

JYVÄSKYLÄ STUDIES IN BUSINESS AND ECONOMICS 7

Jari Ritsilä

Studies on the Spatial Concentration of Human Capital

Esitetään Jyväskylän yliopiston taloustieteiden tiedekunnan suostumuksella
julkisesti tarkastettavaksi yliopiston Agora- salissa (Ag B105)
tammikuun 26. päivänä 2001 kello 12.

Academic dissertation to be publicly discussed, by permission of
the School of Business and Economics of the University of Jyväskylä,
in Agora (Ag B105), on January 26, 2001 at 12 o'clock noon.



JYVÄSKYLÄN YLIOPISTO

JYVÄSKYLÄ 2001

Studies on the Spatial Concentration of Human Capital

JYVÄSKYLÄ STUDIES IN BUSINESS AND ECONOMICS 7

Jari Ritsilä

Studies on the Spatial Concentration
of Human Capital



JYVÄSKYLÄN YLIOPISTO

JYVÄSKYLÄ 2001

Editors
Tuomo Takala
School of Business and Economics, University of Jyväskylä
Pekka Olsbo and Marja-Leena Tynkkynen
Publishing Unit, University Library of Jyväskylä

ISBN 951-39-0859-3 (nid), 978-951-39-5086-6 (PDF)

ISSN 1457-1986

Copyright © 2000, by University of Jyväskylä

Jyväskylä University Printing House, Jyväskylä
and ER-Paino Ky, Lievestuore 2001

To Jaana, Aleksis and Tuulia

"God will be with you...always."

ABSTRACT

Ritsilä, Jari

Studies on the Spatial Concentration of Human Capital

Jyväskylä: University of Jyväskylä, 2001, 140 p.

(Jyväskylä Studies in Business and Economics

ISSN 1457-1986; 7)

ISBN 951-39-08593 (nid.), 978-951-39-5086-6 (PDF)

Finnish Summary

Diss

This thesis consists of five studies which investigate the reallocation of human capital. The mobility of human capital is considered to be one of the main elements in the spatial concentration process. The actual studies of the thesis can be subsumed under three themes: (I) Potential milieus for the conglomeration of human capital (II) Migration and labour market adjustment, and (III) The selective nature of migration and human capital flows. The empirical findings of the thesis have special reference to Finland.

The studies are preceded by an introductory chapter which provides theoretical background and outlines the content, as well as presents the main results of the thesis. The second chapter continues discussing the foundations of human capital movements, following the concept of innovative milieus. The chapter endeavours to map out regional differences in environments for enterprises. This demand side aspect of human capital logically leads to the main focus of the thesis presented in proceeding chapters.

Chapters three and four analyse the relationship between migration and unemployment. Both studies stress the role of migration in labour market adjustment. The main result of micro- and macro-level analyses is that both personal and regional unemployment have a remarkable effect on migratory behaviour. As a result of the migration process, the future prospects of regions with high unemployment will probably worsen further, while successful areas benefit from the centralising path of development.

Chapters five and six consider the selective nature of migration and human capital flows. These studies stress the role of highly educated migrants in human capital redistribution. The results suggest that migration is selective in regard to educational attainment. The highly educated are found to be more mobile and they are prone to move to urban regions with better job opportunities, as well as more numerous possibilities for self-improvement and leisure. Thus, the migratory behaviour of highly educated individuals plays a significant role in the redistribution of human capital.

Chapter seven concludes the thesis. The chapter starts by revising the main results. The restrictions and problems encountered are discussed along with the implications presented. The chapter ends by discussing the contributions and policy aspects of the thesis.

Keywords: migration, human capital, spatial concentration, labour markets

Author Jari Ritsilä
University of Jyväskylä
School of Business and Economics
Centre for Economic Research
Phone: +358 14 260 3165
Email: jarrits@tase.jyu.fi

Supervisor Professor Hannu Tervo
University of Jyväskylä
School of Business and Economics

Reviewers Dr. Aki Kangasharju
Pellervo Economic Research Institute
Helsinki, Finland

Professor Paavo Okko
Turku School of Economics and
Business Administration
Turku, Finland

Opponent Professor Paavo Okko
Turku School of Economics and
Business Administration
Turku, Finland

ACKNOWLEDGEMENTS

This PhD thesis is a result of a research project carried out at the Centre for Economic Research at the University of Jyväskylä between 1998 and 2000, while I was engaged in full-time research work supported by the Academy of Finland. As for the further financial support, I am grateful to Yrjö Jahnesson Foundation. Now it is time to thank all the people who have made completion of this thesis possible. Without the excellent supervision and co-operation of Professor Hannu Tervo, the writing of this thesis would have been impossible. My warmest and sincerest thanks go to him for his invaluable interest and effort at all stages of this process.

During my research I have benefited from the comments and suggestions of many people. I owe special thanks to my official examiners, Dr. Aki Kangasharju and Professor Paavo Okko, whose advice and suggestions for improvement of the thesis were very valuable. My gratitude goes to Dean Jaakko Pehkonen, Director Tuomo Nenonen and Professor Hannu Niittykangas, who have encouraged my studies at all stages. I would also like to thank all those I have had the pleasure of working with over the years. Marko Ovaskainen and Sari Pekkala deserve my special thanks for acting as co-authors in some of the studies. Special thanks are also due to Dr. Kari Hämäläinen, whose advice and suggestions in the econometric analysis of the thesis were vital.

I would also like to thank the School of Business and Economics at the University of Jyväskylä for providing excellent working facilities. Mrs. Jenneth Sawchuk-Vehkavuori carefully and efficiently checked a major part of the language of this thesis. I wish to thank her for her kind co-operation.

Finally, I wish to thank my family, Jaana, Alekski and Tuulia for their support and understanding. I hope that the completion of this project is as rewarding to them as it is to me.

Jyväskylä, December 2000

Jari Ritsilä

SUMMARY OF ORIGINAL ARTICLES

- Article 1** pp. 31-46 Ritsilä, J. (1999) Regional differences in environments for enterprises. *Entrepreneurship and Regional Development*, **11**, 3, pp. 187-202.
- Article 2** pp. 51-67 Ritsilä, J. and Tervo, H. (1999) Regional Differences in the Role of Migration in Labour-Market Adjustment: The Case of Finland. In G. Crampton (Ed.), *Regional Unemployment, Job Matching and Migration, Series on European Research in Regional Science*, **9**, London: Pion, pp. 166-182.
- Article 3** pp. 71-85 Pekkala, S. and Ritsilä, J. (1999) A Macroeconomic Analysis of Regional Migration in Finland, 1975-95. *Review of Regional Studies*, **29**, 3, pp. 226-240.
- Article 4** pp. 91-106 Ritsilä, J. and Ovaskainen, M. (2001) Migration and Regional Concentration of Human Capital. *Applied Economics*, **33**, 3, (forthcoming).
- Article 5** pp. 109-122 Ritsilä, J. (2000) Where Do the Highly Educated Migrate? Micro Level Evidence from Finland. University of Jyväskylä, *School of Business and Economics, Working paper, 222/2000*, Jyväskylä: University of Jyväskylä, (In referee process: *International Review of Applied Economics*).

CONTENTS

ABSTRACT

ACKNOWLEDGEMENTS

SUMMARY OF ORIGINAL ARTICLES

Chapter 1	Introduction	7	
THEME I			
POTENTIAL MILIEUS FOR THE CONGLOMERATION OF HUMAN CAPITAL			27
Chapter 2	Regional differences in environments for enterprises	29	
THEME II			
MIGRATION AND LABOUR-MARKET ADJUSTMENT			47
Chapter 3	Regional differences in the role of migration in labour- market adjustment: the case of Finland	49	
Chapter 4	A macroeconomic analysis of regional migration in Finland, 1975-95	69	
THEME III			
THE SELECTIVE NATURE OF MIGRATION AND HUMAN CAPITAL FLOWS			87
Chapter 5	Migration and regional concentration of human capital ...	89	
Chapter 6	Where do the highly educated migrate? Micro level evidence from Finland	107	
Chapter 7	Summary and conclusions	123	
SUMMARY IN FINNISH (TIIVISTELMÄ).....			140

CHAPTER 1

INTRODUCTION

1	BACKGROUND OF THE THESIS	9
1.1	Endogenous growth and spatial concentration	9
1.2	Migration and spatial concentration	11
1.3	Human capital concentration in Finland	14
2	OUTLINE OF THE THESIS	17
2.1	Motivation, aim and limitations of the thesis	17
2.2	Potential milieus for the conglomeration of human capital	19
2.3	Migration and labour-market adjustment	21
2.4	The selective nature of migration and human capital flows	22
	REFERENCES	24

This thesis embraces five studies which, from different approaches, deal with the question of the reallocation of human capital. The empirical findings have special reference to Finland. This chapter opens with a brief discussion of the background of the thesis and then presents its outline and scope. It also discusses the main results of the thesis.

1 Background of the thesis

Three basic questions of economics can be formulated as: What is produced? To whom is it produced? and How is it produced? However, mainstream economics has traditionally paid relatively little attention to the location of economic activity, i.e. to the decisions firms and households make about where to produce, sell and consume products and services. Thus, the question of “*where*” has remained minor in economics. Furthermore, the interaction of producers’ and households’ location decisions, which is the chicken-and-egg controversy of whether labour follows enterprises (jobs) or enterprises follow labour, has seldom been considered.

1.1 Endogenous growth and spatial concentration

In the last years, however, spatial questions have received growing attention from economists. As a result, location theory has got a new meaning under the concept of “new economic geography” (see e.g. Fujita et al., 1999; Tervo, 1999). Starting points of the new trend are observable in Paul Krugman’s (1991b, 1993) studies and in the book “Geography and Trade” (1991a). Krugman’s concept was based on the observation that economic activity tends to concentrate regionally into a conglomeration of enterprises and population.

In fact, the main significance of “new economic geography” is precisely in explaining the concentrations of population and economic activity. In other words, it endeavours to investigate the factors behind the distinctions between prosperous and less prosperous regions. This new era of economic geography emphasises the role of increasing returns and imperfect competition in explaining spatial concentrations. The idea of the approach is that examination of the sources of increasing returns to spatial concentration provides answers to the questions of how and why these returns change, and then how the economy’s behaviour changes with them. The explanatory factors of regional concentration determined in the approach focus on agglomeration economies, in which spatial concentration of economic activity itself creates favourable circumstances that support further and continuing concentration (Fujita et al., 1999).

The approach of “new economic geography” argues that the spatial advantages are, at least partly, endogenous. Enterprises and population tend to concentrate in centres, but centres are centres because they already abundantly possess enterprises and population. Accordingly, the approach emphasises the process of cumulative causation in regional development (see e.g. Myrdal,

1957), and the role of forward as well as backward market linkages in the evolution of agglomeration economies. The forward and backward linkages herein refer to the markets for final goods, for intermediates or for factors of production. Enterprises settling in a region create forward linkages when they sell their products to other enterprises in the region and by increasing the supply of skilled labour in local labour markets. Backward linkages are created when enterprises settle in a region and their personnel buy final and intermediate products of other enterprises in local markets. Because of these linkages, a spatial concentration of production and population, once established, may tend to persist. Therefore, a small difference in the initial economic size of two otherwise equivalent regions may grow quickly over time due to circular causation involved in the phenomenon (see e.g. Fujita et al., 1999; Haaland et al., 1999; Tervo, 1999).

The new theories of economic growth emphasise the role of human capital as a prerequisite for economic growth processes (e.g. Barro & Sala-i-Martin, 1995; Krugman, 1991a; Lucas, 1988; Romer, 1990). The know-how of population acts as a non-material input for the producers of goods and services, institutes of research and education, trade organisations and local services. Research and development personnel, as well as skilled operative personnel, can be considered as necessary labour input in the process of innovation and production.

Formally the idea of the endogenous growth mechanism can be illustrated by the production function (Y) of a region:

(1)

$$Y = F(K, H_Y, A) = K^\alpha H_Y^{1-\alpha} A^\phi$$

where

K = physical capital

H_A = human capital employed in the research and development sector

H_Y = human capital employed in production

$H_A + H_Y = H$ = human capital

$\dot{H} = \mu H_A$ = growth of average human capital

A = technological advance

$\dot{A} = \dot{H}$ = growth of technological advance.

The model considers that A , "stock of ideas", is sharable and non-excludable. Instead, human capital can be defined as skills and possibilities to use ideas, and is non-sharable and excludable. The growth of technological advance is considered a side effect of the growth of average human capital. Furthermore, human capital is divided into two components: human capital employed in production (H_Y) and human capital employed in the research and development sector (H_A). The growth of human capital is a result of purposeful actions to increase it. However, technological advance is seen here as an input factor, and

hence, as a public good. The representation above includes increasing returns in respect to inputs (Lucas, 1988; Okko, 2000; Romer, 1990).

Broadly speaking, the efficiency of economic activities implies the concentration of economic activity and population. Concentration of production and human capital creates favourable conditions for agglomeration benefits and knowledge spillovers. Concentration of economic activity is advantageous because it generates efficient labour markets, facilitates both horizontal and vertical specialisation, as well as intensifies dissemination of information and innovations. The importance of proximity has not been eliminated with the information society. Technological proximity is crucial for knowledge spillovers at the time of the information society, with its emphasis on innovation and networks (Caniëls, 2000; Okko, 2000).

Human capital plays a central role in the agglomeration process of economic activity. The conglomeration of human capital is cumulative in nature. This means that new human capital built upon education, experience and social networks is generated by previous human capital. The concept of cumulative-ness is also highly relevant in the context of geographic agglomeration of enterprises. The underlying idea is that geographic areas (regions) that have accumulated high levels of economic activity have assembled human capital activity that facilitates the generation of new firms.

1.2 Migration and spatial concentration

The integration of new trade and new growth theory has meant fresh insights into explaining economic development. Accordingly, migration and accumulation of human capital are emphasised in “new economic geography”. When human capital reallocation takes place with any appreciable volume, it has a significant impact on regional levels of know-how, and hence, on the development of regional competitiveness. Considering the potential impact, composition of human capital flows can be the main promoter of social, cultural and economic change in society (Chun, 1996). Accordingly, migration is arguably a very important element as regards analysis of spatial concentration.

The phenomenon of human capital concentration arises from the individual migration decision making process. In fact, it is the individual decision to migrate that forms the movements of human capital, and further, the reallocation of labour input. In any serious analysis of human capital movements, this question should be considered to some extent. One formal viewpoint of migration decisions is the human capital framework. The human capital framework is studied, for example, in the modelling works of Sjaastad (1962), Weiss (1971), Seater (1977) and Schaeffer (1985). The examination of the human capital framework is based on the utility maximising process. Consequently, individuals are assumed to maximise their economic utility when they make location decisions. Heterogeneous individuals are supposed to possess different utility functions, and hence, encounter differences in the net benefits of living in a specific location. As a result, migration is supposed to result from the variations in an individual’s economic utility in different locations. Relocation takes place if

the expected economic utility from migrating exceeds the economic utility gained from staying in the present location.

According to the human capital framework, an individual's human capital reserve has a special role in the formation of her/his economic utility, and hence, in location decisions as well. But what is human capital? Generally defined, human capital consists of heterogeneous assets, resulting from formal schooling, training, experience, etc. Furthermore, human capital can be defined as being of general use, or valuable only in specific tasks.

In order to illustrate the interrelationship between the migratory decision making process and human capital, we assume that there are only two types of human capital: one acquired from education (vector E), and one gained from other sources (vector O). Formally, an individual i is assumed to migrate from location j to location k under the following utility maximisation process at a given time t :

(2)

$$E(R_{it}) = \max_{(E,O)} \left[E \int_0^T e^{-rt} \{ U_{ik}(E_i, O_i) - U_{ij}(E_i, O_i) \} dt - CM_{ijk} \right]$$

under the precondition

$$\int_0^T e^{-rt} (U_{ik} - U_{ij}) dt - CM_{ijk} \geq 0,$$

where $E(R_{it})_{\max}$ is the net present value of the expected economic utility of an individual i , U_k is the expected utility level achieved in the alternative location k , U_j is the expected utility achieved from living in the present location j , and CM_{jk} are the direct costs involved in moving from location j to location k . The expected utilities U_k and U_j , as well as the direct costs CM_{jk} , are formed as a result of personal, household and regional factors involved in the migration process. To reach commensurability, the scale for both utilities and costs can be considered to be a utility, or alternatively, a currency unit. According to the rational decision making process, an individual migrates when her/his expected utility gain from moving exceeds the direct costs of moving.

The implicit assumption of the human capital framework is that migration has a selective nature. Migration studies find that the most likely migrants are young persons with a high level of education (e.g. Pacione, 1984). From the regional perspective, there are significant dynamic gains from inward migration, especially in the case of educated persons. For example, highly educated migrants raise the educational level of the destination region, provide new ideas and encourage investment that embodies new technologies (see e.g. Nijkamp & Poot, 1997).

In addition to the selectivity presented above, migration is observed to be selective as regards origin and destination regions. As a result of agglomeration benefits, human capital often migrates from where it is scarce to where it is

abundant, rather than vice versa (Lucas, 1988). This is due to the fact that agglomerating firms require large labour pools in order to satisfy increased labour demand and flexibility needs in the factors of production (Richardson, 1995). From the perspective of potential migrants, qualified personnel choosing residential location expect a supply of relevant positions/posts, as well as interesting educational, cultural and recreational opportunities for themselves and their families.

Thereby, in the spirit of “new economic geography”, the economic activity of regions and labour migration are mutually dependent. First, growth in economic activity usually also increases job possibilities in a region. This encourages in-migration and discourages out-migration. Second, the economic growth of a region can be accelerated as a result of in-migration. In-migration increases local demand, and hence, further develops beneficial circumstances for economic growth. Positive net-migration also increases the human capital endowments of a region. As a result, the spatial concentration of enterprises, skilled personnel and services support each other, which can further create a self-feeding agglomeration process (see e.g. Hansen, 1992; Myrdal, 1957).

Human capital flows, and changes in the external effects they cause, play a central role in regional dynamics and development. The conglomeration of economic activity and human capital, as well as agglomeration benefits and local competitiveness, are positively connected to the attraction of a region for in-migration, external investments and inter-regional co-operation (see Figure 1).

Spatial concentration of human capital and economic activities enables the efficient use of factors of production. The conglomeration of economic activities generates an efficient labour market, as well as creates worthwhile possibilities for horizontal and vertical specialisation. It also intensifies the dissemination of innovations and information. Furthermore, efficiency of economic activities creates further possibilities for agglomeration benefits. This leads to increased internal and external competence, as well as further development of human capital and other factors of production in a region. As an outcome of improved external competence, the status of a region in external markets of human capital and investments improves. Thus, the region attracts more in-migrants and external investments. The pull for external co-operation also tends to increase. These external incentives form the in-flow of new human and financial capital into the region. Increase in human capital stock and external investments increase the input of factors of production as does the endogenous increase of human capital. The conglomeration of production and population is further supported by increased factors of production. This starts the cycle again and the self-feeding process goes on. In spite of Figure 1’s concentration on agglomeration economies, it is important to notice that there are also agglomeration diseconomies or congestion costs. These can be, for example, congestion, pollution, social problems or criminality. Accordingly, the concentration works only with limits. The process can be further accelerated by regional policy measures aimed at internal and external developmental objectives. However, it is not exactly right to conclude that neither endogenous growth nor human capital

flows can be easily manipulated by policy instruments. The more relevant approach is to define economic growth as the endogenous outcome of an economy in which profit seeking individuals are allowed to earn profits on their own efforts and search for new and better ideas in alternative locations with networking possibilities (cf. Jones, 1998; Okko, 2000).

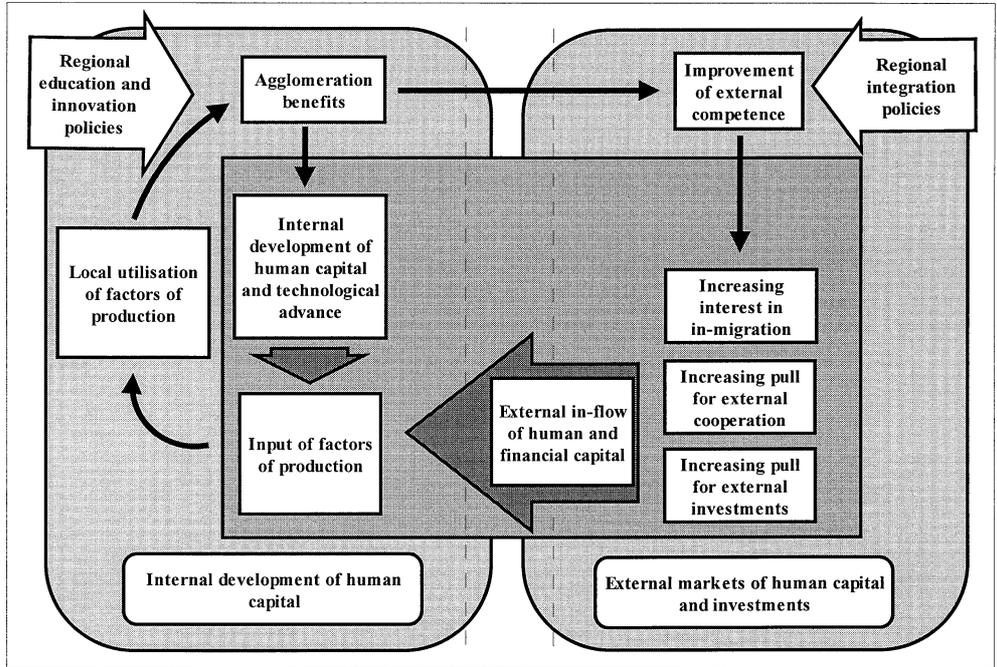


FIGURE 1 Endogenous and exogenous growth of human capital

1.3 Human capital concentration in Finland

In the context of Finland, the spatial concentration of human capital is current and critical. Broadly speaking, economic growth leads to the concentration of economic activities and population. This has been the general experience in Finland also. Nowadays, the discussion on such concentration in Finland often has a negative nuance. The migration and concentration of human capital is seen as a problem. At the same time, economic growth and urbanisation is often judged as a desirable objective. However, the collision of these two objectives is natural. There are always two parties in the concentration process - the regions that grow and become more vital and the regions that diminish and struggle for survival.

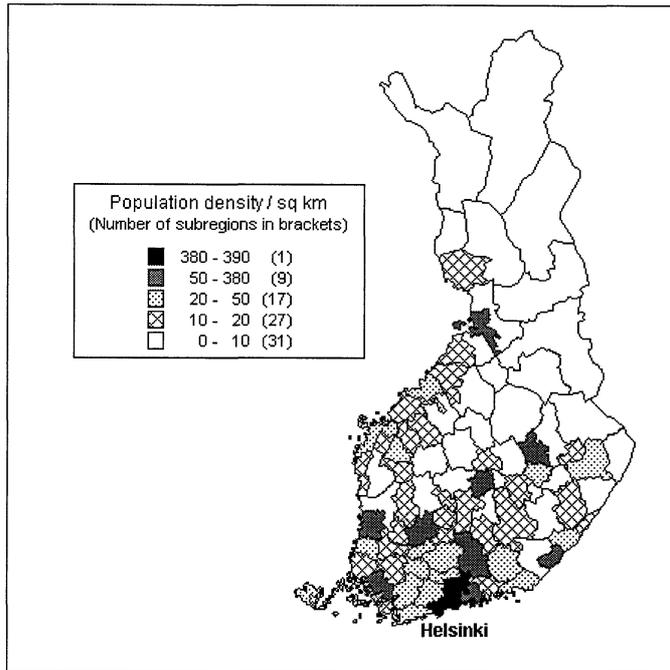


FIGURE 2 Population density in Finnish subregions, 1999

Finland has always been a sparsely populated country and the population density is extremely low in most regions still today (see Figure 2). However, since the Second World War, the urbanisation process has been rapid in Finland, leading to hasty structural changes in and population reallocation to the major cities (Kiljunen, 1977; Peltola, 1993). The urbanisation rate has grown from approximately 40% to almost 80% in the period of 1960 to the 1990s (Kiljunen, 1977; Pekkala, 2000; Peltola, 1992). Along with the urbanisation process, Finland has changed from a predominantly agricultural country into an urbanised, service and high tech orientated knowledge based economy.

The urbanisation process has been characterised by a continuous, but fluctuating human capital flow from lagging peripheral regions towards competitive regional centres - conglomerations of human capital and business activities. The direction of regional migration flows is currently the same. However, the number of regions receiving positive net in-migration has dramatically diminished (Pekkala, 2000; Pekkala et al., 1999). At the subregional level, there are only a few growth centre regions that possess a clearly positive migration rate (see Figure 3). In absolute numbers the region of Uusimaa has for a long time played a dominant role in attracting in-migrants, and the situation is the same today. Broadly speaking, positive net-migration flows are directed into subregions that already possess high population density (cf. Figure 2). Furthermore, the growing regions usually form a centre of education and research as well. Thus, these regions can be considered as conglomerations of human

capital (see e.g. Ritsilä & Ovaskainen, 1999). From the viewpoint of regional policy, the development expressed above is problematic, and research into the causes and consequences of human capital mobility can be easily justified.

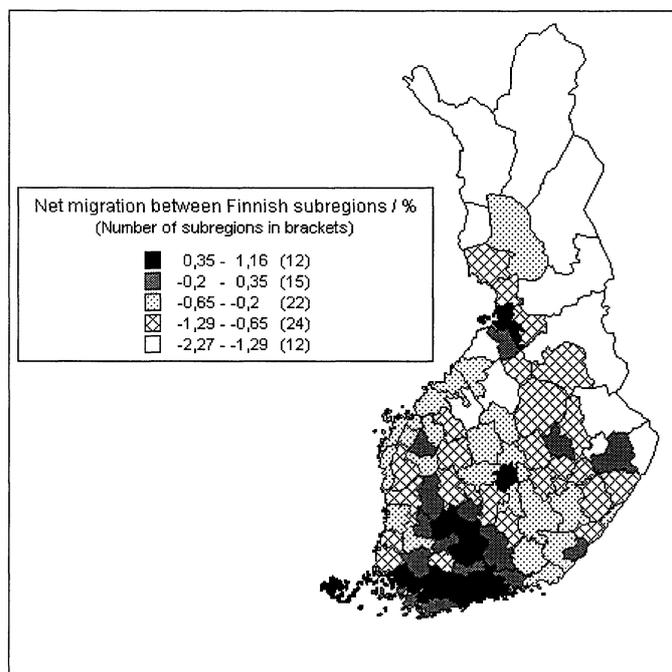


FIGURE 3 Net migration between Finnish subregions, %, 1999

One might ask many questions about patterns of spatial concentration and we are only able to touch on a couple of issues in this thesis. Different approaches may be useful in highlighting different issues. The approach chosen in this thesis focuses on the spatial mobility of labour and human capital. This aspect is central from the viewpoint of regional concentration and growth. Inter-regional migration directly relates to the reallocation process of human capital resources. This thesis provides a specific and simplified viewpoint of the spatial concentration of human capital resources. Thus, this thesis should be seen as a complement to analyses directly related to "new economic geography", such as Krugman's adaptations of the Dixit-Stiglitz model of monopolistic competition (see e.g. Fujita et al., 1999).

2 Outline of the thesis

2.1 Motivation, aim and limitations of the thesis

The analysis of this thesis can be motivated by the current interest in human capital concentration in Finland. Human capital forms the most significant input factor in many lines of production nowadays. The importance of human capital has even increased along with the development of the so-called "information society". At the same time, labour markets have confronted difficult structural problems in Finland. Firstly, there exists an increasing lack of top professionals in many high tech fields and also in certain traditional tasks such as in the building industry. However, simultaneously many lines of business confront a heavy over supply of labour. Secondly, labour markets are not in balance regionally. New jobs are often available only in centres of economic activity and human capital. Accordingly, young professionals flow at an increasing speed from less prosperous regions into the few most competitive regions. This causes distortions in regional demographic structures, leading to further increase in regional differences. Competitive production and human capital resources seem to become the privilege of a few central regions.

Politically, the prevailing regional development is both ticklish and interesting. The arguments of regional policy can be used to support both centralising and decentralising aspects of development. Actually, it is a question of the stress placed on efficiency and equality. Whatever the stress is, the development and mobility of human capital is a central question from the viewpoint of regional growth. Regional developmental programs have adopted this idea, and the aspects of human capital are strongly emphasised in regional strategies in Finland today.

The aim of this thesis is to broaden the understanding of human capital concentration across space in general, and specify the human capital factors that are connected to migration in particular. Furthermore, the thesis focuses on labour market and human capital selectivity questions in the migration analysis accomplished. The emphasis will be on regional levels of human capital flows, instead of on human capital flows at the national level. The reason for choosing a regional view is that regions comprise a geographic area that can be more specifically characterised, and thus, give a better picture of localised human capital concentration than an analysis at the national level.

With this focus on regions, the thesis links up with the theme of endogenous regional growth and the framework of "new economic geography". On one hand, the role of human capital is very central in the analysis of endogenous growth. Human capital and technological advance can be considered as engines of regional growth. On the other hand, regional endogenous growth and agglomeration economies form the core of "new economic geography". Herein, the explanatory factors of regional concentration determined in the approach focus on agglomeration economies, in which spatial concentration of

economic activity itself creates circumstances that encourage further and continuing concentration of enterprises and population.

Several mechanisms can be distinguished by which different factors generate spatial concentration of economic activity and human capital. The approach chosen in the thesis focuses only on one dimension of spatial concentration – the spatial mobility of human capital. Thus, it does not endeavour to mirror the general picture of the spatial concentration process suggested in “new economic geography”. The thesis does not either aspire to explain the actual endogenous regional growth process, but makes an effort at mapping out the background, ongoing phenomenon and implications of human capital concentration.

The term “human capital concentration” reflects a broad and vague concept. It comprises human capital concentration over time and space via all conceivable ways, one of which is diffusion by inter-regional human capital flows. Herein, the examination of human capital concentration is mainly limited to external flows of human capital, and the effects of internal human capital growth is touched on only slightly. Thus, the thesis should be considered as a migration oriented human capital concentration study.

This thesis is an anthology of five separate studies. An anthology of studies does not naturally focus on one fixed theme as clearly as a monologue would. However, the common denominators of all five studies are human capital and regional concentration. The studies attempt to examine the theme from various angles so that a general picture of the phenomena considered is shown. Each of the five studies is based on previous theoretical and empirical findings, which provide foundational support for empirical investigations conducted in the thesis. The empirical investigations use multifarious econometric models in order to test the hypotheses set, and to create a comprehensive insight into the processes involved in the field of research. However, econometric methods used are not introduced in a detailed manner, but presented briefly in the context of applications. Thus, the approach is more application than method developing. The presentation of econometric models also has a methodological purpose, since some of the applications exploited are quite unfamiliar in the field of regional economics.

The overall results reached in the thesis are interesting from the aspect of regional concentration. Even though the findings are not shockingly surprising, they offer strong empirical evidence for ongoing discussion of spatial concentration in Finland. The empirical outcomes of the thesis can be further classified into three broad categories, following the division of studies presented in the previous section: (1) Potential milieus for the conglomeration of human capital, (2) Migration and labour-market adjustment, and (3) The selective nature of migration and human capital flows. The findings reached under the first theme map out the potential environments for enterprises in Finland. According to the concepts of “new economic geography” these regions can be considered as potential environments for the concentration of human capital as well. The results under the second theme mainly deal with the interrelationship between

migration and unemployment. Finally, the outcomes of the third theme consider the effect of educational attainment on migratory behaviour.

2.2 Potential milieus for the conglomeration of human capital

The second chapter of the thesis continues discussion of the foundations of human capital movements, following the concept of innovative milieus. The approach of the first study is different from the following four studies concerning the supply side of human capital. Instead, chapter two studies the viewpoint of enterprises, i.e. the demand side of human capital. Thereby, the thesis proceeds logically in the spirit of “new economic geography”, from the conglomeration of firms to the concentration of the labour force. The agglomeration of enterprises usually generates a potential milieu for the conglomeration of human capital as well.

Chapter two endeavours to map out potential environments for enterprises and innovation processes in Finland. Furthermore, the chapter also discusses the factors and developmental process behind potential milieus for enterprises. The chosen framework of innovative milieus stresses local levels of innovation and synergy as key factors in regional competitiveness. Human capital (the factor exploited in production as well as the one needed in research and developmental activities) and technological advance, are seen as crucial factors in the growth and innovation of a region. The main questions addressed in chapter two include the following:

- What is a potential innovative milieu, and how can it be identified?
- How does a region develop into an innovative milieu?
- What is the potential competitiveness of different regions of Finland as regards the environment of enterprises?
- Does the observed settlement of potential innovative milieus favour the spatial concentration process?

Traditionally, location behaviour of enterprises was considered primarily connected to external resources, including land, raw materials, traffic connections and telecommunication systems. However, the modern view emphasises the availability of skilled labour and economic networks as the key factors behind location decisions. A potential region provides a sufficient reserve of human capital, as well as possibilities to co-operate with other enterprises, research and development institutes, etc. This kind of potential innovative milieu supports the success of current local business activities, encourages business start-ups and inwardly attracts new external investments. Therefore, a favourable economic environment can be determined as a set of territorial relationships that encompass in a coherent way a production system, economic and social players, as well as a specific culture. This integration of economic and social systems generates a dynamic and collective learning process that eliminates uncertainty faced by economic players, thereby enhancing further learning and innovation (Camagni, 1992; Camagni, 1995).

A collective and dynamic learning process usually requires the proximity of players involved. Proximity can be defined as the minimisation of geographic distance. It can also be expressed in terms of economic and cultural relatedness resulting from sharing something in common (Maillat, 1998). Furthermore, the benefits of proximity can be interpreted as a force of spatial agglomeration. Agglomeration economies are a result of the spatial concentration of enterprises, people and institutions, in a way that is favourable to regional economic development (Davelaar & Nijkamp, 1997).

Broadly speaking, economic efficiency usually implies concentration of economic activity and population. Concentration of economic activity is advantageous because it generates efficient labour markets, facilitates both horizontal and vertical specialisation, as well as intensifies dissemination of information and innovations. Geographical concentration of enterprises in the same industry allows for a pooled market of labour with specialised skills (Krugman, 1991b). Local clustering can provide advantages in terms of a more finely detailed division of labour and a better use of phase specialised production, since proximity makes it easier and more efficient to build up and exploit production inputs and resources (Suarez-Villa & Rama, 1996). Locating in a regional pole of one's own industry may also help to create and maintain supportive networks of co-production or subcontracting. These kinds of learning networks are especially crucial for technologically advanced sectors, such as information technology (see Suarez-Villa & Rama, 1996). Furthermore, proximity is important for knowledge spillovers. Knowledge spillovers are intellectual gains from the exchange of information for which no direct compensation is given other than the value of knowledge. Concentration of economic activity intensifies dissemination of both formal and tacit knowledge (Caniëls, 2000; Okko, 2000).

The findings of chapter two relate to the identification of potential innovative milieus, and the examination emphasises the role of innovation and synergy as prerequisites for the development of local economic activity and competitiveness. The indices formed herein show that the urban regions of Finland possess better prerequisites of innovation and synergy compared to densely populated and rural regions. Furthermore, the results indicate that innovation and networking requirements are more likely reached in prosperous regions with an educated labour force, a high local level of technology, a strong clustering rate, a high intensity of external co-operation in the public sector, intense new firm formation, as well as brisk commuting activity. Thereby, the attainment of regional success and competitiveness can be seen as an outcome of the combination of favourable business environments, network structures and innovation. Economic activities with strong horizontal linkages will often agglomerate, and most likely in areas with an abundant supply of highly educated labour. These are the innovative milieu-type regions, which combine strong agglomeration gains and intensive use of highly skilled workers (Braunerhjelm et al., 2000). In pursuance of the forces shaping "new economic geography", the existence of successful economic activity and agglomeration economies usually also implies potential environments for the conglomeration

of human capital. This presumption leads us directly to themes considered in the following chapters.

2.3 Migration and labour-market adjustment

Chapters three and four unfold by analysing the relationship between migration and unemployment. The two studies of this section stress the significance of migration in labour-market adjustment. The main questions addressed here include the following:

- What is the role of inter-regional migration in the labour-market adjustment process?
- Does unemployment encourage migration?
- Is the migration process profitable as regards the employment status of migrants?
- What are the regional characteristics behind net migration flows?
- Do the labour market effects of migration favour regional concentration?

There are two dimensions related to the role of migration in a regional labour-market adjustment process: the effect of unemployment on migration, and conversely, the effect of migration on unemployment. Together these two dimensions of labour market transitions form the basic elements used in evaluating the efficiency of labour migration in the labour-market adjustment process.

Previous studies have shown that the possible effects of unemployment on migration exist at three different levels, viz. the personal level, regional level and national level. Aggregate unemployment influences the effectiveness of the regional labour-market adjustment process; however, we may suppose that it does not make a difference between regions. Personal unemployment and/or a higher regional unemployment level might trigger differentials in labour mobility. Migration can be said to be micro-efficient if personal unemployment increases the probability of moving, all else being equal, and macro-efficient if the triggering factor of migration is regional unemployment (see e.g. Herzog et al., 1993; Pissarides & Wadsworth, 1989; Van Dijk et al., 1989). Thus, unemployment mainly has two channels of influence on migration and its regional differences, viz. personal and regional channels.

In the analysis of the efficiency of inter-regional labour migration, an essential question also relates to the outcome of the move: do migrants benefit from their actions in terms of enhanced employment and/or income opportunities (Hoover & Giarratani, 1984; Van Dijk et al., 1989)? For the improvement of employment to take place, unemployment should provide the spur for migration in the first instance, and migration should also improve the prospects of employment in the second.

The main findings of the micro- and macro-level analyses of chapter three and four are that both personal and regional unemployment seem to have a considerable augmenting effect on the likelihood of out-migration. The results

of the studies also suggest that there are some regional differences regarding the effect. On the whole, it seems that prospering regions attract migrants, while lagging regions tend to lose a remarkable proportion of their labour. Thus, the trend is towards greater concentration of labour. Regionally, another central issue relating to migration is the composition of human capital flows. Next, the selective nature of human capital flows will be considered from the standpoint of the educational background of individuals.

2.4 The selective nature of migration and human capital flows

Chapters five and six of the thesis consider the selectivity of migration and human capital flows. These two studies stress the role of highly educated migrants in human capital reallocation. Both studies, however, highlight a different aspect of the role of migration in the regional redistribution of human capital. Chapter five investigates the effects of the characteristics of both origin and destination regions on the likelihood of migrating. Chapter six highlights the destination choices of actual migrants instead of investigating the decision making of potential movers. Both studies are based on micro-level data and the main questions in the three studies include the following:

- From where and where to does human capital tend to move?
- Is inter-regional migration selective in regard to educational attainment?
- Does the migratory behaviour of the highly educated differ from the rest of the population as regards origin and destination regions?
- Does inter-regional migration augment the concentration of human capital?

The analytical setting of the studies is based on the human capital framework (Schaeffer, 1985; Seater, 1977; Sjaastad, 1962; Weiss, 1971). Herein, migration is supposed to result from the variations in individual economic utility in different spatial locations. The migration process involves both utility gains and costs. An individual is assumed to maximise her/his expected economic utility when s(he) considers moving. Therefore, relocation only takes place if the expected economic utility from moving exceeds the economic utility gained from staying at the present location. Heterogeneous individuals possess different utility functions, and consequently encounter differences in the net benefits of living in a specific location.

Thus, the migration decision is a result of individual and regional factors. Broadly speaking, individuals choosing residential location expect a supply of relevant positions/posts, as well as interesting educational, cultural and recreational opportunities for themselves and their families. According to human capital theory, characteristics of both origin and potential destination regions affect migration decision making. Actually, it is the net benefit that an individual receives from migrating which dominates the decision making process. Potential migrants compare potential regions and then choose the best in respect

to their own utility function. The individual utility function is affected by personal preferences and characteristics, including human capital factors (herein education and work experience).

As a result, human capital flows tend to be selective in regard to personal and regional characteristics. From the regional perspective, there can be significant dynamic gains for a region from inward migration, especially if we consider young and highly educated migrants. Highly educated in-migrants raise the educational level of the region, provide new ideas, and encourage investment that embodies new technologies, and so on (see e.g. Nijkamp & Poot, 1997).

The results of chapter five and six suggest that migration has a selective nature as regards educational attainment. Highly educated persons are found to be more mobile than the whole population on average. It also seems that the regional characteristics of both origin and destination areas have a considerable impact on migration flows. Individuals tend to move from remote districts to more prosperous regions. In addition to the two human capital centralising characteristics of migration expressed above, the conglomeration process is even strengthened by the divergent destination choices of highly educated individuals. Highly educated migrants are more likely to move to urban regions than the whole population on average.

REFERENCES

- Barro, R. J. & Sala-i-Martin, X. 1995. *Economic Growth*. New York: McGraw-Hill.
- Braunerhjelm, P., Faini, R., Norman, V., Ruane, F. & Seabright, P. 2000. *Integration and the Regions of Europe: How the Right Policies Can Prevent Polarization*. London: Centre for Economic Policy Research.
- Camagni, R. P. 1992. Development Scenarios and Policy Guidelines for the Lagging Regions in the 1990s. *Regional Studies* 4, 361-374.
- Camagni, R. P. 1995. The Concept of Innovative Milieu and Its Relevance for the Lagging Regions in the 1990s. *Papers in Regional Science* 74, 317-340.
- Caniëls, M. 2000. *Knowledge Spillovers and Economic Growth*. Cheltenham: Edward Elgar Publishing Limited.
- Chun, J. 1996. *Inter-regional Migration and Regional Development*. Aldershot: Avebury.
- Davelaar, J. E. & Nijkamp, P. 1997. Spatial Dispersion of Technological Innovation: A Review. In C. Bertugilia, S. Lombardo & P. Nijkamp (Eds.) *Innovative Behaviour in Space and Time*. Berlin: Springer-Verlag, 17-40.
- Fujita, M., Krugman, P. & Venables, A. J. 1999. *The Spatial Economy. Cities, Regions and International Trade*. Cambridge: The MIT Press.
- Haaland, J., Kind, H., Knarvik, K. & Torstensson, J. 1999. *What Determines the Economic Geography of Europe?* London, Centre for Economic Policy Research. Discussion Papers.
- Hansen, N. 1992. Competition, Trust, and Reciprocity in the Development of Innovative Regional Milieux. *Papers in Regional Science* 2, 95-102.
- Herzog, H. W. Jr., Schlottman, A. M. & Boehm, T. B. 1993. Migration as Spatial Job-Search: A Survey of Empirical Findings. *Regional Studies* 27, 327-340.
- Hoover, E. M. & Giarratani, F. 1984. *An Introduction to Regional Economics*. New York: Alfred A. Knopf.
- Jones, C. 1998. *Introduction to Economic Growth*. New York: W. W. Norton & Co.
- Kiljunen, K. 1977. *Regional Problems and Policy: A Case Study of Finland*. Institute of Development Studies, Sussex University.
- Krugman, P. 1991a. *Geography and Trade*. Cambridge: The MIT Press.
- Krugman, P. 1991b. Increasing Returns and Economic Geography. *Journal of Political Economy* 3, 483-499.
- Krugman, P. 1993. First Nature, Second Nature, and Metropolitan Location. *Journal of Regional Science* 33, 129-144.
- Lucas, R. E. 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics* 22, 3-42.
- Maillat, D. 1998. Innovative milieux and new generations of regional policies. *Entrepreneurship and Regional Development* 1, 1-16.
- Myrdal, G. 1957. *Economic Theory and Underdeveloped Regions*. London: Duckworth.

- Nijkamp, P. & Poot, J. 1997. Endogenous Technological Change, Long Run Growth and Spatial Interdependence: A Survey. In C. Bertugilia, S. Lombardo & P. Nijkamp (Eds.) *Innovative Behaviour in Space and Time*. Berlin: Springer-Verlag, 213-238.
- Okko, P. 2000. Growth, Human Capital, and Agglomeration Economies. In T. Reponen (Ed.) *Management Expertise for the New Millennium*, In Commemoration of the 50th Anniversary of the Turku School of Economics and Business Administration. Turku School of Economics and Business Administration Series A-1: 2000.
- Pacione, M. 1984. *Rural Geography*. London: Harper & Row.
- Pekkala, S. 2000. Regional Convergence and Migration in Finland 1960-95. Jyväskylä: Jyväskylä Studies in Business and Economics 4. Kauppatieteiden väitöskirjatyö.
- Pekkala, S., Ritsilä, J. & Moisio, A. 1999. Regional Migration and Disparities: Evidence from Finland, 1975-95. University of Jyväskylä. School of Business and Economics Working Paper 191.
- Peltola, O. 1992. Suomen yhdyskuntajärjestelmän muutos 1980-luvulla. University of Vaasa, Discussion Papers, 153.
- Peltola, O. 1993. Suomen yhdyskuntarakenteen rakenne lääneittäin 1990. University of Vaasa, Discussion Papers, 158.
- Pissarides, C. A. & Wadsworth, J. 1989. Unemployment and the Inter-regional Mobility of Labour. *The Economic Journal* 99, 739-755.
- Richardson, H. W. 1995. Economies and Diseconomies of Agglomeration. In H. Giersch (Ed.) *Urban Agglomeration and Economic Growth*. Berlin/Heidelberg: Springer-Verlag, 123-156.
- Ritsilä, J. & Ovaskainen, M. 1999. Future Information Technology Poles - Where and Why? *Futura* 18, 35-47.
- Romer, P. M. 1990. Endogenous Technological Change. *Journal of Political Economy* 98, 71-102.
- Schaeffer, P. 1985. Human Capital Accumulation and Job Mobility. *Journal of Regional Science* 25, 103-114.
- Seater, J. J. 1977. A Unified Model of Consumption, Labour Supply, and Job Search. *Journal of Economic Theory* 14, 349-372.
- Sjaastad, L. A. 1962. The Costs and Returns of Human Migration. *Journal of Political Economy* 70 (Supplement), 80-93.
- Suarez-Villa, L. & Rama, R. 1996. Outsourcing, R & D and the pattern of intrametropolitan location: the electronics industries of Madrid. *Urban Studies* 7, 1155-1197.
- Tervo, H. 1999. "Regional Science" and "New Economic Geography": The Review of Development and Prospects of Regional Economics (in Finnish). *Kansantaloudellinen aikakauskirja* 95, 753-765.
- Van Dijk, J., Folmer, H., Herzog, H. W. & Schlottman, A. M. 1989. Labor Market Institutions and the Efficiency of Inter-regional Migration: A Cross-National Comparison. In J. Van Dijk, H. Folmer, H. W. Herzog & A. M. Schlottman

(Eds.) Migration and Labor Market Adjustment. Dordrecht, Boston and London: Kluwer, 61-84.

Weiss, Y. 1971. Learning by Doing and Occupational Specialization. Journal of Economic Theory 4, 189-198.

THEME I

**POTENTIAL MILIEUS FOR THE
CONGLOMERATION OF HUMAN CAPITAL**

CHAPTER 2

REGIONAL DIFFERENCES IN ENVIRONMENTS FOR ENTERPRISES*

	ABSTRACT	31
1	INTRODUCTION	31
2	THE CONCEPT OF INNOVATIVE MILIEU	32
3	IDENTIFICATION OF THE POTENTIAL INNOVATIVE MILIEU	32
3.1	Identifying local strengths and weaknesses	33
4	THE DATA AND APPLIED INDICATORS	35
4.1	Innovativity (I)	36
4.1.1	Level of education (E)	36
4.1.2	Number of enterprises formed/population (A)	36
4.1.3	The local level of technology (T)	36
4.2	Synergy (S)	37
4.2.1	The quantity of cluster enterprises (C)	37
4.2.2	Intensity of co-operation among communes (J)	38
4.2.3	The degree of commuting (EF)	39
5	THE POTENTIAL MILIEUX OF ENTERPRISES IN FINLAND'S RURAL AREAS AND TOWNS	39
5.1	Innovativity (I)	39
5.2	Synergy (S)	40
6	CONCLUSION	43
	REFERENCES	45

* This paper has been published as: Ritsilä, J. (1999) Regional differences in environments for enterprises, *Entrepreneurship and Regional Development*, 11, 3, pp.187-202.

Regional differences in environments for enterprises

JARI J. RITSILÄ

Centre for Economic Research, School of Business and Economics, University of Jyväskylä, PO Box 35, FIN-40351 Jyväskylä, Finland.

e-mail: jarrits@tase.jyu.fi

Over the past decade there has been a strong emphasis on the analysis of local economic development. Current research on local development has strongly promoted endogenous growth mechanisms, stressing factors such as local entrepreneurship, social networks, synergy, innovativity, dynamic learning processes and factor flexibility. Accordingly, there has been an increasing interest in the role of innovations and their diffusion in regional development and growth. However, few studies have focused on lagging regions and the problems that they are faced with. This paper attempts to chart the existing regional differences in environments for enterprises in Finland following the concept of innovative milieu.

Keywords: innovative milieu; innovativity; synergy; potential environment.

1. Introduction

In recent years, the role and significance of local economies has increased both in Europe and elsewhere. This development has been affected by many different factors. International and national processes of co-operation have strengthened the identity of local economies as independent and self-responsible economic units. On the other hand, internal structural problems have forced local economies to seek new strategies and operations. In Finland, the first half of the 1990s was unfavourable for economic development. Unemployment and economic problems weakened the operational possibilities of municipalities and other regional units. These external factors fell most heavily on rural areas already struggling with structural change and identity problems.

This paper charts the differences between Finland's rural and urban areas as potential environments for enterprise. The paper is based on the study 'Town and country as innovative milieux – a statistical analysis'.¹ The study utilizes the concept of innovative milieu which was generated by the GREMI research project (1991), and which has been recently refined by many studies (Maillat and Lecoq 1992, Camagni 1995, Maillat 1995). The empirical analysis is based on regional statistical data that was partly produced especially for this purpose. Rural and urban areas have been marked off according to a three-class municipal grouping by Statistics Finland (1996b) and EU support area classification.

The structure of the paper is as follows. Section 2 presents the concept of innovative milieu. Section 3 focuses on the identification of potential innovative milieu and section 4 presents the data and indicators used. The potential operational environments for enterprises in rural and urban areas of Finland are analysed in section 5. The final section concludes the paper.

2. The concept of innovative milieu

The concept of the *innovative milieu* originates from the *milieu* concept. The concept of milieu is based on the role of territorial dimension and other spatial characteristics such as a collection of economic players, physical and institutional elements, an interaction logic deriving from co-operation, and learning dynamic. The concept of milieu can be defined by using three different dimensions. First, the micro-analytical dimension bases the definition on uncertainty, information and transaction costs. The micro-analytical dimension of milieu considers the milieu as an efficient management structure that decreases transaction costs (Camagni 1992). Second, a cognitive dimension of milieu is based on the notions of learning, know-how and technical culture (Maillat 1995). This dimension highlights the importance of dynamics and local labour market as the components of a milieu. Third, an organizational dimension of milieu is a mixture of organizational forms that structure corporate strategies (Maillat 1995). The spatial set, which an organizational milieu consists of, is a system of reciprocal expectations about skills and behaviour, but also of ability to establish links (networks).

As distinguished from the concept of milieu, the concept of innovative milieu concentrates on the innovation process instead of covering only the organization of efficient management of productive resources. However, both milieu and innovative milieu concepts involve the existence of learning processes. An innovative milieu consists of a learning process stimulated by interactions amongst economic agents as they seek innovation-specific externalities in a territorial set. This collective learning process improves the interactions between economic actors further on, enables increased efficiency of the subcontracting, and acts as an uncertainty-reducing mechanism in the innovation process. In other words, the concept of innovative milieu assumes that there exists a certain territorial dynamics capable of setting up a regional improvement of innovation ability (Courlet and Pecqueur 1991, Camagni 1995, Maillat 1995).

According to the above-mentioned characteristics of innovative milieu, innovation process is regarded as incorporating the elements determining and promoting the dynamics and transformation ability of the regional techno-productive system. Hence, the innovative milieu is characterized by internal dynamism, as well as capability to exploit external information and resources. The role of innovative milieu in the formation of innovation networks and their dynamism is interactive. The milieu constitutes a comparative advantage, and simultaneously it receives positive spin-offs from innovation networks. These positive by-products have further influence on the process of the development of a milieu. To sum up these definitions, we may say that innovative milieu is a dynamic territorial process in which the interaction (synergy) and learning dynamic are high (Maillat 1995).

3. Identification of the potential innovative milieu

The concept of innovative milieu does not necessarily refer to industrialized areas with large high-tech production, but it can also be thought to generally describe the areas with strong production and innovation activity. In the GREMI research project (Maillat and Lecoq 1992, Camagni 1995) features of the innovative milieu were found in various types of areas: in metropolises, in new industrial areas, in old industrial areas, in poles of excellence (such as Silicon Valley), in border districts, and in

development areas. These areas had something in common: some kind of specialization, a strong interactive and synergic atmosphere, a highly developed process of imitation, a collective learning process, and a strong local identity (Hansen 1992, Camagni 1995).

However, the general definitions of innovative milieu do not usually map out the paths that the lagging areas follow on their way towards the innovative milieu. Hence in this context it is more relevant to examine the potential characteristics of innovative milieux. These *potential innovative milieux* share some characteristics of an innovative milieu, while others are either totally lacking or defective. The significance of internal and external network contacts (interactive logic) is emphasized in the process of development because of these deficiencies. It is important to notice that the key interactions consist of those supporting the implementation of innovation process and resultant network, and not the ordinary commercial connections (Maillat 1995). Examples of new forms of network activities are technological co-operation agreements and strategic alliances. Accordingly, the network relationships between other economic institutions, such as co-operation between research centres and public institutions, have acquired a new meaning. Recent research has shown that new technological, organizational and marketing knowledge that comes from outside the region is vital for lagging areas (Scheer and Zobl 1990, Camagni 1992, 1995, Barrow and Hall 1995, Silander *et al.* 1997, Maillat 1998). The external network makes it possible for capital and technological knowledge to flow in order to strengthen the development of the area. In practice, these external network relationships can be carried out as, for example, joint-ventures, subcontracts or customer enterprises (Koiranen 1993).

3.1 Identifying local strengths and weaknesses

Local specialization has been found to be an efficient structural *ex-ante* indicator when exploring areas in the early phases of regional development. Simultaneous extensive specialization in production, together with growth in employment and per-capita income, are clear signs of district economies, economies of labour force turnover, and a dynamic learning process due to a good exploitation of information and technological imitation (Camagni 1995). In the later stages of development, it is more difficult to recognize these characteristics, and true specialization becomes minor because of the processes of differentiation taking place when the time comes to choose competition strategies. To study the characteristics of innovative milieu in a more realistic and deeper way, we would need other more complex *ex-ante* indicators. Camagni's (1995) suggestion for two direct indicators relating to the nature of innovative milieu are:

- (1) *An indicator that describes existing local synergies*: co-operative projects by local enterprises and joint-ventures, turnover in skilled labour, the number of public agencies promoting technological transfer, the number of units that specialize in consulting local trade, educational institutions and organizations.
- (2) *An indicator of local innovativity*: the rate of formation of new firms, the level of education, the amount of patents produced and used, the amount of money used for research and development.

These indicators of synergy and innovativity often use unofficial sources of information and are based on case studies. However, even if we want to use statistical information, the presented indicators give a good basis for analysis. The creation of synergies among local actors is a key factor of innovative milieu. Interdependencies between economic activities are essential to stimulate and uphold the regional innovative process and development (Johannisson 1990, Bartlett 1993, Harrison 1994, Davelaar and Nijkamp 1997, Maillat 1998). Local synergy among local actors as well as between them and external players, forms the factor that compensates for the lack of other, more traditional competitive advantages, such as economies of scale, advanced production or diffused competence. These synergies can be identified in informal as well as in explicit and formalized relationships: customer-supplier relationships, co-operative sharing revenues, horizontal contracting, wide circulation of information through skilled labour mobility inside and towards the district, fast imitation of successful practices in technology, organization and marketing. Often, a forerunner entrepreneur, a local firm or other institute acts as a diffuser for the creation of local synergies.

Co-operation with external economic actors and institutions is also very important for the continuous recreation of local *innovation capacity* (stock of endogenously generated scientific and technological inventions available for practical application within or outside a given region) and better possibilities for production and marketing strategies. The latter may be even more important in the case of lagging regions, because the element of product and market diversification is an early sign of the creation of a local district and a dynamic learning process (Suarez-Villa 1993, Harrison 1994, Camagni 1995, Gregersen and Johnson 1997, Maillat 1998).

As mentioned before, the concept of innovative milieu highlights the innovation process as the main factor of regional development. *Innovation* in a territorial sense ought to be considered broadly, instead of exploiting the definitions of advanced contexts or references to the state of technological advance. Territorial innovation, in the context of lagging regions, implies factors such as intersectoral job shifts, fast diffusion of successful practices across the local economy, application of advanced technologies into traditional spheres of production/organizational forms, development of new specific applications for existing products/technologies, and radical innovations (Suarez-Villa 1993, Camagni 1995). Hence, innovation in the territorial sense does not have to be high-tech, but it can also mean, for example, new organizational forms.

Figure 1 illustrates the *ex-ante* identification of innovative milieu and possible intervention strategies to create the conduction for an innovative milieu. There are four possible situations that emerge (A). They can be classified in the following way (Camagni 1995):² X = no milieu and no innovation; Y = potentially an innovative milieu; Z = innovation but no milieu; and W = innovative milieu.

These conditions are abstract. The situation of a fully-developed innovative milieu in lagging regions appears very rarely at the regional level, and it is infrequent even at a more disaggregate level.

Part B of figure 1 presents the trajectors that are formed from these abstract situations, and that lead to the conditions for an innovative milieu. There are two possible trajectors (Camagni 1995):

- (1) One is found through an external innovative intervention that is integrated in the local society.
- (2) The other is found through the development of local synergy that makes a high production and innovative level possible.

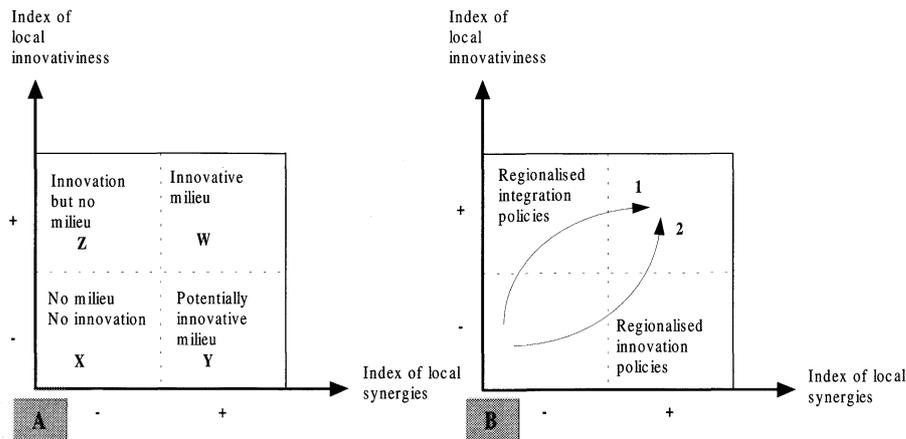


Figure 1. Ex-ante identification of innovative milieu and possible regional intervention strategies. Source: Adapted from Camagni (1995).

4. The data and applied indicators

The methodological approach of the empirical part of this paper is based on a descriptive statistical analysis. The exploited data set has been partly produced especially for this study, and it contains information at municipal level. Further on, rural and urban areas have been marked off according to the municipal grouping by the Statistics Finland and EU support area classification.

This paper attempts to find ways of measuring potential environments for enterprises. The indicators employed have been selected so that they enable the examination of the analysed characteristics from a rural versus urban angle, without forgetting the heterogeneity that exists between regions in area and population. Some compromises have naturally been necessary due to the available statistical data and the chosen approach. It must be remembered that the purpose of this paper is not to describe developmental phenomena and regional characteristics in detail, but rather as a general developmental phenomenon in the local economy. According to the theoretical framework, indices of innovativeness and synergy have been used here as measures of potential environments for enterprises. These indices comprise the following indicators:

- (1) *Index of innovativeness (I)*
 level of education (E);
 number of enterprises formed/population (A); and
 local level of technology (T).
- (2) *Index of synergy (S)*
 quantity of cluster enterprises (C);
 intensity of co-operation among communes (\mathcal{J}); and
 degree of commuting (EF).

The next section of this paper briefly describes and gives reasons for the use of the chosen indicators when forming indices.

4.1 *Innovativity (I)*

4.1.1 Level of education (E): The educational measure formed by Statistics Finland describes the municipal level of education. In this study, the same measure is also used to describe the local level of innovation. Some level of know-how is clearly a necessary condition for creativity and innovativity (Marshall 1990, Lyons 1995, Davelaar and Nijkamp 1997, Gregersen and Johnson 1997). The educational level of the population acts as a non-material input for the producers of goods and services, institutes of research and education, trade organizations and local services. The data used are from the year 1994, and values are means of the municipal level.

4.1.2 Number of enterprises formed/population (A): New local enterprises and innovations are mutually dependent. First, new enterprises are often formed as a result of an innovation process. Second, new enterprises produce innovations and thus promote the birth of further innovations. New enterprises are like challengers, and they have to use their innovative resources efficiently. The indicator formed here is based on the idea of connecting entrepreneurship and adapting innovativeness to local demand. The level of exploitation of local demand in the process of forming new enterprises and innovations is thus the result of the indicator (Garofoli 1992, Niittykangas and Nenonen 1994, Lyons 1995, Niittykangas and Tervo 1997, Littunen *et al.* 1998).

The figure used in this study for the number of enterprises formed is based on the register of enterprises for the second half of 1994 by Statistics Finland. The commune that the enterprise is located in is determined by legal domicile (Statistics Finland 1996a).

4.1.3 The local level of technology (T): The present study emphasizes the importance of the location of high technology enterprises for local entrepreneurship and development. The technological level of industrial output has grown rapidly during the last 15 years, and many fields of production are either directly or indirectly involved with high technology. The products themselves may be high-tech, and the technology of production, product development, logistics and economic administration are all making good use of high-tech goods and/or services.

There are considerable external benefits available for local firms when high technology enterprises and co-operation between science and technology concentrate in a region. Thus enterprises can benefit from each other's development, R&D activities and investment strategy. The importance of the overflow of knowledge, which emerges as a result of co-operation, is prominent in the regional development process. High levels of inventions and innovations are often reached especially in high technology enterprises. Despite the important role of high-tech enterprises in modern regional economies, it is still important to remember that high-tech institutions and firms are not the only places where innovation takes place. In fact, it can be advantageous for a region or country to specialize in low-tech industries (Eskelinen and Kautonen 1997, Maskell 1997). However, on the basis of innovative engagement and of the central position in the developmental process, the regional density of high technology enterprises can be considered as a suitable indicator of the level of technology and innovativity of a region (Chandra and MacPherson 1994, Grimes and Lyons 1994, Lyons 1995, Suarez-Villa 1997).

When looking at the broad specialized line of activity concentration, the regional typologies employed in the present study (the classification of communes by Statistics Finland, the EU support area division) are in some respects problematic. The heterogeneity between and within different classes, especially in area and population characteristics, emphasizes the role of densely populated areas as centres of innovation. Here the problem of heterogeneity is approached by the proportion of local top and high technology enterprises in relation to the denominator of the relative land area and relative population, in accordance with equation 1:

$$T_r = \frac{Q_r^t}{\frac{L_r}{L_s} \times \frac{P_r}{P_s}} \quad (1)$$

where T = indicator of the local level of technology, Q = quantity of technology enterprises, L = land area, P = population, r = region, and s = sum of regional values. The significance of population and land area in the denominator is stressed so that the bigger the proportion of the area or population, the greater its significance. In this study, the quantity of high-tech enterprises is presented in accordance with the classification of technology by Statistics Finland. The data is from the year 1994.

4.2 Synergy (S)

4.2.1 The quantity of cluster enterprises (C): Recent research has shown that success in competition and fast growing processes has often arisen out of the regional concentration of economic activities – in the clustering of lines of business and enterprises that are complementary to each other. Also, often talked about is the conglomeration of enterprises, developmental blocks in the economy or cohesion of know-how (Dahmén 1988, Porter 1990, Krugman 1991, Davelaar and Nijkamp 1997, Maillat 1998).

The selection of this indicator in the present study is based on the positive effects of clusters for local development found in literature. Clusters are regionally formed of functionally or technologically closely related enterprises or lines of activities. The strength of clusters is based on positive externalities, especially benefits from the flow of information and network arrangements. Nowadays, the strongest advantages in industrial competition are found in know-how (here including both formal and tacit knowledge). Modern endogenous growth theory emphasizes the role of knowledge and technological skills in the process of economic development. Know-how is the basic element that enables strong and lasting regional development (Hernesniemi *et al.* 1995, Lyons 1995, Kuusi and Loikkanen 1996, Nijkamp and Poot 1997).

In general, it is justified to assume that agglomeration economies are quite fixed across regional boundaries. This territorial characteristic of agglomeration economies can be explained by the central role of synergy in economic agglomeration. The synergy element arouses from spatial clustering and it is greatly affected by the regional solidity of the clusters (Davelaar and Nijkamp 1997). Hence, the quantity of cluster enterprises represents here the regional dimension of co-operative cohesion and exploitation of synergic benefits. However, it is important to notice that the synergy element is also exploited outside the clusters.

Because of the heterogeneity of regional typologies used, the regional amount of cluster enterprises is divided by a denominator that pays attention to the area and

population heterogeneity of the different regional classes (cf. indicator of local technology level). The indicator is shown formally in equation 2:

$$C_r = \frac{Q_r^c}{\frac{L_r}{L_s} \times \frac{P_r}{P_s}} \quad (2)$$

where C = indicator of the quantity of cluster enterprises, Q^c = quantity of cluster enterprises, L = land territory, P = population, r = region, and s = sum of regional values.

In this study, the wood industry cluster is used to illustrate the synergy of clusters. The wood industry cluster was chosen here on the grounds of being the nationally most significant cluster. All parts of the forestry industry cluster exhibit a strong and competitive domestic enterprise activity. Supporting activity for the wood industry cluster also exists in the public sector, research institutions and other organizations. Another reason for the validity of this indicator is the stable growth prospects of the cluster. The forest industry cluster also has a great importance for rural areas (Lammi 1994, Hernesniemi *et al.* 1995, Eskelinen and Kautonen 1997).

The structure of the wood industry cluster is based on the cluster research carried out by ETLA (Hernesniemi *et al.* 1995). The cluster is defined here to include a cluster's key-products, special inputs, machinery, associate services, supporting branches of cluster and main customers (for further details see Hernesmiemi *et al.* 1995, Ritsilä 1997). The extent of a cluster's constituent groups (typically intuitively formed) affects both regional solidity and the significance of the cluster. The exploited data is from the year 1994 (Statistics Finland 1996a). (Lammi 1994, Hernesniemi *et al.* 1995).

4.2.2 Intensity of co-operation among communes (J): In this study, the second indicator of regional synergy is the intensity of co-operation of communes. Regional co-operation of public sector is a part of the wider concept of local synergy, consisting of several forms of co-operation (such as formal and informal co-operation between enterprises as measured by indicator C). Local co-operation is considered here as a goal-directed form of co-operation between different local organizations (such as county administrations, communes, local enterprises, local federations). The purpose of co-operation might, for example, be to produce services for actors in the economy or the common rationalization of activities (Maillat 1998). In Finland, regional co-operation between municipalities is considerable, but co-operation between other organizational levels is minor.

The values of the indicator for the reduced intensity of co-operation are adapted from the research carried out by the municipal and regional development section of the Ministry of the Interior (Rantahalvari 1992). The indicator does not count co-operation outside the municipal administration or informal co-operation between communes. It is also worthy of consideration that co-operation also takes place inside municipalities, and this kind of action is not measured by the indicators used here (for further details see Rantahalvari 1992, Ritsilä 1997). In the present study, the exploited indicator illustrates the level of regional synergy. This indicator has been used because of the importance of municipal co-operative projects in the formation of local synergy and externalities in Finland (Rantahalvari 1992).

4.2.3 *The degree of commuting (EF)*: The regional level of commuting refers here to employment flows, i.e. the regional re-division of know-how. Human capital flows take place both through commuting outward and through commuting inward. However, it is important to notice that commuting of the work force is only one of the many different ways of modelling inhabitants' mobility. The commuting process gives rise to regional externalities that can be associated with the synergic benefits of the labour market network. Larger labour markets present opportunities for a more flexible use of labour input and a social reproduction of regional labour force (Lyons 1995).

Here the data of commuting has been produced using the PENDELI program of Statistics Finland, and the figures are for the year 1990. The indicator of the level of commuting is derived from equation 3:

$$EF_r = \frac{c_r^{\text{in}} + c_r^{\text{out}}}{W_r} \quad (3)$$

where EF = indicator of the level of commuting, c^{in} = inward commuting, c^{out} = outward commuting, W = work force and r = region.

5. The potential milieu of enterprises in Finland's rural areas and towns

5.1 Innovativity (I)

To begin with, the innovativity levels of the selected typological classifications are analysed. As mentioned before, the measurements used are the level of education, number of enterprises formed/population, and the indicator of the local level of technology (table 1).

The values³ for the educational measure of Statistics Finland (E), in accordance with the EU support area classification, are on average higher in the non-support areas and declining industrial areas than in the rural areas or sparsely populated areas. The values of areas 5b and 6 remain below the national mean. The same feature can be seen in the educational measures of communal classification: on average the

Table 1. Composition of *ex-ante* innovativity.

Indicator	EU support area division					Communal classification of Statistics Finland			
	0	2	5b	6	Mean	Urban	Densely populated	Rural	Mean
E	284.545	264.42	250.60	250.03	257.20	288.48	268.30	248.43	257.20
$A * 1000$	3.15	2.31	2.30	2.07	2.30	2.95	2.33	2.24	2.30
$T \div 1000$	234.40	279.30	60.80	16.90	147.90 ⁱ	245.60	126.00	18.30	130.0 ⁱⁱ

E = education as measured by Statistics Finland.

A = number of enterprises formed/population.

T = local level of technology.

i = The mean of the EU support area classification.

ii = The mean of the Communal grouping by Statistics Finland.

levels of education in urban and densely populated areas are higher than in rural areas. The indicator value of rural areas is below the communal mean. The maximum and minimum communal values are 433.00 and 221.00. On the basis of the analysed data, we can conclude that the urban areas are better off in terms of the connections between education and innovativity (Hedlund *et al.* 1990: 241).

The distribution (EU support area division) of the number of enterprises formed/population (A) in the second half of 1994 is not favourable for the support areas compared to the non-support areas or to the national mean. In all the support areas, the values of the indicator are rather even, although sparsely populated areas are in a slightly weaker position on average. The distribution is somewhat more even in the areas that are composed according to the communal grouping of Statistics Finland, but elsewhere it follows the same pattern: in the urban areas the indicator gets a higher value than in the sparsely populated or rural areas. The maximum and minimum values of the indicator are at the communal level 6.44 and 0.00. The national mean is 2.30.

The indicatory values of the level of regional technology⁴ (T) follow the pattern of the two previous indicators, although there are some small differences. The differences between the regional classes are relatively higher. The EU support area classification and communal grouping of Statistics Finland converge in the urban-rural dimension – technological know-how is concentrated in the more developed areas. This situation is a typical expression of the paradigm of centralized development, and of the knowledge overflow phenomenon that leads to localization.

As mentioned before, the values for the regional level of education, enterprise activity and the level of technology represent the level of regional innovativity here. Next, we aggregate the outcomes of these indicators and form the index of innovativity. Innovativity of region r can be expressed as:

$$I_r = \frac{\frac{E_r}{E_m} + \frac{A_r}{A_m} + \frac{T_r}{T_m}}{3} \quad (4)$$

where I = index of innovativity, E (education) = value of the educational measurement by Statistics Finland, A (activity) = quantity of formed enterprises/population, T (technology) = the indicator of the local level of technology, sub-index r = region, and sub-index m = national mean. Figures 2 and 3 illustrate the values of the innovativity index for the selected regional typologies. According to the outcomes of the index, the urban areas represent the most innovative regions, while the level of innovativity of the rural areas remains far below the national mean.

5.2 Synergy (S)

In this paper, the level of regional synergy is measured by exploiting the indicators of the regional level of cluster enterprises, the intensity of co-operation among communes and the level commuting. The outcomes of the first indicator (C), the indicator of the quantity of cluster enterprises,⁴ are presented in table 2. According to the evidence of both typologies, the cluster enterprises are concentrated in the more developed and urban areas. Rural areas are situated far below the national average.

The second factor analysed is the intensity of co-operation among communes (J). The data is from 1991 and the calculated values follow the municipal classification of

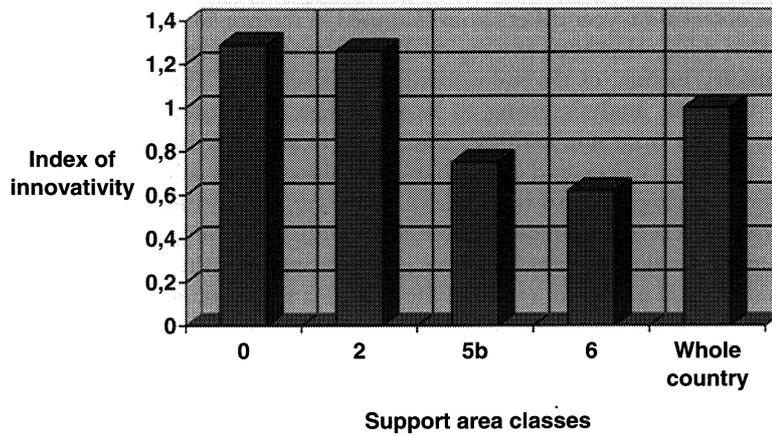


Figure 2. Index of innovativity/EU support area division.

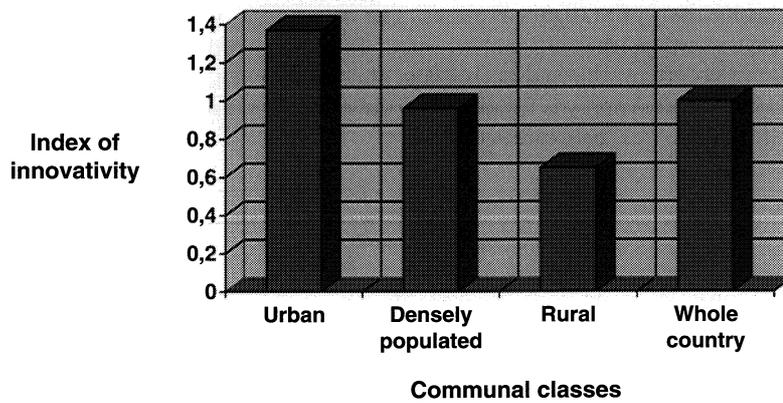


Figure 3. Index of innovativity/communal classification.

Table 2. Indicators of synergy.

Indicator	EU support area division					Communal classification of Statistics Finland			
	0	2	5b	6	Mean	Urban	Densely populated	Rural	Mean
<i>C</i> *1000	1471.00	1743.00	384.00	149.00	937.00 ⁱ	1588.00	752.00	132.00	824.00 ⁱⁱ
<i>J</i>	34.79	30.92	31.70	26.56	30.51	45.75	30.63	27.20	30.51
<i>EF</i>	0.62	0.41	0.35	0.29	0.48	0.55	0.46	0.34	0.48

C = indicator of the quantity of cluster enterprises.

J = indicator of intensity of co-operating among communes.

EF = indicator of the level of commuting.

i = The mean of the EU support area classification.

ii = The mean of the Communal grouping by Statistics Finland.

1994. The observation year differs from that used in the previous indicators because of the available data. However, the regional development process is rather slow and so the asymmetry in time of the indicators is not significant. The county of Ålands is excluded from the analysis owing to its small size. The results of the two chosen typologies depart from one another. The range of values is larger and the relation between the index values and the urban-rural distribution is clearer in communal classification typology of Statistics Finland. However, the position of the non-support areas of the EU classification as the best co-operative class supports the general idea that the more developed areas are more co-operative than the less developed areas. The maximum and minimum values of the indicator at the communal level are 100.00 and 0.00.

The third synergy level measurement is the level of regional commuting (EF). The observation year (1990) for this indicator differs from the other indicator because of the available data. However, the indicator can be regarded as being relevant on the same basis as the previous indicator. The calculated values follow the municipal classification for the year 1994, and again the county of Ålands is excluded. According to the outcomes of this indicator, the regions with most commuting are the non-support areas of the EU support area division and the urban areas of communal classification of Statistics Finland. The commuting values for the rural areas remain clearly below the national average. In other words, the urban and more developed areas obtain the highest benefits of commuting.

Next, an index of synergy is formed from the previous three indicators. The level of synergy in region r can be expressed as:

$$S_r = \frac{\frac{C_r}{C_m} + \frac{\mathcal{J}_r}{\mathcal{J}_m} + \frac{EF_r}{EF_m}}{3} \quad (5)$$

where S = index of synergy, C = indicator of the quantity of cluster enterprises, \mathcal{J} (joint operations) = indicator of the intensity of co-operation of communes, EF = indicator of the level of commuting, sub-index r = region, and sub-index m = national mean. The values of level of synergy for the selected typologies are illustrated in figures 4 and 5. The results of the index naturally follow the outcomes

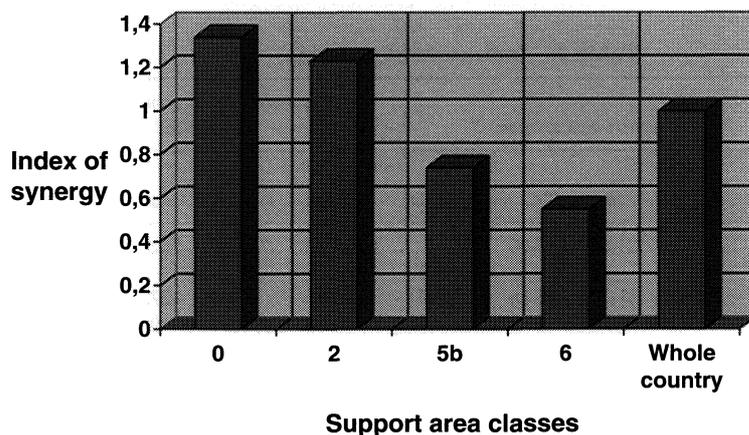


Figure 4. Index of synergy/EU support area division.

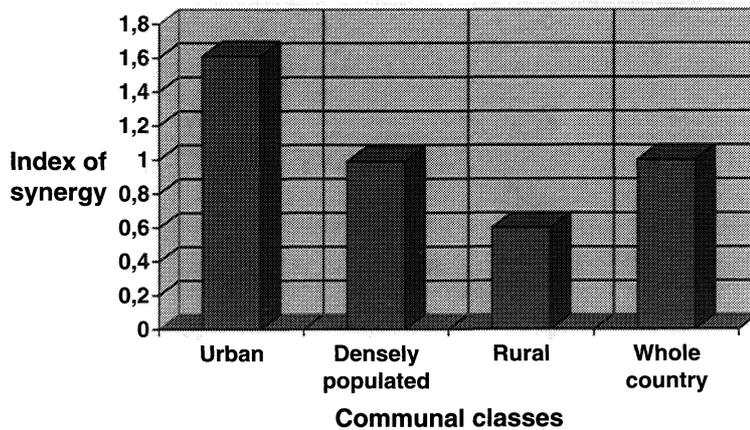


Figure 5. Index of synergy/communal classification.

of synergy indicators presented earlier. On the basis of the empirical evidence, it can be concluded that the urban areas are better off when analysing the synergy element.

The outcomes of the innovativity and synergy indices are illustrated in figure 6 by the two-by-two frequency table first presented in figure 1. The dotted lines stand for the different levels of milieu: the national levels are used as limits.

As we can see from the diagram, the rural and sparsely populated areas of the EU support area division fall in section X, areas with neither milieu nor innovation. Declining industrial areas and non-support areas fall in section W, regions of innovative milieu. The municipal classes of Statistics Finland follow the same pattern: urban areas are found in section W and densely populated as well as rural areas in section X. The case of densely populated areas is very interesting. This category is very close to the upper right quadrant (innovative milieu) and potential possibilities to proceed towards innovative milieu are good. According to the theoretical framework presented in section 3, this improvement could be launched by external innovative intervention or by development of local synergy. From the viewpoint of innovation policy this would involve measures that aim at the improvement of educational level, revival of firm formation as well as better exploitation of advanced technologies and organizational methods. Integration policy measures supporting the regional development would consist of better usage of externalities arising from clusters, improvement of co-operation among communes and better exploitation of the labour input.

To conclude the outcomes of figure 6, the potential environments for entrepreneurship are not as promising in the rural areas as in the urban areas. In fact, the rural areas stand far below the national average.

6. Conclusion

This paper approaches local development and entrepreneurship within the frame of reference of innovative milieu. This is the first time that such analysis has been carried out with Finnish data. The standpoint of the study is that innovativity and synergy play a crucial role in regional development and competitiveness. The attainment of regional success and competitiveness is seen as the outcome of integrating business environment, network structure and innovativity.

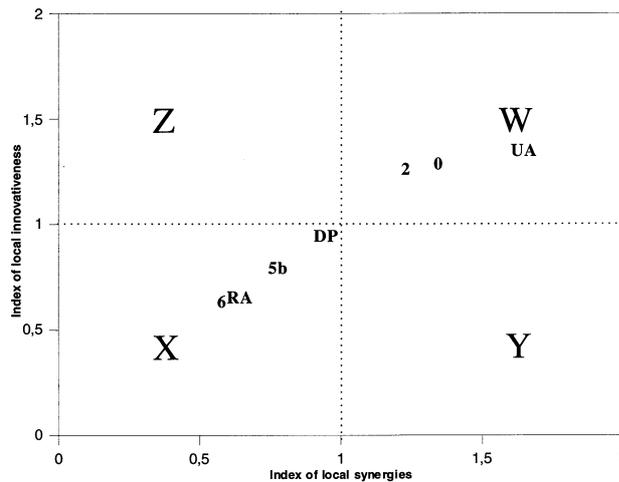


Figure 6. Structural characteristics of the identified milieux of EU support area division and communal classification.

The paper identifies the outcomes for two different regional typologies and hence it can assist in, for example, the evaluation of development programmes. According to the results, urban and rural areas differ from each other as potential environments for enterprises. Typically, the settings of rural areas have a level of innovativity and synergy below the national average (Niittykangas 1996). The characteristics shared by the support area classes 5b and 6, as well as by the rural commune class, are:

- educational level below the national average
- lower rate of formation of new enterprises than in urban areas
- level of technology lower than the national average
- lower quantity of cluster enterprises than the national average
- lower intensity of co-operation of communes than in urban areas
- lower level of commuting than national average.

The measurements of innovativity and synergy can be thought of as regionally set policy goals. The concrete goals for an innovation policy would then centre on the improvement of educational level, an increase in the measures in support of the establishment of firms, and the development of activities that would facilitate the introduction of new technologies and organizational methods. The regionalized integration policies would be formed out of the development of the possibilities of co-operation between enterprises, improvement in communal co-operation and the promotion of commuting (see p. 10).

The outcomes presented here for the use of charting the general characteristics and possibilities for the improvement of local milieu are quite promising. However, the problem with this kind of approach is that it disregards the heterogeneity within the regional classes. To take heterogeneity into account, it would be necessary to analyse smaller regional units and to use more advanced indicators. A more closely focused and more extensive research of regional characteristics would provide more detailed information for political and strategic purposes. Another problem that arises from the concept of innovative milieu is that the concept does not formally include any

dynamic observation of the development phenomenon. Such an analysis would require a long time series of a kind that is not available for all the indicators presented here. However, this kind of research would make the concept of innovative milieu formally more competitive and the phenomenon of regional development more intelligible.

Acknowledgements

The author would like to thank Professor Hannu Tervo for his excellent guidance during this study. My gratitude is also due to Aki Kangasharju, Antti Moisio and Marko Ovaskainen for their comments. The author is also grateful for the valuable comments from two anonymous reviewers. This study is part of a project funded by the Academy of Finland.

Notes

1. See Ritsilä, J. 1997 Town and country as innovative milieux – a statistical analysis (in Finnish). Publication no. 141, Centre for Economic Research in Central Finland, University of Jyväskylä.
2. An almost similar presentation of innovative milieux can be found in Maillat (1995). Maillat exploits the concepts of interaction logic and learning dynamic for defining the typology of milieux.
3. The mean at the municipal level.
4. The means of the EU support area classification and of the communal grouping by Statistics Finland act as comparative values for this indicator. This is because of the manner of calculation of the indicator.

References

- Barrow, M. and Hall, M. 1995 The impact of a large multinational organization on a small local economy, *Regional Studies*, 7: 635–653.
- Bartlett, W. 1993 The evolution of worker's cooperatives in southern Europe: a comparative perspective, in Karlsson, C., Johannisson, B. and Storey, D. (eds.) *Small Business Dynamics* (London: Routledge), pp. 57–76.
- Camagni, R. 1992 Development scenarios and policy guidelines for the lagging regions in the 1990s, *Regional Studies*, 4: 361–374.
- Camagni, R. 1995 The concept of innovative milieu and its relevance for public policies in European lagging regions, *Papers in Regional Science*, 4: 317–340.
- Chandra, B. and MacPherson, A.D. 1994 The characteristics of high-technology manufacturing firms in a declining industrial region: an empirical analysis from western New York, *Entrepreneurship and Regional Development*, 2: 145–160.
- Courlet, C. and Pecquer, B. 1991 Local industrial systems and externalities: an essay in typology, *Entrepreneurship and Regional Development*, 3: 305–315.
- Dahmén, E. 1988 Development blocks in industrial economics. Paper presented at the workshop on New Issues in Industrial Economics, Case Western University, Ohio, June 1988.
- Davelaar, J. E. and Nijkamp, P. 1997 Spatial dispersion of technological innovation: a review, in Bertuglia, C., Lombardo, S. and Nijkamp, P. (eds) *Innovative Behaviour in Space and Time* (Berlin: Springer), pp. 17–40.
- Eskelinen, H. and Kautonen, H. 1997 In the shadow of dominant cluster – the case of furniture industry, in Eskelinen, H. (ed.) *Regional Specialisation and Local Environment* (Denmark: NordREFO), pp. 171–192.
- Grafoli, G. 1992 New firm formation and local development: the Italian experience, *Entrepreneurship and Regional Development*, 4: 101–125.
- Gregersen, B. and Johnson, B. 1997 Learning economies, innovation systems and European integration, *Regional Studies*, 31: 479–490.
- GREMI 1991 Development prospects of the Community's lagging regions and socio-economic consequences of the completion of the internal market: an approach in terms of local milieux and innovation networks. In *Final Report to the Commission of the European Communities*, Milan, October.
- Grimes, S. and Lyons, G. 1994 Information technology and rural development: unique opportunity or potential threat? *Entrepreneurship and Regional Development*, 3: 219–237.

- Hansen, N. 1992 Competition, trust, and reciprocity in the development of innovative regional milieux, *Papers in Regional Science*, 2: 95–102.
- Harrison, B. 1994 The industrial districts and the crisis of the cooperative form: Part I, *European Planning Studies*, 1: 3–22.
- Hedlund, A., Johnstadt, T., Rasmussen, J. C. and Vuorinen, P. 1990 Competence, networks and regional policy, in Illeris, S. and Jakobsen, L. (eds) *Networks and Regional Development* (Copenhagen: Nord REFO), pp. 236–280.
- Hernesniemi, H., Lammi, M. and Ylä-Anttila, P. 1995 *Kansallinen kilpailukyky ja teollinen tulevaisuus* (National competitiveness and industrial future) (Tampere: Tammer-Paino Oy).
- Johannisson, B. 1990 The Nordic perspective: self reliant local development in four Scandinavian countries, in Stöhr, W. B. (ed.) *Global Challenge and Local Response: Initiatives for Economic Regeneration in Contemporary Europe* (London: Mansell), pp. 57–89.
- Koiranen, M. 1993 *Ole yrittäjä: ulkoinen ja sisäinen yrittäjyys* (Be an entrepreneur: external and internal entrepreneurship) (Tampere: TT-kustannustieto Oy).
- Krugman, P. 1991 Increasing returns and economic geography, *Journal of Political Economy*, 3: 483–499.
- Kuusi, O. and Loikkanen, T. 1996 In search for new approaches in technological change, in Kuusi, O. (ed.), *Innovation Systems and Competitiveness* (Helsinki: ETLA), pp. 1–16.
- Lammi, M. 1994 *Papereiden, koneiden ja osaamisen menestystarina* (Success story of paper, machinery and know-how) (Helsinki: ETLA, Tummavuoren kirjapaino Oy).
- Littunen, H., Storhammar, E. and Nenonen, T. 1998 The survival of firms over the critical first 3 years and the local environment, *Entrepreneurship and Regional Development*, 10: 189–202.
- Lyons, D. 1995 Agglomeration economies among high technology firms in advanced production areas: the case of Denver/Boulder, *Regional Studies*, 3: 265–278.
- Maillat, D. and Lecoq, B. 1992 New technologies and transformation of regional structures in Europe: the role of the milieu, *Entrepreneurship and Regional Development*, 4: 1–20.
- Maillat, D. 1995 Territorial dynamic, innovative milieu and regional policy, *Entrepreneurship and Regional Development*, 2: 157–165.
- Maillat, D. 1998 Innovative milieux and new generations of regional policies, *Entrepreneurship and Regional Development*, 1: 1–16.
- Marshall, M. 1990 Regional alternatives to economic decline in Britain's industrial heartland: industrial restructuring and local economic intervention in the West Midlands conurbation, in Stöhr, W. B. (ed.), *Global Challenge and Local Response: Initiatives for Economic Regeneration in Contemporary Europe* (London: Mansell), pp. 163–198.
- Maskell, P. 1997 Localised low-tech learning in furniture industry, in Eskelinen, H. (ed.) *Regional Specialisation and Local Environment* (Denmark: NordREFO), pp. 145–170.
- Niittykangas, H. and Nenonen, T. 1994 The formation of new firms by people living in non-urban settings, *Papers in Regional Science*, 4: 393–406.
- Niittykangas, H. 1996 Enterprise development in different rural areas of Finland, *Entrepreneurship and Regional Development*, 3: 245–261.
- Niittykangas, H. and Tervo, H. 1997 Entrepreneurship and local milieu, in Eskelinen, H. (ed.), *Regional Specialisation and Local Environment* (Denmark: NordREFO), pp. 120–141.
- Nijkamp, P. and Poot, J. 1997 Endogenous technological change, long run growth and spatial interdependence: A survey, in Bertugilia, C., Lombardo, S. and Nijkamp, P. (eds.), *Innovative Behaviour in Space and Time* (Berlin: Springer), pp. 213–238.
- Porter, M. E. 1990 *The Competitive Advantage of Nations* (Worcester: The MacMillan Press Ltd).
- Rantahalvari, V. 1992 *Suomen seutuistuminen* (Towards districts, the Finnish case) (Helsinki: Sisäasiainministeriön monistamo).
- Ritsilä, J. 1997 *Maaseutalueet ja kaupungit innovatiivisina miljöinä – tilastopohjainen analyysi* (Town and country as innovative milieux – a statistical analysis) (Jyväskylä: Centre for Economic Research in Central Finland, University of Jyväskylä).
- Scheer, G. and Zobl, A. 1990 Externally induced regional development on the western side of the 'Iron Curtain': attempts at indigenous regional development in Austria's rural areas, in Stöhr, W. B. (ed.) *Global Challenge and Local Response: Initiatives for Economic Regeneration in Contemporary Europe* (London: Mansell), pp. 295–327.
- Silander, M., Tervo, H. and Niittykangas, H. 1997 *Uusi aluepolitiikka ja yritysten sijaintikäyttäytyminen* (New regional policy and location behaviour of enterprises) (Jyväskylä, Centre for Economic Research in Central Finland, University of Jyväskylä).
- Statistics Finland 1996a Established and Finished Enterprises (Helsinki: Tilastokeskus).
- Statistics Finland 1996b Kuntafokta (Helsinki: Tilastokeskus).
- Suarez-Villa, L. 1993 The dynamics of regional invention and innovation: innovative capacity and regional change in the twentieth century, *Geographical Analysis*, 2: 147–164.
- Suarez-Villa, L. 1997 Innovative capacity, infrastructure and regional inversion: is there a long-term dynamic? in Bertugilia, C., Lombardo, S. and Nijkamp, P. (eds.) *Innovative Behaviour in Space and Time* (Berlin: Springer), pp. 291–305.

THEME II

**MIGRATION AND LABOUR-MARKET
ADJUSTMENT**

CHAPTER 3

REGIONAL DIFFERENCES IN THE ROLE OF MIGRATION IN LABOUR-MARKET ADJUSTMENT: THE CASE OF FINLAND*

1	INTRODUCTION	51
2	EFFICIENCY OF LABOUR MIGRATION	52
2.1	Unemployment and migratory behaviour.....	52
2.2	Postmigratory employment prospects	54
3	DATA, SAMPLE AND DEFINITIONS OF VARIABLES	55
4	EMPIRICAL WORK	58
4.1	Determinants of migratory behaviour	58
4.2	The effects of migration on reemployment	62
5	CONCLUSIONS.....	65
	REFERENCES	66

* This paper has been published as: Ritsilä, J. & Tervo, H. (1999) Regional Differences in the Role of Migration in Labour-Market Adjustment: The Case of Finland. In G. Crampton (Ed.) *Regional Unemployment, Job Matching and Migration, Series on European Research in Regional Science*, 9, London: Pion, pp. 166-182. Jari Ritsilä is the first author of the paper and responsible for the statistical estimation. Writing the theory and interpreting the results have been done together with Hannu Tervo.

Regional Differences in the Role of Migration in Labour-market Adjustment: The Case of Finland

J Ritsilä, H Tervo
University of Jyväskylä

1 Introduction

Recently interregional migration has accelerated in Finland. These population movements are characterised by increasing centralisation to a very few core areas, particularly to the Helsinki region. Any attempt to analyse the economic effects of these migration processes raises a fundamental question about the relationship between migration and unemployment. Migration plays a major role in equilibrating regional labour markets (Marston, 1985; Vanderkamp, 1989). The economic efficiency of interregional labour migration involves two central elements. First, the efficiency of labour migration should be determined by the effect of unemployment on the migration decision. Hence, for economically efficient labour migration, unemployment should augment the likelihood of moving (see Herzog et al, 1993). Second, efficient labour migration also has to include the improvement in the employment prospects of the migrants, that is, the likelihood of reemployment for the migrant has to increase when he or she moves to the region of destination.

In this study, we analyse the efficiency of interregional migration in Finland, pointing out regional differences. First, we map out the role of personal as well as regional unemployment in the equilibrating process of labour markets, and examine whether there are regional differences in these processes. Second, we examine the employment prospects of migrants and analyse whether these prospects differ between regions. The analysis is based on extensive longitudinal microdata from the period 1985–90. It concerns long-distance labour migration because this is usually accompanied by a change in the workplace as well as other labour-market attributes.

In the regional analysis, the main interest is to examine whether the Uusimaa region differs from the other regions of Finland. The Uusimaa region is composed mainly of the capital (Helsinki) region of Finland, which forms Finland's economic and cultural centre as well as its most dynamic region. Employment growth in Uusimaa has been rapid. The attractiveness of this region is demonstrated by decades of positive net migration. Young and well-educated people in particular have been moving into it. Over the last few decades the Helsinki region has spread geographically and now draws upon a labour market far beyond the central urban areas.

The rest of the chapter is structured as follows. In section 2 we present the framework of empirical analysis. Section 3 introduces the model, data, and variables used. In section 4.1, we report the results of the empirical analysis of interregional migratory behaviour in Finland. The results relating to the

postmigratory employment prospects are presented in section 4.2. Section 5 concludes the chapter and suggests areas for further study.

2 Efficiency of labour migration

There are two essential questions related to the role of migration as a regional adjustment process. The first is how does unemployment affect migration? This question is linked to the role of unemployment in augmenting the likelihood of moving. The second question is how does migration affect unemployment? This concerns the role which migration plays in increasing the likelihood of reemployment. Together these two dimensions of labour-market transitions form the basic elements used in evaluating the efficiency of labour migration.

2.1 Unemployment and migratory behaviour

Pissarides and Wadsworth (1989) have argued that the possible effects of unemployment on migration exist on three different levels: the personal, the regional, and the national. First, the employment status of a worker is related to mobility. Unemployed workers could be assumed to have a greater likelihood of migrating than employed workers because of the lower cost of movement. Second, migration may be encouraged by regional unemployment differentials. Workers from regions of high unemployment are more likely to move than those living in regions of low unemployment. Third, higher overall unemployment decreases the probability of moving. In a period of high unemployment, jobs are more valuable to employed workers and new job opportunities are scarce. Because of the decreased probability of getting a job at the destination, the potential migrant is faced with greater uncertainty (which acts as a cost) and a lower rate of return from migration. Accordingly, during recessions the equilibrating role of migration is reduced (Milne, 1991; Pissarides and Wadsworth, 1989).

The first two relationships between unemployment and migration are directly related to the analysis of regional adjustment. Aggregate unemployment per se also affects the efficiency of the regional adjustment process, but we may suppose that it does not make a difference between regions. Personal unemployment and/or a higher regional unemployment level might trigger differentials in labour mobility. Migration can be said to be microefficient if personal unemployment increases the probability of moving, all else being equal, and macroefficient if the triggering factor of migration is regional unemployment (see Herzog et al, 1993; Van Dijk et al, 1989). Thus, unemployment may have two channels of influence on migration and its regional variation: the personal and the regional. As a result, when the overall effect of unemployment on interregional migration is analysed four possible cases emerge, in which neither of the two channels has an effect or only one of the channels has an effect, or both of them have an effect. These cases are characterised in table 1.

Table 1. Channels of regional migration adjustment.

Key elements of adjustment process	Predicted outcome	Level of efficiency
<i>1. None</i> The migration decision is influenced by considerations other than unemployment	The effects of labour migration on regional unemployment disparities remains small	
<i>2. Regional unemployment</i> The employed are at increased risk of becoming unemployed and the unemployed have reduced chances of local reemployment. The influence of regional unemployment operates mainly through the probability of finding a job, that is low-unemployment areas are more attractive to potential migrants.	The ratio of unemployed and employed out-migrants is the same as the ratio of unemployed and employed in the region. Out-migration from high-unemployment regions slows down as regional unemployment disparities even out. The phenomenon of cumulative causation may occur when high-unemployment regions lose their human capital.	Macroefficient
<i>3. Personal unemployment</i> Higher regional unemployment rates do not affect migratory behaviour. Instead, personal unemployment increases the likelihood of migration, because the cost of moving is lower for unemployed workers than for employed workers.	Compared with regional unemployment, this case is more effective in reducing regional unemployment disparities. First, regions with high unemployment rates do not have to lose a considerable part of their labour force because unemployed persons are more likely to move. Second, out-migration from high unemployment regions does not slow down with diminishing unemployment disparities	Microefficient
<i>4. Regional and personal unemployment</i> This case is a combination of cases 2 and 3. Both higher regional unemployment rates and personal unemployment increase the likelihood of migrating.	The overall effect of unemployment on migration is strong. However, although the adjustment takes place, the high-unemployment regions lose their human capital and become smaller. Great danger of cumulative causation.	Macroefficient and microefficient

2.2 Postmigratory employment prospects

In an analysis of the efficiency of interregional labour migration, an essential question relates to the outcome of the move: do the migrants benefit from their actions in terms of enhanced employment and/or income opportunity? (Hoover and Giarratani, 1984; Van Dijk et al, 1989). For an improvement in employment to take place, unemployment should provide the spur for migration ('the first dimension of microeconomic efficiency'), and migration has to improve the prospects of employment ('the second dimension of microeconomic efficiency').

We may distinguish two patterns of behaviour in migrants' job searching: 'speculative migration' and 'contracted migration'. In speculative migration, workers move in the hope of finding a job at their destination, whereas in contracted migration, workers move only after a job at the destination has been arranged (Silvers, 1977). In the second case, a migrant should become employed in the region of destination. However, the first case involves the presence of uncertainty, even though we may suppose that moving improves the employee's employment opportunities.

If moving takes place speculatively, migration can be considered as spatial job-search. According to job-search theory (Jayet, 1990), expansion of the search radius increases the number of available jobs, thereby increasing the reemployment likelihood of the unemployed. Reservation wages at the destination may also be lowered so that relocation costs are recouped more quickly through reemployment. The association between migration and employment may also be negative if migration is viewed as a 'strategy of last resort' (Bailey, 1994). The positive association between migration and employment is, however, intuitively more appealing.

For migrants who already have a contract for a job in the new region, migration is the outcome of an information-gathering and job-search process, and not an active part of a job search as it is for speculative migrants. Either strategy may be appropriate, depending on the circumstances in which individuals find themselves. According to Flowerdew (1992), the bulk of migration behaviour in contemporary Britain and most other developed countries is contracted. To our knowledge, there are no studies on the relative importance between these two main types of labour migration in Finland.⁽¹⁾ However, it seems probable that contracted migration is also more common compared with speculative migration in Finland.

⁽¹⁾The number of persons who found a job outside their home municipality through the Employment Service Agency varied between 8000 and 10 000 in Finland during the period 1983–87 (Kettunen, 1990, page 25). This about 8 to 10% of all jobs mediated by the Agency. Only some of all vacancies go, however, through the employment exchange because many employers prefer to fill vacancies through other information channels, especially for more qualified jobs. For example, in 1986, the share of jobs mediated by the Employment Service Agency was only 15% of all available vacancies (Sääski, 1988, page 10).

As predicted by both the job-search model and the human capital model of migration, migration should augment the employability of migrants as compared with nonmigrants (if earnings potential is held constant), irrespective of whether the migration is contracted or speculative.

3 Data, sample, and definitions of variables

The data set used is a sample from the Finnish longitudinal census file which contains data on the population, economic activity, dwelling conditions, and family obtained in the censuses of 1970, 1975, 1980, 1985, and 1990. The file contains data on 6.4 million people who were residents of Finland at the time of one or more of the censuses. The census file is maintained and updated by Statistics Finland. The data set used here is a 1% sample from the file for 1985 and 1990. The data set was supplemented by data on the characteristics of municipalities.

The number of individuals in the total sample (drawn from the total population, and not only from the labour force) was over 50 000. The subgroups of the total sample used were:

- (1) people who belonged to the labour force both in 1985 and 1990 ('old workers'),
- (2) people who came to the labour market during the period 1985–90 ('new entrants'),
- (3) people who were unemployed in 1985 and belonged to the labour force in 1990 ('unemployed').

The number of individuals in these three groups were 18 849, 5687, and 1596, respectively. The unemployed group is a subgroup of the group of old workers.

For the regional analysis, Finland was divided into four parts according to the common regional breakdown. The first of these regions, the province of Uusimaa, includes the Helsinki region. The other three regions are named the South, Central, and North, and they are composed of ten provinces (see figure 1). The island province of Ahvenanmaa is excluded from the analysis because of its small size.

The definition of migration involves a change of residence from one location to another. This geographical interaction may occur over very short distances as well as across much longer distances. The interest in the present study was in moves that were motivated by labour-market considerations. In addition to work-related reasons, people may also migrate for family, housing, or educational reasons. These moves had to be excluded from the analysis so that they would not be mixed up with the moves motivated by a change of or search for a job. In this study, migration was defined as taking place under two conditions (see Tervo, 1997; 1998). First, an individual belonging to the labour force ought to be a resident of a different province in 1990 from that in 1985. The Finnish provinces are comparatively large in area; therefore a move from one province to another most probably means a change in the local labour market as well as a change in job. Migration defined in this way was termed long-distance migration as distinct from short-distance migration that includes all other moves inside a country. Short-distance moves are often

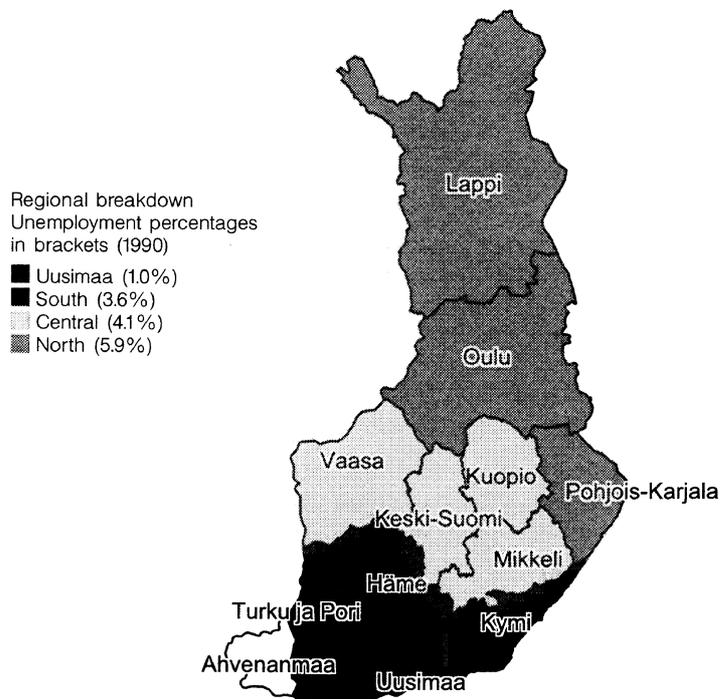


Figure 1. Regional breakdown.

motivated by family reasons and housing needs instead of labour-market reasons. Second, an employed person was assumed to work in the same province where he or she lived in 1990. This second condition was also set to distinguish migrants looking for a job from those with other motives. This condition did not apply to unemployed persons.

The analysis included two data-originated shortcomings which, however, are quite typical of empirical analyses such as this. First, the time span used for observing migration was unavoidably long. As a result, migration rates are likely to be understated because of repeat migration within the relevant time period. Because of the long time span, the relationship between migration and unemployment also becomes harder to analyse. The observations related to employees' employment status at the end of the period may also be far removed from the event of the move, and hence, the contracted migrations observed in this study may involve both speculative and contracted moves. The same time span has nevertheless been used in many other comparable studies. In their survey of migration as a spatial job-search, Herzog et al (1993) selected eleven microdata-based multivariate studies of the migration decision, five of which employed a five-year migration interval. A long time span may weaken the reliability of the results, but, on the other hand, we might argue that migration should improve migrants' employability in the long run and not necessarily instantly after the move. Second, the examination did not

Table 2. The explanatory variables of the logit models.

Variable	Scale	Operational Definition
<i>Migration variables</i>		
Migrant	discrete, dummy	1 = migrated from one province to another and works in the same region as lives in 1990 when employed 0 = other
Migrant of region 1, ..., migrant of region 4	discrete, dummy	1 = interprovincial migrant of region 1, ..., 4 and works in the same region as lives in 1990 0 = other
<i>Personal and household variables</i>		
Personal unemployment 1 (statistical)	discrete, dummy	1 = unemployed over 6(4) months ^a 0 = other
Personal unemployment 2 (short-term)	discrete, dummy	1 = unemployed over 1 month 0 = other
Female	discrete, dummy	1 = female 0 = male
Age	continuous, proportional	00-99 (99 includes cases >99)
Age ²	continuous, proportional	(Age) ²
Educational level (intermediate level)	discrete, dummy	1 = upper secondary education 0 = other
Educational level (higher education)	discrete, dummy	1 = higher education 0 = other
Household size (one-person)	discrete, dummy	1 = one-person household 0 = other
Household size (two-person)	discrete, dummy	1 = two-person household 0 = other
Migration history	discrete, dummy	1 = previous migration experience 1 = no previous migration experience
Homeownership	discrete, dummy	1 = homeowner 0 = other
Personal income	continuous, proportional	income subject to state taxation
Location of job	discrete, dummy	1 = municipality of job differs from place of residence 0 = other
<i>Regional/labour market variables</i>		
Local unemployment rate	continuous, proportional	municipal percentage of unemployment (calculated from the basic sample)
Size of municipality	continuous, proportional	population of residents in thousands
Degree of urbanisation	continuous, proportional	proportion of population living in built-up areas (10% accuracy)
Structure of production (agriculture)	continuous, proportional	share of employed labour force in agriculture and forestry (10% accuracy)
Structure of production (industry)	continuous, proportional	share of employed labour force in industry (10% accuracy)

^a A person primarily included in the economically active population in 1985 was supposed to be employed and/or unemployed for at least six months (where employment is defined as ≥ 20 hours a week) between 18 November 1984 and 17 November 1985. The unemployed part of the economically active population consists of persons who have either been unemployed for over six months, or have been unemployed and employed for at least six months, where the persons are unemployed for over half of this period.

take into account why the particular region was chosen as the destination of migration. Hence, the rest of Finland was treated as the single destination region for all migrants from any observed province. Out-migration abroad was also ignored in this analysis.

A group of other variables taken from the census data file was used in the multivariate settings of this study. These dependent and explanatory variables are defined in table 2.

4 Empirical work

In this section we present the empirical work that focuses on testing the predictions that arose from the theoretical framework treated in section 2. First, in section 4.1 we present the results of the estimations related to migratory behaviour and its regional dimension. Second, the findings of the analysis on reemployment of migrants are documented in section 4.2.

4.1 Determinants of migratory behaviour

Turning to the results of the empirical analysis relating to migratory behaviour, we first look at the results of two slightly different specifications of the basic model. These specifications differ from each other only with respect to the personal unemployment variable. The first longer term specification uses the variable 'Personal unemployment 1' according to which a worker had to have been unemployed for at least half of a six-month period if he or she was registered as unemployed. The second specification uses the variable in which a shorter unemployment period of one month was enough for a person to be registered as unemployed ('Personal unemployment 2'). In table 3 we report the results of the estimation.

The results show that almost all the estimated coefficients are statistically significant and have the correct signs, that is, they accord with the theory and with previous empirical findings. Generally, the findings of the two specifications are quite similar and the estimated coefficients are stable. The most important difference relates to the personal unemployment variable: in specification 1 the variable is not statistically significant whereas in specification 2 it is. This shows that the definition of personal unemployment is of great importance. Short-term personal unemployment has an effect on the decision to move. In contrast, the effect of personal unemployment is not seen if it is measured only according to the main type of activity of the worker.

The variable for regional unemployment is statistically significant in both specifications. Local unemployment increases the likelihood of out-migration. The result is as hypothesised, but differs from many results obtained for several other countries. The regional unemployment variable is strong, and is therefore one of the key factors determining migratory behaviour in Finland. When summarising the information on unemployment factors (obtained from specification 2), we could say that migration is both micro-efficient and macroefficient in Finland.

Table 3. Logit regressions for the probability of moving.

Variable	Specification 1			Specification 2		
	<i>B</i>	SE	<i>R</i>	<i>B</i>	SE	<i>R</i>
Constant	-1.200	0.624		-1.316*	0.629	
Personal unemployment 1	0.191	0.142	0.000			
Personal unemployment 2				0.274*	0.110	0.024
Female	0.028	0.077	0.000	0.032	0.076	0.000
Age	-0.141*	0.030	-0.053	-0.137*	0.030	-0.051
Age ²	0.001*	0.000	0.020	0.001*	0.000	0.018
Intermediate level of education	0.267*	0.093	0.030	0.262*	0.093	0.029
Higher level of education	0.880*	0.129	0.079	0.878*	0.129	0.079
One-person household	0.442*	0.111	0.044	0.448*	0.111	0.045
Two-person household	0.178*	0.091	0.016	0.180*	0.091	0.017
Migration history	1.462*	0.078	0.222	1.464*	0.078	0.222
Homeownership	-0.452*	0.078	-0.067	-0.448*	0.078	-0.066
Personal income	-1.9×10^{-6}	1.3×10^{-6}	-0.005	-1.6×10^{-6}	1.3×10^{-6}	0.000
Location of job	0.129	0.092	0.000	0.129	0.092	0.000
Local unemployment rate	0.059*	0.010	0.065	0.058*	0.010	0.063
Size of municipality	-0.002*	0.000	-0.071	-0.002*	0.000	-0.070
Degree of urbanisation	0.133*	0.040	0.035	0.133*	0.040	0.035
Agriculture	0.206*	0.075	0.028	0.207*	0.075	0.028
Industry	-0.054	0.047	0.000	-0.053	0.047	0.000
Sample size		18 849			18 849	
Number of movers		886			886	
Number of unemployed		881			1 596	
-2 Log-likelihood		6 079.0			6 074.7	
Correctly classified (%)		95.3			95.3	

* statistically significant at the 5% level

B = estimated coefficient; SE = standard error; *R* = *R*-statistic which shows the contribution (sign and class) the variable makes in the model.

The other results show that the four most important variables affecting long-distance migration in Finland are previous migration experience, level of education, size of the municipality, and homeownership. Previous repeated migration appears to have a strong effect on present migration, demonstrating that previous experience considerably increases the probability of moving (see also DaVanzo, 1983; Tervo, 1997; Westerlund and Wyzan, 1995). Another strong explanatory variable is the level of education. Migration has a selective nature. Individuals with higher education are found to be more mobile. The result accords with many previous studies (DaVanzo, 1983; Herzog and Schlottman, 1984; Porell, 1982).

The size of municipality of origin was also found to be a strong factor in determining migratory behaviour. The likelihood of moving decreases with the size of municipality. However, the variable for the degree of urbanisation shows that migration increases with the degree of urbanisation. The structure of production is closely related to the size of municipality of origin. Workers from primary production areas have a greater probability of moving compared with others. However, there was no difference in migration likelihood between workers from industrial-dominated regions and services-dominated regions (the latter being the reference class for the dummy variable).

Homeownership status is a strong explanatory variable in both specifications. This strongly indicates that the nature of the Finnish housing system, characterised by a high share of homeowners, reduces interregional migration. A homeowner confronts very high transaction costs and low liquidity of real estate when making his or her decision, and therefore the probability of moving decreases with homeownership (see also Oswald, 1996; Tervo, 1997; Westerlund and Wyzan, 1995).

In addition to the previously mentioned personal characteristics, age variables are also statistically significant. We adopt the procedure of using age with its square, which defines the age factor as nonlinear. The outcome of these two age variables is that migration probability decreases with age, though not in a linear relationship. Unlike age, the gender of a worker does not seem to affect the decision to move. The variables for the size of household are both statistically significant. The interpretation of the results is that workers living alone or in two-person households are more prone to move than workers of bigger household units. Families with children find the decision to move more complicated. The variables of personal income and location of job are not statistically significant.

Next we turn to our main question of whether the four regions differ with respect to migratory behaviour. Our modelling strategy was twofold. First, we estimated an interactive dummy model in which we used regional dummy variables that aimed to capture regional differences in the role of the two unemployment variables. Second, we estimated a separate model for the labour force of Uusimaa, to have a closer look at the migratory behaviour of that specific region. The results of these estimations are presented in table 4.

The interactive dummy model is used here because it makes the testing of equality restrictions easier compared with separate regressions. The estimated results show that, of the six interactive regional dummy variables, only the dummy in which Uusimaa interacts with local unemployment is statistically significant. Its estimated coefficient is negative. This result, together with the significantly positive main effects, indicates that local unemployment, together with the effect of living in Uusimaa (excluding the effects of other regional control variables) has a clearly smaller effect in Uusimaa than in the reference region (North). The local unemployment dummies related to the two other regions are also negative, but they are not statistically significant.

Table 4. Logit regressions for the probability of moving.

Variables	National-level model			Model of Uusimaa		
	<i>B</i>	SE	<i>R</i>	<i>B</i>	SE	<i>R</i>
Constant	-1.035	0.601		-2.700	1.396	
Age	-0.142*	0.030	-0.054	-0.075	0.067	0.000
Age ²	0.001*	0.000	0.020	0.000	0.001	0.000
Intermediate level of education	0.258*	0.092	0.029	0.321	0.203	0.018
Higher level of education	0.836*	0.120	0.081	0.099	0.272	0.000
One-person household	0.438*	0.111	0.044	0.340	0.228	0.012
Two-person household	0.185*	0.091	0.017	0.135	0.192	0.000
Migration history	1.467*	0.078	0.222	1.510*	0.176	0.219
Homeownership	-0.452*	0.078	-0.067	-0.407*	0.174	-0.049
Size of municipality	-0.002*	0.000	-0.044	-0.001*	0.001	-0.065
Degree of urbanisation	0.109*	0.041	0.026	0.094	0.101	0.000
Agriculture	0.188*	0.074	0.025	0.217	0.264	0.000
Personal unemployment 2	0.186	0.206	0.000	0.657*	0.302	0.043
Interaction of personal unemployment 2 with:						
Uusimaa	0.491	0.363	0.000			
South region	0.010	0.271	0.000			
Central region	0.193	0.282	0.000			
Local unemployment rate	0.049*	0.012	0.047	0.074	0.096	0.000
Interaction of local unemployment rate with:						
Uusimaa	-0.118*	0.051	-0.022			
South region	-0.018	0.014	0.000			
Central region	-0.008	0.014	0.000			
Sample size	18 849			5 209		
-2 Log-likelihood	6 094.3			1 298.5		
Correctly classified (%)	95.31			96.77		

* statistically significant at the 5% level

B = estimated coefficient; SE = standard error; *R* = *R*-statistic which shows the contribution (sign and class) the variable has in the model.

None of the regional dummies that interacts with personal unemployment is statistically significant.

However, in the separate model of Uusimaa the personal unemployment variable is statistically significant and has a large positive coefficient. This suggests that personal unemployment does matter in Uusimaa. Partly, this might relate to the phenomenon of remigration. Thus, migration seems to be a microefficient process in a region of low unemployment such as Uusimaa. Another interesting phenomenon relates to the effect of a high level of education: this variable is not statistically significant for Uusimaa, but in the national estimations it is highly significant. This implies that educated

people are not eager to move out of Uusimaa. This result also suggests that the highly educated move to Uusimaa and tend to stay there. Together, these two findings for Uusimaa call into question the claim that migration acts as an equilibrium mechanism which tends to even out regional disparities. It seems that Myrdal's (1957) 'circular and cumulative causation' effect can be observed here.

Surprisingly, regional unemployment does not seem to have an effect on migratory behaviour in Uusimaa. However, the variable was important in the national models. One explanation for this confusing result might be a smaller variation of regional (local) unemployment at the regional level than at the national level, because local unemployment levels do not vary as much within regions as between regions.

4.2 The effects of migration on reemployment

To complete the examination of the efficiency of labour migration, we shall now turn to the empirical evidence on postmigratory employment prospects. The analysis in this section centres on three groups: those who were already in the labour market in 1985, new entrants to the labour force, and those who were unemployed in 1985. Using the microdata, we estimated the direct impact of migration on reemployment among these three groups, while holding constant both the personal characteristics and local labour-market conditions. Furthermore, these direct effects of migration are also examined from the regional viewpoint, that is, two different specifications with interaction dummies are constructed to reveal regional differences in reemployment prospects. The binary-logit estimation method based on logistic distribution is also employed here. The dependent variable is a dummy variable showing whether the worker is employed or not. Explanatory variables consist of the selectivity and labour-market variables, a binary variable representing migration status, and interaction dummies for regional analysis. The results of the estimations are presented in table 5.

The estimated coefficients of the control variables are mainly as expected. In the group of old workers (that is those who were also in the labour force five years previously), previous unemployment seems to be the most important factor preventing reemployment. For old workers and new workers, education increases the likelihood of getting a job. However, this effect is not statistically significant for the unemployed. Women have better postmigration employment prospects than men. Surprisingly, age does not have a statistically significant effect, except for the unemployed, where age diminishes the likelihood of reemployment. Among old workers and unemployed workers, living alone decreases the likelihood of being employed. High local unemployment seems to prevent reemployment, as expected. The size of the destination municipality does not have any noticeable effect on reemployment prospects.

The most interesting variable in the estimations is the migration variable, measuring the effect of migration on reemployment. This variable provides information on the comparative efficiency of the job search between migrants

Table 5. Determinantes of reemployment among old workers, new workers, and the unemployed in 1990, binary-logit estimates for three specifications.

Variable	Old workers		
	1	2	3
Constant	4.957***	4.366***	4.366***
Migrant	-0.793***		-1.483***
of region 1		1.131*	2.613***
of region 2		-0.805**	0.678
of region 3		-1.225***	0.258
of region 4		-1.483***	
<i>Personal characteristics</i>			
Personal unemployment 2	-2.073***	-2.220***	-2.220***
Female	0.393***	0.428***	0.428***
Age	0.005	-0.005	-0.005
Age ²	-0.001	-0.000	-0.000
Higher education	0.947***	1.096***	1.096***
One-person household	-0.723***	-0.684***	-0.684***
<i>Labour market conditions</i>			
Unemployment rate (municipal)	-0.205***		
Size of municipality	0.001*		
Sample size	18 849	18 849	18 849
Number employed in 1990	18 353	18 353	18 353
Number of migrants	886	886	886
-2 Log-likelihood	3 915.21	4 008.23	4 008.23
Correctly classified (%)	97.37	97.37	97.37

* statistically significant at the 10% level, ** statistically significant at the 5% level,

and nonmigrants as well as knowledge about the matching mechanisms of labour markets. The regional analysis of reemployment prospects involves the use of interaction dummies for migration (region dummies multiplied by the migration dummy). These dummies refer to migration to selected regions.

The results of the estimations do not seem to provide evidence in favour of the positive effects of migration on employment prospects at the national level. When selectivity factors and labour-market conditions are taken into account, it cannot be shown that moving would advance reemployment. On the contrary, the estimated effect of migration is even significantly negative for old workers and the unemployed. For new workers, the estimated coefficient is also negative, but not statistically significant.

Specification 2 employs four dummy variables of migration, measuring the migrants' employment probabilities compared with the employment probabilities of those staying in the home province. For old workers, the payoff from in-migration in terms of reemployment decreases from South to North. Most importantly, Uusimaa is the only region with a positive coefficient for in-migration. For new workers none of the regional dummies is statistically significant. The results for the unemployed are in line with the results for old

New workers			Unemployed		
1	2	3	1	2	3
3.856***	3.107***	3.107***	5.904***	5.077***	5.077***
-0.092		-0.462	-0.566**		-1.226**
	0.620	1.082		1.865*	3.091***
	-0.470	-0.007		-0.722*	0.504
	1.095	1.557		-0.744	0.483
	-0.462			-1.226**	
0.272**	0.296**	0.296**	0.519***	0.534***	0.534***
-0.012	-0.021	-0.021	-0.151**	-0.156**	-0.156**
3.5×10^{-5}	0.000	0.000	0.001*	0.001*	0.001*
0.671**	0.824***	0.824***	0.485	0.691	0.691
-0.311*	-0.248	-0.248	-0.878***	-0.826***	-0.826***
-0.243***			-0.204***		
0.001			0.001		
5687	5687	5687	1596	1596	1596
5433	5433	5433	1389	1389	1389
557	557	557	135	135	135
1961.33	2045.72	2045.72	1123.84	1150.42	1150.42
95.52	95.53	95.53	86.84	87.09	87.09

*** statistically significant at the 1% level.

workers, although we do not find statistical significance in all the regions even at the 10% level. Uusimaa is also the only destination region where the reemployment prospects of unemployed in-migrants are higher compared with the prospects of the unemployed who stay in their home provinces.

In specification 3, the dummy migration variables measure regional differences in the chances of in-migrants getting a job. The reference region is the North. The results of this specification are in line with those of specification 2. For old workers and the unemployed, the largest positive coefficient is reported for Uusimaa and, in fact, it is the only region reaching statistical significance. There are no statistically significant differences for the new workers.

Overall, the results of these multivariate analyses would suggest that migration alone has not improved the employment prospects of migrants. The direct effect of migration on employment would even seem to be negative for the old workers and the unemployed at the national level. But, the reemployment prospects of migrants vary between the destination regions. Those migrating to Uusimaa seem to have better employment prospects than those staying in the region of origin or in-migrants to other regions.

Certain reservations about the results have to be mentioned. First, it is possible that a worker becomes unemployed during the five-year period, even though he or she is not unemployed at the beginning of the period, and moves as a response. Accordingly, the experience of unemployment decreases the chances of getting a job. This might be one explanation for the estimation results relating to old workers, according to which migration has a negative effect on reemployment. In the same way, the situation in which a worker moves for reasons other than those related to the labour market may have an effect on this outcome. For example, women may relinquish employment in order to migrate with their husbands and enter a period of unemployment.

Second, the end of 1990 was still a time of full employment in Finland. The results might be very different in the analysis of the period 1990–95 following the breakup of the Soviet Union, when unemployment was at a high level during the whole period.

5 Conclusions

In this chapter we have explored migratory behaviour and the effects of migration on reemployment prospects, bringing out the regional point of view. The analysis focused on the efficiency of labour migration. The main idea was that for efficient labour migration, unemployment should augment the likelihood of moving and migration should also lead to improved employment prospects for migrants. There are clearly some problematic associated questions of simultaneous modelling, which we have not been able to address here.

According to the findings of this study, personal and regional unemployment both seem to have a remarkable effect on migratory behaviour. The surprising outcome was, however, that regional unemployment seems to be a dominating factor. One possible explanation for these results are the unique characteristics of Finland as well as the Nordic countries in general. Most of the area is sparsely populated and social security in these countries is high.

In relation to regional variation in migratory behaviour, the results suggest that personal unemployment has a clear effect on migration in Uusimaa, whereas the effect elsewhere is not statistically significant. This might relate partly to the phenomenon of remigration. Regional unemployment was not statistically significant in any region, that is, the regions are quite similar according to the effect of regional unemployment. Thus, it can be deduced that regional migration has an equilibrating role in labour markets, albeit not a very strong one. However, the future prospects of the areas of high unemployment are probably worsening further, while the successful areas benefit from the centralising path of development. The process of migration seems to have the characteristics of cumulative causation.

In the analysis of the whole country, the results related to the second condition of the efficiency of labour migration gave no strong evidence in favour of the positive effects of migration on employment prospects. However, those migrants whose destination region is Uusimaa clearly have better employment prospects compared with those staying in the region of origin or

with the in-migrants to other regions. Apparently, the more favourable employment opportunities in the capital region also account for the positive net migration, which has for decades characterised the region. A more detailed data source might also tell us whether migration to Uusimaa also has a higher proportion of contracted moves, in which reemployment in the destination is 'automatic'.

There are several areas of research that would improve our understanding of issues related to the labour-market equilibrating role of migration. An analysis of the migration process from the point of view of destination areas would be interesting. Another interesting question would be the causal relationship between unemployment and migration—the chicken and egg controversy of whether people follow the job or jobs follow people. These are some of the questions to be answered in future research on migration.

Acknowledgements. This study is part of a project supported by the Academy of Finland and the Yrjö Jahnesson Foundation.

References

- Bailey A J, 1994, "Migration and unemployment duration among young adults" *Papers in Regional Science* 73 289 – 308
- DaVanzo J, 1983, "Repeat migration in the United States: who moves back and who moves on" *Review of Economics and Statistics* 65 552 – 559
- Flowerdew R, 1992, "Labour market operation and geographical mobility", in *Migration Processes and Patterns. Volume 1. Research Progress and Prospects* Eds T Champion, T Fielding (Belhaven, London) pp 135 – 147
- Herzog H W Jr, Schlottman A M, 1984, "Labor force mobility in the United States: migration, unemployment, and remigration" *International Regional Science Review* 9 43 – 58
- Herzog H W Jr, Schlottman A M, Boehm T B, 1993, "Migration as spatial job-search: a survey of empirical findings" *Regional Studies* 27 327 – 340
- Hoover E M, Giarratani F, 1984 *An Introduction to Regional Economics* (Alfred A Knopf, New York)
- Jayet H, 1990, "Spatial search processes and spatial interaction: 1. Sequential search, intervening opportunities, and spatial search equilibrium" *Environment and Planning A* 22 583 – 599
- Kettunen J, 1990, "Re-employment, labour mobility and welfare of unemployed persons" (in Finnish), The Research Institute of the Finnish Economy, Helsinki
- Marston S T, 1985, "Two views of the geographic distribution of unemployment" *Quarterly Journal of Economics* 100 57 – 79
- Milne W, 1991, "The human capital model and its econometric estimation", in *Migration Models: Macro and Micro Approaches* Eds J Stillwell, P Congdon (Belhaven, London) pp 137 – 151
- Myrdal G, 1957 *Economic Theory and Underdeveloped Regions* (Duckworth, London)
- Oswald A J, 1996, "A conjecture on the explanation for high unemployment in the industrialized nations", paper presented at the EALE 1997 Conference, 27 September, Århus; copy available on CD, European Association of Labour Economists, Research Centre for Education and the Labour Market, University of Maastricht, Maastricht
- Pissarides C A, Wadsworth J, 1989, "Unemployment and the inter-regional mobility of labour" *Economic Journal* 99 739 – 755

- Porell F J, 1982, "Intermetropolitan migration and quality of life" *Journal of Regional Science* **22** 137–158
- Sääski N, 1988, "External and internal labour mobility in 1986" (in Finnish) *Labour Reports* **31** (3) 10–15
- Silvers A L, 1977, "Probabilistic income-maximising behaviour in regional migration" *International Regional Science Review* **2** 29–40
- Tervo H, 1997, "Long-distance migration and labour market adjustment: empirical evidence from Finland 1970–90", WP 168, School of Business and Economics, University of Jyväskylä, Jyväskylä
- Tervo H, 1998, "Post-migratory employment prospects: evidence from Finland" WP 187, School of Business and Economics, University of Jyväskylä, Jyväskylä
- Van Dijk J, Folmer H, Herzog H W, Schlottman A M, 1989, "Labor market institutions and the efficiency of interregional migration: a cross-national comparison", in *Migration and Labor Market Adjustment* Eds J Van Dijk, H Folmer, H W Herzog, A M Schlottman (Kluwer, Dordrecht) pp 61–84
- Vanderkamp J, 1989, "The role of migration in regional adjustment", in *Migration and Labor Market Adjustment* Eds J Van Dijk, H Folmer, H W Herzog, A M Schlottman (Kluwer, Dordrecht) pp 147–176
- Westerlund O, Wyzan M L, 1995, "Household migration and the local public sector: evidence from Sweden, 1981–1984" *Regional Studies* **29** 145–158

CHAPTER 4

A MACROECONOMIC ANALYSIS OF REGIONAL MIGRATION IN FINLAND, 1975-95*

	ABSTRACT	71
1	INTRODUCTION	71
2	THEORETICAL BACKGROUND	74
3	DATA AND METHODS OF ANALYSIS	76
4	EMPIRICAL FINDINGS	77
5	THE DETERMINANTS OF SUBREGIONAL MIGRATION - PANEL DATA ESTIMATION.....	79
6	CONCLUSIONS	81
	APPENDICES	83
	REFERENCES	84

Corrigenda

Equation 2 should read

$$y_{it} = \alpha^* + \sum_{k=1}^K \beta_k x_{kit} + e_{it} .$$

Equation 3 should read

$$y_{it} = \alpha_{it}^* + \sum_{k=1}^K \beta_{kit} x_{kit} + e_{it} .$$

Equation 5 should read

$$y_{it} = \alpha_t^* + \sum_{k=1}^K \beta_k x_{kit} + e_{it} .$$

* This paper has been published as: Pekkala, S. & Ritsilä, J. (1999). A Macroeconomic Analysis of Regional Migration in Finland, 1975-95. *Review of Regional Studies*, 29, 3, pp. 226-240. The statistical estimation, writing the theory and interpreting the results have been done together with Sari Pekkala. Sari Pekkala is responsible for collecting and manipulating the data.

A Macroeconomic Analysis of Regional Migration in Finland, 1975-95

*Sari Pekkala and Jari Ritsilä**

Abstract: This study analyzes regional migration in the 85 Finnish subregions during the period 1975-95 using data on net in-migration rates. Both cross-section and panel data methods are employed. The regression analysis reveals that the direction of net in-migration flows can be explained by a set of regionally differing characteristics. Unemployment rates, tax rates, and the share of primary production affect net in-migration negatively, whereas the share of higher education and the growth of regional incomes have a positive effect. This indicates that regional disparities may not be alleviated by migration, but there is some evidence for a cumulative causation growth pattern induced by net in-migration flows.

I. INTRODUCTION

Migration is one of the most important equilibrating forces in the regional economy according to neoclassical theory and thus forms an interesting and topical object of study. This assumption has met a lot of criticism, though. For example, Evans (1990) and Leven (1985) argue that it is not realistic to expect migration flows to equalize interregional differences, as the reaching of such equilibrium would severely reduce migration flows. It is generally assumed that labor market adjustment occurs through the migration of labor from high-unemployment regions to those with low unemployment. On the other hand, it has been argued that jobs follow people (Borts and Stein 1964), implying that migration to given regions leads to increased economic growth in those regions. This means that a region that offers better opportunities than others draws in a net flow of labor and starts to accumulate human resources, which, in turn, enhances growth prospects in that region. This leads to faster economic growth, and the resultant higher wages cause even more migrants to move in. Thus, for example, Greenwood (1973) concludes that migration does not alleviate regional disparities but tends to increase them. The process of cumulative causation (Myrdal 1957), in which migration plays an important role in determining regional development prospects, reveals the reasons why some regions succeed in reaching a positive development path while others lag behind.

Factors affecting migration can be divided into regional characteristics and personal characteristics of the migrants. Similarly, migration research can be conducted at both macro- and microeconomic levels. The focus of the present study

*University of Jyväskylä, School of Business and Economics, Centre for Economic Research, Jyväskylä, Finland. This study is a part of a project, no. 757717, supported by the Academy of Finland. Our warmest thanks to Antti Moisio for his cooperation in an earlier version of this paper, and for the help and advice he gave us with the panel data analysis. We would also like to thank professors Hannu Tervo and Jaakko Pehkonen for their helpful comments on this paper.

is at the macro level as we hope to find out which types of regionally differing factors are connected with net in-migration. Basically, the assumptions of the macro analysis are derived from the micro-level decision making of the migrants, but these factors cannot be traced due to the aggregated nature of the macro-level data.

There is a vast amount of empirical literature on interregional migration in various countries (see, for example, Greenwood et al. 1991 for an excellent review of recent migration literature). Migration patterns in Finland have recently been studied by Laakso (1998) and Vartiainen (1997). Both studies confirm that migration flows have lately experienced a rapid increase, with migration largely concentrated in a few urban areas located mainly in southern Finland. The same conclusion is reached in the present study. Table 1 reports the number of regions with positive and negative net in-migration in different periods. It seems that, in particular, the 1990-95 period displays an increasing concentration of population in fewer subregions. Figure 1 displays a map of the Finnish subregions, showing the main urban centers and population densities in 1997. Regional differences in unemployment rates vary markedly across subregions in Finland and the direction of migration seems to be towards growing regions with lower unemployment, i.e., regions marked on the map. Vartiainen (1997) concludes that the reason for this concentration stems from the fact that the most mobile groups (students and the unemployed) migrate to large towns with universities and other large town centers. Moreover, the net in-migration of employed persons is positive only in the largest towns. Laakso (1998) argues that even though we could expect migration to affect regional employment differentials, this has not been so much the case in Finland with differences in unemployment rates having remained stable since the 1970s (see also Pehkonen and Tervo, 1997).

TABLE 1
Number of Subregions with Positive, Negative, and Zero Net Migration Rates

Period	Positive net migration (Net migration rate > 0.001)	Negative net migration (Net migration rate < -0.001)	Zero net migration (-0.001 ≤ Net migration rate ≤ 0.001)
1975-1979	18	60	7
1980-1984	26	45	14
1985-1989	25	47	13
1990-1994	20	51	14

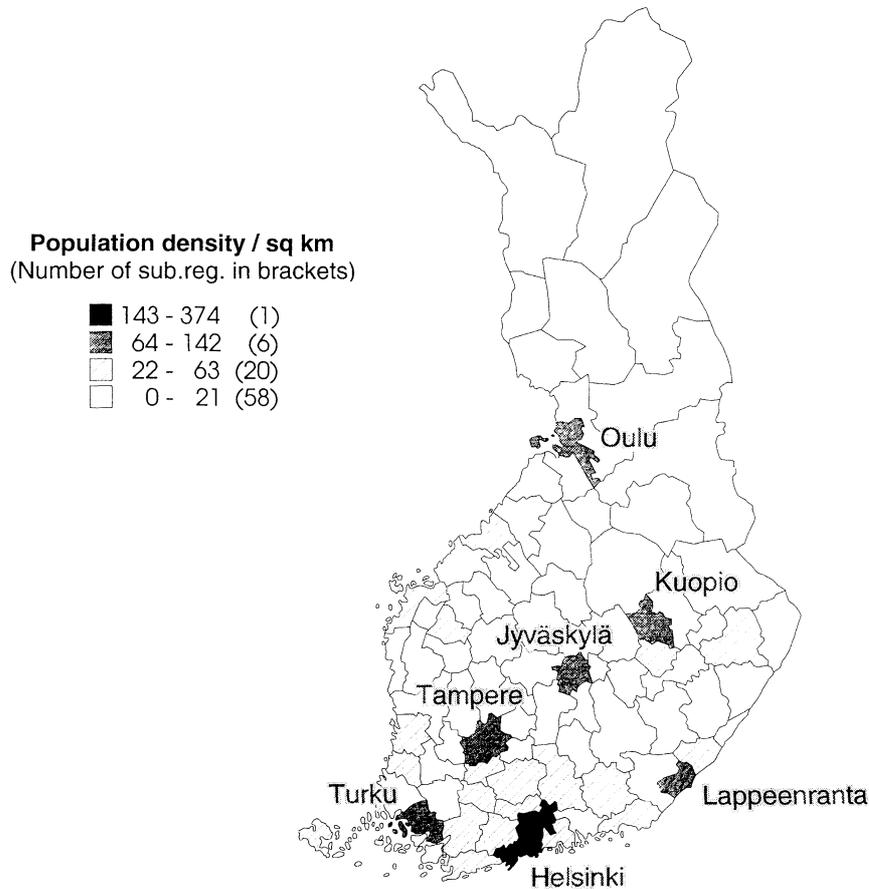
The present study analyzes regional migration in Finland during 1975-95 using macro-level data on the 85 subregions. Information on migration rates and various attributes that describe regional characteristics are used. Such factors are, for example, the growth of regional per capita taxable incomes, local tax rates, share of higher education, unemployment rates, and regional economic structures. Data for five-year periods are used to estimate a number of single-equation models for net in-migration. The data are compiled by Statistics Finland and are available as a regional database, ALTIKA.

The results show that, at the national level, migration flows tend to fluctuate from one period to another, according to aggregate economic cycles. On subregional level, it is observed that noticeable differences in regional net in-migration

A Macroeconomic Analysis of Regional Migration in Finland, 1975–95

rates continue to exist. Moreover, we observe that the faster regional incomes grow and the larger the share of population with higher education, the greater the net in-migration rate is. On the other hand, net in-migration is smaller in regions with a high tax rate and unemployment rate. Interestingly, many previous studies have failed to find a connection between the regional unemployment rate and migration (see Herzog, Schlottman, and Boehm 1993; Greenwood 1975). In the present study, however, unemployment turns out to be an important determinant of net in-migration. And finally, it is observed that regions in which the share of primary production is large tend to attract fewer migrants. These results imply that regional differentials in incomes and education may not be alleviated by migration, but it is possible that a cumulative causation process between regional growth and migration occurs.

FIGURE 1
Population Density in the Finnish Subregions (1977)



The second section introduces the theoretical basis for macro-level migration analysis and discusses the reasons for choosing net in-migration as the dependent variable. The data and empirical methods exploited are described in the third section, and the actual empirical findings are detailed in the fourth section. Finally, section five concludes the paper.

II. THEORETICAL BACKGROUND

Forms and Trends of Migration

The present study concentrates on analyzing migration from the macro-economic perspective, by evaluating the effect of certain regional characteristics on regional net in-migration. The basic idea is that both the origin and destination region have characteristics that cause in- and out-migration to occur, the difference between which is the net in-migration. These characteristics are called pull and push factors (Hoover and Giarratani 1985). We consider both pull and push factors as affecting the net in-migration flow simultaneously. Net in-migration is interesting from the aspect of regional development since we can determine what type of regions attract most migrants, which is likely to result in concentration of population in those regions. Moreover, if we include educational variables in the analysis, we will obtain information on the development path as to where human capital accumulates in certain regions, since the most highly educated individuals tend to be the most mobile (Chun 1996). In particular, regions that have a relatively high proportion of highly educated labor tend to have a positive net in-migration rate. We may expect such regions to start accumulating more and more human resources. This, in turn, further enhances their growth and development prospects.

It can be reasonably expected that migration rates change over time. The major components of short-term changes are due to cyclical variations of the aggregate economy (Hoover and Giarratani 1985). It is generally found that migration activity is higher when the aggregate economy is booming, whereas recessions tend to reduce regional migration flows. The long-run trends in migration rates are more difficult to analyze. On one hand, growth studies imply that regions are becoming more and more alike over time (which should reduce the incentives to migrate). On the other hand, people are becoming more mobile through education, experience, and incomes. These two counteracting forces make it hard to predict what the long-term development of migration will be.

Basis for the Macro Approach

The traditional macroeconomic approach forms a good starting point for the analysis of regional migration flows as it concentrates on studying the reasons for overt migration behavior. In short, the idea is to use a single-equation framework in which the explanatory variables are given regional characteristics that can be objectively measured (Cadwallader 1992).

$$(1) \quad M = f(O_i), \quad i = 1, \dots, n.$$

A Macroeconomic Analysis of Regional Migration in Finland, 1975–95

In the above equation, M is the net in-migration rate and O_i represents the vector of positive or negative attributes associated with the origin or destination region. Such attributes can be, for example, the regional income level, a measurement for the cost of living, an unemployment rate, population density, etc.

Studies using the macro approach concentrate on finding a set of variables that can be considered as the determinants of migration (see, e.g., Greenwood 1975, 1985; Chun 1996). These determinants can be divided into economic, quality of life, population composition, and public policy factors. The first group consists of attributes such as regional income differentials, cost-of-living differentials, employment opportunities, tax level differentials, and regional economic structures. When considering the composition of population, the regional level of education provides interesting aspects of study as the accumulation of human capital is closely linked with regional growth prospects. Shaw (1985), for example, finds that the higher the educational level of a region, the greater the in-migration rates.

Other factors affecting regional migration rates are population density, climate, local government expenditure and services provided, as well as quality-of-life factors. Many studies have found that climatic variables especially describe quality of life well in the amenity-oriented approach, particularly in countries with large geographic areas (Graves 1980). The amenity-oriented approach considers migration as resulting from differentials in regional “amenity bundles.” According to this theory, migration occurs as long as these differentials are large enough. In contrast, migration can be seen as a cause of the changes in region-specific attributes (Vanderkamp 1989) and, thus, many studies focus on the causal relationships among net in-migration, regional per capita incomes, and employment (see, e.g., Chun 1996). Hence, migration should be seen in a larger regional context in which it both causes changes in regional differences and reacts to them.

Hypotheses on the Determinants of Migration

Turning now to the factors assumed to determine the direction of migration in the Finnish context, some specific hypotheses are presented. First, income growth is expected to have a noticeable positive impact on the net in-migration rate of a given region (Lowry 1966) and thus acts as one of the main determinants of migration. The growth of regional incomes represents the most recent economic success of a region, which obviously attracts in-migrants. On the other hand, employment opportunities are an important reason to migrate and therefore regional unemployment should induce a negative effect on net in-migration (Greenwood 1973; Van Dijk et al. 1989). Another negatively influencing variable is the local tax rate, as potential migrants also examine fiscal factors when deciding where to move (Cebula 1979).

The characteristics of the population are also expected to affect regional migration rates. First, it is generally found that the most educated people are also the most mobile (Herzog and Schlottman 1984; DaVanzo 1982). In contrast, educated people tend to concentrate in areas that offer the best employment opportunities and, therefore, regional education level should influence net in-migration

positively (Porell 1982; Chun 1996). Finally, as the production of the agricultural sector is diminishing, it offers fewer jobs than before and, therefore, a high share of primary production in a region should have a negative impact on net in-migration. The share of primary production is taken here to distinguish urban regions from the rural ones.

III. DATA AND METHODS OF ANALYSIS

To analyze the phenomenon of regional migration, subregional data are used for the period 1975-95. The empirical analysis is divided into three sections. First, descriptive exploration is used to map out the temporal nature of migration flows at the national level. Second, the paper uses cross-sectional modeling to define the relationship between net in-migration and certain factors characterizing the subregions. Third, panel data estimation is exploited in order to confirm the robustness of cross section estimates.

In the cross-sectional estimations, data for five-year periods were used for the time span of 1975-95. The exploitation of five-year data in this section is due to the availability of certain regional information only for this time span. In the empirical analysis, we examine the factors affecting subregional migration patterns using net in-migration as the dependent variable. The net in-migration rate is counted as the sum of net in-migrants per population in five-year periods. The explanatory variables include structural and economic factors that are considered important from the viewpoint of subregional migration. These variables are the growth of logarithmic income during the *previous* period (GROWTH), the share of population with higher education (HIGHEDUC), the tax level (TAX), the share of labor force in primary production (PRIMARY), and the unemployment rate (UNEMP). The explanatory variables are registered at the beginning of each five-year period. However, the income growth variable is the measurement of the previous time period, i.e., the values of growth variables explaining net in-migration during 1980-85 are counted from the time period of 1975-1980, and so on. This is done so as to avoid the endogeneity problem arising from simultaneous determination of net in-migration and income growth. The definitions of the variables used and a summary of data description are presented in Appendices 1 and 2.

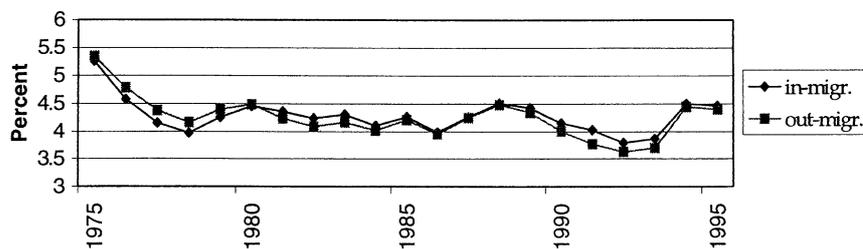
The panel data analysis concludes the empirical part of the study. The panel is formed by stacking the four cross sections described above (like Barro and Lee 1994 or Barro 1997) and is exploited to complement the cross-sectional analysis. The main benefits of this approach are: i) the ability to observe the heterogeneity of data; ii) a larger number of observations; and iii) a better possibility to analyze dynamic relationships between variables (Baltagi 1995; Moio 1998). For the present study, the main advantage was the possibility to control for region-specific components.

IV. EMPIRICAL FINDINGS

Characteristics of Aggregate Level Migration

Let us first look at the outcomes of the descriptive analysis explaining the development of migration rates at the national level. Figure 2 shows the evolution of annual in- and out-migration rates (municipal) at the national level from 1975 to 1995. The national levels of out- and in-migration seem to proceed at almost exactly the same pace and magnitude. Hence, net foreign migration has not played a marked role but has remained minor. These temporal differences in migration activity are likely to be related to economic trends. In general, high migration activity is associated with economic booms and low migration rates are related to recession periods.

FIGURE 2
Evolution of In-Migration and Out-Migration in Finland, 1975–95



The Determinants of Subregional Migration—Cross Section Estimation

The dependent variable of the macro model estimated is the ratio of net in-migrants per population. The quantity of net in-migrants is defined as their sum in each of the five-year periods. Ordinary least squares (OLS) estimates for three different time periods are summarized in Table 2.

TABLE 2
Least Squares Estimates of Subregional Migration by Period

Variable	Period 1980-85		Period 1985-90		Period 1990-95	
	B*	P [T >t]**	B	P [T >t]	B	P [T >t]
PRIMARY	-0.030	0.183	-0.078	0.050	0.345	0.149
GROWTH	0.545	0.000	1.083	0.004	0.481	0.130
HIGHEDUC	0.458	0.008	0.301	0.122	0.511	0.001
TAX	-0.627	0.042	-0.598	0.142	-0.411	0.240
UNEMP	-0.209	0.000	-0.479	0.000	-0.128	0.061
CONSTANT	0.055	0.259	0.066	0.372	0.017	0.787
	N = 85 R ² = 0.51		N = 85 R ² = 0.61		N = 85 R ² = 0.36	

* B = estimated coefficient.

** P [|T|>t] = probability value for the estimated coefficient.

As expected, the coefficient on income growth is positive for all periods and this result is in line with previous findings (see, e.g., Chun 1996). The result is

statistically significant at the 5% level in the first and second periods. Hence, regions with a high growth of income are expected to attract in-migrants.

The coefficient on higher education also has a positive sign for every period, as expected, and the outcome is mostly significant at the 5% level. The results lend support to the phenomenon of cumulative causation, as it is generally found that people with a higher educational level are more eager to move (see, e.g., DaVanzo 1982; Porell 1982; Herzog and Schlottman 1984; Tervo and Ritsilä 1998).

The sign of the coefficient on primary production varies between subperiods. However, the variable gets a statistically significant coefficient only for the second subperiod when it is negative, as expected. A region that displays a high share of workers in the primary production sector is likely to lose jobs and less likely to generate new ones, as the production in that sector is constantly diminishing (Appendix 2). Moreover, the process of urbanization draws population into main urban centers that display a high share of services and an extremely small share of primary production.

The level of taxation shows a negative coefficient for all periods, as expected. Thus, a high level of taxation can be interpreted as preventing the accumulation of regional human capital (that most migrants represent). The result is statistically significant at the 5% level only for the first subperiod.

The coefficient on the regional unemployment level has a negative sign for all periods, as expected, and this result is also in line with previous findings (see, e.g., Haurin and Haurin 1988). However, most of the previous studies fail to find a clear connection between regional unemployment and migration behavior (see, e.g., Greenwood 1975, 1985; Herzog, Schlottman, and Boehm 1993; Tervo and Ritsilä 1998). Here, net in-migration decreases with a high regional unemployment level. The result of the regional unemployment variable is again statistically significant at the 5% level, except for the last subperiod.

Table 3 displays the predictions for selected regions using the coefficients from cross section regressions and the actual net in-migration rates. This procedure is performed in order to test the consistency of this model. The results imply that the model is consistent to some extent, as the predicted signs are generally correct. It seems that the model succeeds best in its predictions for periods 1980-85 and 1990-95, for the regions selected here.

TABLE 3
Predictions of the Cross-Sectional Models for Selected Regions

Subregion	Predicted and Actual Net Migration Rates					
	1980-85		1985-90		1990-95	
	Predicted	Actual	Predicted	Actual	Predicted	Actual
HELSINKI	0.029	0.022	0.010	0.022	0.039	0.016
OUTOKUMPU	-0.026	-0.031	-0.078	-0.043	-0.024	-0.027
JYVÄSKYLÄ	-0.002	-0.007	-0.063	-0.007	-0.019	-0.010
OULU	-0.020	0.008	-0.093	-0.050	-0.020	-0.044

V. THE DETERMINANTS OF SUBREGIONAL MIGRATION— PANEL DATA ESTIMATION

The final stage of the empirical analysis consists of estimating net in-migration by exploiting panel data, where the panel was formed by stacking the cross sections analyzed above. The dependent variable of the panel estimation is the ratio of net in-migrants per population. The quantity of migrants is defined as above. The following presentation describes step by step the progress towards the model presented in the paper.

As our data set contains all the subregions, we do not have any problems with the generalization of results in a cross-sectional respect. However, in terms of the time dimension, the data set (four periods) does not cover the whole population. Due to this characteristic of the data set, the choice of a suitable estimation method is not simple.

Before one can join the cross-sectional data set and the time series data set into a pooled panel data set, the assumptions of fixed constants and β -coefficients over time and over cross section units have to be checked. One way to test these assumptions is to exploit the Chow test. The hypotheses of the Chow test are $H_0: \beta_i = \beta$ against $H_1: \beta_i \neq \beta$.

First, the assumption of simultaneously fixed constants and β -coefficients over time is tested. For this purpose, both restricted and unrestricted models are estimated. The restricted model assumes fixed constants and β -coefficients over time. Formally (Hsiao 1986):

$$(2) \quad y_{it} = \alpha_1 + \sum_{k=2}^K \beta_k x_{kit} + e_{it}$$

where y is the dependent variable, β is the estimated coefficient, x_i 's are the exogenous variables, and sub-indices k , i , and t are the identity numbers for the exogenous variable, individual, and time period, respectively. In turn, the unrestricted model assumes that all coefficients vary over time and over individuals. Formally (Hsiao 1986):

$$(3) \quad y_{it} = \alpha_{1it} + \sum_{k=2}^K \beta_{kit} x_{kit} + e_{it}$$

The actual test of restrictions is carried out according to the following equation (Hsiao 1986):

$$(4) \quad \frac{(SS_3 - SS_1) / [(T-1)(K+1)]}{SS_1 / [NT - T(K+1)]} \sim F_{(T-1)(K+1), NT-T(K+1)}$$

where SS_3 is the restricted residual sum of squares, SS_1 is the unrestricted residual sum of squares, T is the number of time periods, K is the number of explanatory variables, and N is the number of cross-sectional units (subregions). In our analysis, these assumptions are not fulfilled, and hence H_0 is rejected (see Table 4). Thus, a further analysis on joining the time series and cross-sectional data is needed.

Second, if H_0 is rejected in the Chow test, we can identify whether the β -coefficients are fixed over time, while constants may vary over time (within-estimation):

$$(5) \quad y_{it} = \alpha_{1t} + \sum_{k=2}^K \beta_k x_{kit} + e_{it}.$$

In this case, the Chow test is carried out according to the following equation (For further details, see Hsiao 1986, pp. 18, 32):

$$(6) \quad \frac{(SS_2 - SS_1) / [(T-1)K]}{SS_1 / [NT - T(K+1)]} \sim F_{(T-1)K, NT-T(K+1)},$$

where SS_2 equals the residual sum of squares from the within-estimation. The results of this test are not in line with the assumptions, and the pooling of the time series and cross-sectional data sets into a panel data set is statistically restricted (see Table 4).

The results of the Chow test for pooling suggest that none of these specifications passes the test for pooling. However, the Chow test for pooling has an assumption of homoskedasticity of error terms. Hence, to test the relevance of the Chow test we need to carry out a test for heteroskedasticity. This study exploits a Lagrange multiplier test (Breusch-Pagan) for identifying possible heteroskedasticity of error terms. The results show that heteroskedasticity indeed exists. Thus, the Chow test becomes unreliable and the results of our panel estimation cannot be straightforwardly rejected (Baltagi, Hidalgo, and Li 1996). Furthermore, the stability of the estimated coefficients of the cross-sectional analysis supports the relevance of panel estimation in this context.

In order to find the best estimation method, three further specification test statistics were used: Breusch and Pagan's Lagrange multiplier statistic, Hausman's chi-squared test, and Ramsey's RESET test (For further details, see Godfrey 1988, pp. 158-160; Greene 1995, pp. 290-291, 306-307; and Spanos 1986, p. 555). The outcomes of these tests suggest the following procedure.

The large values of the LM statistic favor the fixed effects model/random effects model over the classical regression model. The large values of the Hausman statistic argue in favor of a fixed effects model over a random effects model. We also use a simplified Ramsey RESET test procedure in which we add powers of the dependent variable to the estimated function. The RESET test shows that the linear specification of the model is correct (see Table 4).

The modeling proceeds parsimoniously. Least squares (LS) estimates for three different specifications of the fixed effect model are summarized in Table 4.

In specification 1, with five explanatory variables, the coefficient on income growth is positive, as expected, and the result is in line with previous findings (see, e.g., Chun 1996). The result is statistically significant at the 5% level. Hence, regions with a high growth of income are expected to attract migrants. The coefficient on higher education also has a positive sign, as above, but the outcome is not significant.

A Macroeconomic Analysis of Regional Migration in Finland, 1975–95

TABLE 4
Least Squares Estimates of Subregional Migration (Panel Data Estimation)

Variable	Specification I		Specification II		Specification III	
	B*	P [T >t]**	B	P [T >t]	B	P [T >t]
PRIMARY	-0.127	0.008	-0.130	0.002	-0.133	0.002
GROWTH	0.250	0.004	0.247	0.004	0.285	0.001
HIGHEDUC	0.143	0.440	—	—	—	—
TAX	-0.187	0.515	—	—	—	—
UNEMP	-0.085	0.252	-0.092	0.199	—	—
CONSTANT	—	—	—	—	—	—
	N = 255 R ² = 0.748		N = 255 R ² = 0.750		N = 255 R ² = 0.749	
SPECIFICATION I Least squares with group dummy variables.		SPECIFICATION II Least squares with group dummy variables.		SPECIFICATION III Least squares with group dummy variables.		
The value of first Chow-test for pooling is 3.68 ~ F (12, 237). Critical value: 1.57.		The value of first Chow-test for pooling is 4.53 ~ F (8, 243). Critical value: 1.70.		The value of first Chow-test for pooling is 0.705 ~ F (6, 246). Critical value: 1.80.		
The value of second Chow-test for pooling is 3.37 ~ F (10, 237). Critical value: 1.63.		The value of second Chow-test for pooling is 4.50 ~ F (6, 243). Critical value: 1.80.		The value of second Chow-test for pooling is 0.924 ~ F (4, 246). Critical value: 1.97.		
Breusch-Pagan 55.12 ~ χ^2 (1)		Breusch-Pagan 74.56 ~ χ^2 (1)		Breusch-Pagan 99.55 ~ χ^2 (1)		
Hausman 24.52 ~ χ^2 (5)		Hausman 19.14 ~ χ^2 (3)		Hausman 51.92 ~ χ^2 (2)		
RESET 9.2 ~ F (89, 165) < 32.45 ~ F (92, 162)		RESET 9.52 ~ F (87, 167) < 33.43 ~ F (90, 164)		RESET 9.56 ~ F (86, 168) < 33.68 ~ F (89, 165)		

*B = estimated coefficient.

**P [|T|>t] = probability value for the estimated coefficient.

A negative sign is obtained for the coefficient on primary production, and this result is also in line with the cross section findings. The coefficient for this variable is statistically significant at the 1% level. The level of the taxation variable also has a negative coefficient, as does the coefficient of the regional unemployment level. These results correspond to the cross-sectional estimates. Therefore, a region's net in-migration decreases with a high regional unemployment level. As in the case of taxation, the result of the regional unemployment variable does not reach any statistical significance.

The following two specifications comply with the outcomes of specification 1 by applicable parts. The coefficients of income growth and primary production seem to be stable regardless of specification changes and their statistical significance increases along the parsimonious procedure. Moreover, the similarity between panel data and cross section estimates shows that the results obtained by both methods are relevant and quite robust.

VI. CONCLUSIONS

The present study analyzed regional migration patterns in the 85 Finnish subregions during 1975–95. Models for regional net in-migration were estimated using both panel data and cross section methods and employing a single-equation framework. It was assumed that certain region-specific attributes explain why some regions gain a larger number of net in-migrants while others lose migrants. The results show that, first, a region's in-migration rate tends to be greater if its

per capita income level grows faster or it has a higher proportion of highly educated inhabitants. This indicates that the already prosperous regions especially tend to attract migrants, and the future prospects of such regions look relatively promising (i.e., growing regional income and education means more human capital). Secondly, a large share of primary production and high regional unemployment rate and local tax rate seem to reduce migration to such regions. Unlike many previous studies, the present study found a negative connection between unemployment rates and regional migration behavior (particularly in the case of cross section regressions). This implies that regional differences in unemployment rates could be alleviated by migration, assuming that it is the unemployed who are moving out of high-unemployment regions in search of a new job. However, if lagging regions tend to lose productive, highly educated labor in their negative net in-migration flows, their growth prospects may be further worsened. In order to confirm which of these scenarios is actually being realized, one would need data on the characteristics of the migrants for the whole time period, which is, unfortunately, not available.

According to the results obtained in the present study, it seems that migration cannot be seen as an equilibrating mechanism in the Finnish regional economy. Instead, the trend is towards greater concentration of population and economic activity. It can be argued that migration may be involved in a cumulative causation process that could eventually lead to centralized regional development with a few urban growth centers and a large number of agricultural, peripheral regions.

To conclude, it seems that the differences in economic variables help to explain why the migration experience differs so widely across Finnish subregions. However, all differences in net in-migration rates cannot be explained by structural, income, unemployment, tax, and education differentials. Hence, it is assumed that the characteristics of migrants also have a marked impact on inter-regional migration flows. However, these characteristics residing behind the observed macroeconomic variables cannot be revealed in a macro analysis. Moreover, to confirm whether it is economic differences that affect migration or vice versa, it would be necessary to perform causation tests. These issues give scope for further research.

A Macroeconomic Analysis of Regional Migration in Finland, 1975–95

APPENDICES

APPENDIX 1

Variables Used in the Econometric Estimations

DEPENDENT VARIABLE				
Variable		Scale	Operational Definition	
Rate of net migration		Continuous	Sum of migrants per 5-year period (per population in the beginning of the period).	
EXPLANATORY VARIABLES				
Variable	Abbreviation	Expected Effect	Scale	Operational Definition
Growth of income level	GROWTH	+	Continuous	Growth rate of income level per population.
Population with higher education	HIGHEDUC	+	Continuous	The share of population with at least the lowest level of tertiary education (equivalent of 13-14 years).
Share of primary production	PRIMARY	-	Continuous	The share of workforce in primary production.
Taxation	TAX	-	Continuous	Rate of taxation per taxable income
Regional unemployment	UNEMP	-	Continuous	Regional rate of unemployment (partly aggregated from the municipal level).

APPENDIX 2

Summary of Data Description

Variable	Time Period	Mean	Min	Max	Std. Dev.
NET MIGRATION	1975-80	-0.01	-0.062	0.040	0.02
	1980-85	-0.01	-0.076	0.049	0.02
	1985-90	-0.01	-0.052	0.043	0.02
	1990-95	-0.01	-0.050	0.040	0.02
GROWTH RATE OF INCOME LEVEL	1975-80	0.07	0.032	0.105	0.02
	1980-85	0.05	0.035	0.074	0.01
	1985-90	0.04	0.029	0.063	0.01
	1990-95	-0.01	-0.030	0.020	0.01
SHARE OF HIGHLY EDUCATED INHABITANTS	1975	0.03	0.017	0.093	0.01
	1980	0.04	0.024	0.116	0.01
	1985	0.04	0.026	0.121	0.02
	1990	0.05	0.031	0.136	0.02
	1995	0.07	0.046	0.157	0.02
SHARE OF PRIMARY PRODUCTION	1975	0.28	0.012	0.540	0.15
	1980	0.23	0.010	0.460	0.12
	1985	0.21	0.009	0.420	0.11
	1990	0.17	0.009	0.360	0.09
	1995	0.15	0.008	0.360	0.08
TAXATION	1975	0.16	0.131	0.175	0.01
	1980	0.16	0.144	0.180	0.01
	1985	0.17	0.150	0.185	0.01
	1990	0.17	0.153	0.190	0.01
	1995	0.18	0.170	0.190	0.01
REGIONAL UNEMPLOYMENT RATE	1975	0.06	0.013	0.188	0.04
	1980	0.07	0.015	0.182	0.03
	1985	0.07	0.010	0.140	0.03
	1990	0.09	0.020	0.150	0.02
	1995	0.21	0.050	0.330	0.05

REFERENCES

- Baltagi, B. *Econometric Analysis of Panel Data*. Chichester, UK: Wiley, 1995.
- Baltagi, B., J. Hidalgo, and Q. Li. "A Nonparametric Test for Poolability Using Panel Data." *Journal of Econometrics* 75 (1996), 345-367.
- Barro, R. *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge, MA: The MIT Press, 1997.
- Barro, R., and J. Lee. "Sources of Economic Growth." *Carnegie-Rochester Conference Series on Public Policy* (June 1994), 107-158.
- Borts, G., and J. Stein. *Economic Growth in a Free Market*. New York: Columbia University Press, 1964.
- Cadwallader, M. *Migration and Residential Mobility*. Madison, WI: The University of Wisconsin Press, 1992.
- Cebula, R. *The Determinants of Human Migration*. Lexington, MA: Lexington Books, 1979.
- Chun, J. *Interregional Migration and Regional Development*. Aldershot, UK: Avebury, 1996.
- DaVanzo, J. "Repeat Migration in the United States: Who Moves Back and Who Moves On." *Review of Economics and Statistics* 65 (1982), 552-559.
- Evans, A. "The Assumption of Equilibrium in the Analysis of Migration and Interregional Differences: A Review of Some Recent Research." *Journal of Regional Science* 30 (1990), 515-531.
- Graves, P. "Migration and Climate." *Journal of Regional Science* 20 (1980), 227-237.
- Greene, W. *Econometric Analysis*. New York: Macmillan, 1995.
- Greenwood, M. "Urban Economic Growth and Migration: Their Interactions." *Environment and Planning* 5 (1973), 91-112.
- . "Research on Internal Migration in the United States: A Survey." *Journal of Economic Literature* 13 (1975), 397-433.
- . "Human Migration—Theory, Models, Empirical Studies." *Journal of Regional Science* 25 (1985), 521-544.
- Greenwood, M., P. Mueser, D. Plane, and A. Schlottmann. "New Directions in Migration Research." *Annals of Regional Science* 25 (1991), 237-270.
- Godfrey, L. *Misspecification Tests in Econometrics*. Cambridge, UK: Cambridge University Press, 1988.
- Haurin, D., and J. Haurin. "Net Migration, Unemployment, and the Business Cycle." *Journal of Regional Science* 28 (1988), 239-254.
- Herzog, H.W. Jr., and A. Schlottman. "Labor Force Mobility in the United States: Migration, Unemployment, and Remigration." *International Regional Science Review* 9 (1984), 43-58.
- Herzog, H.W. Jr., A. Schlottman, and T. Boehm. "Migration as Spatial Job-Search: A Survey of Empirical Findings." *Regional Studies* 27 (1993), 327-340.
- Hoover, E., and F. Giarratani. *An Introduction to Regional Economics*. New York: Alfred A. Knopf, 1985.
- Hsiao, C. *Analysis of Panel Data*. Cambridge, UK: Cambridge University Press, 1986.
- Laakso, S. *Inter-regional Migration in Finland* (in Finnish). City of Helsinki Urban Facts, Research Series, 1998:4.

A Macroeconomic Analysis of Regional Migration in Finland, 1975–95

- Leven, C. "Regional Development Analysis and Policy." *Journal of Regional Science* 25 (1985), 569-592.
- Lowry, I. *Migration and Metropolitan Growth: Two Analytical Models*. San Francisco: Chandler Publishing Co., 1966.
- Moisio, A. *Municipalities' Expenditures and Government Grants: A Panel Data Analysis* (in Finnish). University of Jyväskylä, School of Business and Economics, 111/1998.
- Myrdal, G. *Economic Theory and Underdeveloped Regions*. London: Duckworth, 1957.
- Pehkonen, J., and H. Tervo. "Persistence and Turnover in Regional Unemployment Disparities." *Regional Studies* 32 (1998), 445-458.
- Porell, F. "Intermetropolitan Migration and Quality of Life." *Journal of Regional Science* 22 (1982), 137-158.
- Shaw, R. *Intermetropolitan Migration in Canada: Changing Determinants over Decades*. Toronto: NC Press, 1985.
- Spanos, A. *Statistical Foundations of Econometric Modelling*. Cambridge, UK: Cambridge University Press, 1986.
- Tervo, H., and J. Ritsilä. "Regional Differences in Migratory Behaviour in Finland." Working Paper 188, School of Business and Economics, University of Jyväskylä, 1998.
- Vanderkamp, J. "Regional Adjustment and Migration Flows in Canada, 1971 to 1981." *Papers of the Regional Science Association* 67 (1989), 103-119.
- Van Dijk, J., H. Folmer, H. Herzog, and A. Schlottman. "Labor Market Institutions and the Efficiency of Interregional Migration: A Cross-National Comparison." In J. Van Dijk, H. Folmer, H. Herzog, and A. Schlottman (eds.) *Migration and Labor Market Adjustment*. Boston: Kluwer, 1989.
- Vartiainen, P. *The New Picture of Migration* (in Finnish, summary in English). Helsinki: The Department of Regional Development, Ministry of Internal Affairs, 4/1997.

THEME III

**THE SELECTIVE NATURE OF MIGRATION AND
HUMAN CAPITAL FLOWS**

CHAPTER 5

MIGRATION AND REGIONAL CONCENTRATION OF HUMAN CAPITAL*

	ABSTRACT	91
1	INTRODUCTION	91
2	MIGRATION DECISIONS AND HUMAN CAPITAL REDISTRIBUTION	93
2.1	Migration as utility maximisation.....	93
2.2	Migration decisions and centralisation of human capital.....	94
2.3	Analytical framework	95
3	MODELLING, DATA AND VARIABLES	96
4	EMPIRICAL RESULTS.....	101
5	CONCLUDING REMARKS	103
	REFERENCES	104

* Forthcoming as: Ritsilä, J. and Ovaskainen, M. (2001) Migration and regional concentration of human capital. *Applied Economics*, 33, 3. A few minor differences of detail exists between this chapter and the forthcoming paper. Jari Ritsilä is the first author of the paper and responsible for the statistical estimation, writing the theory and interpreting the results in co-operation with Marko Ovaskainen.

ABSTRACT

The objective of the paper is to analyse the relationship between migration and the regional redistribution of human capital. The analysis follows the human capital approach that considers migration as a result of the rational decision making and utility maximisation process. The emphasis is on the decision making of a potential migrant. The migration decision is assumed to be an outcome of personal, household and regional characteristics. The results of the paper indicate the following. First, the paper supports the generally accepted hypothesis that the highly educated are more prone to move than the rest of the population. Second, the regional characteristics of both the origin area and the destination area also have a significant effect on migratory behaviour. Individuals are more likely to migrate from remote regions to centres of economic activity. Third, as a result of two previous findings, reallocation of human capital seems to be taking place in Finland.

Keywords: educational level, human capital, migration, regional development

J.E.L. classification: R23

1 Introduction

Lately, both academics and policy makers have started to give increasing attention to the importance of human capital as a source of economic development both at the national level and at the regional level. The role of human capital stock as a prerequisite for regional growth and competitiveness has been emphasised in many studies (e.g. Barro and Sala-i-Martin, 1991; Camagni, 1995; Davelaar and Nijkamp, 1997; Forslid, 1999; Lucas, 1988; Ritsilä, 1999).

Recent phenomena in Finnish regional development have been increased inter-regional migration and centralisation of population into a few core areas. The migration process, and especially its selectivity, can lead to regional redistribution of human capital (see Table 1). In order to understand this process, three crucial questions should be considered. These can be determined as: 1) What are the effects of educational attainment on the likelihood of migrating? 2) What are the effects of the characteristics of the origin region on migratory behaviour? 3) Which role do the characteristics of the destination region play in determining the propensity for moving?

Recent literature has focused a lot of attention on the interdependence of personal and regional characteristics and migratory behaviour (see e.g. Antolin and Bover, 1997; Greenwood, 1985; Herzog *et al.*, 1993; Milne, 1991; Newbold, 1997; Ritsilä and Tervo, 1999; Stillwell and Congdon, 1991). The general find-

ings of these studies reveal that migration is selective both from the personal and regional viewpoint. There exists a number of economic, social and psychological factors that contribute to or prevent the decision to move. Personal and family traits, as well as the characteristics of the origin and destination regions, shape the outcome of individual decisions to migrate or stay. Ultimately, positive migration decisions at the individual level aggregate into considerable population flows and significant changes in the regional stocks of human capital. From the standpoint of regional human capital reallocation, the effect of educational attainment on migratory behaviour is of special interest.

TABLE 1 Long-distance migration by provinces in Finland, 1985-1990 (Based on a 1% sample of Statistics Finland Longitudinal Census File)

Province	Out-migration as % of labour force, 1985 - 1990	In-migration as % of labour force, 1985 - 1990	Net-migration as % of labour force, 1985 - 1990	% of out-migrants, who are highly educated	% of in-migrants, who are highly educated
Uusimaa	3.2	5.5	+2.3	17.3	17.9
Turku and Pori	3.5	3.0	-0.5	20.0	27.5
Häme	5.6	5.2	-0.4	20.7	17.2
Kymi	5.1	4.5	-0.6	25.0	19.6
Mikkeli	7.1	7.2	+0.1	3.7	30.9
Pohjois-Karjala	6.8	5.4	-1.4	18.6	11.8
Kuopio	6.3	5.4	-0.9	20.0	29.4
Keski-Suomi	4.9	5.2	+0.2	42.2	14.6
Vaasa	4.4	2.6	-1.8	31.3	25.6
Oulu	5.3	4.2	-1.1	17.9	23.0
Lappi	9.1	5.4	-3.7	20.9	23.7
Ahvenanmaa	0.0	0.0	-	-	-

A common result of the studies on migration behaviour is that a higher level of education increases an individual's likelihood of migrating (Antolin and Bover, 1997; Hughes and McCormick, 1989; Levine, 1996; Molho, 1987; Owen and Green, 1992; Ritsilä, 2000). The positive correlation between the likelihood of migration and educational attainment stems from a number of factors. The extensive mobility of the highly educated is strongly related to personal factors, such as career orientation, psychological readiness to move, social needs, knowledge about personal opportunities, sufficient economic potential to move, opportunities to profit economically, and narrowness of relevant job markets.

In addition to personal factors, the characteristics of both the region of origin and the potential destination locality may also play a remarkable role in the decision to migrate. The effect of these factors on the likelihood of migration has also been examined to some extent, both at the micro level and at the macro level (see e.g. Greenwood *et al.*, 1991; Milne, 1991).

Our paper distinguishes itself from the majority of studies examining the origin and destination regions separately, by integrating the characteristics of the origin area and the destination area into the same analysis. Thereby, we are

better able to examine the process of regional reallocation of human capital. If the analysis only concentrated on either the origin area or the destination area, we would not be able to indicate whether the reallocation between different types of regions is actually taking place.

The focus of our paper is on the micro level migratory behaviour, and especially on the role of educational attainment in the migration decision making. In order to reveal the factors behind migratory behaviour at the individual level, the analysis exploits maximum likelihood estimation with a cross-sectional binary logit model, based on logistic distribution. The econometric estimations are based on the Finnish Longitudinal Census File, containing information on the individuals' personal characteristics, household conditions and home districts. The exploited data set covers the years 1985 and 1990.

The rest of the paper is structured as follows. Section 2 outlines the theoretical background of the paper. Section 3 introduces the econometric methods, the data set and the variables used. Section 4 reports the outcomes of the accomplished empirical analysis. Finally, section 5 presents the concluding remarks of the paper.

2 Migration decisions and human capital redistribution

2.1 Migration as utility maximisation

The analytical setting of this paper is based on human capital framework. The framework is based on the modelling works of Sjaastad (1962), Weiss (1971), Seater (1977), and Schaeffer (1985). Herein, migration is supposed to result from the variations in individual economic utility in different locations. Furthermore, an individual is assumed to maximise economic utility. Thus, relocation takes place if the expected economic utility from migrating exceeds the economic utility from staying in the present location. Heterogeneous individuals possess different utility functions, and consequently encounter differences in the net benefits from living in a specific location.

An important factor that affects the economic utility, and hence the decision making of an individual, is her/his personal human capital reserve. Human capital can be considered as a heterogeneous asset, resulting from formal schooling, training and experience, etc. In addition, human capital can be defined to be of general use, or valuable only in specific tasks. For simplicity, we assume that there are only two types of human capital: one acquired from education (vector E), and one gained from other sources (vector O). Formally, an individual i is assumed to decide to migrate from location j to location k under the following utility maximisation process at a given time t :

$$(1) E(R_{it}) = \max_{(E,O)} \left[E \int_0^T e^{-rt} \{ U_{ik}(E_i, O_i) - U_{ij}(E_i, O_i) \} dt - CM_{ijk} \right]$$

under precondition

$$\left| e^{-rt} (U_{ik} - U_{ij}) dt - CM_{ijk} \geq 0, \right.$$

where $E(R_{it})_{\max}$ is the net present value of expected economic utility of an individual i , U_k is the expected utility level achieved in the alternative location k , U_j is the expected utility achieved from living in the present location j , and CM_{jk} are the direct costs involved in moving from location j to location k . The expected utilities U_k and U_j , as well as the direct costs CM_{jk} , are formed as a result of personal, household and regional factors involved in the migration decision process. As a result of the rational decision making process, the positive migration decision is reached when the expected utility gain from moving exceeds the direct costs of moving.

2.2 Migration decisions and centralisation of human capital

Recent research has shown that success in competition and rapid economic growth has often arisen out of the regional concentration of economic activities – the clustering of lines of business and enterprises that are complementary to each other. Also, the topics of recent research interest have included the conglomeration of enterprises, developmental blocks in the economy and the cohesion of know-how (Davelaar and Nijkamp, 1997; Krugman, 1991; Maillat, 1998; Porter, 1990). Clusters can be defined as regionally formed entities of functionally or technologically closely related enterprises or activities. The strength of clusters is based on positive externalities, especially the benefits from an efficient flow of information and network arrangements. Nowadays, the strongest advantages in industrial competition can often be found in know-how, including both formal and tacit knowledge (Kuusi and Loikkanen, 1996; Lyons, 1995; Nijkamp and Poot, 1997; Ritsilä, 1999).

The new theories of economic growth emphasise the role of human capital as a prerequisite for economic growth processes (e.g. Barro and Sala-i-Martin, 1995; Krugman, 1991; Lucas, 1988; Romer, 1990; Stern, 1991). The know-how of population acts as a non-material input for the producers of goods and services, institutes of research and education, trade organisations and local services. Research and development personnel, as well as skilled operative personnel, can be considered as a necessary labour input in the process of innovations. As a result, the corporal and mental endowments of regions affect the location decisions of enterprises. Usually the geographical concentration of economic activities also implies the concentration of population, as agglomerating firms require large labour pools (Richardson, 1995).

From the perspective of potential migrants, the qualified personnel choosing residential location expect a supply of relevant possessions/posts, as

well as interesting educational, cultural, and recreational opportunities for themselves and their families. Thus, the accumulation of enterprises, skilled personnel and services support each other, which can create a self-feeding agglomeration process (see e.g. Hansen, 1992; Myrdal, 1957).

As a result of agglomeration benefits, human capital often migrates from where it is scarce to where it is abundant, rather than vice versa (Lucas, 1988). This is in line with the rational decision making process, according to which labour is assumed to move from declining regions of high unemployment into expanding regions with modern and well-paid jobs. Migration is also selective, and the most likely migrants are young persons with a high level of education (e.g. Pacione, 1984; Ritsilä and Tervo, 1999). The highly educated can be expected to be more prone to move, since they attempt to realise their investments in education efficiently, even though it requires moving. From the regional perspective, especially in the case of educated persons, there are significant dynamic gains from inward migration. For example, the migrants raise the educational level of a region, provide new ideas, and encourage investment that embodies new technologies (see e.g. Nijkamp and Poot, 1997). Thereby, the centralising development path can lead to a "vicious circle", where centralisation feeds further centralisation. Hence, migration can lead to regional concentration of human capital, which may have a diverging rather than converging effect on the development of local economies (see e.g. Myrdal, 1957; Nijkamp and Poot, 1997).

2.3 Analytical framework

Our research problem and hypotheses are strictly connected to the utility maximisation process expressed in section 2.1, and the phenomenon of centralisation introduced in section 2.2. The fundamental condition of the examination and the main hypotheses tested can be outlined as follows:

Fundamental condition of the examination

An individual is assumed to maximise her/his economic utility according to her/his own preferences (see equation 1).

Hypothesis 1

The highly educated possess a higher likelihood of migration than the rest of the population, i.e. they are more mobile.

Hypothesis 2

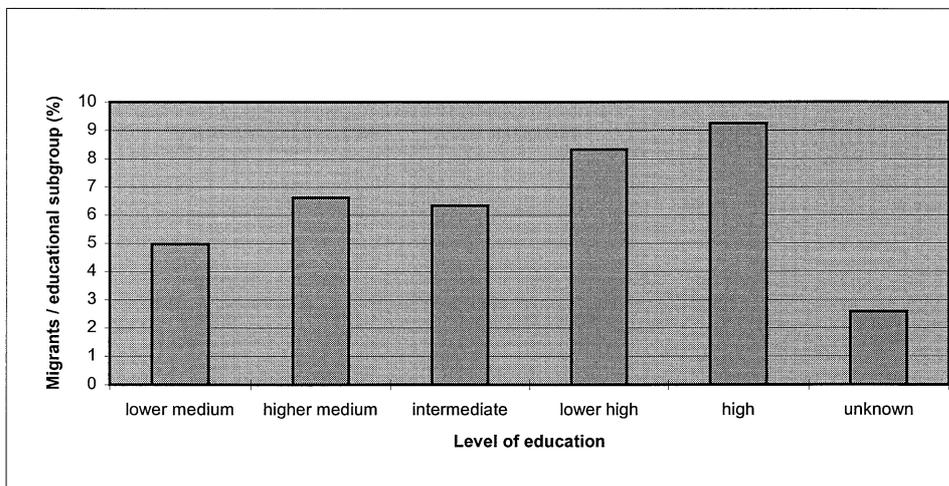
The likelihood of migration is supposed to be affected by the characteristics of both origin and destination regions. As a result of economic, labour market and agglomeration factors, individuals are supposed to be more prone to migrate

from remote and economically lagging regions into central and prosperous regions, than vice versa.

3 Modelling, data and variables

The econometric analysis of this paper concentrates on the micro level decision making of a potential migrant. The modelling stems from the human capital approach, which was introduced in section 2.1.

Methodologically, the analysis is based on maximum likelihood estimation. It employs the cross-sectional binary logit model, based on logistic distribution. The discrete choice of an individual relates to the question of whether (s)he remains in the current region or moves to another location. If the benefits of moving exceed the costs, an individual would be better off if (s)he moved. The paper considers the benefits, costs and the resulting probability of individual migration as a function of personal, household and regional factors.



Lower medium	=	Lower level of upper secondary education
Higher medium	=	Upper level of upper secondary education
Intermediate	=	Lowest level of tertiary education
Lower high	=	Lower degree level of tertiary education
High	=	Higher degree level of tertiary education, or doctorate or equivalent education
Unknown	=	Level of education unknown

FIGURE 1 Labour migration by the level of education (One percent sample of the Finnish Longitudinal Census File, years 1990-1995, inter-provincial migration. The Finnish Standard Classification of Education 31.12.1994)

We use the data set, which is a one percent sample from the Finnish Longitudinal Census. It contains data on the individuals' economic activity, dwelling and family conditions, as well as the regional characteristics of their home districts. The census file is maintained and updated by Statistics Finland. The analysis

focuses on the individuals belonging to the labour force both in 1985 and 1990, and the follow-up sample size is 18 849. A preliminary investigation of the data set reveals that the relative share of migrants is highest among the highly educated (Figure 1). This finding is in line with the first hypothesis of our analysis (section 2.3).

The exploited data set includes one unavoidable shortcoming, namely the unfortunately long time span for observing migration. As a result, migration rates are likely to be underestimated, as the repeat migration within the used time period cannot be controlled (Ritsilä and Tervo, 1999). However, the same time span has also been used in several previous migration studies (see e.g. Herzog *et al.*, 1993; Ritsilä and Tervo, 1999).

The dependent variable, migration, involves a change of the province of domicile. In Finland, the provinces are relatively large in area (see Figure 2). Thereby, a move from one province to another most probably also means a change of local labour market, as well as a change of job. Migration that is observed here is thus long-distance in nature, as distinct from short-distance migration that would include all the other moves inside the country. Out-migration abroad is also ignored in our analysis.

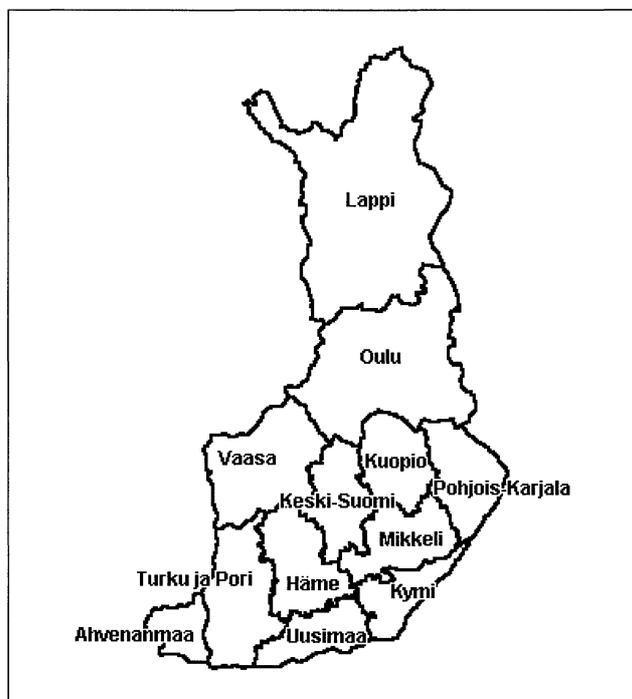


FIGURE 2 The provinces of Finland

TABLE 2 The explanatory variables of migration in the micro model

PERSONAL AND HOUSEHOLD VARIABLES			
VARIABLE	EXPECTED SIGN OF EFFECT	SCALE	OPERATIONAL DEFINITION
IMLEUC	+	Discrete, Dummy	1 = upper secondary education 0 = other
HIGHEDUC	+	Discrete, Dummy	1 = higher education 0 = other
PERSUN	+	Discrete, Dummy	1 = unemployed over 6 / 4 months 0 = other
HISTMIG	+	Discrete, Dummy	1 = previous migration experience in three preceding periods (1970-75, 1975-80, 1980-85) 0 = no previous migration experience
HOMEOWN	-	Discrete, Dummy	1 = home owner 0 = other
HOUSEH1	+	Discrete, Dummy	1 = one person household 0 = other
HOUSEH2	+ / -	Discrete, Dummy	1 = two person household 0 = other
INCOME	+ / -	Continuous, Proportional	Income subject to state taxation
FEMALE	+ / -	Discrete, Dummy	1 = female 0 = male
AGE	-	Continuous, Proportional	00 - 99 99 includes cases >99
AGE2	+ / -	Continuous, Proportional	Age ²
REGIONAL VARIABLES (MUNICIPAL LEVEL)			
Origin area			
REGUNORIG	+	Continuous, Proportional	Regional rate of unemployment (%) (calculated from the basic sample)
AGRIC	+	Continuous, Proportional	Share of employed labour force in agriculture and forestry (1/10 % accuracy)
MIDSIZE	+ / -	Discrete, Dummy	4 000 < population ≤ 15 000
BIGSIZE	-	Discrete, Dummy	Population > 15 000
Destination area			
REGUNDEST	-	Continuous, Proportional	Regional rate of unemployment (%) (calculated from the basic sample)
SERVICES	+	Continuous, Proportional	Share of employed labour force in services (1/10 % accuracy)
URBAN	+	Continuous, Proportional	Proportion of the population living in built-up areas (10% accuracy)

The definitions of the explanatory variables of our empirical micro model, as well as their expected outcomes, are presented in Table 2. The explanatory variables in our micro model include a wide variety of different factors that have been found to affect migratory behaviour (see e.g. Antolin and Bover, 1997;

Greenwood, 1975; Tervo, 1997). These factors can be divided into three main categories: personal factors, household characteristics and regional factors. The variables and their relevance for the tested hypotheses are shortly described below.

Personal and household factors

The most essential personal characteristic of our analysis is educational attainment and its impact on the micro level migratory decisions. According to our hypothesis, the educational level of an individual correlates positively with the likelihood of migration. This hypothesis is supported by many previous studies (e.g. Antolin and Bover, 1997; Hughes and McCormick, 1989; Levine, 1996; Molho, 1987; Owen and Green, 1992; Pissarides and Wadsworth, 1989; Ritsilä and Tervo, 1999). This result is directly related to rational decision making and the maximisation of economic utility. The highly educated are supposed to be more likely to migrate, because they attempt to realise their considerable investments in education in an efficient way, even though it requires moving. There is also a number of other factors that may augment their desire to move. These include career orientation, knowledge about personal opportunities, psychological readiness to move, sufficient economic potential to move, narrowness of relevant job markets, etc.

In our empirical model, educational level is defined by two dummies. The definition follows the Finnish Standard Classification of Education (31.12.1994). The first dummy (**IMLEDUC**) indicates upper secondary education (education time from 10 to 12 years). Correspondingly, the second dummy (**HIGHEDUC**) gets the value of 1, if an individual has at least the lowest level of tertiary education (education time about 13-14 years).

In addition to the level of education, we include a number of other variables describing the personal characteristics in our empirical estimations. They are considered as control variables of the model. One interesting factor in terms of migration behaviour is personal unemployment (**PERSUN**). Here, the status of unemployment is defined according to the main activity classification of Statistics Finland. The expected effect of personal unemployment on the propensity to move is positive, since the unemployed have lower opportunity costs of moving (Antolin and Bover, 1997; Herzog *et al.*, 1993; Hughes and McCormick, 1989; Molho, 1987; Ritsilä and Tervo, 1999; Van Dijk *et al.*, 1989).

The migratory behaviour of an individual can also be affected by previous migration history (**HISTMIG**). This dummy variable describes whether the individual has moved between provinces in three preceding periods (1970-75, 1975-80 or 1980-85). Several studies indicate that previous migration experience increases the likelihood of moving (e.g. DaVanzo, 1983; Tervo, 1997). This is due to several factors. In-migrants into a region may find themselves disappointed and move on. Repeat migration is also easier in terms of psychological costs, since original family ties and the like have already been broken.

Another important factor affecting migratory behaviour is home owning status (**HOMEOWN**). It indicates whether an individual is a home owner or

holds the shares that entitle occupancy of a dwelling (Tervo, 1997). The impact of home owning on the likelihood of migration is assumed to be negative. The explanation is two-fold. First, the likelihood to migrate is expected to decrease with economic welfare in the location of origin. Accordingly, a home owner is assumed to have a higher threshold to move (Antolin and Bover, 1997; Pissarides and Wadsworth, 1989). Second, home owning by itself is supposed to indicate engagement to a region where the owned residence is located (Böckerman, 1998; Hughes and McCormick, 1989; Pehkonen, 1998; Ritsilä and Tervo, 1999). In Finland, home owning is relatively common, which increases the potential significance of this variable (Tervo, 1997).

The income variable (**INCOME**) measures personal income subject to state taxation. The assumption is that the likelihood of migration decreases as the experienced economic welfare in the location of origin increases (Antolin and Bover, 1997; Pissarides and Wadsworth, 1989). In turn, the expected outcome of gender (**FEMALE**) in relation to the propensity to move is not unambiguous (see e.g. Ritsilä and Tervo, 1999; Tervo, 1997). Age in years (**AGE**), and its square (**AGE2**), further describe the migrants' personal characteristics that may have an effect on migratory behaviour. The assumption is that the significance of location ties increases with age. Generally, the benefits from moving also tend to decrease with a growing age (see e.g. Antolin and Bover, 1997; Pissarides and Wadsworth, 1989; Ritsilä and Tervo, 1999). The inclusion of the square of age in the model relies on the assumption that the effect of age is not linear.

The household factors of our model include two dummies, which indicate whether a household unit consists of only one or two persons (**HOUSEH1** and **HOUSEH2**). The underlying assumption is that the decision to move is easier for small households than for bigger families with children (Antolin and Bover, 1997; Pissarides and Wadsworth, 1989; Ritsilä and Tervo, 1999; Tervo, 1997).

Regional factors

The characteristics of the region of origin, as well as the ones of the potential destination region, also play an important role in migratory decision making. The explanatory factors of our analysis include both these groups.

We use four different variables to characterise the municipality of origin. The local unemployment rate (**REGUNORIG**) is a continuous, proportional variable that is defined as the regional percentage of unemployment calculated from the basic sample. As a result of the rational decision making process, it follows that the likelihood of out-migration is assumed to correlate positively with the local rate of unemployment. This is due to the fact that the probability of job placement is low if a worker lives in a region of high unemployment (Tervo, 1997). Second, we use the share of the employed labour force in agriculture and forestry (**AGRIC**) to describe the local production structure. This variable is also supposed to correlate positively with the propensity for out-migration. This results from the assumption that the regions dominated by

primary production are declining in terms of population, and the future prospects of these regions are generally weakening.

In addition, two dummy variables are included in the model to describe the size of population in the origin municipality. The other dummy refers to the middle-sized municipalities (**MIDSIZE**), and the other one to the big municipalities (**BIGSIZE**) in the scale of Finland. The incentives to move away from central areas are considered to be low. Consequently, the assumption is made that the size of the origin municipality correlates negatively with the likelihood of out-migration (Tervo, 1997; Ritsilä and Tervo, 1999).

In order to characterise the destination municipality, we use the variables of the local unemployment rate (**REGUNDEST**), structure of production (**SERVICES**), and the degree of urbanisation (**URBAN**). As in the case of the origin area, the local unemployment rate is defined as the percentage of unemployment calculated from the basic sample. The share of the employed labour force in the service sectors characterises the local stage of structural change. In turn, the degree of urbanisation refers to the local proportion of the population living in built-up areas. Resulting from the rational decision making process, a low level of unemployment in the destination area is assumed to increase the likelihood of in-migration. In turn, the service-dominated and prosperous areas are assumed to attract in-migrants. The same applies to the highly urbanised regions (e.g. Ritsilä and Tervo, 1999).

4 Empirical results

The results of our econometric analysis are reported in Table 3. Most of the estimated coefficients reach statistical significance and have a correct sign, i.e. they are in accordance with our expectations and previous empirical findings. The results support our first hypothesis that the level of education correlates positively with the likelihood of long distance migration. As the marginal effects of the variables are traceable, we can also define the magnitude of the effects. In our model, a high level of education increases the estimated probability of moving¹ by 2.22 percent units (an 85% increase in the probability of migration). Respectively, if an individual possesses an intermediate level of education, the increase is approximately 0.75 percent units (a 29% increase in the probability of migrating). The presented outcomes give evidence in favour of the selective nature of migration. Highly educated individuals are found to be significantly more mobile than the others. As explained in sections 2 and 3, this results from economic, social and psychological factors (see e.g. DaVanzo, 1983; Ritsilä, 2000).

The control variables with a statistically significant coefficient are personal unemployment, migration history, home ownership, household size

¹ The estimated probability of migrating is 2.61%. For calculating the probability see e.g. Greene, 1997, pp. 874.

(HOUSEH1) and age (AGE). The outcomes of these variables are in line with our theoretical assumptions and previous studies. In contrast, gender and personal income do not reach statistical significance in explaining migratory behaviour.

TABLE 3 Logit regressions for the likelihood of migration

VARIABLE	REGRESSION VALUES				
	B	MEAN	SE	P	ME
Constant	-2.5307*	-	0.5682	0.0000	-0.0644*
Personal/Household					
IMLEDUC	0.2949*	0.4958	0.0931	0.0015	0.0075*
HIGHEDUC	0.8718*	0.1223	0.1291	0.0000	0.0222*
PERSUN	0.2464*	0.0847	0.1110	0.0264	0.0063*
HISTMIG	1.4455*	0.1884	0.0782	0.0000	0.0368*
HOMEOWN	-0.4290*	0.7159	0.0778	0.0000	-0.0109*
HOUSEH1	0.3722*	0.0941	0.1111	0.0008	0.0095*
HOUSEH2	0.1640	0.1977	0.0906	0.0702	0.0042
INCOME	-0.2e-05	7.1e+04	1.3e-06	0.1044	-0.5e-07
FEMALE	0.0151	0.4662	0.0766	0.8433	0.0004
AGE	-0.1151*	36.0777	0.0305	0.0002	-0.0029*
AGE2	0.0006	1.4e+03	0.0004	0.1475	0.2e-04
Origin area					
REGUNORIG	0.0988*	6.3335	0.0116	0.0000	0.0025*
AGRIC	0.2315*	0.7115	0.0505	0.0000	0.0059*
MIDSIZE	0.1902	0.2418	0.1207	0.1151	0.0048
BIGSIZE	-0.3670*	0.3822	0.1294	0.0045	-0.0093*
Destination area					
REGUNDEST	-0.0975*	3.2115	0.0226	0.0000	-0.0025*
SERVICES	0.0902*	5.4610	0.0459	0.0493	0.0023*
URBAN	0.1480*	7.5471	0.0321	0.0000	0.0038*
Sample size					
Number of movers	18 849				
	886				
Notes					
	* = Statistically significant at the 5% level				
	B = Estimated coefficient				
	SE = Standard error				
	ME = Marginal effect				

The empirical results also support our expectations that the characteristics of both the origin area and the destination area have a significant effect on the likelihood of migration. For the origin area, the coefficients of local unemployment and the share of the employed labour force in agriculture and forestry both reach statistical significance. Thus, the results indicate that a high local unemployment rate increases the propensity of out-migration, and that the individuals living in the areas of primary production also have an increased probability to move out. The results also indicate that the regional size of population correlates negatively with out-migration.

All three variables related to the destination area reach statistical significance and the signs of the coefficients are in accordance with our expectations. A high level of local unemployment decreases the likelihood of in-migration. In contrast, we found a positive correlation between in-migration and the share of services, as well as the degree of urbanisation. This refers to utility maximising, according to which the migrants are more prone to migrate into prosperous and attractive regions.

To sum up the previous results, we may say that migration is likely to take place from remote and lagging regions into central and prosperous regions. Hence, the reallocation of human capital seems to be taking place. It is moving from where it is scarce into where it is already abundant.

5 Concluding remarks

The paper explored the relationship between migration and the centralisation of human capital in Finland. The empirical part of the paper analysed the personal, household and regional factors affecting the likelihood of long-distance migration at the micro level. The analysis was based on human capital framework.

Accordingly to previous studies, we found that the level of education increases the propensity to move, i.e. long distance migration is selective. In addition, the regional characteristics of both the origin area and the destination area have a considerable effect on migratory behaviour. According to our results, individuals tend to move from remote regions of high unemployment to more prosperous regions with better employment opportunities and economic prospects. Hence, we can conclude that migration may play a significant role in the regional redistribution of human capital. As remote regions face significant losses of their human capital reserves to centres of economic activity, regional disparities can be expected to further increase rather than decrease.

Acknowledgements

Mr. Jari Ritsilä would like to thank the Academy of Finland for financial support. Both authors would like to express their gratitude to professor Hannu Tervo, senior researcher Kari Hämäläinen and anonymous referees for valuable comments.

References

- Antolin, P. and Bover, O. (1997) Regional Migration in Spain: The Effect of Personal Characteristics and of Unemployment, Wage and House Price Differentials Using Pooled Cross-Sections, *Oxford Bulletin of Economics and Statistics*, 59, 215-35.
- Barro, R. and Sala-i-Martin X. (1991) Convergence across States and Regions, *Brookings Papers on Economic Activity*, 1, 107-58.
- Barro, R. and Sala-i-Martin X. (1995) *Economic Growth*, McGraw-Hill, Inc., New York.
- Böckerman, P. (1998) Adjustment of Dwelling and Labour Markets, *Labour Institute for Economic Research, Discussion Papers*, 149, (in Finnish).
- Camagni, R. P. (1995) The concept of innovative milieu and its relevance for the lagging regions in the 1990s, *Papers in Regional Science*, 74, 317-40.
- DaVanzo, J. (1983) Repeat Migration in the United States: Who Moves back and Who Moves on, *Review of Economics and Statistics*, 65, 552-59.
- Davelaar, E. J. & Nijkamp, P. (1997) Spatial Dispersion of Technological Innovation: A Review, in *Innovative Behaviour in Space and Time* (Eds.) C.S. Bertuglia, S. Lombardo & P. Nijkamp, *Advances in Spatial Science*, Springer-Verlag, Berlin, Heidelberg, pp. 17-40.
- Forslid, R. (1999) Agglomeration with Human and Physical Capital: An Analytically Solvable Case, *CEPR Discussion Paper No. 2102*, Centre for Economic Policy Research, London.
- Funck, R. H. (1995) Competition among Locations: Objectives, Instruments, Strategies, Perspectives, in *Urban Agglomeration and Economic Growth* (Ed.) H. Giersch, Egon-Sohmen-Foundation, Springer-Verlag, Berlin, Heidelberg, pp. 227-55.
- Greene, W. H. (1997) *Econometric Analysis*, Third Edition, Prentice-Hall, Inc., New Jersey.
- Greenwood, M. (1975) Research on Internal Migration in the United States: a Survey, *Journal of Economic Literature*, 13, 397-433.
- Greenwood, M. (1985) Human migration - Theory, Models, Empirical Studies, *Journal of Regional Science*, 25, 521-44.
- Greenwood, M., Mueser, P., Plane, D. and Schlottman, A. (1991) New Directions in Migration Research, *Annals of Regional Science*, 25, 237-70.
- Hansen, N. (1992) Competition, Trust and Reciprocity in the Development of Innovative Regional Milieux, *Papers in Regional Science*, 71, 95-105.
- Herzog, H. W. Jr., Schlottman, A. M. and Boehm, T. B. (1993) Migration as Spatial Job-Search: A Survey of Empirical Findings, *Regional Studies*, 27, 327-40.
- Hughes, G. A. and McCormick, B. (1989) Does Migration Reduce Differentials in Regional Unemployment Rates?, in *Migration and Labour Adjustment*, (Eds.) J. Van Dijk, H. Folmer, H.W. Herzog and A.M. Schlottman, Kluwer, Dordrecht, Boston and London, pp. 85-108.
- Krugman, P. (1991) Increasing Returns and Economic Geography, *Journal of Political Economy*, 3, 483-99.

- Kuusi, O. and Loikkanen, T. (1996) In Search for New Approaches in Technological Change, in *Innovation Systems and Competitiveness*, (Ed.) O. Kuusi, ETLA, Helsinki, pp. 1-16.
- Levine, P. (1996) Migration Theories and Evidence: An Assessment, *Journal of Economic Surveys*, 10, 159-98.
- Lucas, R. E. (1988) On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22, 3-42.
- Lyons, D. (1995) Agglomeration Economies among High Technology Firms in Advanced Production Areas: The Case of Denver/Boulder, *Regional Studies*, 3, 265-78.
- Maillat, D. (1998) Innovative milieux and new generations of regional policies, *Entrepreneurship and Regional Development*, 1, 1-16.
- Milne, W. (1991) The Human Capital Model and Its Economic Estimations, in *Migration Models: Macro and Micro Approaches* (Eds.) J. Stillwell and P. Congdon, Belhaven Press, London and New York, pp. 137-51.
- Molho, I. (1987) The migration decision of young men in Great Britain, *Applied Economics*, 19, 221-43.
- Myrdal, G. (1957) *Economic Theory and Underdeveloped Regions*, Duckworth, London.
- Newbold, K. B. (1997) Primary, Return and Onward Migration in the U.S. and Canada: Is There a Difference?, *Papers in Regional Science*, 76, 175-98.
- Nijkamp, P. and Poot, J. (1997) Endogenous Technological Change, Long Run Growth and Spatial Interdependence: A Survey, in *Innovative Behaviour in Space and Time* (Eds.) C.S. Bertuglia, S. Lombardo and P. Nijkamp, *Advances in Spatial Science*, Springer-Verlag, Berlin, Heidelberg, pp. 213-38.
- Owen, D. and Green, A. (1992) Migration patterns and trends, in *Migration Processes & Patterns*, (Eds.) T. Champion and T. Fielding, Belhaven Press, London and New York, pp. 17-40.
- Pacione, M. (1984) *Rural Geography*, Harper & Row, London.
- Pehkonen, J. (1998) Decline of the nineties and employment development of regions and line of activities, in *Finnish Unemployment* (Ed.) M. Pohjola, Taloustieto Oy, Helsinki, pp. 337-56 (in Finnish).
- Pissarides, C. A. and Wadsworth, J. (1989) Unemployment and the Inter-Regional Mobility of Labour, *The Economic Journal*, 99, 739-55.
- Porter, M. E. (1990) *The competitive advantage of nations*, The MacMillan Press Ltd, Worcester.
- Richardson, H. W. (1995) Economies and Diseconomies of Agglomeration, in *Urban Agglomeration and Economic Growth* (Ed.) H. Giersch, Egon-Sohmen-Foundation, Springer-Verlag, Berlin/Heidelberg, pp. 123-56.
- Ritsilä, J. (1999) Regional differences in environments for enterprises, *Entrepreneurship and Regional Development*, 11, 187-202.
- Ritsilä, J. (2000) *Mobility of the Highly Educated Labour Force*, University of Jyväskylä, School of Business and Economics, Working Paper 214, Jyväskylä, Finland.

- Ritsilä, J. and Tervo, H. (1999) Regional Differences in The Role of Migration in Labour Market Adjustment: The Case of Finland, in *Series on European Research in Regional Science*, (Ed.) G. Crampton, Pion, London, pp. 166-82.
- Romer, P. M. (1990) Endogenous Technological Change, *Journal of Political Economy*, 98, 71-102.
- Schaeffer, P. (1985) Human Capital Accumulation and Job Mobility, *Journal of Regional Science*, 25, 103-14.
- Seater, J. J. (1977) A Unified Model of Consumption, Labour Supply, and Job Search, *Journal of Economic Theory*, 14, 349-72.
- Sjaastad, L. (1962) The Costs and Returns in Human Migration, *Journal of Political Economy*, 70 (Supplement), 80-93.
- Stillwell, J. and Congdon, P. (1991) Migration modelling: concepts and contents, in *Migration Models: Macro and Micro Approaches* (Eds.) J. Stillwell and P. Congdon, Belhaven Press, London and New York, pp. 1-16.
- Tervo, H. (1997) Long-distance Migration and Labour Market Adjustment: Empirical Evidence from Finland 1970-90, University of Jyväskylä, School of Business and Economics, Working paper 168, Jyväskylä, Finland.
- Van Dijk, J., Folmer, H., Herzog, H. W. and Schlottman, A. M. (1989) Labor Market Institutions and the Efficiency of Interregional Migration: A Cross-National Comparison, in *Migration and Labor Market Adjustment*, (Eds.) J. Van Dijk, H. Folmer, H. W. Herzog and A. M. Schlottman, Kluwer, Dordrecht, Boston and London, pp. 61-84.
- Weiss Y. (1971) Learning by Doing and Occupational Specialization, *Journal of Economic Theory*, 4, 189-98.

CHAPTER 6

WHERE DO THE HIGHLY EDUCATED MIGRATE? MICRO LEVEL EVIDENCE FROM FINLAND*

	ABSTRACT	109
1	INTRODUCTION	109
2	MIGRATION DECISIONS AND HUMAN CAPITAL REDISTRIBUTION.....	110
2.1	Migration as utility maximisation	110
2.2	Reallocation of human capital.....	111
3	MODEL, DATA AND VARIABLES	112
3.1	Modelling framework.....	112
3.2	The data set and the econometric specifications	114
4	EMPIRICAL RESULTS	117
5	CONCLUDING REMARKS	120
	REFERENCES	121

* This paper has been published as: Ritsilä, J. (2000) Where Do the Highly Educated Migrate? Micro Level Evidence from Finland. University of Jyväskylä, School of Business and Economics, Working paper, 222/2000, Jyväskylä: University of Jyväskylä, (In referee process: *International Review of Applied Economics*). A few minor differences of detail exists between this chapter and the published paper.

ABSTRACT

This paper analyses the role which migration of highly educated labour plays in human capital reallocation. The study focuses on actual migrants, examining the direct effect of educational attainment on destination choices. The paper uses the ordered probability model and a micro-level data set in econometric analyses. Individual level investigations of migrants show that highly educated migrants are likely to move to urban regions. As a result, the reallocation of highly educated labour, and thereby also the redistribution of human capital, seems to be taking place in Finland.

Keywords: human capital, migration, educational attainment, regional development

J.E.L. classification: O18, J60

1 Introduction

According to migration theories, a number of different forces may affect the movements of labour, and thus, human capital. The individual decision to migrate can be seen as a utility maximising process, which is driven by personal, household and regional factors. One important factor is certainly education. The analysis of the effects of educational attainment on migratory behaviour is quite extensive (Antolin & Bover, 1997; Hughes & McCormick, 1987; Levine, 1996; Molho, 1987; Owen & Green, 1992; Ritsilä & Tervo, 1999). The overall finding of these studies is that educational attainment increases the likelihood of migration. On the other hand, micro-level analyses of destination choices of highly educated migrants are much scarcer and related themes have remained rather untouched.

From the viewpoint of human capital allocation, the role of educational attainment on destination choices of migrants is of special interest. As mentioned above, it is generally accepted that educational attainment increases the likelihood of migration. Similarly, it is empirically proved that population tends to concentrate spatially. This study accepts these results, but will show that the impression they give is incomplete because it neglects the possibility that divergent destination choices of highly educated migrants may even strengthen the concentration process. Qualified individuals choosing residential location expect a supply of relevant jobs, as well as interesting educational, cultural and recreational opportunities for themselves and their families. Thus, the location decisions of skilled labour are connected to the infrastructure and production of regions. In a coherent way, the settling of enterprises, services and skilled la-

bour support each other (see e.g. Camagni, 1995; Hansen, 1992; Myrdal, 1957; Ritsilä, 1999).

The aim of this paper is to investigate the extensive role which migration of the highly educated plays in human capital reallocation. For simplicity, this paper assumes that the human capital acquired from schooling is the main factor in the formation of the human capital stock of a person, and thus also at the aggregate level. The empirical analysis focuses on migrants, examining the direct effect of educational attainment on destination choices. Consequently, the approach of this paper is different compared with a number of other studies dealing with the relationship between migration and educational attainment. These studies usually aim to define the effects of educational attainment on the likelihood of migration, without considering the destination of this movement.

The empirical analysis of the paper is based on data from the Finnish Longitudinal Census File. The data set used herein is a sample of inter-municipal migrants in the period from 1994 to 1995, and it includes information on population characteristics such as mobility, economic activity, dwelling conditions, family and district of residence. The analysis focuses on persons that were of working age. The econometric estimations of the paper are based on the ordered probability model.

The paper is organised as follows. The theoretical background of the paper is outlined in section 2. Section 3 introduces the econometric methods, data set and variables exploited in the empirical analysis. The outcomes of the estimations accomplished are reported in section 4. Finally, the paper ends in concluding remarks.

2 Migration decisions and human capital redistribution

2.1 Migration as utility maximisation

The analytical setting of this paper is related to human capital framework. The framework is based on the modelling work of Sjaastad (1962), Weiss (1971), Seater (1977) and Schaeffer (1985). Herein, migration is supposed to result from variations in individual economic utility in different locations. Furthermore, an individual is assumed to maximise economic utility. Thus, relocation takes place if the expected economic utility gained from migrating exceeds the economic utility achieved by staying in the present location. Heterogeneous individuals possess different utility functions, and consequently encounter differences in the net benefits of living in a specific location.

An important factor that affects economic utility, and hence the decision making of an individual, is her/his personal human capital reserve. Human capital can be considered as a heterogeneous asset, resulting from formal schooling, training and experience, etc. In addition, human capital can be defined as being of general use, or valuable only in specific tasks. For simplicity,

we assume that there are only two types of human capital: one acquired by education (vector E), and one gained from other sources (vector O). Formally, an individual i is assumed to decide to migrate from location j to location k under the following utility maximisation process at a given time t :

$$(1) E(R_{it}) = \max_{(E,O)} \left[E \int_0^T e^{-rt} \{ U_{ik}(E_i, O_i) - U_{ij}(E_i, O_i) \} dt - CM_{ijk} \right]$$

under the precondition

$$\int_0^T e^{-rt} (U_{ik} - U_{ij}) dt - CM_{ijk} \geq 0$$

where $E(R_{it})_{\max}$ is the net present value of expected economic utility of an individual i , U_k is the expected utility level achieved in the alternative location k , U_j is the expected utility achieved by living in the present location j , and CM_{jk} are the direct costs involved in moving from location j to location k . The expected utilities U_k and U_j , as well as the direct costs CM_{jk} , are formed as a result of personal, household and regional factors involved in the migration decision process. As a result of the rational decision making process, the positive migration decision is reached when the expected utility gained from moving exceeds the direct costs of moving.

2.2 Reallocation of human capital

Recent research has shown that success in competition and rapid economic growth has often arisen out of the regional concentration of economic activities – the clustering of lines of business and enterprises that are complementary to each other. Also, the topics of recent research have included the conglomeration of enterprises, developmental blocks in the economy and the cohesion of know-how (Davelaar & Nijkamp, 1997; Krugman, 1991; Maillat, 1998; Porter, 1990). Clusters can be defined as regionally formed entities of functionally or technologically closely related enterprises or activities. The strength of clusters is based on positive externalities, especially the benefits of an efficient flow of information and network arrangements. Nowadays, the strongest advantages in industrial competition can often be found in know-how, including both formal and tacit knowledge (Kuusi & Loikkanen, 1996; Lyons, 1995; Nijkamp & Poot, 1997; Ritsilä, 1999).

The new theories of economic growth emphasise the role of human capital as a prerequisite for economic growth processes (e.g. Barro & Sala-i-Martin, 1995; Krugman, 1991; Lucas, 1988; Romer, 1990). The know-how of population acts as a non-material input for the producers of goods and services, institutes of research and education, trade organisations and local services. Research and development personnel, as well as skilled operative personnel, can be considered as necessary labour input in the process of innovation. As a result, the cor-

poral and mental endowments of regions affect the location decisions of enterprises. Usually the geographical concentration of economic activities also implies the concentration of population, as agglomerating firms require large labour pools (Richardson, 1995).

Considering potential migrants, qualified personnel choosing residential location expect a supply of relevant positions/posts, as well as interesting educational, cultural and recreational opportunities for themselves and their families. Thus, the accumulation of enterprises, skilled personnel and services support each other, which can create a self-feeding agglomeration process (see e.g. Hansen, 1992; Myrdal, 1957).

As a result of agglomeration benefits, human capital often migrates from where it is scarce to where it is abundant, rather than vice versa (Lucas, 1988). This is in line with the rational decision making process, according to which labour is assumed to move from declining regions of high unemployment to expanding regions with modern and well-paid jobs. From the regional perspective, especially in the case of educated persons, there are significant dynamic gains from inward migration. Highly educated migrants raise the educational level of the region, provide new ideas and encourage investment that embodies new technologies, and so on (see e.g. Nijkamp & Poot, 1997). Hence, migration can lead to regional concentration of human capital, which may have a diverging rather than converging effect on the development of local economies (see e.g. Myrdal, 1957; Nijkamp & Poot, 1997).

3 Model, data and variables

This analysis focuses on the destination choices of migrants, and stresses the role of educational attainment in the decision making process. The destination choices of migrants are seen as results of the utility maximising process where the benefits of moving are weighed against the costs of moving. The probability of individual destination choice is considered as a function of personal and regional factors.

3.1 Modelling framework

The use of the unusual framework of analysis (using the data set of actual movers instead of modelling the destination choice of potential migrants) in this study can be rationalised by at least three arguments. First, the simultaneous modelling of moving decisions and choices of destination usually involves a pitfall in estimating the effects of aggregate variables on micro units, i.e. integrating regional and individual level factors into the same econometric or statistical models (Moulton, 1986; Moulton, 1990; Moulton & Randholm, 1989). Second, the procedure used herein makes it possible to treat the destinations as ordered choices of the municipality class. This characteristic is not reached by using, for example, the multinomial logit model in the case of potential migrants. Third, the analysis of potential migrants often involves the difficulty

that the proportion of migrants in the whole population is minor, for which reason the econometric analysis may be problematic. The sample of migrants gives a better statistical starting point for the analysis.

The econometric analysis of the paper implements the ordered probability model. The form of the ordered probability model used herein is based on Zavoyna & McElvey's (1975) derivations. With normal distribution and normalisation the following specification can be expressed for the model exploited in the analysis (cf. Greene, 1997):

(2)

$$\begin{aligned} y_i^* &= \beta' x_i + \varepsilon_i, \quad \varepsilon_i \sim N[0,1] \\ y_i &= 0 \quad \text{if } y \leq \mu_0 \\ y_i &= 1 \quad \text{if } \mu_0 < y \leq \mu_1 \\ y_i &= 2 \quad \text{if } \mu_1 < y \leq \mu_2 \end{aligned}$$

where y_i is the observed counterpart to y_i^* . The μ 's are unknown parameters to be estimated with β . The model is founded on a latent regression analysis. Measurable factors x and unobservable factors ε describe the respondents' opinions/characteristics. The mean and variance of ε is normalised to 0 and 1. The variance of ε_i is assumed to be 1 since as long as y_i^* , β and ε_i are unobserved, no scaling of the underlying model can be deduced from the observed data. In addition, ε is assumed to be normally distributed across the observations. There is no significance to the unit distance between the set of observed values of y , since the μ 's are free parameters. Instead, they simply provide the ranking for the phenomenon. With normal distribution, the formulation above yields the following probabilities (Greene, 1997; Greene, 1998):

(3)

$$\begin{aligned} \Pr(y = 0) &= \Phi(-\beta' x) = 1 - \Phi(\beta' x) \\ \Pr(y = 1) &= \Phi(\mu - \beta' x) - \Phi(-\beta' x) \\ \Pr(y = 2) &= 1 - \Phi(\mu - \beta' x) \end{aligned}$$

For all the probabilities to be positive, the condition $\mu > 0$ must be fulfilled. Defining the set of ordinal variables $y_{ij} = 1$ if $y_i = j$ and 0 otherwise (a dummy variable), the log-likelihood function can be expressed as

(4)

$$\log L = \sum_{i=1}^N \sum_{j=1}^2 y_{ij} \log \left[\Phi(\mu_j - \beta' x_i) - \Phi(\mu_{j-1} - \beta' x_i) \right]$$

The marginal effects of changes in the regressors for the three probabilities presented in Equation 3 above are:

(5)

$$\begin{aligned}\frac{\partial \text{prob}[y = 0]}{\partial x} &= -\phi(\beta'x) \beta \\ \frac{\partial \text{prob}[y = 1]}{\partial x} &= [\phi(-\beta'x) - \phi(\mu_1 - \beta'x)] \beta \\ \frac{\partial \text{prob}[y = 2]}{\partial x} &= \phi(\mu_2 - \beta'x) \beta\end{aligned}$$

where $\phi(\cdot)$ is the standard normal density. Each vector is a multiple of the coefficient vector. However, it is important to notice that magnitudes of the coefficient vectors and marginal effect vectors are likely to be very different. Indeed, in at least one case (Prob [cell 0]), the partial effects may have the opposite signs from the estimated coefficients. In addition to that, partial derivatives for dummy variables are in principal inaccurate and thus may differ in value when assessing the change in predicted probability. For that reason, we should compare the probabilities that result when the dummy observed takes two different values (i.e. 0 and 1) while other variables are held at their sample means. Thereby, we get a more accurate picture of the actual effect the dummy has on the estimated probabilities.

3.2 The data set and the econometric specifications

The empirical analysis is based on a sample of inter-municipal migrants registered in the Finnish Longitudinal Census data. The sample covers the period from 1994 to 1995, and it contains versatile information on population characteristics (e.g. economic activity, dwelling conditions and the families of individuals). This analysis focuses on persons that were of working age in 1994 (aged 17 to 64). The sample size is 24 904 individuals.

The dependent variable (**municipality class**) of this analysis has three different ordered classes based on the amount of population and degree of urbanisation of the municipalities of destination. The classification formed in the analysis applies the same classification elements as the Communal Classification of Statistics Finland (1996). The bordering prerequisites of the classes used are:

Y=2 (Urban)	if the number of population > 50 000 and the level of urbanisation \geq 90%, (N = 10 332)
Y=1 (Densely populated)	if the number of population > 15 000 or the level of urbanisation \geq 70%, and the condition of Y=2 is not valid, (N = 9 802)
Y=0 (Rural)	otherwise, (N = 4 770)

The regional division of classification is presented in Figure 1. Exploiting the municipal moves enables a larger sample size, but the problem of the municipal level sample is that the migrations of the sample include a number of moves that are not labour market based. However, this problem is reduced to some extent by forming a relevant data set (e.g. an individual being of working age) and by using the explanatory variables that control the relevant labour market characteristics (e.g. an individual being a student) of an individual.

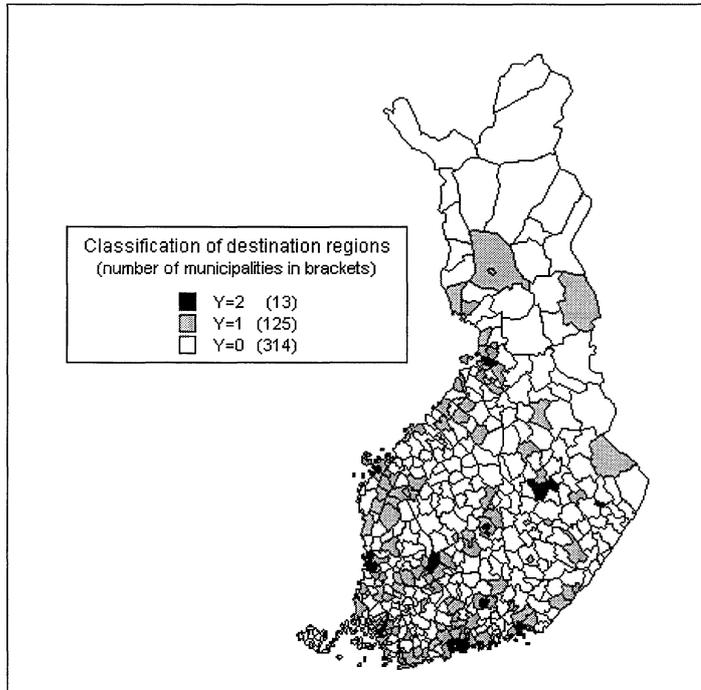


FIGURE 1 Classification of municipalities used in the analysis

The estimation procedure is based on an ordered choice model. Thereby, the research procedure assumes that migrants choose their destination region according to a proxy which describes the regional level of human capital concentration in the destination region. The phenomenon under examination could have exploited the procedure of the multinomial logit model, making no attempt to classify the regions in ordered classes. However, the exploitation of an ordered probit model can be justified for the reason that it yields very interesting and relevant information from the viewpoint of spatial concentration. Actually, the procedure exploited considers the destination regions of migrants as ordered levels of spatial concentration.

The definition used in this study forms explicit ordered classification, i.e. the regions can be put in order regarding features they possess. Even though the dependent variable used herein is discrete, the regular multinomial logit model or probit models would fail to account for the orderly nature of the

above presented phenomenon. An ordinary regression analysis would also fail in the opposite direction. In fact, the regression analysis would treat the differences between the various classes similarly, whereas they are only a ranking (Greene, 1997; Greene, 1998). Hence, the ordered probability model is the relevant tool for the analysis carried out.

TABLE 1 The variables of the ordered probability model

VARIABLE	DEFINITION	MEAN
DEPENDENT VARIABLE (YEAR 1995)		
Y Municipality class	Y=2 if number of population > 50 000 and level of urbanisation \geq 90% Y=1 if number of population > 15 000 or level of urbanisation \geq 70% and Y=2 not valid Y=0 otherwise	1.2233
EXPLANATORY VARIABLES (YEAR 1994)		
X ₁ Highly educated	X ₁ =1 if an individual has at least the lowest level of tertiary education (the whole education time being about 13-14 years) X ₁ =0 otherwise	0.1363
X ₂ Female	X ₂ =1 if an individual is female X ₂ =0 otherwise	0.5040
X ₃ Age	X ₃ = age of an individual	29.1855
X ₄ Unemployed	X ₄ =1 if a person has been unemployed at least two weeks in the observation year X ₄ =0 otherwise	0.3939
X ₅ Student	X ₅ =1 if an individual is reported as a student on the basis of the main type of activity in the last week of the observation year X ₅ =0 otherwise	0.2223
X ₆ Commuter	X ₆ =1 if the location of an individual's job is different from her/his municipality of residence at the end of the observation year X ₆ =0 otherwise	0.1921
X ₇ Fragmentary work	X ₇ =1 if a person has experienced terminated employment at least twice in the observation year X ₇ =0 otherwise	0.1307
X ₈ House owner	X ₈ =1 if an individual has her/his own house X ₈ =0 otherwise	0.2652
X ₉ Flat owner	X ₉ =1 if an individual has her/his own flat X ₉ =0 otherwise	0.2035
X ₁₀ Size of household	X ₁₀ = size of the household unit an individual belongs to	3.1666
X ₁₁ Urban (origin)	X ₁₁ =1 if the number of population > 50 000 and level of urbanisation \geq 90% (origin region) X ₁₁ =0 otherwise	0.3282
X ₁₂ Densely populated (origin)	X ₁₂ =1 if the number of population > 15 000 or level of urbanisation \geq 70% and X ₁₁ =0 X ₁₂ =0 otherwise	0.4277

As stated above, this analysis focuses on the effect of educational attainment on the destination choices of migrants. The variable used for educational attainment indicates whether a person is highly educated. The value of this dummy (**highly educated**) is 1 if an individual has at least the lowest level of tertiary education, the whole education time being about 13-14 years. The definition of the variable follows the Finnish Standard Classification of Education (31.12.1994). It is supposed that highly educated individuals possess divergent choices of destinations due to economic, labour market and agglomeration factors.

The control-variables used in the analysis measure an individual's personal characteristics, household and region of origin. Further details on variables used are presented in Table 1.

4 Empirical results

Table 2 presents the outcomes of the ordered probability model for destination choices of migration. All the coefficients, except the size of household, reach statistical significance at the 5% level.

TABLE 2 Estimated model for destination choices of migration, 1994-1995

Estimated model for destination choices of migration, 1994-1995		
Variable	Coefficient	P-value
Constant	0.8171*	0.0000
μ	1.1417*	0.0000
X ₁ Highly educated	0.1149*	0.0000
X ₂ Female	-0.0317*	0.0307
X ₃ Age	-0.0136*	0.0000
X ₄ Unemployed	-0.0576*	0.0003
X ₅ Student	0.2456*	0.0000
X ₆ Commuter	0.1849*	0.0000
X ₇ Fragmentary work	0.1073*	0.0000
X ₈ House owner	0.2712*	0.0000
X ₉ Flat owner	0.1948*	0.0000
X ₁₀ Size of household	-0.0080	0.0543
X ₁₁ Urban (origin)	0.6306*	0.0000
X ₁₂ Densely populated (origin)	0.2854*	0.0000

P-value	=	P[Z >z], Probability value of estimated coefficient
μ	=	Threshold parameter
*	=	Statistically significant at the 5% level
N	=	24 904 observations

The dependent variable exploited herein involves ordered classification of destination municipalities, and hence, direct interpretation of β -coefficients is not advisable (see section 3). This also applies to the signs of coefficients. Therefore, we look at the marginal effects of changes in regressors. These are presented in Table 3.

TABLE 3 Marginal effects for the ordered probability of destination choices of migrants, 1994-1995

Marginal effects for the ordered probability of destination choices of migrants, 1994-1995			
Variable	Y=0 (Rural)	Y=1 (Dens. pop.)	Y=2 (Urban)
Constant	-0.2144	-0.1033	0.3178
X ₁ Highly educated	-0.0301	-0.0145	0.0447
X ₂ Female	0.0083	0.0040	-0.0123
X ₃ Age	0.0036	0.0017	-0.0053
X ₄ Unemployed	0.0151	0.0073	-0.0224
X ₅ Student	-0.0644	-0.0311	0.0955
X ₆ Commuter	-0.0485	-0.0234	0.0718
X ₇ Fragmentary work	-0.0282	-0.0136	0.0417
X ₈ House owner	-0.0712	-0.0343	0.1055
X ₉ Flat owner	-0.0511	-0.0246	0.0758
X ₁₀ Size of household	0.0021	0.0010	-0.0031
X ₁₁ Urban (origin)	-0.1655	-0.0797	0.2452
X ₁₂ Densely populated (origin)	-0.0749	-0.0361	0.1110

Note: Marginal effects are computed on overall means of the data.

Let us first consider the outcomes of control variables. According to the results, if an individual is a student (**student**) at the beginning of the observation period, her/his likelihood of moving to urban regions increases. Urban regions possess more job opportunities, and hence, a greater likelihood of finding new employment compared to remote districts. Availability of job vacancies is even more important in the case of newcomers to labour markets, since finding a first job without any work experience is usually tricky. On the other hand, the first job is very important for the work résumé. Commuting (**commuter**) and short-term employment (**fragmentary work**) also seem to increase the propensity for moving to urban regions. Again, these outcomes are connected to the ability of urban municipalities to offer more job opportunities. In contrast, it seems that personal unemployment (**unemployed**) does not encourage individuals to move to urban municipalities.

House (**house owner**) or flat owners (**flat owner**) seem to be more likely to migrate to urban regions. This might partly be explained by welfare factors. If migrants have their own accommodation therein, or they have the capital to buy housing, they are more able to move to urban municipalities that normally have a lack of housing. **Size of household** has a minor effect on the destination choices of migrants, and it does not reach statistical significance at the 5% level.

The effects of **age** and **female** are also slight. However, the outcomes of these variables show that large households, aged individuals and females are less likely to move to urban municipalities. These results are logical from the viewpoint of opportunity costs and labour market reasons.

Furthermore, the dummies of **urban** and **densely populated regions** were used in the estimations to control the effect of origin on destination choices of migrants. The estimates of these dummies indicate that individuals living in urban municipalities or in densely populated regions are more likely to move to urban regions compared to the reference group of persons living in remote districts.

Next let us proceed to this study's main explanatory variable, educational attainment. The results reveal that highly educated persons are more likely to migrate to urban municipalities. In fact, the sign of the marginal effects of the **highly educated** dummy is positive only for urban regions. Furthermore, if the assumption of the highly educated being more likely to move in the first place is considered, the outcomes of the dummies of **urban** and **densely populated regions** also seem to strengthen the effect.

Since the partial derivatives for dummy variables are in principal inaccurate, and thus may differ in value from assessing the change in predicted probability, this analysis next compares the probabilities that result when the dummy of educational attainment takes two different values (i.e. 0 and 1) while other variables are held at their sample means. Table 4 presents the results of the comparison. The outcomes are in line with the signs of the marginal effects presented in Table 3. However, the examination presented makes the results more concrete and more accurate. The probability of moving to rural or densely populated regions decreases by 18.5% and 4.7%, respectively, if a person is highly educated. In contrast, the probability of moving to urban municipalities increases by 13.2% if an individual is highly educated. To sum up the outcomes of this analysis, we may say that the highly educated prefer to move to urban municipalities, even if other personal factors are controlled.

TABLE 4 Effect of the highly educated dummy variable on the probabilities of moving

Effect of the highly educated dummy variable on the probabilities of moving					
	$-\beta'x$	$\mu-\beta'x$	Rural Pr[y=0]	Dens. pop. Pr[y=1]	Urban Pr[y=2]
Highly educated $X_1=0$	-0.8997	0.2420	0.1841	0.4115	0.4044
Highly educated $X_1=1$	-1.0361	0.1056	0.1500	0.3921	0.4579
Change			-0.0341	-0.0194	+0.0535
Change %			-18.5	-4.7	+13.2

5 Concluding remarks

This paper examined the influence of educational attainment on destination choices of migrants. The modelling results, which were based on the findings of previous theoretical and empirical research, indicated that highly educated migrants are likely to move to urban municipalities which offer better job opportunities as well as more versatile possibilities for self improvement, hobbies, etc. At the same time, rural regions, as well as densely populated regions, tend to lose a remarkable part of their highly educated labour to urban regions. As a result, the destination choices of highly educated migrants seem to strengthen the human capital concentration in Finland.

The results are not very promising as regards the regional equality of human capital redistribution. It seems that the ongoing process of centralisation might even become set, and divergence between lagging regions and central areas deepen in the future. From a political point of view the phenomenon is interesting. A number of regional policy measures aim at developing the human capital endowments of lagging regions. However, it seems that simultaneously human capital flows at an increasing speed to central regions. