 and 1860 respectively (Kilpi 1913, 110). These figures are in stark contrast, for example, to British hearth tax lists, which have been estimated to lack up to 40% of the actual population, leading Husbands to warn that hearth tax exemption figures "will not throw much light on poverty and pauperization" (Husbands 1984, 46–47).

Orrman states that the Finnish poll tax registers are far more complete in the years following legislative reforms and tend to deteriorate over time (Orrman 1980; Jutikkala 1957). This forms the crucial reason for using a relatively late sample in this study: as the data used is collected from poll tax registers after a major reform (1865), it is reasonable to believe that the data not only record contemporary conditions in rural Finland fairly accurately (i.e. include the majority of Finns), but also that the tax exemption code had been simplified and homogenized sufficiently in order to use the taxation registers to assess the living standards and social status of exempted social groups.

The person-specific tax used in this study is the poll tax (*f. henkiraha, s. mantalspenningar*), the first legislation dating back to 1609 (s. *hjonelagspenningar*, in 1622 s. *qvarntulls mantalpenningar*), originally targeting people older than twelve, although in 1652 the lower age limit was raised to fifteen and an upper age limit of 63 years was introduced. These age limits lasted until a reform in 1865, when the lower limit was raised to sixteen, the upper remaining unchanged (Imperial statute, Feb 20 1865; Von Bonsdorff 1833, 582–99; Lext 1967, 43–47; Orrman 1980. For similar content of e.g. Dutch poll tax registers see Schellekens 1995, 200–201). The reform also abolished the majority of earlier bases for exemption, several of which had a distinct feature of "social steering"; people were granted exemption as a concession after services to the community (including, for example, soldiers, industrial owners, urban migrants…). The nobility were exempted from all forms of taxation during the early modern era. Inability to work was vaguely incorporated in 1660, and in 1693 the subject's poverty was acknowledged for the first time, but with no exact criteria defining when a poor person was entitled to exemption (Jutikkala 1957, 159–61; Orrman 1980 and Sirén 1999, 171–73). After 1865 the only legal reasons for exemption were particular age groups (under 16, over 63), if a subject had three or more children under the age ten or five or more children under the age of sixteen, or if a person was taking care of a sick or elderly relative. Some special groups (such as low ranking military personnel) also retained the right to exemption. Poverty remained a stated ground for exemption, but still without an explicit definition. All those exempted for reasons other than age were listed in poll tax registers under the category *"för andra laga orsaker"* (for other reasons), comprising a wide array of people from nobles with many children to the poor and disabled living in shanties. Those men not exempted were obliged to pay an annual tax of two Finnish marks, women one mark, corresponding to c. 14.6 and 7.3 liters of rye at 1865 taxation prices respectively (Vattula 1983, 437).

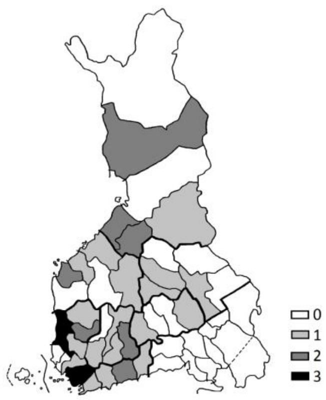
Independent rural households were obliged to maintain local judiciaries, a liability funded through two separate annual taxes (*f. laamannin- ja tuomarinvero, käräjäkappa s. lagmans- och häradshöfdingeräntan, tingsgästningspengar*), both of which were levied on a household according to similar criteria. These obligations were composed of some of the oldest taxes levied in the Kingdom of Sweden, first enacted in 1602 and adjusted through the centuries. The exemptions were detailed in 1741 and remained effective until the late 1800s. As with the poll tax, the exemptions focused mainly on the upper social strata but also on certain rental farmers cultivating gentry lands. In 1743 poverty was acknowledged as a cause for exemption, being tied to the inclusion in poll tax registers and the unit of taxation, i.e. an independent household (*rök*), was tied to a livelihood from agriculture. In the third decade of Russian rule, 1829, the exemption legislation came to distinguish certain rural social groups which were by definition exempted from the obligation to pay. The formal reasoning behind their exclusion was that they were not recognized as being independent households in the strictest sense (von Bonsdorff 1833, 614–20). The last pieces of legislation effective in 1865 were codified in 1858, also stipulating that the first part of the household tax was twenty five kopeks of silver and the second some twenty liters of grain (Imperial statute, 12.4.1858. Technically tax was four *kappa*s of grain, one *kappa* being equivalent to c. 5.5 liters). The latter followed a long tradition: after varying legislation, in 1773 it was determined that the household tax had to be paid in kind, in grain. Several taxpayers wanted to pay the tax in money, which was seemingly easier to obtain and featured lower opportunity costs than grain. The fact that paying in grain caused problems suggests that getting an exemption was related to a household's (scarce) agricultural output. According to contemporary perception, the exemption was difficult to obtain and the tax collection practices were often criticized. Complaints were filed especially because household tax was levied on households regardless of whether the inhabitants were eligible for public poor aid or had already been granted exemption from another tax (Nevanlinna 1907, 499–501; Uusi Suometar 24.10.1872, 1.11.1872).

The 1858 household tax reform separated the tax obligation and agricultural livelihood and simultaneously increased the number of rural households liable to pay the tax. The size of the tax remained the same after the poll tax reform of 1865, when at the same time the first part of the household tax (*f. laamannin- ja tuomarinvero, s. lagmans- och häradshöfdingeräntan*) was abolished. On macro level, the 1865 tax reform effectively widened the tax base and subsequently cut taxes from certain groups at the lowest end of the income distribution.

The empirical section of this article is based on household-level micro-data gathered from the poll tax register of 1865. Only heads of household (frequently men) were systematically listed in the Finnish poll tax registers. Wives and children were also relatively often mentioned by name, but servants etc. only sporadically. Because of this practice comprehensive individual level data is extremely difficult to construct, and therefore the statistical unit we use is a household. The household level measurement is followed as part of a wider tradition (e.g. Arkell 1987, 45), making the results suitable for international comparison, but also because household level has been considered to be a better statistical unit in the measurement of individual entitlements to welfare (Sen 1997, 386; see however Deveraux 2001, 252–54).

Due to the laborious nature of the data collection task, in the first stage 50 parishes were randomly selected from each of which data concerning 50 households were gathered. The Province of Viipuri in the southeast and the northernmost district of Lapland were not included in the sampling population for reasons of data availability. We had to exclude nine parishes due to data restrictions, leaving us with 41 randomly assigned parishes and a cross-section of 2,050 households (see Map 1).[2] The 50 households gathered from each parish were selected in listing order starting from the beginning of each register. As these registers were compiled so that villages were listed in alphabetical order within each parish, and households according to their addresses, there is no reason to believe that this procedure would yield a biased sample, meaning that we would end up with biased data because we selected the households from villages with initials at the start of the alphabet.

Map 1. Locations of the sample parishes in administrative districts.



Note: Number of parishes included in the sample per administrative district (f. *kihlakunta*).

Some additional data elimination had to be done. Of the households selected, 229 (11.1% of the total sample) were excluded due to reasons of data quality (mainly because the taxation information was not provided), leaving us with a total of 1,821 households, corresponding to 11,428 inhabitants (approx. 0.7% of the total population in

[2] I am grateful for the assistance provided during the academic course HISA012, spring 2013 at the Department of History and Ethnology, University of Jyväskylä.

the region studied). A control analysis was conducted with the whole sample included and no qualitative differences were found in the results presented, emphasizing the quality of the original sources and robustness to possible outliers.

Table 2. Comparison of household sample and the total sampling population

	Household sample		Whole country	
Province	Poll tax exemption rate (%)	Household tax exemption rate (%)	Poll tax exemption rate (%)	Household tax exemption rate (%)
Uusimaa	4.5	19.4	5.4	35.4
Turku and Pori	9.6	25.0	9.9	22.9
Häme	7.4	51.0	9.4	44.0
Mikkeli	14.1	14.4	13.2	13.4
Kuopio	13.5	2.2	22.8	9.9
Vaasa	10.0	13.7	8.8	15.4
Oulu	16.0	27.6	16.6	34.2

Sources: Household micro data, poll tax registers (1865).
Note: As e.g. in Söderberg (1978, 14), the denominator used in poll tax exemption rate is the adult population, here those between ages 15 and 63. The number of households is gathered from poll tax registers.

Table 2 presents tax exemption percentages deduced from the household data in comparison to the whole sampling population; the total number of people, households etc. is easy to obtain for the information is summed up in the registers. As is observable, no systematic differences are evident, the main exception being the Eastern Finnish province of Kuopio, where the sample yielded fairly low exemption estimates. Overall, however, the exemption rates deduced from the micro sample and the actual population rates correlate highly ($r_{\text{poll tax}}$ =0.79; p=0.033, $r_{\text{household tax}}$=0.87; p=0.012) with modest qualitative differences.

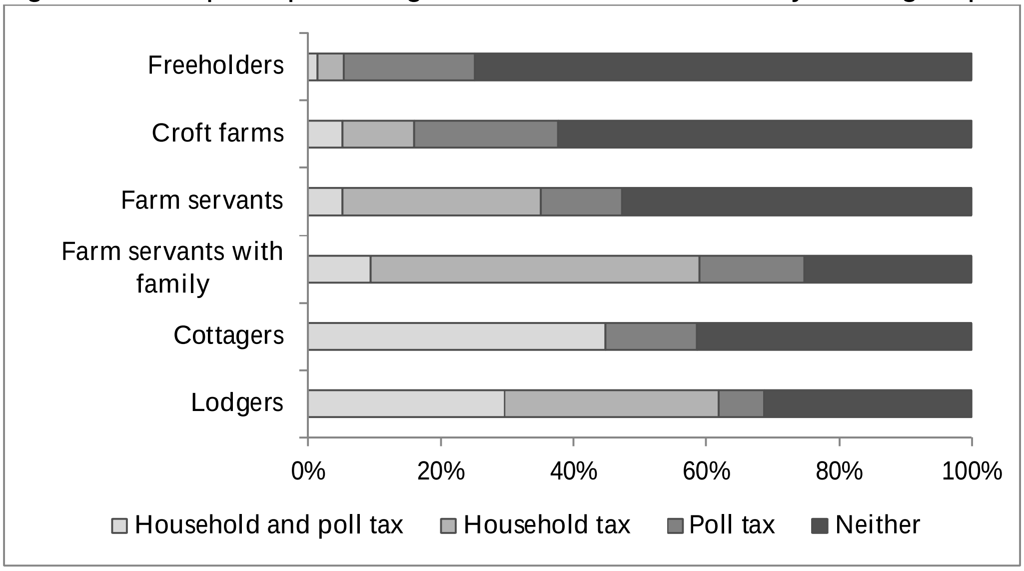
Modeling Exemptions

Two kinds of dependent variables are used in the following regression analysis: 1. If a household was exempted from household tax (n=452) and 2. If a household accommodated an adult (i.e. between ages 15 and 63) exempted from poll tax (n=413). Both these variables score dichotomous values, e.g. 1, if the household was exempted / there was an adult exempted, otherwise 0.

