

Timo Tohmo

Regional Economic Structures in Finland

Analyses of Location
and Regional Economic Impact





ABSTRACT

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English summary

Diss.

This dissertation consists of nine empirical studies which seek to broaden understanding of Finnish regional economic structures. These studies are divided between two topics: 1) regional specialization and industrial concentration in Finland, and 2) regional economic impact analysis. The empirical studies are preceded by an introduction, in which the theoretical background, outline and the main results of the thesis are presented.

The research on the first topic is guided by the new economic geography literature, from which answers are sought to the location and agglomeration questions addressed in this dissertation. Evidence is found of increasing post-recession specialization in Finland. Furthermore, the results indicate that the rich regions gained during the boom. The results also suggest that the agglomerative forces in the Finnish regions are industry-specific. The most concentrated industries are found to have high economies of scale, a high level of technology and to be reliant on imports. Furthermore, entrepreneurial and growth activity decrease regional specialization. The results also indicate that the presence of positive situational and pull factors were important motivating factors in the creation of a new high growth business.

The first topic in the second part of the dissertation focuses on location quotient (LQ) methods of regionalizing input-output coefficients and multipliers. The main finding is that the new LQ-based adjustment formula, the FLQ, gives very accurate estimates for regional multipliers. Moreover the inclusion of a measure of regional specialization in the standard FLQ does not offer more accurate results than these obtained from the reformulated FLQ. In Chapter 8 the economic impacts of the Kaustinen Folk Music Festival are analysed via regional input-output analysis. The results indicate that the Festival can be seen as a good investment for the local municipality as the annual subsidy given to the Festival is lower than the regional impacts generated by the festival. Finally, the value of the Central Finland Museum is assessed using the contingent valuation-method. The results show, first, that Jyväskylä residents contribute less in taxes to the Museum than they report that they are willing to pay and, second, that the Museum has non-use value.

Keywords: location, linkages, growth, regional economic impacts

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LIST OF ORIGINAL PUBLICATIONS

Part I Regional specialization and industrial concentration in Finland

- Article 1 pp. 59-93 Tohmo, T. & Littunen, H. 2007. Specialization and spatial concentration patterns in Finland, 1993-2003. (In referee process: Journal of Socio-Economics).
- Article 2 pp. 97-113 Tohmo, T. & Littunen, H. & Tanninen, H. 2006. Backward and forward linkages, specialization and concentration in Finnish manufacturing in the period 1995-1999. European Journal of Spatial Development (EJSD), April 2006, no 19, 1-27.
- Article 3 pp. 117-143 Tohmo, T. & Littunen, H. & Storhammar, E. 2007. Entrepreneurial and regional growth activity in Finland. (In referee process: Journal of Enterprising Culture).
- Article 4 pp. 147-160 Littunen, H. & Tohmo, T. 2003. The high growth in new metal-based manufacturing and business service firms in Finland. Small Business Economics 21, 187-200.

Part II Regional economic impact analysis

- Article 5 pp. 165-176 Tohmo, T. 2004. New Developments in the Use of location Quotients to Estimate Regional Input-Output Coefficients and Multipliers. Regional Studies 38, 43-54.
- Article 6 pp. 179-208 Flegg, A.T. & Tohmo, T. 2007. Regional size, regional specialization and the FLQ formula: A case study of Finland.
- Article 7 pp. 211-231 Tohmo, T. 2005. Economic impacts of cultural events on local economies: an input-output analysis of the Kaustinen Folk Music Festival. Tourism Economics 11, 431-452.

- Article 8 pp. 235-250 Tohmo, T. 2001. The Economic Value of the Externalities Associated with Cultural Goods- Dichotomous Choice Contingent Valuation Study of the Willingness to Pay for the Central Finland Museum in Jyväskylä. *Journal of Enterprising Culture (JEC)* 9, 237-252.
- Article 9 pp. 253-264 Tohmo, T. 2004. Economic Value of a local museum - Factors of willingness-to-pay. *Journal of Socio-Economics* 33, 229-240.

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CHAPTER 1

INTRODUCTION

1.1 Background of the thesis

1.1.1 Regional specialization and industrial concentration

Many economic activities have marked geographical concentration. Once the agglomeration process has started, spatial differences take shape and become quite rigid. This prompts the question: if spatial economic structures are rigid in Finland, what are the forces that can change the status quo? After the early 1990s two notable events in Finnish economic recent history might be thought to have changed the prevailing rigid economic structure and the geographical distribution of economic activities in Finland: globalization, including deepening economic integration, and the recession between 1990 and 1993.

Globalization¹ refers to a unique global market for goods, factors and ideas. Interactions between firms and people become increasingly tighter. The globalization process also means that barriers on the international mobility of goods, factors and ideas fall. Deepening integration is characterized by common markets where trade costs are lowered, facilitating free movements of factors. This in turn could favour the emergence of economic concentrations and clusters.

¹ A useful study on globalization and the connection between globalization and regional structures in Finland in the 1990s has been compiled by Okko et al. (1998). This was part of the *Globalization, welfare and employment*-program funded by SITRA (Finnish National Fund for Research and Development). Okko et al. (1998) found that along with strengthening globalization Finland seems to polarize into high-fliers and losers. The development seems to be connected with levels of technology and education. For the connection between globalization and regional policy see Eskelinen (2001).

Finland experienced a severe recession (an exogenous shock) between 1990 and 1993; for example unemployment rose from over three per cent to 16,6 per cent. This shock proved to be a remarkable watershed in Finnish economic performance and development. The recession broke up the traditional Finland's economic structure and made room for innovations and growth (see e.g. Ottaviano & Pinelli, 2004). Closures of firms were common and falling profits induced entrepreneurs to innovate. In Schumpeter's view the engine of economic development is entrepreneurial innovation. Creative destruction makes way for innovations and growth.

The recession was followed by a boom in which gross domestic production (GDP) grew at nearly five per cent for several years. The boom was related to the mainstays of Finnish economic performance and development (see e.g. Ottaviano & Pinelli, 2004). Along with the growth in GDP regional convergence ended (see e.g. Kangasharju et al., 2001). The main source of growth after the recession was in the electronics industry. The dispersion of growth (regional imbalance) and the rise in the significance of electronics was made possible by rising migration (see e.g. Nivalainen, 2003; Pekkala, 2000), a higher level of education and a shift in policy thinking towards research and development and technology (Tervo, 2005), and gravitation towards international trade and collaboration.

In the post-recession period (1994-2002) economic development and growth in Finland were very rapid. Development was based on the above-mentioned higher emphasis on R&D and technology and the gravitation towards international trade. The information technology industries and exports, which the post-recession growth in Finland was based on, were highly unevenly distributed across the Finnish regions. As a consequence per capita income started to diverge after a long positive era of convergence² (see e.g. Loikkanen et al. 1998, 1999 and 2005). Also population concentration accelerated substantially. The rate of migration rose, with people moving especially from both rural and urban areas to the bigger centres of population where employment opportunities were better. In addition the growth of these centres was based on expansion of the high technology industries as well as exports (see e.g. Tervo, 2005).

In sum, as during many previous decades, rapid structural change describes Finnish regional development in the 1990s. This rapid change has been enabled by high migration. Tervo (2000) observes two mega-trends in Finnish regional development in the 1990s: a) concentration of production and population in the main centres and b) regional divergence in per capita income levels following the recession.

² The unemployment rate also shows similarly changing patterns in regional disparities in the 1990s in Finland, i.e., growing regional differences in unemployment rates during the recession (Huovari, 1999; Tervo, 1998). The focus of this thesis is on the location patterns of Finnish regions and industries. As a consequence, we do not examine unemployment (or employment) and questions related to unemployment (or employment) any further.

In the first part of this thesis we examine Finnish regional specialization and the concentration of Finnish industries and possible changes in them during the post-recession period 1993-2003. The investigation on the first topic is guided by the new economic geography literature, which allows for the explanation of location and agglomeration questions addressed in this study. The theoretical framework of the first part of this thesis is presented below in figure 1.

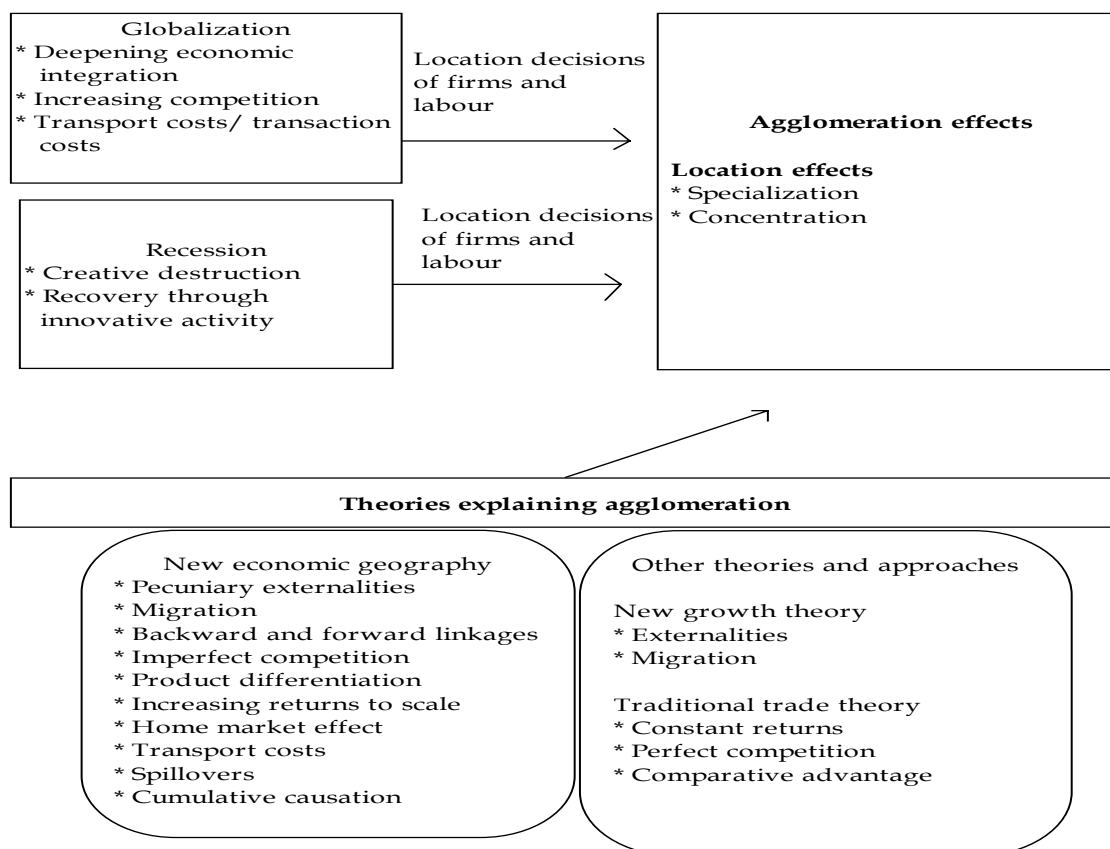


FIGURE 1 Framework of the first part of the study (see Tervo 2000; Tanninen & Tiainen, 2005)

Why do economic activities agglomerate in a small number of places? What are the forces that generate uneven development and drive even ex-ante identical regions towards unbalance? The conventional trade theory, the new growth theory and the new economic geography have offered explanations for the above questions concerning the agglomerative forces of economic activities³. Pekkala (2000) argues that the new growth theory and the new economic geog-

³ These are not the only paradigms that focus on the spatiality of economic processes. For example, Sheppard (2002) compares three recent schools one of which is dominated by geographers and two by economists: there are the regional political economy in geography and the evolutionary and complexity approach and increasing returns (NEG) approach in economics. We do not enumerate the differences of these approaches but conclude that they differ from one another because they look at the same phenomenon through different lenses and norms.

raphy are the two noteworthy strands of investigation in the economic literature related to regional development that have emerged since the 1980s. Comparative advantage and economies of scale are forces pushing the economy towards specialization and concentration. The idea underlying figure 1 is that regional development can be analysed from either a locational development view or a regional differences in welfare view. Location patterns can be revealed by changes in regional production, population or employment (see e.g. Tervo, 2005).

The conventional trade theory argues that nations will tend to specialize in those industries in which they have comparative factor advantages, such as favourable sources of raw materials (or cheaper labour etc.). The new growth theory⁴ emphasises the role of human capital in economic growth⁵. In the so called convergence studies international and regional economic growth and convergence⁶ are analysed.

In the 1990s a new approach to understanding why some regions attract a disproportionate share of economic activity was developed. Krugman (1991) wrote in his seminal paper:

“ ... this is a vastly oversimplified model even of the core-periphery issue, and it says nothing about localization of particular industries. The model does illustrate, however, how tools drawn from industrial organization theory can help to formalize and sharpen the insights of a much-neglected field. Thus I hope that this paper will be a stimulus to a revival of research into regional economics and economic geography.”

⁴ The results of empirical growth studies are summarized in Barro & Sala-i-Martin (1995) and Okko (1997).

⁵ The role of technological spillovers in generating growth have emphasized by Romer (1986), Porter (1990) and Jacobs (1969) but their theories differ in where they believe the source of externalities lies. Jacobs's view is that the geographical diversity of industries promotes growth. Both Porter and Romer (Marshall-Arrow-Romer externality) take the view that knowledge spillovers in specialized and geographically concentrated industries stimulate growth. Jacobs and Porter predict that local competition is better for growth because it quickens the adoption of new technology. Romer in turn argues along Schumpeterian lines that local monopoly restricts the flow of ideas to other firms, allowing externalities to be internalized by the innovator. Generally speaking, endogenous growth models argue that dynamic information externalities are the driving force for economic growth through technological innovations (see e.g. Romer, 1986; Lucas, 1988). Endogenous growth models emphasize a stock of accumulated capital, human capital, i.e. Marshallian externalities are at the center of economic development. In endogenous growth theories technological development is seen as dependent on one's own efforts, endogenously.

⁶ In his economic growth (income growth) studies Quah (1997) found no simple patterns of convergence or divergence, but rather the existence of convergence clubs of countries where countries catch up on each other but only within particular subgroups. Magrini (2004) provides an overview of studies concerning regional convergence. He concludes that Europe is characterised by geographic clusters of regions with similar levels of per capita income. The literature concerning growth and convergence is based on the seminal writings of Barro & Sala-i-Martin (1991). In Finland, Pekkala (2000), Kangasharju (1998), Loikkanen et al. (1998) and Haukioja & Okko (1995) have reported income per capita (or bkt/capita) convergence between Finnish regions (or provinces).

The new approach, the so called new economic geography (henceforth referred to as NEG⁷), assigns a key significance to the role of the internal geography of a nation on the trading performance of that nation's industries. In explaining interregional imbalances NEG stresses the transport costs and pecuniary externalities arising from increasing returns in the presence of backward and forward linkages in a world characterised by imperfect competition. NEG deals with the question of how the interaction between transport costs and increasing returns might lead to certain geographical structure of production. NEG has been initiated by three authors, namely Fujita (1988), Krugman (1991) and Venables (1996), who all use general equilibrium models with monopolistic competition⁸. A special feature of these models is that agglomeration forces tend to encourage the concentration of industrial activities through the process of cumulative causation. In mainstream economics it is only during the last decade, along with Paul Krugman's work, that location and geography⁹ appear to have been discovered. Since then the literature has continued to grow in many directions. Empirical work connected to the NEG framework has also expanded, especially since 2000. The basis of NEG¹⁰ are trade, externalities and industrial localization. Head & Mayer (2004) argue that five essential insights distinguish NEG models from other approaches to understanding the geography of economic activity:

- 1) Increasing returns to scale that are internal to the firm
- 2) Imperfect competition
- 3) Trade costs
- 4) Endogenous firm locations
- 5) Endogenous location of demand (demand in each region depends on workers and firms)

As we can see, NEG contains elements and ingredients that were developed long before Krugman's (1991a) paper. Ottaviano & Thisse (2004) have suggested that the main contribution of NEG was to combine old ingredients through a new recipe¹¹. NEG can be seen as a synthesis of theories of location¹²,

⁷ A useful survey of the NEG literature has been compiled by Ottaviano & Pinelli (2004).

⁸ A monopolistic competition framework was initially suggested by Dixit & Stiglitz (1977).

⁹ Krugman (1998) argues that the reason why space has finally made it into the economic mainstream is development of models of imperfect competition crucial for studies concerning economies of scale. Scotchmer & Thisse (1992) try to evaluate what has been done so far to incorporate space in economic models, putting weight on increasing returns to scale, imperfections in competition and capitalization (price of land reflects transport costs, public services incurred by the occupant).

¹⁰ The main question for the new economic geography is where firms are located and why they tend to concentrate (agglomerate) in a few regions.

¹¹ Krugman (1991) formalized the earlier analysis and suggestions in the founding paper of the genre (new economic geography). His model, also called a core-periphery model, is based on footloose labour. The model of Venables (1996) and Krugman & Venables (1995) is based on vertically linked industries.

agglomeration economies, externalities (Marshallian, especially pecuniary externalities), cumulative causation, regional specialization and concentration, imperfect competition¹³ (economies of scale), transfer costs (including trade barriers) and technological spillovers.

It is well known that regional economic structures tend to be rather rigid. Deepening economic integration, globalization and recession are forces that might have changed Finland's regional economic structures. The effects of these factors can be examined either as a location problem or in the light of regional inequality as a welfare problem. The first part of this thesis concentrates on location issues and we adopt the framework of the new economic geography in seeking the main explanations for the questions raised by this thesis.

We then take a closer look at the location of firms, agglomeration and spillovers¹⁴, which are at the heart of the new economic geography literature. Our review also considers other tenets of NEG, namely externalities, the notion of cumulative causation, regional specialization, industrial concentration, imperfect competition, economies of scale and transfer costs (including trade barriers).

Location of firms

A key question with reference to location is why and when does manufacturing become concentrated in a few regions? Ottaviano & Thisse (2004) summarized the legacy of location theory in five points, which also capture the main ingredients of NEG:

- 1) The economic space is the outcome of a trade-off between various forms of increasing returns and different types of mobility costs;
- 2) Price competition, high transport costs and land use foster the dispersion of production and consumption.

Therefore:

- 3) Firms are likely to cluster within large metropolitan areas because transport costs are low;
- 4) Attraction of cities to consumers and workers is high because they provide a wide range of goods and specialized labour markets;

¹² For the long-standing Germanic tradition in the use of the equilibrium location theory see von Thünen (1826) *The isolated state*, Weber (1909) *The theory of the location of industries*, Christaller (1933) *Central places in southern Germany*, Lösch (1940) *The economics of location* and Isard (1956) *Location and space economy* and (1960) *Methods of regional analysis*.

¹³ See Dixit & Stiglitz (1977) Monopolistic competition and optimum product diversity, which deals with consumers' heterogeneous tastes and imperfect competition.

¹⁴ If the knowledge created can be used by others without compensation (or with compensation lower than the "value" of the knowledge), we are rubbing elbows with spillovers. Spillovers also result if the launching of a product containing the production process brings benefits to other participants in the market.

- 5) Agglomerations are the outcome of cumulative processes (self-sustaining cycle) of additional income generated by accumulated capital feeding additional expenditures.

Economies of scale and the costly shipment of goods and factors across space generate an economic trade-off between “proximity” and “concentration”. A firm may fragment its production across many plants or concentrate production in a few plants depending on level of transport cost and power of returns to scale. Krugman (1991) states that in order to realize economies of scale¹⁵ while minimizing transport costs, manufacturing firms tend to locate in the region where demand is larger¹⁶.

Firms also have to take into account their competitors and potential threats. Ottaviano & Pinelli (2004) argue that a firm can increase its market power with respect to its competitors by careful geographical positioning. Generally the market power of a firm stems from economies of scale. Under imperfect competition firms trade higher prices against higher quantities sold (product markets). The location of firms can be seen as a profit maximizing decision allowing firms to increase their market power by careful positioning.

Market interactions may cause so called pecuniary externalities. The relocation of a firm increases competition in its place of destination. Thus NEG concentrates on the role of pecuniary externalities (see Scitovsky, 1954) and imperfect competition. Other approaches concentrate on technological externalities, which are independent of market interactions, materializing through non-market interactions directly affecting the utilities of individuals or the firm’s production functions (pollution, congestion, criminality, social problems, informal knowledge transmission). As an outcome, the existing geographical distribution of firms determines the relative attractiveness of alternative locations to a given firm through externalities generated by market and non-market interactions. In other words, firms’ location decisions jointly generate localized externalities that determine regional attractiveness (Ottaviano & Pinelli, 2004). New locations may have difficulty attracting firms because they are not yet able to offer information spillovers¹⁷ from the past, i.e. the locality has not built a

¹⁵ At the centre of the location theory is the assumption of the economies of scale force the geographical concentration of activities.

¹⁶ This is the so called home market effect; i.e. the location that offers the larger markets tends to export goods conditional on increasing returns to scale when resources are immobile between two locations. If some resources (for example, workers) are mobile, there is an incentive for those resources to move to the location with a larger market. The movement of workers itself tends to increase the size of the new location. This cumulative process explains the birth of the core-periphery pattern that has come to be known as core-periphery model. As a consequence a small change in transportation costs, economies of scale or the share of the economy’s resource can turn one region into the industrialized core and the other into a deindustrialized periphery (see e.g. Krugman, 2002).

¹⁷ Jaffe et al. (1993) provided evidence on the geographic localization of knowledge spillovers by examining patent citations. They found that citations of domestic patents are both more likely to be domestic and more likely to come from same area as the cited patents, indicating that proximity matters in exploiting knowledge spillovers. Almeida & Kogut (1999) showed that spillovers may be channelled through

stock of local “trade secrets” (local knowledge accumulation) dependent on past industrial activity. In fact, decisions about where to locate are based on current conditions and therefore the geography of an economy reflects history and accident, not future expectations (Krugman, 2002).

Haaland & Wooton (1999) argue that linkages between multinational enterprises (MNEs) and domestic producers of intermediate goods may give a rise to gains from attracting foreign direct investments (FDI). Crozet (2004) studied whether access to markets (supply) has a positive influence on migration choices (the effects of RMP¹⁸ on migrants) and found that migrants do follow market potentials¹⁹ (forward linkage²⁰) although distance limits the impact of the proximity of customers and suppliers on workers. Head et al. (1999) studied Japanese manufacturing investments in the US between 1980-1992, and found that the provision of foreign trade zones (FTZ), lower taxes and job-creation taxes affects the location of investments. Head et al. (1995) observed that Japanese investors were drawn to US states with a high contraction of the same industries and moreover attracted to areas with other Japanese plants in the same industry (keiretsu). Thus foreign firms favour locations with higher RMP (Ottaviano & Pinelli, 2004).

Agglomeration of sectors

Agglomeration can be studied at the level of sectors, regions or countries. Ottaviano & Pinelli (2004) argue that the main tenet of NEG is that the evolution of the economic landscape is mainly driven by pecuniary externalities. The

the mobility of people (labour markets) rather than communication between scientists. Audretsch & Feldman (2004) state that location and proximity matter in transmitting knowledge and exploiting spillovers, i.e. the productivity-enhancing impact of spillovers fades quite rapidly with distance. Furthermore innovative firms tend to locate in areas where there are resources that have accumulated along with the region’s past successful innovations (see e.g. Feldman, 1994). Maurel & Sedillot (1999) studied geographic concentration in French manufacturing industries and found that some high technology industries are highly localized, indicating the importance of technological spillovers. Henderson (2003) found that the count of other plants in one’s own industry (representing a count of information spillover sources) has a strong productivity effect in high tech industries. He also found evidence that single-plant firms benefit more from external benefits as well as generate greater external benefits than corporate firms. Generally speaking, small firms are able to invest only negligible amounts in R&D or other knowledge or spillover-generating inputs. Acs et al. (1994) showed that spillovers from university research laboratories are relatively more important in producing innovative activity in small firms. Large firms have a comparative advantage at exploiting knowledge created in their own laboratories and R&D expenditures made by private companies provide inputs to large firms innovative activity as well.

¹⁸ The real market potential (RMP) of a certain location A is the weighted average real expenditure across all locations that plants can tap if located in A (Ottaviano & Pinelli, 2004). RMP is used as a proxy of the profits that an average firm can earn if located in A.

¹⁹ Forward linkages influences the location choice of individuals because a region having a good access to markets reduces the cost of living of individuals because the transportation costs of consumption are lower.

²⁰ Input-output relations between industries also contains forward linkages inducing agglomeration.

mechanism creating the externalities is linkages between firms through the input-output structure (Krugman & Venables, 1995) or linkages between firms and workers/customers (Krugman, 1991). Firms maximize their profits when they locate close to (“proximity”) customers and suppliers and far from competitors. Firms also make decisions about the number of plants their production will be concentrated in. The proximity of competitors causes the so called *market crowding effect*. If a new firm produces intermediate inputs (forward linkages), the supply of intermediate goods will increase as also will the demand for labour²¹. Wages will rise and prices of intermediate inputs (goods) will fall to the disadvantage of other firms producing intermediate goods. The gainers are the final suppliers, who will be faced with lower production costs and a higher demand for workers with higher wages. Lower production costs and higher demand will attract new final suppliers into the market. New suppliers will increase the demand for intermediate inputs (backward linkages), causing the so called “*market expansion effect*”, due to customer proximity. When the market expansion effect dominates the market crowding effect, final suppliers and intermediate producers will agglomerate in the same area. Growth in income and expenditures may bring about a self sustaining agglomeration process²² (see e.g. Myrdal, 1957). Thus demand and cost linkages between industries create forces for the agglomeration of activity in a single location, indicating that the process of cumulative causation is more likely in the presence of vertically linked industries (Venables, 1996). Ottaviano & Pinelli (2004) state that positive externalities are stronger in sectors with pronounced economies of scale and strong market power because both weaken the market crowding effect. Generally speaking, there is flexibility in location “decisions” *a priori*, but once the agglomeration process has started, spatial differences take shape and become quite rigid²³ (because of backward and forward linkages). Therefore two initially equivalent regions are able to develop unevenly over time due to the presence or absence of the self sustaining agglomeration process (see e.g. Fujita et al., 1999; Tervo, 1999).

Kim (1995) found evidence that increasing returns to scale explain the long run trends in US regional specialization, i.e. agglomeration is more common (and more persistent) in sectors characterized by economies of scale. Midelfart-Knarvik & Steen (1999) found significant economies of scale within the nine maritime industries in Norway. Paluzie et al. (2001) studied specialization and concentration in Spain in 1979, 1986 and 1992 and found that the most impor-

²¹ This example of a vertically linked chain is from Ottaviano (2003). Three vertically linked activities are assumed: intermediate production, final production and consumption. Final production uses only intermediate inputs, intermediate production employs only labour and workers are the only source of final demand.

²² It may be called also “circular causation”, “cumulative causation”, “economic growth poles”, “positive feedback”, “self-reinforcing process”, “big push” or “backward and forward linkages”.

²³ For example Dumais & Ellison & Glaeser (2002) found that measures of the level of agglomeration of industries are very stable over time (correlation of 0.92 between 1972 and 1992 indexes) and Kim (1995) found a correlation of 0.64 between 1980 and 1987 values.

tant determinant of Spain's economic geography is scale economies. Agglomeration has been found to be more common (and more persistent) in sectors characterized by strong input-output relations. Ellison & Glaeser (1997) found a positive correlation between upstream-downstream ties (input-output linkages) and agglomeration. Amiti (1998) found that industries with high proportion of intermediate inputs in final production are the most geographically concentrated. Midelfart-Knarvik et al. (2000, 2002) and Brülhart (1998a) found in their studies that increasing-returns industries and technology intensive industries are more agglomerated than average. Brülhart (1998b) also found that labour intensive industries appear to be concentrated in peripheral EU regions, excluding Ireland which is specialising out of labour intensive and low-tech industries into scale-sensitive and high-tech industries. Forslid & Ottaviano (2003) found that skill-intensive sectors tend to be more clustered because the probability to migrate is high among skilled employees²⁴. Glaeser (1999) demonstrated that agglomeration can arise from knowledge spillovers. Rosenthal & Strange (2001) also found evidence that reliance on skilled labour positively affects agglomeration and may cause spillover effects when skilled workers change firms for new job opportunities in the same region. Peri (2002) states that environments promoting interactions with skilled workers generate learning opportunities for workers. He found that workers learn from each other (they increase their skills and productivity) when they are young²⁵, trading these advantages for current disadvantages such as higher rents and lower real wages for young workers. As a mature worker their learning decreases and some choose to move away from core areas.

For industries with increasing returns to scale and important intra-industry linkages Forslid et al. (2002) found a bell-shaped (inverted U-shaped) relationship between trade liberalisation and concentration (industrial concentration is highest where trade costs are intermediate). Devereux et al. (2004) found in the UK that most geographically concentrated industries appear to be older and relatively low-tech. Duranton & Puga (2005) argue that the significance of sectors is diminishing. They found that firms that use the same type of labour are located close to each other, predicting functional concentration (concentration of firms using similar skills) rather than sectoral concentration.

In sum, agglomeration is more common (and more persistent) in the sectors that are characterized by economies of scale and tighter input-output relations and that are technology intensive as well as science-based. NEG also suggests that agglomeration is more common (and more persistent) in sectors characterized by stronger market power, faster innovation, higher value added,

²⁴ Skill-intensive sectors, which benefit from knowledge spillovers, could be harmed by geographical dispersion of skilled employees and plants. Resulting dispersion is exchanged for rapid innovation and fast capital accumulation. This could be offset if better infrastructures improve international attractiveness of national markets (Ottaviano & Pinelli, 2004).

²⁵ Computerization and increased availability of technology made skills more transferable in the 90s, in turn making urban areas learning grounds for skilled young workers.

higher relative intensity of mobile factors such as capital and skilled labour, and rapidly changing products and tasks (hi-tech industries).

Agglomeration on the regional level

At the international level the immobility of labour is a reasonable assumption as firms find it very difficult to hire workers from other countries. At the regional level labour is not immobile and when an industry agglomerates it hires workers from other sectors as well as from other regions. According to Krugman (1991) labour mobility²⁶ actually fosters regional agglomeration. If we think about it, a positive demand shock creates an incentive for the supply side to expand in the affected region²⁷. Wages will rise because firms supplying the markets require more employees. Such firms attract also employees from other regions and local income may rise, leading to a rise in expenditure as immigration rises. As a result, labour mobility (immigration flow) increases local expenditure making cumulative causation more likely.

Venables (1996) shows that vertical linkages between upstream and downstream industries can play an equivalent role to that of migration in determining the size of market of different regions. Krugman & Venables (1996) found that increasing integration makes it more likely that firms in the same industry will cluster together, providing that intra-industry input-output linkages are stronger than inter-industry linkages.

Ottaviano & Pinelli (2004) argue that the implementation of interregional transport infrastructures fosters cross-region agglomeration²⁸. In the case of gates and hubs a demand shock in any other location may expand supply in the location of the gate and reduce it in the other location. Therefore, the presence of transport hubs and gates makes cross-region agglomeration more likely. These transport gates or hubs are locations where transportation routes cross or a port through which goods mainly flow in and out of a country (sea, river and lake ports and even transport nodes including major railways terminals and highways, bridges and tunnels). Transportation hubs naturally generate a lock-in for firms, and economic activities and agglomerations take place in such locations, as these offer good access to markets and consumers. Thus agglomeration is more likely to take place in locations which have better accessibility to all other relevant locations. Behrens (2004a) states that cities are drawn to transportation hubs during the early stages of economic development. He argues that in the past cities were established at natural transportation hubs that provided some advantage in transportation. Many of these cities (e.g. Paris, Chicago, New York, Detroit, Philadelphia, Boston, Los Angeles and Buffalo) show con-

²⁶ The intensity of economies of scale, amount of market power and interregional trade “barriers” do not matter in regional agglomeration fostered by immigration (Ottaviano & Pinelli, 2004).

²⁷ This example is from Ottaviano & Pinelli (2004).

²⁸ Behrens (2003) found that a decrease either in tariffs (tariffs don’t consume existing resources, whereas they redistribute resources) or in transport costs (transportation is regarded as resource-consuming) favour agglomeration.

tinuing prosperity even after the initial advantage (for example water-access) has become irrelevant. Fujita & Mori (1996) explain this as due to the lock-in effect of self-reinforcing agglomeration forces generated by the interaction of increasing returns and transport costs²⁹. Nowadays modern transportation technologies with increasing returns can create hubs and a city can have locked-in indeterminacy.

There are few studies on the effect of international integration on the spatial distribution of economic activities. The studies by Crozet & Koenig-Soubeyran (2004) and Monfort & Nicolini (2000) show that integration generally fosters spatial concentration, i.e. an increase in regional inequalities within the liberalizing country. Krugman & Elizondo (1996) found on the contrary that closed markets promote huge central metropolises and open markets discourage them. Brühlhart & Traeger (2004) found no statistically significant change in geographic concentration over period 1975-2000 across Western European regions. Midelfarf-Knarvik & Overman (2002) found a mixed picture for regional specialization between 1980 and 1995 in the EU; i.e., increasing specialization in about half of the regions and decreasing specialization in the other half. Crozet & Koenig-Soubeyran (2002) studied the relationship between trade openness and the location of economic activity in a country (the country contains a border region and a remote region) and found that when one of the regions has an advantage in terms of its access to international markets, trade openness favours the border region. Behrens (2004b) found that the impact of a fall in international trade costs depends on the structure of trade flows and the internal transport costs³⁰. Generally speaking these results suggest that international integration affects regions in complex ways and that regions show a more mixed pattern than industries. Production structures differ across regions; however we may ask whether similar regions with similar production structures exist and whether these specialization patterns change over time.

1.1.2 Regional economic impact analysis

Pleeter (1980) introduces three basic categories of regional models to represent the essential features of the numerous modelling efforts used in economic impact analysis: 1) economic base models³¹, 2) econometric models, and 3) input-output models. He points out that there are no method that yield generally superior multipliers; i.e., some models are more appropriate for some problems than others. Price is usually used to measure the economic impacts or value of

²⁹ In order to promote the industrial growth of the periphery by improving the transport connections between the core and periphery may result in the removal (or close down) of existing industries in the periphery if periphery does not hold a comparative advantage in any industry. Thus the timing of the implementation of policy measures is important.

³⁰ Countries with a poor infrastructure are likely to experience regional divergence. If workers are mobile across regions, providing a better infrastructure is likely also to lead to regional divergence. Thus providing too little or too much infrastructure leads to regional divergence.

³¹ For an illustration of the economic base model see e.g. Romanoff (1974).

e.g., a certain investment or event. However, to assess the value of things like environmental quality, cultural value or safety, that are not exchanged in the market and which have no associated market prices, other methods are needed. The Contingent Valuation (CV) method is a way of estimating such non-market values (see e.g. Mitchell & Carson, 1989; Hanemann, 1994).

A very widely accepted approach in estimating the impacts on a region is based on input-output analysis³². Input-output analysis is the name given to an analytical framework developed by Wassily Leontief in the 1930s. In the input-output model the general equilibrium economic theory is applied (Miller & Blair, 1985). The fundamental purpose of input-output analysis is to analyze the interdependence of industries in an economy. In input-output analysis the change in production in sector *i* is interpreted as a change in final demand; i.e., it is the consequences of changes in final demand on production, wages and employment that are analysed (Eskelinen, 1986). Input-output analysis is a way of studying economic structures of a specific area (usually country or region). An input-output model consists of a system of linear equations that describe the distribution of an industry's output throughout the economy (Miller & Blair, 1985).

Originally, applications of the input-output model were carried out at the national level. In Finland, interest in input-output models began to be shown at the end of the 1950s³³. In the US during the same period input-output models were already a common tool at the regional level. In the 1970s the demand for input-output models at the regional (and urban) levels grew rapidly as planners became increasingly aware of the potential and the value of the input-output approach in regional studies (Smith & Morrison, 1974)³⁴. In Finland the very first thesis dealing with regional input-output analysis appeared in 1971³⁵. In the 1980s interest in regional input-output analysis was reawakened with the publication of two theses dealing with subnational input-output analysis³⁶. Worldwide interest in regional analysis grew in the 1980s. Miller & Blair (1985) argue that in the 1980s interest in economic analysis at the regional level led to modi-

³² Pleeter (1980) points out that input-output analysis is most appropriate for short run forecasting problems where considerable detail is required. However, input-output analysis does not seem to be appropriate for small local economies where interindustry relations are not important.

³³ See Forssell & Grönlund (1960), who produced the first Finnish input-output tables for the whole country in 1956.

³⁴ Jensen & MacDonald (1982) argue that the initial development phase (from the 1950s to the early 1970s) was dominated by relatively few contributions (period of the establishment and development of general operating principles and models). The development of the regional input-output technique was initiated by the professional research market itself (not from the commercial planning market); i.e., the users of the technique were also the developers of the technique.

³⁵ See Hirvonen (1971)

³⁶ See Nenonen (1981) and Eskelinen (1985). In Finland, most of the input-output tables created in the 1970s and 1980s pertained to a specific area (a province or district). Province-based tables were produced by e.g. Forssell, 1978 (all provinces), Forssell-Häyrynen, 1979 (all provinces); Eskelinen et al., 1978 (Pohjois-Karjala); Eskelinen, 1980 (Pohjois-Karjala); Eskelinen & Sullström, 1979 (Pohjois-Karjala, Helsinki and the rest of Finland); and Häyrynen, 1981 (Oulu and Lappi). District-based tables were produced by e.g. Hirvonen, 1971 (Tammermaa); Varjonen, 1977 (Helsinki); Similä, 1979 (Oulu); and Saurio, 1982 (Rauma).

fications of the input-output model in an attempt to reflect the peculiarities of a regional problem. Moreover, attention has shifted towards new methods of table construction, as alternatives to survey-based tables and the analytical properties of input-output models (Jensen, 1980). In Finland, in 2000, Statistics Finland published regional input-output tables for the year 1995. The tables were compiled at the NUTS-3 level³⁷, which divides Finland into 20 regions³⁸. As we have noted earlier international and national processes of co-operation strengthened the identity of local economies as independent and self-responsible economic units in the 1990s. Changes in the operational environment have strengthened competition between regions and affected how a region defines its goals and objectives, evaluates its most important economic domains, implements strategies etc. As a consequence, regions have to compete fiercely with each other for investments, firms' location decisions and population³⁹. Reliable figures are supremely important for regional development analysis. Economists should be able to give regional development bodies and policy-makers tools for decision-making regarding the development of a region. Input-output analysis provides a very common and useful tool for examining the effects of interest. If regional input-output tables are not available, the only way to proceed is by the regionalization of national input-output coefficients and multipliers. So called non-survey techniques are a common and cost-efficient way to adjust national coefficients and multipliers. In the beginning of regional extensions to the input-output model, data limitations and the cost of furnishing the regional data hindered research in this field. This led to an interest in non-survey methods, as these enabled the use of regional input-output analysis without prohibitive costs.

The second part of this thesis deals with regional economic impact analysis. There may be an important role for economic impact analysis to play in regional development and economic growth. What impact would an investment of event have on a certain area? The first topic of the second part of the thesis focuses on studying methods of regionalizing input-output coefficients and multipliers. We compare the coefficients and multipliers produced by non-survey, especially LQ methods, with survey-based coefficients and multipliers. The second topic is to reveal the economic impacts of a specific cultural event, namely Kaustinen Folk Music Festival via regional input-output analysis. Thereafter we assess the value of a very specific non-market good, The Central Finland Museum, with the CV -method.

³⁷ NUTS= nomenclature of territorial units for statistical purposes.

³⁸ Such single-region models represent one approach to modelling a regional economy in input-output terms. So called many-region input-output models attempt to capture interregional linkages as well as the regional aspects of production (see e.g. Miller & Blair, 1985).

³⁹ Niittykangas (1992) has found that the centripetal development of population and production occurred on at least on three levels in Finland in 1980s. First, Helsinki outperformed the rest of the country at the national level; second, regional centres (and other large cities) outperformed other towns at the regional level; and, third, the centre has outperformed the periphery at town level (see also Kangasharju, 1998).

Regionalization of national input-output coefficients

Researchers often wish to know the regional economic effects of certain investments or events. However, owing to a lack of regional input and output figures the only way to proceed is to adjust the national coefficients to produce a regional table. A very common approach is to use location quotients (see Richardson, 1972; Miller & Blair, 1985). Hence we next examine ways of carrying out regional input-output analysis⁴⁰.

Generally speaking, regional input-output studies attempt to quantify the impacts caused by new final demands for products made in a region on the producing sectors located in that region (Miller & Blair, 1985). One way to gather the data needed for the construction of a regional input-output table is a survey. Surveys are based on inquiries, interviews and statistics. Partial-survey methods⁴¹ are based on national coefficients. The information generated by the national coefficients is complemented with information concerning the regional economy obtained from inquiring methods (Saurio, 1986). To produce an input-output table based on survey of establishments in the economy or on partial survey methods is a time-consuming and expensive task.

However, given the lack of regional input-output figures the only option is to adjust the national coefficients to produce a regional table. A very common approach is to use non-survey methods⁴² to estimate regional input-output coefficients from national data. Statistical evaluations of non-survey techniques have been performed by Schaffer & Chu (1969), Czamanski & Malizia (1969), Morrison & Smith (1974) and Harrigan et al. (1980). Our study concentrates on examining non-survey methods, especially the location quotients approach. Round (1983) interpreted the term non-survey techniques rather broadly, including techniques used to generate surrogate coefficients when direct observations are not available, techniques used to adjust estimates directly based on survey data and short-cut methods used to derive regional sectoral multipliers which bypass the construction of a regional input-output table. We adopt Round's interpretation in our study.

Schaffer & Chu (1969) and Round (1983) classify non-survey techniques for generating regional input-output tables⁴³ into three principal classes:

⁴⁰ A useful survey of the literature and demonstration exercises in regional input-output analysis has been compiled by Miernyk et al. (1967), Richardson (1972) and Schaffer (1976).

⁴¹ For partial survey methods see e.g. Miller & Blair (1985) and Saurio (1986).

⁴² A precise definition of a non-survey method is difficult, because in practice all input-output tables are hybrid tables based on semi-survey techniques, employing primary and secondary sources to a some extent. As a consequence, all regional input-output tables have relied on the use of indicators, ad hoc judgement or some kind of data-smoothing techniques (Round, 1983). Miller & Blair (1983) argue that it is always possible to debate whether or not a survey-based table is a true presentation of an economy. As a consequence survey-based tables could be considered to be the target which the regional tables are designed to replicate.

⁴³ These are so-called single-region methods. These methods outlined here are directed towards the construction of a regional input-output table. However, attention has also been paid to circumventing the cost of constructing a regional input-output table (e.g. Davis, 1976; Burford & Katz, 1977; Burford & Katz, 1981; Harrigan, 1982; Katz &

- 1) Commodity balance approach
- 2) Location quotients
- 3) Iterative methods

In the commodity balance approach estimated regional commodity demand is matched with regional commodity supply (Isard, 1953; Schaffer & Chu 1969; Morrison & Smith, 1974). Many variants of location quotients have been employed as non-survey techniques (see e.g. Schaffer & Chu (1969), Hewings (1971), Morrison & Smith (1974), Flegg et al. (1995) and Flegg & Webber (2000). Round (1983) states that the number of examples of the use of LQs must be legion. A third non-survey approach is to use an iterative balance method of which the RAS (biproportional matrix adjustment) method is an example⁴⁴.

Iterative methods are expected to perform better than other non-survey methods because more information is assumed to be available. As Round (1983) points out it is important to notice that all the RAS methods focus on generating regional input-output coefficients with known total intermediate sales and purchases in the region; i.e., there is more information than can be assumed in other non-survey methods.

In this study we adopt the location quotients approach. We compute the regional input coefficients, r_{ij} , by the corresponding national coefficients, a_{ij} , using the formula

$$r_{ij} = t_{ij} * a_{ij}, \quad (1)$$

i.e., where r_{ij} is the regional coefficient, t_{ij} is the trading coefficient estimated using location quotients (LQs) and a_{ij} is the national coefficient. Therefore

$$\hat{r}_{ij} = \text{LQ}_{ij} * a_{ij} \quad (2)$$

LQs⁴⁵ are thus a way of estimating trading coefficients.

Burford, 1982). Regional sectoral multipliers are derived in situations where no complete regional input-output table exists. The 1960s saw the rapid development of non-survey methods for generating regional input-output tables. In the early 1980s and late 1970s the interest was in the derivation of regional input-output multipliers in a situations where no table exists. Miller & Blair (1985) state that three of the most frequently used types of multipliers are those that estimate the effects of the exogenous changes on a) outputs of the different sectors in the economy, b) income earned by households as a result of the new outputs and c) employment that is expected to be generated because of the new outputs. The simple output multiplier for sector j , O_j , is given by $O_j = \sum_{i=1}^n \alpha_{ij}$, where elements of the Leontief inverse $((I-A)^{-1})$ is presented by α_{ij} . The sector j output multiplier is then defined as a sum of the elements in the column j of the Leontief inverse. The simple household income multiplier for each of the n sectors is $H = H_R (I-A)^{-1}$, where H_R is the n -element household input coefficient row. The simple household employment multiplier is defined as $E = W_R (I-A)^{-1}$, where W_R is the vector of the physical labor input coefficients.

⁴⁴ Studies testing the RAS method include, e.g., Czamanski & Malizia (1969), McMenemy & Haring (1974), Morrison & Smith (1974), Malizia & Bond (1974) and Harrigan et al. (1980).

⁴⁵ Sectors where $\text{LQ} < 1$ are reduced by multiplying them, for example, by SLQ, CILQ or FLQ, i.e. increasing the import coefficients by a corresponding amount. No adjust-

A number of possible variants of quotients have been proposed and tested. The rationale for these alternatives are discussed in, e.g., Schaffer & Chu (1969), Morrison & Smith (1974), Round (1978), Harrigan et al. (1980), Flegg et al. (1995) and Flegg & Webber (1996, 1997, 2000).

How can the performance of given method of compiling regional input-output tables be assessed? Schaffer & Chu (1969) raised a crucial question in their seminal paper on how good these techniques are as generators of regional input-output tables. Harrigan et al. (1981) argue that the accuracy of the estimates derived using these techniques remains largely untested because of the absence of the comparable survey-based data. Jensen (1980), Stevens & Trainer (1980) and Jensen & Macdonald (1982), Harrigan et al. (1980) and Butterfield & Mules (1980), in the course of assessing the relative performance of different formulae, have discussed the general nature of the errors present in regional input-output analysis. These reveal the performance of individual methods within the context of the overall performance of the regional input-output model (see e.g. Round, 1983).

A measure of the difference between actual and surrogate matrices or vectors of elements are also required. Schaffer & Chu (1969), Czamanski & Malizia (1969), Morrison & Smith (1974) and Harrigan et al. (1980) are the earliest attempts to measure the difference between actual and surrogate matrices⁴⁶. In Finland Eskelinen & Suorsa (1980) and Eskelinen⁴⁷ (1983) conducted a comparison between survey and nonsurvey methods. The measures used were the Theil measure of information content (Czamanski & Malizia, 1969), Theil information index and chi-square (Schaffer & Chu, 1969). Subsequent studies used, e.g., the index of relative change, the similarity index, the correlation coefficient and regression methods. The properties and performance of these statistics were discussed in Harrigan et al. (1980) and Smith & Morrison (1974). Difficulties arose, for example, in how to accommodate zero elements (chi-square method) and the sensitivity of the measures to the size of the coefficients.

More recent studies use novel measures such as the mean weighted error, mean weighted absolute error and mean weighted relative error (see. Flegg & Webber, 2000). A serious problem that applies to all the measures used is that there is no clearly defined benchmark for the measures (see e.g. Round, 1983). However, as Harrigan et al. (1980) argue, no single measure of the distance be-

ment is made in the sectors with an LQ above one (Flegg *et al.*, 1995). See Isard (1960) for a discussion of simple location quotients. A potential drawback of SLQ is that only the size of the selling industry is taken into account. See Miernyk (1968) for a description of the CILQ. Morrison & Smith (1974) argue that a potential failure of the technique lies in its (in)ability to take account of the regional size.

⁴⁶ Miernyk (1969) argue that for example Czamanski & Malizia (1969) have provided the kind of empirical evidence which has been lacking so far to support *a priori* arguments that adjusted national coefficients do not reflect true structural differences among regions.

⁴⁷ Eskelinen (1983) analyses the shifts in input coefficients between 1970 and 1975. Technically they equal the measure of the distance between matrices. The indicator used is the average percentage difference and so called sensitivity index, which shows by how many per cent the input coefficient can change without causing a change of over 100 per cent in the gross output in any industry.

tween actual and surrogate matrices (or vectors of elements) can be deemed preferable to the others. Jensen (1980) states that one obstacle is the failure to agree on acceptable levels of accuracy in the use of model. Jensen & MacDonald (1982) are of the opinion that there is some agreement that the accuracy requirements will vary according to intended use of the table, but no agreement on how to assess them. Miernyk (1976) considers any error in excess of 50 per cent to be unacceptable, errors greater than 100 per cent to be large and those greater than 500 per cent to be very large.

In sum, there are attempts to compare actual and surrogate input-output matrices statistically. In addition there are attempts to compare actual and surrogate vectors of sectoral multipliers, outputs or imports. Round (1983) points out that comparisons of vectors are as problematic as comparisons of matrices. Morrison & Smith (1974) found that the RAS technique produces superior simulation measures of distance. It was somewhat surprising that the best of the tested purely nonsurvey approaches was the SLQ. The SLQ was also the most successful in the earlier work by Schaffer & Chu (1969). However, Miernyk (1976) argues that the RAS method is not a satisfactory way of deriving a regional input-output table from the national counterpart in spite of the elegance and mechanical nature of the method.

The notion regarding the accuracy of surrogate matrices or vectors is also bound up with the use of a regional input-output table. Jensen (1980) distinguishes partitive and holistic accuracy. The term partitive accuracy denotes cell-by-cell accuracy and holistic accuracy refers to the general consistency of the whole matrix. Jensen & West (1980) show with respect to partitive accuracy that more than fifty per cent of the smaller coefficients in the table can be set equal to zero before a ten per cent error appears in the input-output multipliers. As a consequence larger coefficients are more important in multiplier formation than lower coefficients (see also Park et al., 1981). However, Jensen (1980) argue that with existing data sources and research resources partitive accuracy in regional input-output tables is not an achievable goal. Jensen (1980) also argue that non-survey tables should be judged primarily in terms of their ability to represent the economic structure of the region in holistic sense⁴⁸; i.e., an appropriate approach to holistic accuracy would be to compare the size and ranking of multipliers derived from the two tables. In our study the interest is in general consistency. Therefore we compare the column sums produced by LQs and surveys for several regions⁴⁹ rather than cell-by-cell dissections. Also, Miller & Blair (1983) used aggregate or holistic measures, such as output multipliers, as a basis for comparing input-output matrices. Moreover, Burford & Katz (1981) emphasize the strong effect that the column totals of regional coefficients have on the output multipliers.

⁴⁸ However, many of the tests used in the comparison of non-survey tables with survey-based tables have been tests of partitive accuracy.

⁴⁹ Butterfield & Mules (1980) argue that the ultimate test of a nonsurvey method should be its ability to estimate coefficients (as well as multipliers) for a variety of regions. A method that passes this test could confidently be used for a region without a benchmark.

To summarize the overall result of the attempts that have been made to compare actual and surrogate input-output matrices is, first, that the LQs in general understate regional trade, leading to unacceptable adjustments. Secondly, the RAS method seems to provide reasonable surrogates for regional coefficients and multipliers. Third, a very promising variant of the location quotient technique to date has been the FLQ formula and variants on it. McCann & Dewhurst (1998) argue that accuracy of the approach deserves further investigation. Empirical work, especially, is needed concerning the formula by using data for several regions of different sizes.

Valuing non-market cultural goods

Hanemann (1994) argues that when cost-benefit analysis started in the USA in the 1930s, economic valuation was based on market prices; i.e., an appropriate market price was ascertained which could serve as the basis of the valuation. Economic theory evolved and economics was not seen just as the study of markets but more generally as the study of human preferences and behaviour⁵⁰. This made room for non-market valuation. If no market for a good exists, there will still be a latent demand curve. This demand curve could be revealed by either an indirect or direct method⁵¹. Arrow et al. (1993) argue that no method other than the contingent valuation method (CV -method) is capable of providing information on the value of goods satisfaction with which derives from their mere existence independent of their active use of it⁵².

The contingent valuation method (CV-method) was first proposed by Ciriacy-Wantrup (1947). The rationale of the CV -method has been discussed in Cummings et al. (1986) and Mitchell & Carson (1989). The most important landmarks⁵³ of the CV -method have been: 1) the EPA (Environmental Protection Agency) conference in 1984⁵⁴, 2) the publication of Mitchell & Carson (1989),

⁵⁰ The paradigm shift was allowed following theoretical innovations by Hotelling (public utility pricing), who perceived that the most appropriate welfare criterion is the maximization of aggregate consumers' and producers' surplus and by Samuelsson, whose theory of public goods illustrated that the valuation of public goods could be based on the vertical aggregation of individual demand curves. These innovations lead to the paradigm shift contributing to the emergence of the non-market valuation (for the development of the non-market valuation see Hanemann, 1992).

⁵¹ See Mitchell & Carson (1989) for behaviour-based methods of valuing public goods.

⁵² This is so called existence value. The origin of existence values can be found Krutilla (1967).

⁵³ Moisseinen (1997) argue that other factors affecting the development of the CV -method are: 1) environmental problems have given external impetus for the use of CV; 2) the commonly used mean measure is consistent with Pareto efficiency and cost-benefit analysis; 3) willingness-to-pay values are more reliable than willingness-to-accept values; 4) legislation in the USA has brought about a practical context for lost non-use values; and 5) the general strategy of assessing the validity of applications by comparing the results with those produced by other valuation methods or studies. In fact there are also two more ways of validating CV results, namely, replication and comparison with actual behaviour (see e.g. Hanemann, 1994),

⁵⁴ The conference aimed at assessing the state of the art of contingent valuation studies by leading practitioners, other economists and psychologists (see Cummings et al., 1986)

which has become the standard reference on contingent valuation, 3) publication of Carson et al. (1992) for the State of Alaska's contingent valuation survey⁵⁵, 4) the Exxon symposium (Hausman, 1993)⁵⁶, and 5) the NOAA (National Oceanic and Atmospheric Administration) panel report by Arrow et al. (1993)⁵⁷. A major issue in the development of CV is that until the mid-1980s most CV surveys used some version of an open-ended question (Hanemann, 1994). However, in markets, similarly as in voting, people face discrete choices: "This good costs € 10, do you want to buy it"?. Bishop & Heberlein (1979) were the first to use this binary choice technique⁵⁸. An important issue is how willingness-to-pay varies with factors that could reasonably be expected to influence it (embedding effect). The embedding effect was introduced by Kahneman & Knetsch (1992). With contingent valuation the researcher will get the same willingness-to-pay, whether valuing one lake or ten lakes, as in the study by Kahneman (1986), where respondents were willing to pay to clean up fishing lakes equally in a specific region of Ontario as in all of Ontario⁵⁹.

Our study focuses on the use of contingent valuation to measure the value for cultural goods. Our aim is to clarify the willingness-to-pay to maintain the Central Finland Museum of persons of 18 years of age and over and resident in Jyväskylä and of factors which affect this willingness in the light of the NOAA Panel (Arrow et al., 1993) guidelines⁶⁰ for applications of the contingent valuation method. The CV method has mostly been applied to the valuation of environmental goods and benefits and only occasionally to cultural goods⁶¹. The bibliography by Carson et al. (1994) lists 1600 studies worldwide on such topics as the environment, health, arts and transportation⁶². The bibliography by Noonan (2002) lists 53 CV studies on the arts and culture. Most of these studies have been targeted at publicly supported cultural activities. Definitions of what con-

⁵⁵ In 1989 the oil-tanker Exxon Valdez ran aground on Bligh Reef in Prince William Sound, Alaska. 11 million gallons of crude oil spilled into the sea. In the wake of the accident a state-of-the-art study (Carson et al., 1992) was carried out to estimate lost existence values with the contingent valuation method.

⁵⁶ Several empirical and theoretical CV studies were presented at the Exxon symposium in spring 1992 and published in Hausman (1993).

⁵⁷ The National Oceanic and Atmospheric Administration (NOAA) appointed a panel of experts to consider whether CV can produce accurate estimates of non-use values in damage suits (see e.g. Portney (1994)).

⁵⁸ This methodology is based on the random utility model for individual preferences.

⁵⁹ Hanemann (1994) argue that the embedding effect has come to mean several different things: 1) scope effect, 2) sequencing effect and 3) sub-additivity effect.

⁶⁰ The guidelines for CV surveys concern among others the design of the study and the format used to elicit willingness-to-pay. The principal sources of the biases connected with contingent valuation studies, the conditions that promote their occurrence and the approaches that may be used to minimize their effects are presented in Mitchell & Carson (1989).

⁶¹ Pommerehne (1992) argue that in the 1980s the economics of art and culture were a largely unknown subject. However, the work of Baumol & Bowen (1966) and Peacock (1969) marked the starting point of the economics of art and culture as a distinct discipline within the field of economics. A specialist scientific journal, the *Journal of Cultural Economics*, was founded in 1977. See also Throsby (2001) for the development of cultural economics.

⁶² In Finland the first applications of the CV -method were Sipponen (1987), Sievänen et al. (1992), Ovaskainen et al. (1992) and Mäntymaa (1993).

stitute cultural goods have been very broad. Culture-related CV studies include e.g. Throsby & Withers, 1983, Morrison & Westi, 1986, Martin 1994 and Bille Hansen, 1996 and 1997.

Many arguments have been made for the public support of culture. In studies, in addition to the existence of a funding gap, the (different) positive impacts of culture have become one of the most important arguments for public support. But how far should governments subsidise commodities which provide positive externalities. We can evaluate the economic value of such commodities by measuring people's willingness to pay for the commodity. These externalities and the surplus accrues to the consumer have, however, only seldom been measured by empirical studies, i.e. by the CV method. The change in the consumer's welfare as a result of obtaining the cultural good can be measured by willingness-to-pay, willingness-to-accept, the costs sacrificed, or the consumer's surplus. Thus CV is the only method that provides reliable results on the non-use values⁶³ of non-market items. Willingness-to-pay measures how much the consumer is ready to pay for an increase in benefit.

In this study we evaluate the economic value associated with cultural goods. Culture is increasingly linked in with tourism and plays an important and growing role in attracting visitors. But, besides persuading tourists, an even more important task of cultural services is to enrich the life of the inhabitants of the district. In this connection the CV method can be considered to be a relevant way to estimate the economic value, including externalities, of cultural activities.

1.2 Outline of the thesis

The first part of the thesis is limited to location questions, which justifies the adoption of the new economic geography as a framework. Two very important tasks in respect of the structure of the Finnish regional economy are considered, i.e., location and regional growth.

Chapters 2, 3 and 4 reports three separate empirical studies that analyses Finnish regional specialization and the regional concentration of Finnish industries. We analyse the Finnish economic structure via employment, export and production value patterns among others. We also make comparisons between our empirical findings and those of earlier similar studies. Since the main frame of our study is the new economic geography (NEG) it is connected to the kinds of topics commonly investigated in NEG studies. Our topics relate: 1) patterns of specialization 1993-2003, 2) returns to scale, 3) high technology, 3) growth 4) backward and forward linkages, 5) patterns of concentration among Finnish industries and 6) entrepreneurial activity. Our study seeks to answer the following questions:

⁶³ People who make no active use (or never intend to) of a certain item may nevertheless derive satisfaction from its mere existence. Arrow et al. (1993) argue that this existence value is the major element of non-use or passive-use values.

- 1) Has regional specialization in Finland or the regional concentration of Finnish industries increased during the post recession period between 1993 and 2003? (Chapter 2)
- 2) Is specialization higher in regions or concentration higher in industries that are dependent on the production of intermediate goods? (Chapter 3)
- 3) Are there particular industrial characteristics that lead to the higher concentration of an industry in Finland? (Chapter 3)
- 4) How regionally concentrated has growth been? (Chapter 2)
- 5) Does entrepreneurial activity or growth activity reduce regional specialization? (Chapter 4)
- 6) How good are entrepreneurial and growth activity as measures of a dynamic environment? (Chapter 4)
- 7) Which regions have the most favourable economic structure in the light of entrepreneurial and growth activity? (Chapter 4)

Chapters 2 to 4 seek to resolve many questions that have been left unanswered so far in the literature on the location problem in Finland. Studies on specialization and concentration in Finland have hardly taken account of the recession⁶⁴ Finland experienced during 1990-1993. Similarly, the connections between specialization and backward and forward linkages as well as between specialization and entrepreneurship have not been taken into account in the literature on Finland. Moreover, the connections between industrial concentration and linkages have been ignored and the connections between industrial concentration and high economies of scale/technological level of industries have hardly been analysed. Finally, in this thesis we examine the connections between specialization and growth and whether growth has been evenly distributed regionally.

The empirical findings of Chapters two, three and four deal with the crucial determinants of regional development, i.e., agglomeration (i.e., specialization and concentration) and growth. The results of the first part of this thesis are presented in more detail in Chapters 2, 3 and 4 and in Chapter 1.3, which unfolds the main results of the study.

Chapter 5 examines how new SME firms achieve a high rate of growth. Much of the literature is concerned with explaining the factors behind successful firms. Only a few studies have contrasted high-growth firms with those that grow marginally (Cooper et al., 1994; Zhao & Aram, 1995). We examine the effects of the factors involved in the start-up situation and the first seven years' development on the subsequent high growth of firms. Knowledge of the factors involved in high growth may contribute to our understanding of success in general. Moreover, high-growth firms are often notable job creators, a factor which is of considerable importance both economically and from the SME policy point of view. We analyse the significance of management, networks,

⁶⁴ There are many studies on the causes and consequences of the economic recession of the 1990s in Finland from the point of view of the effects on welfare, e.g. Kangasharju et al. (2001) and Riihelä et al. (2001).

changes in strategy and features of the environment on firms' success. The empirical findings deal with a crucial determinant of regional development, i.e., growth.

The second part of the thesis (Chapters 6, 7, 8, 9 and 10) is concerned with regional economic impact analysis. First regional input-output analysis and its use in impact analysis is considered. More specifically, the concern is with methodological questions of input-output analysis in terms of non-survey techniques, especially LQ regionalization. Second, the thesis is to examine the regional economic impact of a particular cultural event, using regional impact analysis, and, that of a cultural service, using the CV method.

Chapter 6 compares the survey-based regional input-output coefficients and production multipliers published by Statistics Finland (2000) with estimates obtained by applying location quotients (LQs) to national data. The consequences of using alternative adjustment formulae, the SLQ, CILQ and FLQ, are illustrated by an input-output model constructed for the Keski-Pohjanmaa (= K-P) region. Schaffer & Chu (1969) introduced the LQ method as a surrogate estimator of trading coefficients in regional input-output tables⁶⁵. Since the 1990s the FLQ method and its variants have been applied in adjusting national input-output coefficients. It is widely known that the main reason why the LQ method overstates multipliers is because conventional location quotients do not take sufficient account of interregional trade. However, the FLQ adjustment formula allows for both regional size and the relative size of the purchasing and supplying sectors, and has been developed to overcome the tendency of the other adjustment formulae to overstate regional multipliers. The behaviour of the FLQ formulae has not been widely analysed. Only Flegg et al. (1995), Tohmo (2004) and Lindgren (2004) have made comparisons of survey and FLQ-based regional multipliers. This thesis gives empirical support for the use of FLQ adjustment formulae in relation to a specific Finnish region.

Chapter 7 argues that the SLQ and CILQ adjustment formulae do not sufficiently take regional specialization and regional size into account. McCann & Dewhurst (1998) are laying claim to take the regional specialization into account when modelling regional economies (see also Flegg & Webber, 2000). This study compares the survey-based regional production multipliers published by Statistics Finland (2000) with estimates obtained by applying location quotients (LQs) to national data. The consequences of using alternative adjustment formulae, such as the SLQ, CILQ and FLQ variants are illustrated by an input-output model constructed for all the Finnish regions. The main objective in our study was to better take account of regional specialization and regional size when adjusting national coefficients. The aim of this study was to test the augmented FLQ, which has been developed to better account for regional specialization and regional size, and to test whether the new estimator (augmented FLQ) serves as a better basis for regional development than the conventional LQs or FLQ, and leads to better adjustments of coefficients and multipliers.

⁶⁵ The LQ method was well and truly established before Schaffer & Chu (1969).

Chapter 8 introduces an economic impact study based on regional input-output analysis. The purpose of this study was to clarify the economic impact's of a specific cultural event- the Kaustinen Folk Music Festival. Many analyses of the economic impacts of cultural goods have been performed (see e.g. Myerscough, 1988, Bohlin & Ternhag, 1990, Gratton & Taylor, 1986) and the results in general have found cultural services to have significant economic impacts on economic indicators such as consumption, employment, personal income and public income (income taxes). We use the input-output analysis as a method of examining the regional economic impacts. It is, however, surprising that hardly any economic impact studies utilizing regional input-output analysis have been conducted to determine the impact of cultural events on output, employment, personal income and public income (income taxes).

Finally, **Chapters 9 and 10** argue that the research on culture has been heavily devoted to studies linked to the legitimacy of public support for the arts. The arguments for cultural support are thus often connected with the gap in finance, the benefit experienced by the users of cultural services and the economic impact of the cultural sector. The outcome tends to be debate on whether culture ought to be supported or not. Answers to the questions How much support? And for which cultural objects? and When? are not generally given. Khakee (1994) states that the amount of support can be estimated, not only through the income and efficiency demands laid down for cultural activities, but also on the basis of people's willingness to pay for them. Willingness-to-pay can be studied by the CV method. The bibliography of Noonan (2002) lists only 53 CV studies on the arts and culture of which eight concerned museums. CV studies connected with culture include Throsby & Withers, 1983, Morrison & Westi, 1986 and Bille Hansen, 1996 and 1997. CV studies on museums include Martin, 1994, Mazzanti, 2001 and Frey & Pommerehne, 1989.

Our study clarifies the willingness of local residents aged 18+ to pay to maintain the Central Finland Museum in Jyväskylä, Finland and of the factors which affect that willingness. Willingness-to-pay is analysed with the CV method. The first aim in our study was to determine the economic value of the Central Finland Museum. The second aim of the study was to identify the factors involved in willingness-to-pay to maintain the Museum by means of a prognostic model. Furthermore, the factors characterize the high bids and the low bids respectively are analysed. Finally the difference between users (visitors) and non-users is analysed in detail.

Chapters 9 and 10 seek to resolve questions that thus far have been left unanswered in the literature on cultural problems in Finland. The value of cultural goods has not been analysed and applications of the contingent valuation method to studying the factors involved in the willingness-to-pay to maintain cultural goods has been ignored until now.

The subjects of these studies and the results reported by this thesis can be considered timely in Finland. The thesis has both academic and policy relevance to research. Although the thesis is in the field of applied economics, it also includes methodological aspects. The first part of the thesis has relevance,

especially within Finnish urban policies such as contained within the Centres of Expertise programme and Regional Centre programme. The second part of the thesis has relevance to methodological as well as regional policy matters.

1.3 Main results

Under topic I some of the main tenets of NEG, namely the spatial concentration of economic activity were investigated. We analysed Finnish regional specialization and industrial concentration. Regional growth was also examined under this heading. **Chapter 2** studied the Finnish regional specialization and industrial concentration after the severe recession of 1991-1993.

The results of the study reported in Chapter 2 present evidence of increasing post-recession specialization in Finland. Furthermore, the study indicates that the rich (southern) regions gained while the poor regions lost employment during the post-recession boom. This means that Finland took a quantum jump towards polarization during the study period. Other studies have also reported trends towards increasing agglomerative development in Finland (see e.g. Ritsilä, 2001). The study also suggests that no single process was driving all sectors in the same direction. This means that the agglomerative forces are industry-specific, i.e., increasing concentration affects specific industries.

Our study also implies that growth was not even regionally; that is, a larger proportion of an industry's employment became increasingly concentrated in a smaller number of regions. This result confirms the observation of uneven regional growth, especially after the severe recession of the early 1990s (see e.g. Tervo, 2005). However, a growing market is usually seen as a dispersion force opposing agglomeration. In contrast, concentration, especially in the growth of the chemicals, paper, wholesale and retail trade and electricity industries, was reflected in an increasing concentration of employment in the post-recession period.

The results also suggest that the industrial strengths of regions, measured by location quotients, were also the fastest growing regional industries at the end of the 1990s. At the EU level regions have evaluated what their most important branches of industry (strengths) are and defined their focal areas of development. In so doing, regions aim to emphasize their advantages and allocate their limited resources in accordance with their focal areas. The ultimate target of these development strategies is to enhance the region's competitiveness and viability. The fact that in Finland, the regional industrial strengths also turned out to be the fastest growing regional industries also confirms that European integration contains forces that tend to strengthen specialization and concentration.

Chapter 3 analysed the characteristics of most concentrated manufacturing industries in Finland. The main focus of the study is the backward and forward linkages in the Finnish manufacturing industries. Thus, the study also

provides some other interesting industry-related outcomes as well as knowledge of regional specialization.

The results show increasing specialization in Finland between 1995 and 1999; i.e., at least some industries showed increased geographical concentration. Thus there was no single process driving all industries in the same direction. These outcomes are not surprising, since many economic activities show marked geographical concentration and previous studies have reported increasing regional specialization and industrial concentration in Europe (e.g. Puga, 1999; Monfort & Nicolini, 2000); Amiti, 1998; Niiranen, 1997, 1999 and Koutaniemi, 2003)

The results also suggest that the most concentrated industries have high economies of scale or a high level of technology. These results are predictable. However, this is the first time this kind of analysis has been implemented with Finnish data. International studies (Midelfart-Knarvik et al., 2000, 2002; Hallet, 2000 and Brühlhart, 1998a,b) have found that industries with increasing-returns industries and technology-intensive industries tend to be more agglomerated than average.

The most concentrated industries were found to be more reliant on imports from other countries than on intra- and inter-industry linkages. This interesting result indicates that there was no home-market effect, meaning that upstream firms are located in areas where there are relatively many downstream firms. This is an important result, because linkages are at the centre of the location theory (Venables, 1996; Krugman & Venables, 1995). The interaction between trade costs, increasing returns to scale and linkages creates the possibility of cumulative causation, leading to the formation of new centres of activity (Venables, 1996, 1998; Tervo, 1999). However, it may turn out that linkages are found to be less important in moulding the regional economic structure than, for example, scale economics or spillovers. In Finland it might also be the case that changing technology and the shift in economic policy thinking towards research & development and technology, and the gravitation towards international trade and collaboration played a more important role than industrial linkages in shaping industrial concentration patterns in Finland in the 1990s.

On the regional level our findings support the assumption that when the proportion of intermediate goods used in the production of final goods is higher, the level of specialization will also be higher. This is due to the industrial structure of the most specialized regions, characterized by the powerful paper, wood and metal industries, which all use a large proportion of intermediate inputs in their final products.

Chapter 4 analysed the entrepreneurial and growth activity as a measure of the dynamic environment. We also examined the role of the entrepreneurial and growth activity on regional specialization. This is the first time this kind of analysis has been carried out with Finnish data. Firstly the results show that the indicators used were very well suited to measure the dynamic environment, especially in manufacturing, since the regions with the most dynamic environ-

ment were areas with high small-business activity. The entrepreneurial activity indicator, used in the study, has been used previously in Finland (e.g., Niitykangas et al., 1994). This study also supports the use of the entrepreneurial activity indicator as a reasonably reliable measure of the dynamics of regional entrepreneurship (and of the environment). Furthermore, the study indicates that growth activity should be taken into account when examining regional development through the concept of the dynamic environment.

Secondly, the study suggests that entrepreneurial activity and growth activity decrease regional specialization, i.e., the regions with the highest regional specialization are characterized by the lowest levels of entrepreneurial activity and growth activity. Our study, with Finnish data, confirms the findings of Dumais et al. (2002) that new plant births play a deagglomerating role. The results of the study also indicate that growth activity tends to act to reduce regional specialization. As a whole, the results suggest that regional specialization is the result of a dynamic process in which plant births and growth act in unison.

Chapter 5 analysed the high growth of firms. The article seeks to contribute to our understanding of how new firms achieve a high rate of growth. We examined the importance of management, networks, changes in strategy and features of the environment. The firms of interest were the best performing firms drawn from a group of new firms studied in a longitudinal project focusing on their development during 1990-1997. First, the results of Chapter 5 show that the founders of high growth firms had different motives than those of other firms' founders. The presence of positive situational and pull factors were important motivating factors in the creation of a new high growth business.

Second, the study showed a clear connection between styles of management and high growth. In entrepreneurial team-driven firms the members of the entrepreneurial team participate directly in the activities of the firm. They also handle the firm's interest group relationships. Moreover the strategic management of the firm is driven by a group of people (entrepreneurial team). Our study, with Finnish data, also confirms that a firm's internal (entrepreneurial teams) and external personal networks bring about competitive advantage, innovations and efficiency. These networks are of importance in achieving high growth.

One interesting outcome of the study is that the change in product policy (developing new products) in the third year of operation did not explain the high growth of firms. Instead, in the critical operational phase of entrepreneurship, the best performing firms were more active in developing new markets. This suggests that they have the ability to make changes in their production process to complement an active market development strategy. The results also suggest that firms have equal chances for growth independently of their locality. If this result holds more generally it would mean that, for example, located social capital, externalities and spillovers play a limited role in the growth of firms, contrary to NEG. However, the firms studied were newly established

metal-based manufacturing and business service firms in Finland, and thus this result can not be generalized to other sectors.

Turning to the second part of the results, **Chapter 6** dealt with the regionalization of input-output coefficients and multipliers. The study compared the survey-based regional input-output coefficients and production multipliers published by Statistics Finland (2000) with estimates obtained by applying location quotients (LQs) to national data. The finding is that the SLQ and CILQ both produce highly misleading regional input-output coefficients and multipliers in the case of a small regional economy, the K-P-region. These adjustment formulae are clearly not good enough for the purposes of local policy making and regional planning. This outcome is not surprising, as previous studies have reported similar results (see e.g. Smith & Morrison, 1974; Flegg et al. (1995); Flegg & Webber, 1996; Harris & Liu, 1998; Harrigan et al., 1980). Another finding in Chapter 6 is that the FLQ formula yields much better regional input-output coefficients and multipliers than the SLQ and CILQ. In fact, the FLQ gives very good estimates for regional multipliers in nearly all industries. We find that the difference between the multipliers generated by the FLQ and the survey-based K-P regional multipliers is on average about -0.3%.

In **Chapter 7**, we tested how good are estimates that the augmented FLQ, which has been designed to better take account of regional specialization and regional size, produces for regional imports and multipliers. The results show first that the SLQ and CILQ adjustments produce highly misleading multipliers compared with the survey-based regional multipliers. As a consequence these adjustment formulae can not be considered as an adequate measure for regional multipliers and a good enough tool for regional planning. These results are predictable. Secondly, Chapter 7 found that the augmented FLQ gives better estimates for regional imports and regional multipliers than the conventional LQs. Consequently, the augmented FLQ better captures regional specialization and the size of the local industry than the conventional LQs. We find that the difference between the multipliers generated by the augmented FLQ ($\delta=0.2$) and the survey-based regional multipliers is on average about 0.09. Third, we also tested whether the inclusion of a measure of regional specialization yields more accurate simulations compared to the reformulated FLQ. The test showed that the inclusion of a measure of regional specialization in the FLQ formula does not appear to offer more accurate results.

Chapter 8 conducted a regional economic impact study based on input-output analysis. The results of the study highlight the importance of cultural tourism to a regional economy in terms of the economic impact on the local community of visitors to the Kaustinen Folk Music Festival. The results indicated first that the effects of the Kaustinen Folk Music Festival on output are about MEUR 1.7. Regional tax revenues increased by about EUR 66.800. This implies that Kaustinen Folk Music Festival can be seen as a good investment for the local municipality as the annual subsidy awarded to the Folk Music Festival has, at its highest, been EUR 40.365. Secondly, Chapter 6 found that although the input-output-method is laborious and statistically complex, it is a very suit-

able way of measuring the impact of cultural events or tourism on local economies.

In **Chapters 9 and 10**, we clarified the willingness-to-pay to maintain the Central Finland Museum and of the factors which affect willingness-to-pay among residents of Jyväskylä, filled age 18+. Willingness-to-pay is analysed with a CV method. The study offers many interesting results concerning the overall valuation of the Central Finland Museum, factors affecting willingness-to-pay and the difference between users and non-users. The results show first that Jyväskylä residents contribute less in taxes to the Central Finland Museum than they report that they are willing to pay. Secondly, Chapters 9 and 10 illustrate the factors affecting willingness-to-pay, including other use of culture, such as visits to art exhibitions and concerts. Furthermore, we find that different factors among the high bids compared to low bids explain the respondents' willingness to pay to maintain the Central Finland Museum. Among the low bids the motivating influences were more frequently the number of visits made to the Museum. Among the high bids an attitude towards the amount of taxpayers' money that are set aside for the Central Finland Museum was more frequently cited as the underlying motive for willingness-to-pay. Intention to next visit the Museum also explains the respondents' willingness to pay to maintain the Central Finland Museum. Furthermore, the results of the study indicate that although a large proportion of the respondents had not visited the Museum very often and did not intend to visit it in the near future, they reported willingness-to-pay for the existence of the Museum and for the possibility to visit it in the future. As a consequence the Museum has non-use value.

In tables 1 and 2 we present a summary of the empirical studies reported in the thesis. The focus and main results of each study are presented. The background to Part I of the thesis and the empirical findings of Part I were to provide a proper and solid explanation for regional specialization, industrial concentration and to broaden understanding of the causes and consequences of agglomeration and regional economic development processes. Likewise the background to Part II of the thesis and the results the Part II were to test the capacity of the FLQ to produce accurate coefficients and multipliers for regional policy purposes. In Part II we apply the regional input-output method and CV method to analyse the regional economic impacts of cultural items. We seek to broaden understanding of the impact of cultural goods on the local economy.

TABLE 1 Summary of the main focus and results of the empirical studies

Topic I		
Chapter	Main focus	Main results
2	<ul style="list-style-type: none"> * Specialization in Finnish regions and concentration of Finnish industries after recession years 1991-1993. * How concentrated has growth been during the post recession period in Finland? 	<ul style="list-style-type: none"> * Specialization increased after the recession * Rich regions gained and poor regions lost employment during the post-recession boom. * There was no single process driving all sectors in the same direction. * Growth has not been even across regions.
3	<ul style="list-style-type: none"> * Characteristics of the most concentrated industries in Finland. * Backward and forward linkages in the Finnish manufacturing industry. 	<ul style="list-style-type: none"> * The most concentrated industries have high economies of scale (petroleum and transport equipment) or a high level of technology (electronics). * The most concentrated industries were found to be more reliant on imports from other countries than on intra and inter industry linkages.
4	<ul style="list-style-type: none"> * How good as measures of dynamic environment are entrepreneurial and growth activity? * The role of entrepreneurial and Growth activity on regional specialization. 	<ul style="list-style-type: none"> * Indicators of entrepreneurial and growth activity are very good measures of the dynamic environment. * Both entrepreneurial and growth activity in regions reduces regional specialization.
5	<ul style="list-style-type: none"> * High growth of the new metal-based manufacturing and business service firms in Finland. * How do new firms achieve a high rate of growth? 	<ul style="list-style-type: none"> * High growth firm founders have different motives from others for setting up a business. Among them positive situational and pull factors are more important motivating factors in the creation of a new business. * High growth firms were characterised by an ability to make changes in their production process to complement their active market development strategy. * Local environmental characteristics did not affect the growth of new firms.
Topic II		
Chapter	Main focus	Main results
6	<ul style="list-style-type: none"> * To compare the survey-based regional input-output coefficients and production multipliers (Statistics Finland, 2000) with estimates obtained by applying location quotients (LQs) to national data. 	<ul style="list-style-type: none"> * The SLQ and CILQ both produce highly misleading regional input-output coefficients and multipliers. * The FLQ gives very good estimates for regional multipliers in nearly all industries.
7	<ul style="list-style-type: none"> * To test the augmented FLQ formula for regionalization of national input-output coefficients and multipliers. * How good are the estimates of regional coefficients and multipliers produced by LQs. 	<ul style="list-style-type: none"> * The SLQ and CILQ produce highly misleading multipliers compared with survey-based regional multipliers. * The augmented FLQ serves better as a basis for adjusting the national coefficients and multipliers than the conventional LQs. * The inclusion of a measure of regional specialization in the FLQ formula appears not to offer more accurate results than the reformulated FLQ.

TABLE 2 Summary of the main focus and results of the empirical studies

Topic II		
Chapter	Main focus	Main results
8	<ul style="list-style-type: none"> * Economic impact study based on regional input-output analysis. * What are the effects of certain cultural event, namely the Kaustinen Folk Music Festival, on output, employment, demand and taxes? 	<ul style="list-style-type: none"> * Effect of the Kaustinen Folk Music Festival on output is about MEUR 1.7. * Regional tax revenues increased by about EUR 66.800.
9	<ul style="list-style-type: none"> * Willingness to pay to maintain the Central Finland Museum among residents of Jyväskylä aged 18+. * Factors affecting willingness to pay among the high bids and low bids. 	<ul style="list-style-type: none"> * Jyväskylä residents contribute less in taxes to the Central Finland Museum than they report that they are willing to pay. * Different factors among the high bids and among the low bids does explain their relative willingness to pay to maintain the Central Finland Museum.
10	<ul style="list-style-type: none"> * To determine the economic value of the Museum of the Central Finland. * Factors affecting willingness-to-pay for the Museum. * The difference between users (visitors) and non-users 	<ul style="list-style-type: none"> * Maintenance of the Museum can be legitimised on the basis of the public's willingness-to-pay. * At least the present amount of tax revenue can be justifiably be targeted at the Museum. * Construction of a prognostic model of the willingness to maintain the Museum. * The Museum has non-use value.

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CHAPTER 11

CONCLUDING REMARKS AND DISCUSSION

Ottaviano (2003) argues that the spatial distribution of economic activities is the central concern of regional policy due to its welfare implications¹. The spatial concentration of economic activity - one of the main concerns of NEG - has widely been measured by concentration indices of agglomeration and by concentration regressions. This thesis provides several insights into regional policy and regional development. First, the results of the first part tentatively suggest that regional specialization has increased since the recession 1991-1993 in Finland. Furthermore, rich regions have gained and poor regions have lost employment during the post-recession boom. When studying the welfare effects of agglomeration, Ottaviano & Pinelli (2004) state that there are two main view points: efficiency and equity. Ottaviano & Thisse (2002) argue that equity is

¹ Ottaviano (2003) present six key implications of NEG models: 1) regional side effects, 2) trade interaction effects, 3) threshold effects, 4) lock-in effects, 5) selection effects and 6) coordination effects. Regional side effects imply that all sorts of non-regional policies can have regional effects. Trade interaction effects mean that the impact of regional policies depends on the extent of trade integration. Threshold effects mean that there is *a priori* great flexibility in the location of economic activities, but once spatial differences take shape they become quite rigid. Lock-in effects mean that even temporary policy shocks can have permanent effects on the economic landscape. Selection effects mean that policy interventions can play an important role in selecting which distribution of firms will be reached in the long run. Coordination effects arise when the complexities of forward-looking behaviour become relevant. Expectations (rather than history) determine which spatial landscape will emerge. Expectations may become self-fulfilling and public authorities may shape the economic landscape by coordinating firms' expectations. Tervo (2000) has also analyzed the implications of the new economic geography on regional development by considering the regional concentration process in Finland, the importance of migration on that development process and whether regions can affect their own development and to what extent.

based on the distinction between mobile² and immobile individuals. Young and skilled people are typically those who gain from agglomeration because they have a higher probability of migration. They are able to move to areas that provides more and better jobs, a larger variety of goods and services and better matching in the labour markets. The losers from agglomeration are individuals who are immobile, elderly and unskilled.

In sum, specialization and concentration may provide many strengths and opportunities. If a region evaluates its most important branches of industry, defines its focal areas of development and emphasizes its advantages, and allocate its limited resources in accordingly, the growth and development of that region may turn out to be fast. The disadvantage of increasing specialization and geographical concentration is a one-sided economic structure and inflexibility during a period of recession.

Second, the findings of this thesis indicate that there is no single process driving all sectors in the same direction. This finding offers an insight into the question of how to implement and promote regional policy. As a consequence, on the regional policy level, attempts could be made to influence the development of industries (and firms) via industry-specific policies, as concentration and agglomeration seem to rely on economies of scale and high technology. Also, targeting firms with the highest growth and new firms with the highest growth potential would be reasonable in the context of regional development policy.

Third, our research argues that both entrepreneurial and growth activity in a region reduces regional specialization. This implies that there is a rationale for political measures promoting either firm births or firm growth or both. An interesting finding is that growth has not been even across regions. This might have impact on economic development, leading to increasing specialization and concentration.

The overall conclusion of the first part of the study relates to the issue of how new firms achieve a high rate of growth. The results show that the firms have equal chances for growth independently of their locality. This implies, that there is a rationale for policy measures promoting growth processes in firms irrespective of the firm's locality. The key processes in the growth of firms were connected to development of new markets and the ability to make changes in their production process, at least in the case of newly established metal-based manufacturing and business service firms in Finland.

One regional policy alternative is to try slow down agglomeration through subsidies to peripheral areas or try to influence the migration flows. Another way is to allow for agglomeration while redistributing its gains to posing regions. If agglomeration is driven by pecuniary rather than technological externalities, redistribution of income may lead to the dispersion of economic activities (by reducing gains from externalities). Pecuniary externalities also depend on the level of trade costs. Ottaviano & Pinelli (2004) argue that when non-market interactions (knowledge spillovers) dominate and when trade costs are

² Cultural barriers and linguistic barriers are impediments to mobility.

high or low, policy makers achieve efficiency by allowing for agglomeration while pursuing equity through interregional redistribution. In turn, if market interactions dominate and trade costs are intermediate, agglomeration should be slowed down.

Midelfart-Knarvik & Overman (2002) identify three possible roles for policy³:

- 1) Change endowments
- 2) Change the balance and strength of agglomeration and dispersion forces by facilitating deeper integration
- 3) Directly affect the location of particular sectors through aid programmes

Regions and nations may try to influence the geographical distribution of different factors. This tends to occur in situations where location patterns are driven by comparative advantage. By infrastructure investments in transportation or telecommunications, for example, policy makers can change the balance between the forces of agglomeration and dispersion. Policy may also directly, through aid programmes, encourage the relocation of firms or affect the location of different sectors. What are the economic consequences of the use of government policies to influence the location of economic activities? Midelfart-Knarvik & Overman (2002) found that EU aid has a significant impact on the location of R&D-intensive activities i.e. EU policy interventions have attracted R&D-intensive industries to locations without large endowments of high-skilled labour. In fact EU aid is acting counter to market forces, as the Commission intended it to.

The thesis has especial relevance within Finnish urban policy making initiatives, such as the Centres of Expertise programme and the Regional Centre programme. The Centres of Expertise Programme (started in 1994) supports regional specialization as well as cooperation between different Centres. The aim of the program is to utilize the economies of concentration, specialization and know-how to spread growth more evenly across Finland (Tervo, 2005). The Regional Centre programme, launched in 2001, aims at developing a network of regional centres based on regional strengths, development of competence and know-how and specialization of urban regions. The purpose of the program is to spread growth in the pursuit of a more balanced regional structure and enhanced global competitiveness. Regional development bodies and policy-makers may find the results of this study on regional specialization and industrial concentration of value in the task of planning future phases in these programmes.

Tervo (2005) argues that, since the 1990s, the priority of Finnish regional policy has been macroeconomic development and efficiency. Regional development and policy are seen as subordinate to the competitiveness of the country as a whole. On the national level a timely shift in policy thinking, focusing

³ The roles are identified at the national level but the classification can also be applied at the regional level.

on research & development and technology that has also had regional effects, seems to have been implemented. Finland is a small peripheral European country with low market potential and relatively high unemployment. Notwithstanding, the promotion of higher levels of education and new focus on R&D and technology (Ottaviano & Pinelli, 2004; Tervo, 2005), together with a gravitation towards international trade and collaboration, has been successful.

Tervo (2005) states that to be effective each era needs a regional policy of its own. The infrastructure policy implemented in the 1950s and 1960s affected in particular the development of regions in the north and east of Finland. The regional policy of the 1970s and 1980s aimed at encouraging manufacturing industries to locate in the designated development areas. Welfare policy, especially in the 1960s and 1970s, and the regionalization of university education in the 1970s (and 1980s also) had a levelling effect on regional development. In the 1990s the driving force in regional development, and thus regional policy, was specialization and know-how. Regional centres, i.e. the smaller towns, are the target of support seeking to utilize concentration, specialization and know-how to spread growth more evenly across Finland. Spreading the location of the universities worked effectively as a regional policy for over twenty years. Although the universities have supported R&D and technological activity, and increased job opportunities in the regions, this has turned out to be only a start. The universities are expected to become more and more active, and thus effective regionally.

The regional policy of the 1990s may be seen as nothing more than a delaying action, unless it succeeds. Does Finland need another round of policy innovation? The present finding of an increasing sectoral concentration and geographical clustering of economic activity provides a justification for a fresh emphasis on clusters. The extensive literature on social capital and trust may provide a wider footing for a cluster-based development strategy compared to the conventional Porter-based view. The earlier view of clusters could be augmented by an emphasis on non-market forms of interaction, based on trust. However, clusters as a development strategy can only be applied where locations have the economic mass necessary to support specialization (see Glasmeier, 2002).

Let us turn now to the results relating to the second part of the thesis. Round (1983) argues that the non-survey approach as a whole is in disrepute, due to the fact that many non-survey methods lack of theoretical or empirical underpinnings or that many studies apply non-survey methods out of expediency and mechanical convenience rather than logical consistency. In the 1990s a new LQ variant of the FLQ was introduced. The new method and its variants have been auspicious, although more empirical evidence on the accuracy of the method is needed. The results of the second part of the thesis, tentatively suggest that the non-survey method, the FLQ, gives very good estimates for regional multipliers. Furthermore we tested an augmented FLQ as a method of adjusting the national coefficients and found that it gives even better results than the FLQ. We also tested whether the inclusion of a measure of regional

specialization yields more accurate simulations compared to the reformulated FLQ and found that such a measure did not appear to offer more accurate results. However, the implication is that the LQ method can be used as well as a survey, to aid in decision-making regarding the development of a region. Nevertheless, the reservations⁴ expressed about the results and method should be kept in mind when using the method.

The final set of conclusions deals with the regional economic impacts of tourism. The results of the study on the economic impact of expenditure by tourists contribute to our understanding of the role of tourism (or other sectors) in regional economic development. Policy-makers may find the results of this study of value in the task of planning future tourist attractions or cultural activities. Local authorities may benefit from strengthening their efforts to sell local goods and services during, for example, a festival from making improvements to the infrastructure or putting effort into diversifying the economic structure of the region so that products used as inputs in production processes would not be sourced so widely outside the region. Also (cultural)policy-makers may find the results of the study on the factors explaining respondents' willingness to pay to maintain the Central Finland Museum valuable in their work.

Lastly, this thesis produces some ideas for further research. First of all, the empirical work related to questions raised by NEG theory has for long been very fragmentary. Therefore, much more empirical work is needed.

Second, empirical work with a historical perspective is needed to study the different roles of natural advantages, self-reinforcing processes and shocks in determining the patterns of agglomeration (see e.g. Head & Mayer, 2004). Also it would be very fruitful to study industries with different structures of linkages, transport costs and factor intensity. One area that has been neglected so far in empirical NEG studies is the role of the local infrastructure, local institutions, polity and policy issues; and state spending and interventions in specialization and concentration. A challenging research topic would be to combine NEG with labour economics and matching and search models.

Third, more empirical work is needed to give evidence on accuracy of the FLQ method and its variants. In particular, empirical work on AFLQ formula, using data for several regions of different size, would be welcomed. The AFLQ formula introduced by Flegg & Webber (2000) takes account of the regional specialization issue raised by McCann & Dewhurst (1998), who state that regional specialization must be considered when modelling regional economies. The inclusion of regional specialization and regional size may prove to be the basis for producing more accurate regional coefficients. Tests of the different formulations of the specialization term are also needed. In addition, factors other than specialization, that explain why some regional sectors may have higher input-output coefficients than the corresponding national sectors, should be tested.

⁴ Limitations on the accuracy of the input-output analysis include: a) no capacity constraints, b) linearity, c) sector homogeneity and d) constant coefficients.

Fourth, although the regional input-output method is laborious, it is very suitable for measuring the impacts of cultural events or tourism on local economies. Thus the method provides results that can be used in framing regional policy.

Fifth, the CV method can be used to measure the economic value of cultural goods, other than just museums, that have the features of a public good. Khakee (1994) argues that the amount of support to be given to cultural activities can be estimated on the basis of studies of people's willingness-to-pay for their maintenance. Thus the results of the CV studies on cultural goods could be used to aid the policy questions like how much, or to which cultural objects, support should be allocated.

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TIIVISTELMÄ (SUMMARY IN FINNISH)

Väitöskirja esittelee yhdeksän empiiristä työtä, jotka käsittelevät Suomen aluerakennetta ja alueellista vaikutusanalyysiä. Useissa tutkimuksissa on todettu talouden rakenteet melko pysyviksi. Suomeen on vaikuttanut kuitenkin 1980-luvun jälkeen kaksi keskeistä eri tekijää, jotka voivat murtaa jäykät taloudelliset aluerakenteet: a) globalisaatio ja b) vuosien 1991-1993 lama.

Johdannossa esitellään uuteen aluetalousteoriaan (new economic geography) ja taloudelliseen vaikutusanalyysiin liittyvä väitöskirjan teoreettinen tausta sekä keskustellaan väitöskirjan keskeisistä tuloksista.

Väitöskirja jakautuu kahteen eri teemaan. Ensimmäinen väitöskirjan teemoista analysoi sijaintirakenteita Suomessa, sisältäen neljä empiiristä työtä. Ensimmäinen työ tarkastelee alueiden erikoistumis-/monipuolistumis-kehitystä ja toimialojen keskittymis-/hajaantumis-kehitystä vuosien 1991-1993 laman jälkeisenä aikana. Lisäksi tarkastellaan miten keskittävää kasvu on ollut kyseisellä periodilla. Tulosten mukaan alueiden erikoistuminen on lisääntynyt ja erityisesti kehittyneet alueet ovat hyötäneet kasvusta. Osa toimialoista on keskittynyt entisestään ja osan kohdalla on tapahtunut hajaantumista. Tulokset osoittavat myös kasvavien toimialojen työllistävän vaikutuksen jakaantuvan epätasaisesti eri alueille.

Toinen empiirinen työ tarkastelee keskittyneimpien toimialojen erityispiirteitä. Lisäksi analysoidaan tarkemmin teollisuuteen liittyviä taaksepäin ja eteenpäin suuntautuvia kytkentöjä. Tulosten perusteella keskittyneimpiä toimialoja luonnehtivat tuotannon skaalaedut ja korkea teknologinen taso. Ne eivät ole riippuvaisia taaksepäin ja eteenpäin suuntautuneista alueiden sisäisistä tai alueiden välisistä kytkennöistä, vaan ovat vahvasti sidoksissa ulkomaan tuontiin.

Kolmas työ analysoi yrittäjyys- ja kasvuaktiiviteetin merkitystä alueellisessa erikoistumisessa. Tutkimuksen tulosten perusteella yrittäjyys- ja kasvuaktiiviteettiä voidaan pitää hyvinä ja luotettavina mittareina kuvaamaan dynaamista toimintaympäristöä. Lisäksi tutkimuksen tuloksena saadaan, että sekä yrittäjyys- että kasvuaktiiviteetti voimistuessaan vähentävät alueiden erikoistumista.

Neljännessä työssä tarkastellaan uusien yritysten kasvua ja erityisesti sitä, miten uudet yritykset pääsevät voimakkaan kasvun uralle. Havaitaan, että voimakkaan kasvun yritysten perustajilla on erilaiset motiivit perustaa yritys kuin muilla. Positiiviset tilanne- ja vetotekijät motivoivat heitä yrityksen perustamiseen muita enemmän. Tutkimuksen tuloksena saadaan myös, että voimakkaan kasvun yrityksillä on kyky tehdä sellaisia muutoksia tuotantoprosesseihin, jotka täydentävät niiden aktiivista markkinastrategiaa. Alueellisilla ominaisuuksilla ja erityispiirteillä ei havaittu olevan vaikutusta uusien yritysten kasvuun.

Väitöskirjan toisena teemana on alueellinen vaikutusanalyysi. Teema koostuu viidestä empiirisestä tutkimuksesta (5-9). Tutkimuksissa viisi ja kuusi testataan sijaintiosamäärämenetelmien (SLQ, CILQ, FLQ) kykyä tuottaa alueel-

lisiä panoskertoimia. Yleensä panos-tuotostaulujen laadinnassa ns. survey -menetelmää pidetään luotettavimpana. Panos-tuotosmallin soveltajien on kuitenkin usein käytettävä ns. non-survey -menetelmiä, jotka ovat halvempia ja yksinkertaisempia. Sijaintiosamäärämenetelmät ovat yksi versio kyseisistä non-survey -menetelmistä. Tutkimuksen tuloksena saadaan, että yksinkertainen sijaintiosamäärämenetelmä (SLQ) ja ristikkäissijaintiosamäärämenetelmä (CILQ) tuottavat kertoimia, joiden hyödynnettävyys alueellisen suunnittelun tukena on kyseenalainen. Sen sijaan FLQ -menetelmä tuottaa erittäin hyviä alueellisten panoskertoimien estimaatteja. Erityisesti uudistettu FLQ (reformulated FLQ) tuottaa estimaatteja, joita voidaan hyödyntää aluekehittämisessä. Tutkimuksessa testattiin myös mallia (AFLQ), joka ottaa muita menetelmiä paremmin huomioon alueellisen erikoistumisen. Malli ei kuitenkaan tuottanut parempia tuloksia kuin mitä uudistetulla FLQ:lla saavutettiin.

Seitsemännessä tutkimuksessa toteutetaan alueellinen vaikutusanalyysi kulttuurihyödykkeen (Kaustisen kansanmusiikki juhlat) tapauksessa. Tulokset osoittavat kyseisten musiikkijuhlien olevan kunnalle hyvä investointi. Juhlien vaikutukset alueen tuotantoon ja kunnallisveroihin ovat suuremmat kuin kunnan juhlille myöntämät vuotuiset avustukset.

Tutkimuksissa kahdeksan ja yhdeksän alueellisia vaikutuksia tutkitaan julkishyödykeominaisuuksia sisältävän kulttuurihyödykkeen, Keski-Suomen museo, tapauksessa. Koska kulttuurihyödykkeille ei ole markkinoita, niiden taloudellisen arvon määrittämiseksi on etsittävä muita keinoja. Tutkimuksessa selvitetään Keski-Suomen museon taloudellinen arvo ns. contingent valuation-menetelmällä. Lisäksi analysoidaan tekijöitä, jotka vaikuttavat maksuhalukkuuteen museon ylläpitämiseksi sekä kävijöiden ja museon palveluita käyttämättömien preferenssejä. Tutkimuksen päätuloksena on, että jyvaskyläläiset hyötyvät Keski-Suomen museon olemassaolosta enemmän, maksuhalukkuutensa perusteella, kuin heidän verovarajaan kohdennetaan museolle. Siten museo legitimoitui olemassaolonsa myös veronmaksajien maksuhalukkuuden perusteella. Korkeaa maksuhalukkuutta luonnehtivat eri tekijät kuin alhaista maksuhalukkuutta. Keski-Suomen museoon tehtyjen vierailujen määrä oli selittävä tekijänä alhaisen maksuhalukkuuden ryhmässä. Korkeaa maksuhalukkuutta puolestaan selitti intentio vierailla museossa.