Figure 1 plots tax exemptions by selected social group where the social status information was available (72% of cases were assigned to the six groups presented here). It features two distinct trends: 1. Exemption from household tax decreases as a function of land control and 2. Exemptions generally became rarer as a function of land control. Only 6% of all freeholder estates (hereafter also including the gentry) were exempted from household tax, while 31% of the rest of the rural households were exempted. The poll tax exemption is considerably more typical among freeholders, with

c. 20% of households accommodating at least one exempted adult. Close to 75% of freeholders and slightly over 62% of croft farmers were not exempted from either of the two taxes.

Figure 1. Exemption percentages from the taxes studied by social group.



Source: Household micro data

The two *a priori* poorest of the social groups, cottagers and lodgers, are also evident in the tax exemption figures. Close to 45% of cottager households and almost 30% of lodger households were exempted from both taxes. Even if tax exemptions seem generally more common among the farm servants with family, their households were typically exempted only from the household tax.

The initial social group specific exploration confirms some preliminary considerations about the social stratification prevailing in rural Finland. In order to shed further light on the social characteristics of the tax exempted, logit-estimated logistic regression analyses were run explaining the event of gaining exemption from the taxes. These results are presented in Table 3. Regional control dummies, fixed effects, were introduced on province-level in order to capture the region-specific sources of variation, such as differences in climate, soil, social structure, economic activity, and in taxation practices. Moreover, the crop failures at the beginning of the 1860s (Pitkänen 1993, 54–55) could be suspected of affecting at least the short-term regional patterns of tax exemptions.

Social groups. The first variables introduced to logit models were the social groups displayed in Figure 1. As can be seen in Table 3, in the case of household tax exemption, the ordering of the social groups is similar regardless of the control variables: freeholders are the most likely not to receive exemption, likewise croft farmers. Farm servants with family were the most likely group to be granted exemption, preceded by farm servants without family and lodgers.

If we compare these results to the *a priori* assumption deduced from the earlier literature mentioned above, it seems that the order of the lodgers and farm servants with family is reverse; lodgers have traditionally been considered to constitute the lowest of the rural social classes. The reason for the observed ordering is threefold. First of all, it may be that lodger households more typically cultivated a plot of land (even a small one) and thus practiced some form of farming livelihood, whereas farm servants on the other hand mainly received their wages from their employers. Such wage arrangements could contribute to interpretations whether or not farm laborers were considered to form an independent household obligated to pay the tax. Secondly, it was stipulated in the law that laborers and rental farmers of certain categories of the rural gentry were entitled to exemption. Farm servants with family concentrated in the southern parts of Finland, where the largest of the gentry's estates were also located. This could mean that these servant households were often set on land entitling them to an exemption, suggesting that the poverty connectivity of the household tax exemption may be obscured by differences in the land tenures and in the employment contracts. Thirdly, the lodger group is admittedly more heterogeneous than that of farm servants. The rural social grouping was conducted on the basis of rural land ownership and labor conventions, leaving vast numbers of people not fitting into these categories. This opens up the possibility that the lodger group as it appears in tax registers includes people and households which were relatively well off.

In the case of the poll tax, the social classes yield ambiguous results: both the lower and the upper social classes had households where at least one person was exempted from poll tax for reasons other than age. In order to understand this result, we have to keep in mind that the dependent variable measures whether the poll tax registers listed at least one exempted person residing in the household in question. The poorer households most likely were poor not only in terms of agricultural output (reflected in the household tax exemption) but also on the individual level. Wealthier households, on the other hand, were able to accommodate/employ especially lodgers unable to set up a household of their own. This property suggests that poll tax exemption can effectively pinpoint households with stratified socioeconomic structure but not unambiguously poor households. The interpretation is strengthened by the fact that the effect persists after controlling for number of children and poll taxed men, both more abundant in the upper social groups.

Demographic composition. Finnish surveys of the poll tax records of the pre-industrial era have generally concluded that information on women's social position and even their numbers is poorer than that on men (Piilahti 2007, 41; Happonen 2009, 37; Miettinen 2012, 80–81). The pattern of excess female representation in poor relief registers is widespread throughout pre-industrial Europe (Jütte 1996, 40; Vikström 2006, 227–28) and, according to Jütte, a distinct structural feature of the poverty of people roughly between the ages of 30 and 50 was a rather high proportion of widows and/or women-headed households with children. Engberg has reported similar results from Sweden (Engberg 2006, 41).

Table 3: Logit-estimated logistic regression analysis results for tax exemptions.

	Household tax exemption					Poll tax exemption				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Freeholder	-2.42	-2.40	-2.38	-1.75	-1.77	0.25	-0.06	-0.08	0.88	0.91
	(0.24)***	(0.25)***	(0.25)***	(0.29)***	(0.29)***	(0.16)	(0.17)	(0.18)	(0.22)***	(0.23)***
Croft farm	-0.87	-0.86	-0.85	-0.70	-0.72	0.58	0.48	0.48	0.99	1.01
	(0.17)***	(0.17)***	(0.17)***	(0.18)***	(0.19)***	(0.16)***	(0.17)***	(0.17)***	(0.20)***	(0.20)***
Farm servants	1.35	1.36	1.37	0.94	0.97	-0.07	-0.09	-0.10	-0.93	-0.99
	(0.42)***	(0.42)***	(0.43)***	(0.44)**	(0.44)**	(0.55)	(0.55)	(0.56)	(0.59)	(0.59)*
Farm servants with family	2.54	2.53	2.58	2.93	2.90	0.64	0.76	0.78	1.38	1.27
	(0.35)***	(0.35)***	(0.35)***	(0.37)***	(0.37)***	(0.33)*	(0.33)**	(0.34)**	(0.40)***	(0.41)***
Cottagers	0.59	0.59	0.62	0.34	0.33	1.12	1.17	1.17	0.92	0.91
	(0.39)	(0.38)	(0.39)	(0.42)	(0.43)	(0.38)***	(0.39)***	(0.38)***	(0.46)**	(0.47)*
Lodgers	1.47	1.46	1.48	1.14	1.14	0.87	0.98	0.99	0.32	0.26
	(0.21)***	(0.21)***	(0.21)***	(0.23)***	(0.23)***	(0.21)***	(0.21)***	(0.21)***	(0.24)	(0.24)
Children under age 15 >2 in the household		-0.04	-0.07	-0.27	-0.29		0.43	0.42	0.42	0.43
		(0.26)	(0.26)	(0.28)	(0.28)		(0.20)**	(0.20)**	(0.22)**	(0.22)**
Number of boys under age 15		-0.01	0.02	0.05	0.05		0.13	0.13	0.14	0.14
		(0.08)	(0.08)	(0.09)	(0.09)		(0.06)**	(0.06)**	(0.06)**	(0.06)**
Number of girls under age 15		-0.02	-0.01	0.04	0.04		0.12	0.12	0.11	0.11
		(0.08)	(0.08)	(0.09)	(0.09)		(0.06)**	(0.06)**	(0.06)*	(0.06)*
Elderly household			0.52	-0.60	-0.52					
			(0.35)	(0.36)*	(0.38)					
People over age 64 in the Household			0.03	-0.11	-0.11			0.09	-0.23	-0.23
			(0.17)	(0.18)	(0.18)			(0.14)	(0.15)	(0.15)
Female household				1.78	1.69				2.96	2.89
				(0.21)***	(0.24)***				(0.21)***	(0.22)***
Male household				0.50	0.50				-0.81	-0.84
				(0.28)*	(0.28)*				(0.42)*	(0.42)**
Widow				-0.39	-0.38				-0.37	-0.35
				(0.37)	(0.37)				(0.36)	(0.36)
Number of poll taxed men				-0.02	-0.03				0.12	0.12
				(0.09)	(0.09)				(0.06)**	(0.06)**
Exemption from poll tax					0.16					
					(0.19)					
Exemption from household tax										0.21
										(0.27)
Province dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	1821	1821	1821	1821	1821	1821	1821	1821	1821	1821

**** indicates statistical significance at the 1%, ** at the 5%, * at the 10% level. Standard errors in parentheses.*
Note: The dependent variable is dichotomous ("household was exempted"/ "was not exempted" - 1/0) and the estimated coefficients show the effect of the variable on the probability of being tax exempted. The actual probability is calculated from exponential distributions' cumulative distribution function, e.g. Stock and Watson 2003, 307-308.

The introduction of the dummy variable "Female household", designating households without an adult male, considerably lowers the estimated effect of the social classes (esp. lodgers), farm servants with family being an exception: their estimated effect increases with the introduction of the variable. The households headed by women were remarkably often exempted from both of the taxes: 58.4% of these were exempted from household tax, 53.3% had at least one adult exempted from poll tax (as an example of such a case see Annola's article in this issue). The corresponding percentages in the sample for the rest of the households are considerably smaller: 16.1% and 15.0%.

Contrary to the increased probability of exemption of female-headed households, the same does not apply to households without an adult woman; designated with the "Male household" variable. The estimated effect is weakly positive in the case of household tax exemption, negative in the case of poll tax. The *number* of tax paying men did, however, increase the probability of poll tax exemption. There are considerable differences between social classes in the average number of adult men per household. On freeholder farms there were on average 3.2 tax paying men, whereas lodger households only had 0.6 tax paying men on average. The number of adult men is suggested to capture the socioeconomic status of a household in greater detail than does simple division by social group. As was the case with the freeholder estates, the number of poll taxed men seems to designate the *possibility* that the household accommodated someone exempted from the poll tax, i.e. especially poor lodgers. This may stem from the possibility that the number of poll tax paying men indicates the labor demand of the household and thus its economic output.

The "Widow" variable did not yield significant results, i.e. a household headed by a widow did not increase its probability of exemption. Adding to this, even if supporting an elderly relative was a poll tax exemption criterion based on law in Finland, it does not seem to coincide with an increased probability of exemption. This may be due to the ineffectiveness of the particular piece of legislation or show the relative rarity of such a relation. The limitations in the data have to be considered here, too: the data does not allow us to distinguish between residence and support of the elderly in a household. Furthermore the "Elderly household" variable, which designates households where all the adults are over 63 years old, was only weakly associated with household tax exemption. This leads us to conclude somewhat confidently that old age does not seem to be an important determinant of the fiscal poverty analyzed here.

The number of children. The association between the number of children and the household's welfare has been an especially debatable topic. On the basis of Swedish data, Lilja and Bäcklund have argued that children provided households with cheap and flexible labor, leading them to conclude on a positive association between the number of children and the household's welfare. According to Markkola, income brought in by children was an important part of urban working class households' budgets during the late nineteenth century in Finland and using French data Fauve-Chamoux could find no evidence for a negative relationship between the number of children in a household and its living standards (Lilja & Bäcklund 2013; Markkola 1994, 117–23; Fauve-Chamoux 1993). In our data, the number of children does correlate positively with the probability of exemption from poll tax, but not from household tax. The households which were exempted from household tax were considerably smaller than those paying the tax: the mean household size of the household tax exempted was 3.95 and 7.04 for others ($p<0.001$). This difference is largely due to differences in the number of under 15-year-olds in households ($p<0.001$), whereas the difference in the number of people over 63 was smaller ($p=0.0145$). The finding concurs with previous Finnish assessments concerning age at marriage and mean household sizes of different social classes: according to Moring (2003) and Kaukiainen (1979) the lowest of Finnish social classes tended to have small mean household size. This resulted from high age at first marriage, which in turn contributed to fewer births.

The relationship between number of children and exemption from poll tax is the opposite. This is hardly surprising: the number of children constituted an exemption criterion in law. The tax registers do not, however, allow for exact age-level differentiation, and therefore we cannot precisely detect different poll tax exemption criteria (three or more children under the age ten or five or more children under the age of sixteen). Furthermore, we cannot establish whether those under 15 years old registered in a certain household were actually the children of the householders – we only know that they resided there. These source restrictions reduce the effectiveness of the estimation.

The fact that we observe no association between number of children and household tax exemption suggests that children did not contribute decisively to the household's ability to pay the tax. This contrasts with findings on Dutch data. Schellekens suggests that 8–15 year-old daughters especially caused an economic burden on the family due to lack of work opportunities (Schellekens 1995; see also Vikström 2006, 228). Both Moring (2003, 83) and Kaukiainen (1979, 22) have suggested that Finnish women were actually in a better position than men in rural labor markets because of the range of tasks in which they could be employed (see also Wilmi 2003 and Rahikainen 2006).

Other variables. The qualitative results were robust to the introduction/removal of province dummies. The removal of the dummies lowered the estimated effects, but did not alter any of the statistical significances in the case of the household tax. In the case of the poll tax, lodger households exhibited an increased risk of exemption when province dummies were not included, although only at the 10% level. Taken together, the results are roughly identical regardless of whether the regional controls are taken into account or not.

In an uncontrolled bivariate setting, the two exemptions were strongly associated. This effect, however, vanishes with the introduction of social control variables. These results suggest that households were not characterized with a general "taxpaying ability". Paying the tax or applying for an exemption may have been decided one tax at a time. This has been suggested in the earlier literature with the idea of "overlapping poverty".

Conclusions

When scrutinizing pre-industrial welfare in and beyond Finland, scholars often have to face the fact that on the basis of the data currently available we cannot attach income levels to every household. This concerns especially the lower section of income distribution. In order to measure and understand historical poverty, we therefore have to approach welfare indirectly.

In this article we used exemptions from two different taxes to study the social characteristics of the households considered poor in fiscal terms. Even if it may seem close to tautological, it needs to be emphasized that using of different taxes for these purposes yields different results. Exemption from household tax follows quite closely the *a priori* social demarcation lines, poll tax exemption on the other hand is less dependent on the household's social status. These results suggest that taxes levied on individual level were not necessarily dependent on the households' economic status, and similarly household level taxes may have partially been independent of the inhabitants' social and economic conditions.

Of the two taxes studied, the household tax is undoubtedly more useful as a poverty indicator, though not exactly a perfect measure. This is because, first of all, household tax is related to land tenure contracts which, even if indicative, is not necessarily connected to a household's welfare. Secondly, while those exempted include the majority of the rural underclass, notable sections of the rural gentry are also included. On macro level, however, the size of the gentry was small enough not to confound the regional aggregate rates (Table 1).

The results presented here suggest a clear connection between household tax exemption and lowest social groups. In this respect these findings concur with those from Sweden as presented by Vikström (2006, 232–33). As the lowest of social groups produced staple crops practically only for subsistence purposes, it is not surprising that the household tax (paid in grain) has a clear socioeconomic gradient. This contrasts with some of the previous considerations suggesting that tax exemptions were local interim solutions to occasional deprivation — the household tax exemption is clearly structural. The conclusion about the nature of household tax is in line with Goose's and Spufford's conclusions about the English hearth tax that it "can be used […] to indicate relative social status […] cannot be taken as a general guide to *levels* of wealth, even if it does faithfully reflect the *shape* of local social structures" (Goose 2001, 58, 59) and "may be used as a guide to status and wealth in general, it may not safely be used in any individual example" (Spufford 1962, 58).

In addition to the social group connectivity, the following can be concluded on Finnish poverty on the basis of the tax exemption data analyzed here. 1. Regardless of whether we used social groups or tax exemptions as a measure, households considered to be poor had considerably smaller mean household sizes. This was a result of a smaller number of under-aged children but also of the smaller number of adult men. 2. Households without an adult male, i.e., those headed by a woman, were very often exempted from taxes even when social group was taken into account. 3. The extraction of regional control variables did not affect the statistical significance of variables designating law-based exemption criteria or those reflecting social ordering. It thus seems that Finland was relatively homogenous with respect to tax legislation, which contradicts some assessments inclined to favor heterogeneous, locally constructed conventions. 4. The two tax measures used here are conditionally independent. That is, after controlling for a variety of social characteristics, exemption from one tax is not associated with an increased probability of exemption from another. This shows that these exemptions featured the overlapping poverty phenomenon, as suggested on the basis of English evidence e.g. by Arkell and King.

From a methodological point of view, the results presented here are in contrast to Lees' account that the "best that scholars can do today is to estimate an order of magnitude for the problem [regional differences and extent of poverty] and note large-scale variations over time" (Lees 1998, 45–46). Although the source critical dilemmas are far from resolved, it is reasonable to argue that, at least in the Finnish case, carefully used taxation records do have relevance in the assessment of poverty. While this relevance may be distorted by obscurities in regional practices and loopholes in the legislation, there is more to taxation than meets the eye, much of which does indeed serve as a reasonable source for assessing pre-industrial poverty.

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[3]

Feeding the famine. Social vulnerability and dislocation during the Finnish famine of the 1860s

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Feeding the Famine. Social Vulnerability and Dislocation during the Finnish Famine of the 1860s

Introduction

In recent years, it has been standard practice for accounts of the regular famines which occurred in pre-modern Finland to make a strong causal link between early autumn frosts with subsequent increases in mortality. A recent example is provided by Timo Myllyntaus, who in a 2009 article on the role of the natural hazard of summer frosts in pre-industrial Finland pondered why crop failures could "so easily cause a crisis in agrarian Finnish society."[1] This apparent and logical causal explanation has left Finnish famine history, and particularly the study of the 1860s famine period, centring largely around the themes of imminent mortality causation and coping strategies, therefore lacking closer scrutiny of quantitative structural analysis and usage of closed form economic theory and econometric modelling. Although this article does not seek to deny that repeated harvest failures were vital triggers, it argues that the Great Finnish Famine unfolded in considerable part because of the disintegration of societal structures and social institutions in response to those recurrent failures.

Regardless of the "disease versus hunger" debate surrounding bulk of research into famine mortality, the close connection between harvest failures and mortality increase has long been observed. For example, Fernand Braudel underlined in the 1960s that it required at least two consecutive bad harvests to spell disaster in a peasant society.[2] This stance is largely supported by the Irish economist Cormac Ó Gráda, who stresses that while famine-causing successive crop failures were rare, in the event that they did occur, they often turned out to be lethal.[3] The tradition and the basis of the Finnish debate have mainly been influenced by Eino Jutikkala's and Oiva Turpeinen's representation of famine mortality as an epidemiological phenomenon.[4] This has meant an emphasis on the peculiar punctuated nature of past food crises, prompting the conclusion that the 1867-1868 famine was effectively a coincidental occurrence – a disease outbreak in the wake of a random harvest failure.[5]

The past twenty years have brought a considerably more nuanced view of the Finnish crisis. Antti Häkkinen has emphasized the role of insufficient or misplaced poor relief.[6] Kari Pitkänen has demonstrated the extent of social dislocation and the interactive relationship between malnutrition and deadly infections.[7] Antti Kuusterä's research has stressed the role of the prevalent economic policy environment in explaining the governmental lack of action in relieving the famine.[8] Even within this context, two background factors have maintained a prominent position in this historiography: Arvo Soininen's conceptions about old "traditional" Finnish agriculture and its inability to cope with recurrent crop failures and long-term growth of inequality between the landless and the landowning agricultural population. [9]

The Great Finnish Famine of the 1860s was characterized by high mortality, even in comparison with several continental famines during the eighteenth and nineteenth centuries.[10] War-related mortality peaks aside, from the beginning of sixteenth century Finland experienced a handful of severe crises: the most significant ones occurred in

1542-1545; "The Straw Years" at the beginning of seventeenth century; the Great Famine of the 1690s; and the famines at the beginning of the 1740s and during the 1830s. In this context, the famine of the 1860s is typically seen as a blow at the last possible stage before modernization, either because it stimulated a transition from unproductive and inefficient agriculture to a more modern and industrialized society, or because Finland was later wealthier and vastly better equipped to counter such a natural calamity.

In general famine studies, the idea has become more accepted over the last couple of decades that a famine should be understood as an outcome of a long-term socio-economic process, that accelerates the destitution among some of groups in society to the point where their livelihood systems become untenable.[11] In the specific Finnish case, this of course begs the question as to whether 1860s Finland was a society in which frequent subsistence shocks inevitably led to a full-blown demographic cataclysm. Though Turpeinen has challenged the "deterministic" chronology of Finnish famine on a number of occasions, this article argues that the apparent "certainty" of the famine has to be understood in the context of the society in which such catastrophic mortality was possible in the first place. It is often considered that social structures of common help, lending, and of occasional governmental aid provided Finnish farmers and their labourers shelter through short-lived agricultural downturns. Pitkänen has stated that rural labourers (who often were to first to face the harsh conditions of an economic crisis) may not have fallen into immediate risk due to crop failures, provided that the landowners themselves were relatively well off.[12] This emphasizes the paternalistic side of a moral economy largely relevant during crop failures that were deemed "normal". According to Eric Vanhaute, famines triggered by harvest failures only occurred when societal institutions failed and the moral economy ceased to function.[13] This research therefore seeks to study *social vulnerability*: those social and economic structures that were at risk of disintegration after protracted stress, worsening the social status of the affected people, and subsequently contributing to famine-related excess mortality.

The article is structured as follows: first it outlines the theoretical framework of vulnerability and presents the debate over its measurement. The subsequent section uses novel data to estimate some aspects of the prevailing social structure before the outbreak of the famine and links this structure to the unfolding process. These findings are then summarised in the conclusion.

Understanding the Unfolding of Famine: The Role of Vulnerability and Social Dislocation

When the passenger liner RMS Titanic sank after colliding with an iceberg in April 1912, the resulting mortality was distributed extremely unequally among sexes and three passenger classes. A third class male passenger faced a mortality risk almost thirty times greater than a female travelling in first class. It would be absurd, of course, to claim that third-class men were somehow more biologically prone to drown than first-class women, but rather the latter group was socially favoured in terms of leaving the ship in life-boats, and hence were less likely to find themselves in life-threatening conditions of icy sea water.[14]

While the sinking of a ship is ultimately about water and famine essentially about food, and while a crisis develops through an aggregation of individual fates, the unfolding of the disaster in terms of loss of lives is determined beyond the mere subjective variables such as bundles of available resources or individual capacities.[15] In the event of a disaster, if an individual loses the possibility to retain the means of staying alive, the odds of getting them replaced (a place in a lifeboat, or food aid) is determined within the surrounding social context according to existing valuations. In order to gain analytical insight, we have to understand which segments of people are at the greatest risk to the particular set of environmental changes. At a very general level, this is captured in the concept of *vulnerability.* Because the possibilities, risks and resources assigned to individual's societal position are determined by larger conventions of social and institutional organisation, it is reasonable to talk about *social vulnerability* associated with disasters.

This chapter adopts the stance of 'livelihood literature' in defining famine as an event where numerous people's livelihoods simultaneously cease to produce sufficient nutrition, either directly or indirectly.[16] Furthermore, we propose that in the event of livelihood stress, social vulnerability refers *to the measure of an individual inability to maintain, re-establish or substitute a (lost) livelihood and in due process to avoid exposure to potentially hazardous socio-environmental conditions.*

This definition is not only practicable but also clarifies previous plural definitions and their inconsistent usage.[17] First of all this definition treats not only the disaster itself but also the vulnerability as dynamic and importantly as an evolving phenomenon affecting different individuals in various ways at different stages of the crisis. Secondly, this definition incorporates the concept of sustainability of livelihood, which in the Finnish context is naturally seen through the monoculture of grain production, resulting in high connectivity to an under-diversified ecosystem, often seen as a risk factor.[18] Thirdly, the definition includes social disintegration and allows it to increase the mortality risk of people trying to re-establish their food consumption, not only through increased risk of infections, but also through other factors such as the increased threat of physical violence. From the perspective of an individual, the crisis chronology thus follows a path where it is initially impossible to maintain an existing livelihood (subsistence shock); it is subsequently not possible to re-establish that livelihood; and eventually it remains impossible to substitute for it (i.e. from an absence of or shortfall in aid). Transition from one phase to another coincides with a deterioration of the socio-economic environment.

It is widely supposed that malnutrition associated with deep structural poverty persistent in many historical peasant populations even in the times of relative plenty, helped swell the heavy death tolls when crop failures struck.[19] There are reasons to believe that in pre-industrial societies there was always some proportion of people living under the poverty line and hence suffering from (at least) seasonal hunger, though a subsistence economy does not imply starvation, *per se*.[20] In this setting, it is important to acknowledge that although vulnerability and poverty are closely associated, they are far from being identical: the poor may be vulnerable but vulnerable do not have to be poor. Karl Marx made the quip that the Irish famine of the 1840's killed "poor devils only", reflected in the longstanding analogy that famines are like ripples in water, and those with noses closest to the surface drown first.[21] While famine necessarily requires starvation to occur, the opposite may not be true: starvation can only occur in prevalence of poverty, but poverty may not necessarily lead to starvation.[22] In this regard, Joel Mokyr has warned that circular reasoning ("a land starves due to its poverty and is poor because it starves") can underpin assessments of famines, economic development and prevailing deprivation.[23]

While poverty forms a problematic independent variable in explaining food crises, it also presents a conceptual challenge when applied to historical events. In a situation where a lack of health care, social security and welfare commodities created significant upward mortality risk for anyone losing the access to their livelihood, using the concept of poverty (as it is understood today) is clearly ambiguous.[24] To elaborate on this, although mortality rates could vary between social classes, conditional mortality rates (conditioned with disease or disability of some kind) may not have. Thus, what should be emphasized is the risk of being "conditioned" and the consequent risk of facing possible outcomes (such as death) due to this condition. Social class differences in famine mortality can be interpreted reflecting this conditioning tendency. Of empirical studies focusing explicitly on mortality differences, Kari Pitkänen has provided evidence from the 1860s Finnish famine which demonstrates that, regardless of whether the region under investigation was devastated by crop failure, rural workers faced a substantially larger increase in mortality when compared with land-cultivating farmers. Marc Klemp and Jacob Weisdorf suggest that social differences in famine deprivation can also have long-term health effects. According to their results from 1720s England, only individuals born during the famine to families of a lower socio-economic rank suffered a substantially increased long-term death risk in comparison to the post-famine control group.[25] Using Malian data, Allan G. Hill reports above average mortality rates in among those groups engaging in migration to urban areas.[26] Furthermore, evidence gathered from Darfur's 1984-1985 famine led Alex de Waal to conclude that "it is not the undernutrition caused by the famine but the social disruption caused by it that is critical in causing excess deaths."[27]

In order to gain a more coherent picture, is it necessary to highlight de Waal's suggestion that we should ultimately abandon the concept of famine as necessarily involving mass starvation unto death, and instead consider famines as a virulent form of poverty. In this construction, famines are not *caused by* group of individuals falling to poverty, rather famines *are* situations marked by widespread acute poverty.[28] Allan G. Hill's findings are worthy of consideration here. According to Hill, the prevailing high base-line mortality of a social group is a symptom of low-income social status. In this reasoning, famine is a situation where noticeable proportions of people with higher social status succumb among the poor and subsequently face a higher mortality risk, translating to an increase in death tolls on the macro level.[29] This process is what is generally considered as social dislocation: *people move from a pre-crisis social position to one where they are at a higher mortality risk*. In the case of Finland, Pitkänen has estimated that social dislocation (as manifested through migration from regions experiencing crop failure) could account for up to 70 % of excess mortality during the crisis.[30] Turpeinen emphasizes the same phenomenon, with the juxtaposition of disease and deprivation explanations.[31] We perceive vulnerability and social dislocation being causally entwined: social dislocation should *a priori* work its way through the socioeconomic structure in the order of social group vulnerability. The first group affected is the one at immediate risk due to the occurrence of a hazardous event (such as crop failure), the following groups either due to prolonged economic depression, or by social turmoil resulting from other groups losing ground. This brings the focus of research to the very moment when social disruption becomes a social collapse, that is when coping strategies break down, and the possibility of preserving (at least the main features of) a previous way of life vanishes.[32]

The identification of social dislocation as a critical background factor of famine mortality is only a small proportion of the story, and often a trivial task; the larger dilemma is identifying the pre-famine vulnerable groups. The definitional plurality of the vulnerability concept has in turn led to diverse methods of its measurement, obfuscating the task of identification.[33] The generic methodological solution is reliance on a more or less explicit assumption that statistically constructed composite indicators and the actual underlying vulnerability structure correlate positively; the higher the score of the indicator, the more of a certain type of vulnerability it measures. Deducing vulnerability from this kind of reasoning is straightforward enough, but entails a crucial, yet untangled assumption: in order to have a crisis, an outbreak must take place along these *a priori* social fault lines. In a historical situation it is relatively easy to come up with various rationales that, for example, economic inequality might have an equivocal contribution to famine vulnerability; under some conditions inequality may be beneficial (not everybody in a community need be affected by a catastrophe, and so the sufferers might have someone to call on for help), under some others it may yield devastating results (those unaffected refuse to help). The question of effect-dominance rises, possibly in an unresolvable manner, displaying the inherent non-linearity in the socio-economic settings: similar conditions may not cause social cataclysm in the absence of some crucial catalysts or other interactive variables. We may have found some aggregation of variables, which yet may not necessarily qualify as measures of vulnerability, or even contextually defined poverty.

The methodological solution put forward here, is to search for societal constraints and to study the unfolding of the crisis with respect to spatially defined socioeconomic environments. Only then should we be able to tell something about the genuine vulnerability structure prevalent prior to the catastrophe.[34] This is close to the so-called "vulnerability of places" approach, which emphasizes the interplay between the prevalent (contextually independent) socio-economic environment and vulnerability's time and place specific characteristics, taken here a step further to reveal disparities in the outcome of the crisis.[35] At this stage, it is worthwhile highlighting that Alwang, Siegel and Jorgensen stress that *ex post* welfare losses are neither necessary nor sufficient for the existence of *ex ante* vulnerability.[36] While this is unquestionably true, to avoid the historio-philosophical bog of counterfactuality, it does seem reasonable to focus on past cases where vulnerability did become measurable, i.e. visible.[37] Credible historically based famine analysis must be built upon theoretical knowledge of the socio-economic mechanisms leading to starvation, but it ultimately rests in an understanding of the different variables playing an important role in the society and famine in question.

Empirical Findings

The cataclysmic mortality surge of the winter 1867-8 had been a long time coming. Gradual economic growth in Finland from the end of the 1830s until the early 1850s was cut short by the Crimean War and by a smaller-scale famine in 1856-57. Instead of returning to a path of shaky growth, economic conditions gradually deteriorated, culminating in four bad harvests during the 1860s: of the crop failures in 1862, 1865, 1866 and 1867, only the one in 1866 was regionally confined (to western parts of the country), all others effectively plaguing the whole of Finland.[38] In the absence of economic growth, better individual harvest years in between could not correct the structural basis of the deteriorating poverty: by the spring of 1866 the demographic responses to the economic downturn were clearly visible.[39]

Previous literature provides a good primer for theorizing the nature of the prevalent structures, and displays the potential *a priori* vulnerable groups. The crucial ingredient in the famine threat prior to the actual outbreak of the crisis in 1867-8 was tied to widespread dependence on grain production, extent of which greatly influenced the subsequent social-group-specific mortality: through either crude food unavailability or from the effects of social stratification and from the malfunctions in moral economy. These differences are duly reflected in the famine chronology: how far had the famine to develop in order to force yet another group to succumb, and how long could social structures remain intact in these circumstances. According to Pekka Haatanen's classic inquiry into mid-1800s rural Finnish poverty, the group of major concern was the large landless population with low living standards, characterized by persistent and intergenerational poverty.[40] Furthermore, this high-risk group was supplemented by the sick and disabled, and those already living in destitution and using poor relief in normal harvest years, severely affected by further decreases in their food intake. The second of the risky groups is formed from those facing an exogenously sustained livelihood. These consist of small-scale (subsistence) farmers and seasonal agricultural labourers, their labour supply unrequired if there should be no crops to harvest. The third group is formed from a variety of rural labourers, such as artisans, servants etc., whose employment opportunities closely follow the availability of disposable income in the upper social strata. Then there are, of course, the groups resorting to market purchases of staple food affected by high inflation of food prices during the crisis. The actual importance of this group is somewhat unclear: the pre-industrial markets were far from complete, and the vast majority of grain never got supplied to markets, thus causing market price variation to reflect poorly the actual extent of variance of purchasing possibilities.[41]

For the purpose of this study, information concerning various kinds of explanatory variables was collected: income level, income inequality, and several social variables. The statistical unit used here is a township (*pitäjä*), of which there are 251 in the area of research. The whole country is included in the analysis, excluding only the province of Viipuri in the southeast and the district of Lapland due to a lack of data. Income data was compiled using information obtained from income tax (*suostuntavero)* collected in 1865. The classification of taxpayers into different income groups allows us to use this data also to calculate prevailing income inequality.[42] Due to the structure of society and women's position in the labour markets, technically only men were responsible for paying the income tax and hence it is households that can be considered being the unit of taxation. This allows us to calculate household-level income, which is clearly a better measure of social entitlement than individual income.[43] Household count, tax exemptions, and population information is obtained from poll tax registers (*henkikirja*). These registers were originally composed to track and list taxpayers, but they provide valuable information concerning economic and societal conditions.[44] Turpeinen has published parish-level mortality rates and population counts, which are used in subsequent analysis.[45]

TABLE 1 Township-level variables of interest

Variable	Mean	Standard deviation	Min.	Max.	N
Exemption from household flat tax (rate) (1865)	0.26	0.16	0.01	0.69	251
Households per capita (1865)	0.17	0.04	0.08	0.25	251
Exemption from poll tax (persons, rate) (1865)	0.07	0.06	c. 0.00	0.50	251
Income per household (1865)	500.33	158.86	276.70	1228.70	251
Gini coefficient (1865)	0.58	0.12	0.19	0.84	251
Income-taxed households (rate) (1865)	0.25	0.15	0.03	0.71	251
Township population (1865)	5328.9	3996.20	168.00	27529.00	251
Sum of township population (1866-1868)	16684.2	12647.20	519.00	93142.00	243
Excess mortality (1866–1868)	476.6	4484.00	13.00	3325.00	243
Pre-famine average yearly mortality (1861–1865)	139.2	110.00	5.20	777.40	243

Sources: Poll tax registers (1865), SVT IV (1875), O. Turpeinen, Nälkä vai Tauti Tappoi? Kauhunvuodet 1866-1868 (Helsinki: Societas Historica Finlandiae, 1986), 149.
Note: Year(s) of coverage in parentheses. Statistical unit: township

Factor and principal component analysis have remained the most frequently applied methods for extracting vulnerability estimates in a multivariate setting.[46] We applied the latter, yielding two components together counting a high 84.2 % of variable variance, but encountered the interpretation problem noted previously: both ends of both components *a priori* correlate positively with underlying vulnerability. In the first component, positive scores reflected large households able to pay the taxes levied, but simultaneously characterised the eastern part of the country and an area of scattered land ownership, associated with large numbers of agricultural labourers and landless people. The negative scores demonstrated the western pattern of high numbers of unviable farms and relatively low income per household. The second component, displaying the patterns of inequality within and between the households, produced similar ambivalence in interpretation: inequality and vulnerability are difficult to link to one another in a linear fashion.[47]

Because of these, we proceeded with cluster analysis. Sharma and Patwardhan have advocated the use of cluster analysis in vulnerability studies on the basis that it provides nominal instead of continuous information. They state that there is actually no direct means of interpreting the differences between two statistical units with respect to continuous measure.[48] While these two can be ordered (i.e. a measure is quantitatively larger in the other one), there is however no indication that this *ex ante* difference actually means any divergent behaviour in a hazardous event. On the contrary, the proposed clustering can reveal qualitative differences in the regional social structure and hence pinpoint geographical patterns in the extent and nature of vulnerability.[49]

TABLE 2 Estimated two-step clusters

	(1)	(2)	(3)	Whole country
Households per capita	0.20 (0.024)***	0.17 (0.027)	0.11 (0.020)***	0.17 (0.041)
Flat tax exempted households	0.37 (0.135)***	0.17 (0.083)***	0.11 (0.095)***	0.26 (0.163)
Gini coefficient	0.64 (0.077)***	0.44 (0.088)***	0.6 (-0.092)	0.58 (0.116)
Income per household	472.06 88.31)***	377.92 (53.66) ***	683.67 181.87)***	500.33 (158.86)
Income taxed households	0.22 (0.100)***	0.15 (0.087) ***	0.43 (0.128)***	0.25 (0.148)
Number of townships	125	64	62	251
Population in 1865	531388	393152	413008	1337548

*Estimated cluster means reported, standard deviations in parentheses. T-test is used to measure the significance between the differences of cluster and population mean. *** - denotes significance at 1 % level.*

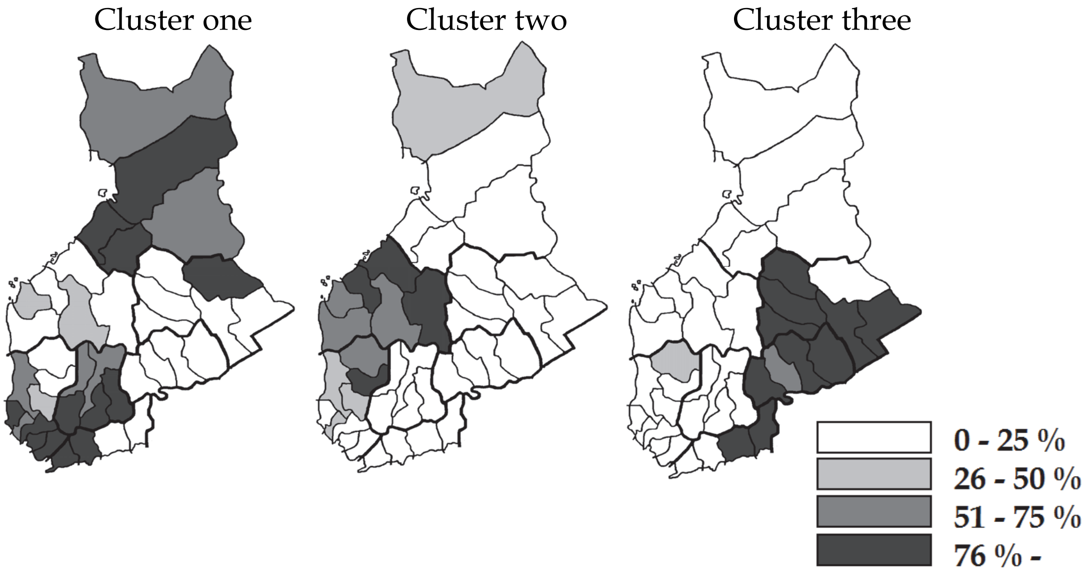
There is a wide range of methods suitable for this kind of task, but due to several well-known shortcomings in generally used clustering algorithms, and because of the sizable sample of statistical units, we applied the so-called "two step" clustering to categorize cases to sub-groups.[50] This cluster procedure, as implied by its name, consists of two phases. In the first stage, cases are pre-clustered into several small groups, then in the second stage a hierarchical procedure is conducted in order to form a large cluster from these small ones.[51] Of the two available distance measures, Euclidian and log-likelihood, the latter was applied to ensure a probability-based estimation. Unlike several clustering methods, which rely on researchers' opinion concerning the number of clusters, two-step procedure produces statistically defined "optimal" number based on information criteria. Three clusters were obtained using Bayesian information criterion (BIC), Akaike's information criterion produced no qualitative difference to the results obtained.

TABLE 2 reports clusters extracted with two-step analysis using pre-famine data from 1865. All variables of interest loaded significantly at least to two of the clusters. The first cluster consists of 125 townships (49.8 %), shown in MAP 1. As reported in TABLE 2, a cluster is characterized with an above average number of households per capita ($p<0.001$), and simultaneously significantly a higher number of households exempted from flat tax ($p<0.001$). The average share of households paying income tax is less than in the whole country ($p<0.001$), and the income distribution is more skewed than in general ($p<0.001$). This is mainly due to the relatively thicker right-hand tail of the income distribution. Regionally, townships allocated to this cluster prevail in Southern Finland, in Western Uusimaa and Southern Häme, in Finland Proper and in Northern Ostrobothnia and Kainuu.

The second cluster includes 64 townships (25.5 %), mainly from Middle Finland, Middle Ostrobothnia and from the region of Satakunta. This cluster features below average Gini coefficient ($p<0.001$) and below average household income ($p<0.001$). The vast majority of households were exempted from income tax ($p<0.001$), but more often than on average paid the household specific tax ($p<0.001$). Townships in this cluster are categorized as being evenly poor.

The third cluster prevails in Eastern Finland; in provinces of Kuopio and Mikkeli, but also in Eastern Uusimaa. This cluster is made of 62 townships (24.7 %), which are characterized by a high rate of income ($p<0.001$) and flat taxed ($p<0,001$) households. Townships feature below average household per capita ratio ($p<0.001$) that is, households are of larger size and with above average income per household ($p<0.001$). These do not, however, imply eastern households being large and wealthy. The social structure prevailing in Eastern Finland only displays another form of social stratification: in Western Finland the inequality was mainly *between* households, thus *horizontal*, whereas in Eastern Finland the inequality is located also *within* the household, thus more of *vertical* type. Population pressure levied on households is higher in the third cluster than in the two previous ones, signifying the apparent feature of inequality in decision power concerning agricultural output and inequality in its intra-household distribution.[52]

We also compared these results to ones obtained with K-means clustering, using standardized values of the variables and setting the cluster number to three as indicated by the two step algorithm. This provided no qualitative difference in the results obtained: cross-tabulation of the clustering solutions had 90.4 % of its elements in the diagonal with agreement measuring kappa-coefficient a high 0.851 ($p<0.001$). The K-means cluster solution provided higher entropy relation ($H/H_{max}=0.976$) than the two-step procedure ($H/H_{max}=0.948$), which is expected, since K-means clustering tends to produce cluster closer in size.



MAP 1: Spatial distribution of clusters. Townships in administrational districts (%)

Sharma and Patwardhan use vulnerability impacts (cumulative death toll) in the clustering sequence. We contend that response should not be included in the clustering phase: cluster analysis cannot be used in causal inference, i.e. due to missing variable bias, certain clusters can erroneously be interpreted as displaying an underlying relation between pre-crisis and manifested variables. If clusters represent different aspects of spatial social structure, we propose the usage of the clustering solutions as sub-samples to reveal disparities between relations of independent and dependent variables. On the basis of the vulnerability framework, we should detect empirical evidence favouring the following two hypotheses: 1. relationship between famine mortality and independent variables should differ between clusters; and 2. explanatory variables with statistically significant loadings should reflect the cluster-specific vulnerability structure: famine cannot happen without certain catalytic conditions embedded in the fabric of society. In other words, subsistence crises reinforce social patterns that already exist.[53]

Violetta Hionidou has suggested that a disease-prone environment coupled with social disintegration creates epidemics-driven famine mortality like that observed in the 1860s Finland.[54] A key feature of the famine period in Finland was the out-migration of destitute people from regions ravaged by the crop failures.[55] Methodologically, this suggests that we should seek to understand the factors behind throngs of people *simultaneously* abandoning their places of residence. Furthermore, it indicates that the severity of the famine is ultimately dictated by the extent of social breakdown; not in relative terms, but in individuals spreading the deprivation in their wake (thus highlighting the “virulence of poverty” idea embedded in the works of de Waal and

Hill). A logical way to implement this is to study the famine mortality using count instead of proportional data. Usage of relative proportions (mortality rates) implicitly incorporates the idea that famine-escalation follows a linear and continuous process, when actually an estimated average increase in regional mortality rates due to a unit increase in dependent variable could effectively result in a highly heterogeneous response in mortality counts and miss the relationships important for the famine-escalation on larger scale. This is enforced by the rationale that high mortality rates in regions with only a handful of inhabitants could scarcely spread the crisis to neighbouring regions, whereas extensive harvest failures even if manifested in low mortality rates in populous regions could easily produce a mass out-migration and hasten the deterioration of living conditions also in the surrounding areas.

From the technical side, according to Osgood, applying OLS regression (or its variants) to incidence rate data should frame the population of comparison as large relative to the number of events. If this is not the case, the discrete nature of events cannot be ignored, because for a population of a few thousand even an addition of a single event corresponds to a substantial increase in the rate.[56] Count data approach has been applied in recent famine studies but without any explicit theoretical rationale.[57]

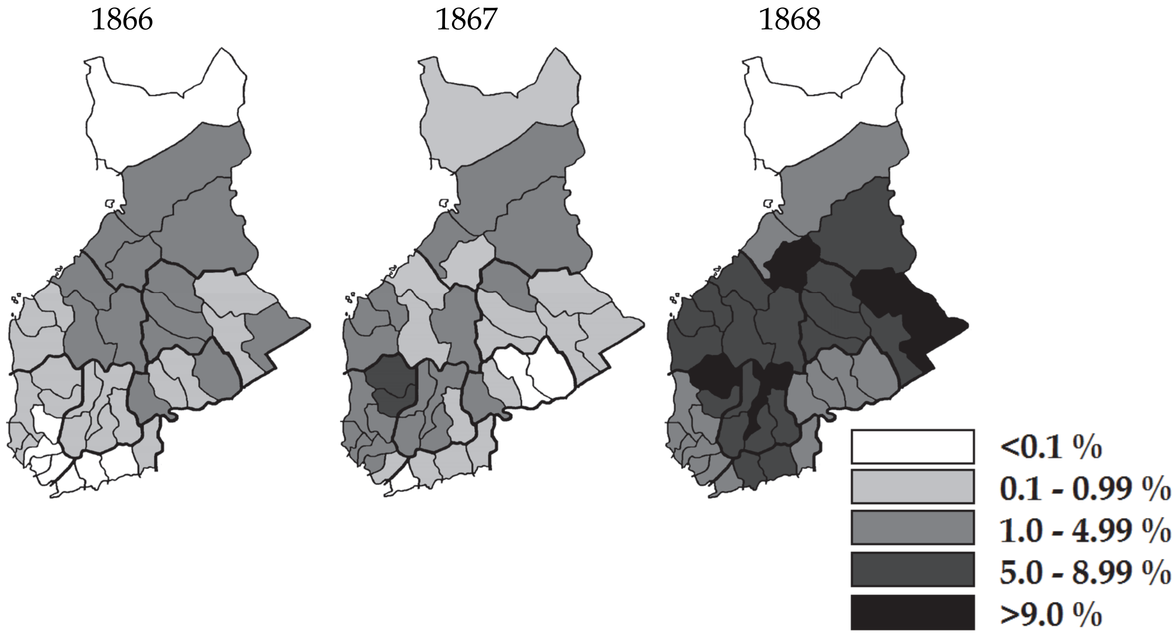
A useful property of Finnish mortality statistics aids in tracking the regional social risk: in principle deaths had to be reported to the parish of residence. Though it is obvious that registration of deceased most likely deteriorated during the crisis, this convention still provides us an explanatory variable of location-specific mortality and through statistical analysis an insight into the question about the local structures subjecting people to out-migrate, giving rise to the *mass* mortality observed.

When we inspect the spatial distribution of famine mortality during the 1860s (MAP 2), it becomes vividly clear that death took its toll well beyond the peripheries of North-East Finland. Mortality levels show significant surges in Satakunta, Southern Ostrobothnia, Häme and Western Uusimaa and yet for a long time no apparent increases in Eastern Finland. According to regression results conducted by Pitkänen, variables indicating the importance of social structure had no significant explanatory value in analysing regional excess mortality, while income and price variables and grain dependence did contribute to an explanation of excess mortality rates.[58] Count regression model results fitted to township level data are reported in TABLE 3, where the dependent variable is the total excess mortality for the famine period (1866-1868) in each township.[59] As the variance of the dependent variable exceeds its mean, we applied negative binomial regression design to handle over-dispersion, instead of the generic Poisson regression. The choice is verified in all four models reported, with highly significant likelihood test ratios. Furthermore, because all of the observations of the dependent variable are positive, we apply zero-truncated model. As there is reason to believe that a larger base-population could result in a higher number of famine victims, we use the sum of township population as an exposure variable. We run four separate models, each with a different sample: the first included every township, the last three townships assigned to each cluster.[60] We did not observe any significant spatial clustering of residuals, implying that the impact of potential spatial autocorrelation should not form a serious bias to the results.

TABLE 3: Zero-truncated negative binomial regression results for township-level excess mortality

Model	(1)	(2)	(3)	(4)
Constant	-3.939 (<0.001)***	-3.203 (<0.001)***	-1.842 (0.257)	-8.247 (<0.001)***
Households per capita	-3.387 (0.005)***	-4.966 (0.014)**	-8.234 (0.009)***	-1.609 (0.567)
Exemption from poll tax (rate)	0.921 (0.091)*	2.256 (0.144)	6.392 (0.009)***	0.605 (0.155)
Exemption from household flat tax (rate)	0.916 (0.004)***	0.869 (0.023)**	0.151 (0.921)	-0.198 (0.738)
Proportion of children under 16 years (rate)	1.629 (0.176)	-2.267 (0.203)	0.918 (0.657)	11.211 (<0.001)***
Average income per household	0.00001 (0.981)	0.0004 (0.705)	-0.003 (0.646)	-0.001 (0.143)
Income taxed households	-0.488 (0.193)	0.017 (0.980)	0.277 (0.904)	0.240 (0.707)
Gini coefficient	-0.596 (0.196)	0.981 (0.985)	0.478 (0.844)	1.772 (0.039)**
Crop failure in 1865 (dummy)	0.204 (0.012)**	0.396 (0.001)***	-0.107 (0.518)	-0.127 (0.291)
Crop failure in 1866 (dummy)	0.378 (<0.001)***	0.216 (0.049)**	0.408 (0.009)***	-0.001 (0.996)
Crop failure in 1867 (dummy)	0.377 (<0.001)***	0.535 (<0.001)***	-0.262 (0.389)	0.226 (0.058)*
Sample	All	Cluster one	Cluster two	Cluster three
N	243	120	62	61
Log-likelihood	-1567.79	-727.95	-419.80	-380.97
P-value for likelihood ratio test, $\beta_i=0, \forall$ i	<0.001	<0.001	0.0045	<0.001
P-value for likelihood ratio test $\alpha=0$	<0.001	<0.001	<0.001	<0.001
Pseudo R^2	0.0242	0.0374	0.0295	0.0611

Dispersion: mean. Dependent variable: township-level excess mortality, count. Exposure variable: sum of township-level population 1866-1868, count
*Zero-truncated negative binomial regression, coefficients reported in incidence rate-ratios. *** - denotes statistical significance at 1 %, ** - at 5 %, * - at 10 % level. P-values in parenthesis.*



MAP 2: Excess mortality in administrational districts. Crude mortality in comparison to average of 1861-1865

The first model reports the findings based on the whole country sample of 243 rural townships. Three social variables have a statistically significant effect to excess mortality. Increase in the number of households corresponds to decrease in famine excess mortality. We do not report the result from inverse measure (mean household size) as households per capita is a convenient of interpreting the distribution of food entitlement in the population: even small-scale farmers were relatively better-off than seasonal workers and farm-hands. The positive mortality impact of exemption from household flat tax brings the other side of subsistence farming to the fore: regions where farms were unable to pay this household level tax were subject to higher excess mortality. Farming-based food entitlements thus include a qualitative difference: to ensure subsistence, farms had to be productive enough. As is evident from model (2), households exempted from this tax only associated positively in the first cluster, where the number of households per capita was the highest. This implies that the average increased ability to establish one's own household resulted in a larger variation in average household viability. Because the Finnish government did not provide extensive aid, township level incomes can be considered as proxies for local possibilities for famine relief. The lack of statistical significance of income level variables in explaining mortality patterns can be interpreted as emphasizing the household level entitlements, enforcing the connection between viability of agriculture and its sustainability.[61]

A higher exemption rate from poll tax is also associated with higher mortality levels. The whole country sample features significance at 10 % level, resulting from a highly significant relationship in the second cluster (p=0.009). According to Tukey HSD post-hoc comparison, the first and the second cluster do not differ statistically in terms of the poll tax exemption rate ($p=0.980$), yet the rate is significantly higher in the third cluster than in the other two ($p<0.001$). Why then is the contribution positive only in the second cluster? As was evident from TABLE 2, the second cluster was characterized by above-average equality but among low-income households. Those exempted from the poll tax were often poor, sick and deprived even in normal harvest years and the lack of communal resources could have turned into inability to provide people with shelter for the whole course of protracted livelihood stress; i.e. the few resources available were hastily dispensed, forcing people to re-migrate and prolong the exposure to hazardous conditions. These results back the previous accounts of the famine-induced migration from regions suffering from earlier crop failures, especially the northern parts of southwest Finland (i.e. Satakunta) and western coastal area of Ostrobothnia.[62]

Inequality-measuring Gini coefficients associate positively with excess mortality in the third cluster, as does the proportion of children under the age of 16. The fact that the Gini coefficient is not joined with a statistically significant increase in mortality in other clusters suits the vulnerability interpretation: high inequality translates to a high concentration of labour demand. When the crisis then escalated to the point where farms had to lay off their seasonal labourers, it most likely happened simultaneously throughout the farming sector within third cluster, leading to an abrupt increase in unemployment and radically diminishing opportunities for re-employment. From the perspective of survival, these kinds of conditions furthermore translated to decreased possibilities of finding even a temporary place of shelter or food aid: when farm labourers were laid off, they consequently became socially dislocated.

The positive effect of proportion of children furthermore suggest that instead of laying-off only a handful of people, farm owners deported whole families. If the positive association of the children's proportion would only captured their higher risk of death due to infectious diseases the variable should also show a positive association with excess mortality in other clusters. As it does not, we propose that the hazardous socio-environmental factors dominated in the third cluster of Eastern Finland, whereas a mere inability to re-establish a lost livelihood prevailed in the first two. These also hint that the crisis escalated rather abruptly in the East forcing throngs of people simultaneously to seek relief, leaving children especially vulnerable, in contrast to the more steadfast process in the Western parts of the country. This interpretation is also in line with regional and intertemporal patterns of excess mortality displayed in MAP 2.

Conclusion

This article was constructed in order to estimate the extent and nature of social vulnerability prior to the famine outbreak and its association with regional excess mortality rates. According to the results presented here, we assert that the prevalent pre-famine vulnerability was multidimensional and led to sequential, even nonlinear famine escalation as opposed to linearly worsening living conditions of landless rural poor. The collapse of one population segment's livelihood increased stress in others, enforcing the positive feedback, ultimately leading to a mortality catastrophe during the winter of 1867/1868.

Country-level excess mortality remained fairly low until the autumn of 1867, when the subsistence crisis intensified to a full-blown famine.[63] This has led previous literature to emphasize the impact of near complete harvest failure of 1867 as the obvious culprit. And yet, objections remain. The regression results reported above do indicate that while crop failures contributed to regional patterns of excess mortality, that in isolation they really do not provide a thorough understanding of how the famine unfolded within different parts of the country and with what kind of qualitative characteristics. There are also results available based on cohort specific life-expectancy suggesting that even the longer definition of the famine period (1866-1868) could be considered too short, not supporting a clear cut punctuation of crop failure induced mortality increases.[64]

While we operate on aggregate scale, we contend that there existed at least three different population groups that were severely vulnerable not only to crop failures *per se* but also to long-term economic deterioration and subsequent social upheaval. Population segments suffering from chronic poverty were the first to face troubles, followed by agricultural labourers and subsistence and small-scale farmers. The groups facing social dislocation in later phases of the crisis could in fact be worse off (i.e. were quicker to face higher mortality risk) than those getting into trouble in the first years of the famine. Not only were the disease conditions much harder at the pinnacle of the famine, but also interregional migration had been exhausting resources for quite some time (for years in some parts of the country) and degrading the moral obligation to help. Häkkinen has stated that during the winter of 1867-1868 the solidarity and humane approach applied at local level turned (at least at face value) distinctly to a more concentrated and "inhumane" policy driven by governmental requirements. The famine also displayed the inherent risks prevailing in a vastly unequal society: though with many individual exceptions, the farmers as a group were rather reluctant to organize aid.[65]

What then can be concluded from the famine-proneness of Finland in the 1860s? It is worthwhile emphasizing that there existed population groups which were vulnerable to even one-off harvest failures of even the smallest scale. This is apparent from the mortality increase of the famine in 1850s and in the beginning of the 1860s. But the identification of this group is clearly insufficient in describing the mortality patterns of autumn 1867 onwards. Pitkänen has advocated using mortality's male-bias as a form of yardstick measuring the extent of social collapse associated with the subsistence crisis. According to him, it is only the most extensive and subsistence-related famines where mortality clearly discriminates between sexes, leaving males in disadvantaged position, as did happen in Finland during the famine of the 1866-1868.[66] His results back the interpretation put forward here: social collapse during the famine was a crucial ingredient in the extent of the crisis.

In spite of data deficiencies, i.e. the lack of longitudinal nature on the independent variables, this study backs previous socially focused interpretations by presenting clear socioeconomic determinants of the regional mortality counts. Our findings presented here re-emphasize that the study of the 1860s Finland can be fruitful in global historical famine research, particularly because of the availability of extensive data, which allows us to dig deeper into the crisis than what is possible for several other pre-industrial famines. These findings can help us to understand not only the formation of crisis in agricultural economies of the past but also to detect vulnerabilities of modern famine-prone regions, hence furthering the causal investigation of mortality risks inherent in prevailing socioeconomic contexts.

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[1] Timo Myllyntaus, "Summer Frost: A Natural Hazard with Fatal Consequences in Pre-Industrial Finland," in *Natural Disasters, Cultural Responses: Case Studies Toward a Global Environmental History*, ed. Christof Mauch & Christian Pfister (Lanham: Lexington Books, 2009), 90.

[2] See, e.g. Fernand Braudel, *Capitalism and Material Life, 1400-1800* (New York: Harper & Row, 1967), 38.

[3] Cormac Ó Gráda, "Making Famine History," *Journal of Economic Literature* 45 (2007), 7-9.

[4] See in particular Oiva Turpeinen, *Nälkä vai Tauti Tappoi? Kauhunvuodet 1866–1868* (Helsinki: Societas Historica Finlandiae, 1986); Eino Jutikkala, *Kuolemalla on Aina Syynsä. Maailman Väestöhistorian Ääriviivoja* (Porvoo: WSOY, 1987); Eino Jutikkala "Katovuodet," in *Suomen Maatalouden Historia I. Perinteisen Maatalouden Aika: Esihistoriasta 1870-luvulle*, ed. Viljo Rasila, Eino Jutikkala & Anneli Mäkelä-Alitalo (Helsinki: SKS, 2003), 504-514.

[5] That is, crop failures happened alongside the simultaneous presence of lethal endemic diseases. For this analysis in relation to 1840s Ireland, see Joel Mokyr, *Why Ireland Starved? A Quantitative and Analytical History of the Irish Economy 1800-1850* (London: George Allen & Unwin, 1981), 261-262.

[6] Antti Häkkinen, "Vaikuttivatko Väärät Hätäaputoimet Vuosien 1867-1868 Suureen Kuolleisuuteen?" in *Pane leipään Puolet Petäjäistä - Nälkä ja Pulavuodet Suomen Historiassa*, ed. Petri Karonen (Jyväskylä: Jyväskylän Yliopisto, 1994), 77; Antti Häkkinen & Jarmo Peltola, "On the Social History of Unemployement and Poverty in Finland, 1860-2000," in *Down From the Heavens, Up From the Ashes: The Finnish Economic Crisis of the 1990s in the Light of Economic and Social Research*, ed. Jorma Kalela, Jaakko Kiander, Ullamaija Kivikuru, Heikki A. Loikkanen & Jussi Simpura (Helsinki: Valtion Taloudellinen Tutkimuskeskus, 2001), 311. This interpretation also surfaces in Cormac Ó Gráda, "Markets and Famines: Evidence from Nineteenth Century Finland," *Economic Development and Cultural Change*, 49 (2001).

[7] Kari J. Pitkänen, *Deprivation and Disease. Mortality During the Great Finnish Famine of the 1860s* (Helsinki: Suomen Väestötieteellisen Yhdistyksen Julkaisuja, 1993), 112–113

[8] Antti Kuusterä, "1860-luvun Epäonnistunut Talouspolitiikka," in *Nälkä, Talous ja Kontrolli: Näkökulmia Kriisien ja Konfliktien Syntyyn, Merkitykseen ja Kontrolliin*, ed. Kari J.Pitkänen (Helsinki: Helsingin Yliopisto, 1987).

[9] Arvo M. Soininen, *Vanha Maataloutemme: Maatalous ja Maatalousväestö Suomessa Perinnäisen Maatalouden Loppukaudella 1720-luvulta 1870-luvulle* (Helsinki: SHS, 1974). See also Häkkinen & Forsberg in this volume.

[10] Paradoxically the Finnish famine is also one of the less-known famines in the international literature, while the Great Irish Famine, occurred a couple of decades earlier, is most likely the best known. Joel Mokyr goes on even to state that the Irish famine is "the last great European natural disaster" and "the last large-scale natural demographic disaster to strike Europe." Mokyr, *Why Ireland Starved*, 262, 275.

[11] Peter Walker, *Famine Early Warning Systems: Victims and Destitution* (London: Earthscan, 1989), 9

[12] Kari J. Pitkänen, "The Patterns of Mortality During the Great Finnish Famine in the 1860s", in *Acta Demographica 1992*, ed. G. Buttler, G. Heilig & G. Schmitt-Rink (Heidelberg: Physica-Verlag, 1992), 85.

[13] Eric Vanhaute, "From Famine to Food Crisis: What History can Teach us about Local and Global Subsistence Crises," *Journal of Peasant Studies*, 38 (2011), 60.

[14] Elinder and Erixson point out that Titanic is actually exception to the rule: women typically faced higher mortality risk in maritime disasters. See Mikael Elinder & Oscar Erixson, "Gender, Social Norms,

and Survival in Maritime Disasters," *Proceedings of the National Academy of Sciences*, 109 (2012), 13220-13224.

[15] Martin Ravallion, "Famines and Economics," *Journal of Economic Literature*, 35 (1997), 1205; Ó Gráda, "Making Famine History", 5.

[16] See, e.g., Amartya Sen, "Ingredients of Famine Analysis: Availability and Entitlements," *Quarterly Journal of Economics*, 96 (1981), 433-464.

[17] Baro & Deubel also point out that "vulnerability mapping tends to be descriptive. It is important to add an analysis of causality within the framework." Mamadou Baro & Tara F. Deubel, "Persistent Hunger: Perspectives on Vulnerability, Famine and Food Security in Sub-Saharan Africa," *Annual Review of Anthropology*, 26 (2006), 527.

[18] Evan D.G. Fraser, "Food System Vulnerability: Using Past Famines to Help Understand how Food Systems may Adapt to Climate Change," Ecological Complexity, 3 (2006), 328-335.

[19] Pitkänen, *Deprivation and Disease*, 9; David Arnold, *Famine: Social Crisis and Historical Change* (Oxford & New York: Basil Blackwell, 1988), 54.

[20] Gregory Clark, *A Farewell to Alms: A Brief Economic History of the World* (Princeton: Princeton University Press, 2007), 23.

[21] Cormac Ó Gráda, *Black '47 and Beyond: The Great Irish Famine in History, Economy and Memory* (Princeton: Princeton University Press, 1999), 10.

[22] Amartya Sen, *Poverty and Famines. An Essay on Entitlement and Deprivation* (Oxford: Clarendon Press, 1981), 39.

[23] Mokyr, *Why Ireland Starved*, 16.

[24] Robert Jütte, *Poverty and Deviance in Early Modern Europe: New Approaches to European History* (Cambridge: Cambridge University Press, 1996), 21.

[25] Pitkänen, 'Patterns of Mortality', 92–93; Maarten Lindeboom, France Portrait, Gerard J. van den Berg, 'Long-run effects on longevity of a nutritional shock early in life: The Dutch Potato famine of 1846–1847', Journal of Health Economics 29 (2010), 617–629; Marc Klemp and Jacob Weisdorf, 'The Lasting Damage to Mortality of Early-life Adversity: Evidence from the English Famine of the 1720s', European Review of Economic History 16 (2012), 239–244. Between 1541 and 1871 life expectancy at birth in England varied mainly between 30 and 40 years. In this context, a decrease of 12 years estimated by Klemp and Weisdorf sounds excessively high. For English population development see E.A. Wrigley and R.S. Schofield, The Population History of England 1541–1871. A Reconstruction (Cambridge: Cambridge University Press, 1981).

[26] Allan G. Hill, "Demographic Responses to Food Shortages in the Sahel," *Population and Development Review*, 15 (1989), 178–179.

[27] Alex De Waal, "A Re-assessment of Entitlement Theory in the Light of the Recent Famines in Africa," *Development and Change*, 21 (1990), 481.

[28] De Waal, "A Re-assessment of Entitlement Theory", 484.

[29] Hill, "Demographic Reponses", 178.

[30] Kari Pitkänen, "The Road to Survival or Death? Temporary Migration During the Great Finnish Famine in the 1860s," in *Just a Sack of Potatoes? Crisis Experiences in European Societies, Past and Present*, ed. Antti Häkkinen (Helsinki: SHS, 1992); Pitkänen, *Deprivation and Disease*, 113–115.

[31] Turpeinen, *Nälka vai Tauti Tappoi?*

[32] De Waal, "A Re-assessment of Entitlement Theory", 484-485.

[33] Jeffrey Alwang, Paul B. Siegel & Steen L. Jorensen, "Vulnerability: A View from Different Disciplines," *SP Discussion Paper*, 0115 (2001), 2.

[34] The regional and socially specific nature of famine vulnerability is highlighted in Jütte, *Poverty and Deviance*, 32-33.

[35] Lisa Rygel, David O'Sullivan & Brent Yarnal, "A Method for Constructing Social Vulnerability Index: An Application to Hurricane Storm Surges in a Developed Country," *Mitigation and Adaption Strategies for Global Change*, 11 (2006), 743–744.

[36] Alwang et al, "Vulnerability", 4. This may be, for example, due to relief and political regime, largely omitted from direct consideration here. The author is grateful for an anonymous referee for highlighting this point.

[37] Vanhaute, "From Famine to Food Crisis", 49.

[38] Pitkänen, *Deprivation and Disease*, 54-55.

[39] Pitkänen, "Patterns of Morality", 84-87; Pitkänen, *Deprivation and Disease*, 54–55. For more detailed description of the famine chronology see e.g. Pitkänen, *Deprivation and Disease*; Ó Gráda, "Markets and Famines".

[40] Pekka Haatanen, *Suomen Maalaisköyhälistö: Tutkimusten ja Kaunokirjallisuuden Valossa* (Helsinki: WSOY, 1968), 6. Later (p. 40), Haatanen states, that "let it be cottage or piece of land […] telling poor from the poorer."

[41] Robert W. Fogel, "Second Thoughts on the European Escape from Hunger: Famines, Chronic Malnutrition and Mortality Rates," in Nutrition and Poverty, ed. S.R. Osmani (Oxford: Clarendon Press, Oxford, 1992), 243-286. Cormac Ó Gráda concludes from Finnish food market data, that a malfunctioning price mechanism did not exacerbate the crisis. See Ó Gráda, "Markets and Famines". For a general overview of markets during famines see, *inter alia*, Cormac Ó Gráda, "Markets and Famines in Pre-Industrial Europe," Journal of Interdisciplinary History, 36 (2005), 143-66; and Cormac Ó Gráda, *Famine: A Short History* (Princeton: Princeton University Press, 2009), 129-158. In many cases market functioning is central to a household's ability to access food, and starvation can occur even when food is readily available at local markets if a household lacks the appropriate entitlements, Baro & Deubel, "Persistent Hunger", 524.

[42] Official Statistics of Finland, *Varallisuuden Suhteita. Kertomus Suomenmaan Suostuntaverosta Vuonna 1865* (Helsinki: SVT IV, 1875). Measured here with the Gini coefficient, see e.g. Michael P. Todaro, & Stephen C. Smith, *Economic Development* (Harlow: Pearson Education Limited, 2003), 195-220. Only (per annum) incomes exceeding 500 Finnish marks were subject to taxation. In this paper a simple procedure of estimation is carried out: the taxpayer distribution within every income class is assumed uniform and people without any income is calculated from the household specific flat tax (*käräjäkappa*) exemption rate.

[43] Amartya Sen, "From Income Inequality to Economic Inequality, " *Southern Economic Journal*, 64 (1997), 386. In comparison, Stephen Devereux has pointed that focus on the household as the principal unit of analysis confounds the entitlement approach, as does its failure to engage with social relations and power inequalities, in this case at the intrahousehold level, Stephen Devereux, "Sen's Entitlement Approach: Critiques and Counter-critiques," *Oxford Development Studies*, 29 (2001), 250.

[44] National Archives of Finland [Digital Archives]: *Poll Tax Registers (Henkikirjat) for 1865*; Eljas Orrman, "Henkikirjat Henkilöhistorian Lähteinä," *Genos*, 1(1980), 1-21.

[45] Turpeinen, *Nälka vai Tauti Tappoi?*

[46] Rygel et al, "Method for Constructing"; George E. Clark, Susanne C. Moser, Samuel J. Ratick, Kirstin Dow, William B. Meyer, Srinivas Emani, Weigen Jin, Jeanne X. Kasperson, Roger E. Kasperson & Harry E. Schwarz, "Assessing the Vulnerability of Coastal Communities to Extreme Storms: The Case of Revere, Ma., USA, " *Mitigation and Adaptation Strategies for Global Change*, 3 (1998), 59-82.

[47] For an alternative view see , Neil W. Adger, "Social Vulnerability to Climate Change and Extremes in Coastal Vietnam," *World Development*, 27 (1999), 255-256.

[48] Upasna Sharma & Anand Patwardhan, "Methodology for Identifying Vulnerability Hotspots to Tropical Cyclone Hazard in India," *Mitigation and Adaptation Strategies for Global Change*, 13 (2008), 713-714.

[49] Sharma & Patwardhan, "Methodology for Identifying", 703-717.

[50] Cluster analysis was conducted using IBM SPSS Statistics 20. For the discussion concerning various methods see for example Johann Bacher, Knut Wenzig & Melanie Vogler, Melanie, "SPSS TwoStep Cluster - A First Evaluation," *Universität Erlangen-Nürnberg: Arbeits- und Diskussionspapiere* 2 (2004); Beth Horn & Wei Huang, *Comparison of Segmentation Approaches* (Decision Analyst Inc., 2009). Generally cluster analysis aims to produce grouping of the data so that the statistical units in a one group are more similar

to one another than to those units in other groups. The similarity measures differ between clustering algorithms and variables of interest.

[51] Tom Chiu, DongPing Fang, John Chen, Yao Wang & Christopher Jeris, "A Robust and Scalable Clustering Algorithm for Mixed Type Attributes in Large Database Environment," *Proceedings of the Seventh ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (San Francisco, CA: ACM, 2001), 263–268.

[52] Pitkänen (1991) pp. 42–47 in Häkkinen et al.

[53] Ó Gráda argues that "famines have always brought out the best and the worst in human nature." Ó Gráda, *Famine: A Short History*, 47.

[54] Violetta Hionidou, "Why do People Die in Famines? Evidence from Three Island Populations" Population Studies, 56 (2002), 75; Pitkänen, *Deprivation and Disease*, 69–80

[55] In particular, see: Turpeinen, *Nälkä vai Tauti Tappoi*; Pitkänen, *Deprivation and Disease*; and Pitkänen, "Road to Survival or Death".

[56] D. Wayne Osgood, "Poisson-Based Regression Analysis of Aggregate Crime Rates," *Journal of Quantitative Criminology*, 1, 16 (2000), 22–23. Technically there is an increased risk of breaking the assumption of homogeneity of error variance and normal error distribution. As depicted in TABLE 1, statistical units (townships) are small in population figures, emphasizing this risk.

[57] See, e.g. Thomas Plümber & Eric Neumayer, "Famine Mortality, Rational Political Inactivity and International Food Aid," *World Development*, 37 (2009), 50-61.

[58] Pitkänen, "Patterns of Mortality," 92–93. For a more detailed description of the famine chronology see e.g. Pitkänen, *Deprivation and Disease*, 51-68.

[59] Calculated summing the yearly mortality counts and deducting three times the yearly average mortality of comparison period (1861-1865)

[60] Greene gives a good overview of count data models. See William H. Greene, *Econometric Analysis* (New Jersey: Prentice Hall International Inc., 2000), 880-893.

[61] Compare to results presented in Pitkänen, "Patterns of Mortality", 91.

[62] See Jütte, *Poverty and Deviance*, 46-50, for a critique of associating poverty and tax exemptions.

[63] Pitkänen, "Patterns of Mortality", 86.

[64] Gabriele Doblhammer, Gerard J. van den Berg and L.H. Lumey, 'A Re-analysis of the Long-term Effects on Life Expectancy of the Great Finnish Famine of 1866–68', Population Studies 67(3) (2011), 309–322.

[65] Antti Häkkinen, "On Attitudes and Living Strategies in the Finnish Countryside in the Years of Famine 1867-68," in *Just a Sack of Potatoes? Crisis Experiences in European Societies, Past and Present*, ed. Antti Häkkinen (Helsinki: SHS, 1992), 149-66.

[66] Kari J. Pitkänen, "Famine Mortality in Nineteenth Century Finland: is There a Sex Bias?" in *Famine Demography: Perspectives from the Past and Present*, ed. Tim Dyson & Cormac Ó Gráda (Oxford: Oxford University Press, 2002), 65-92.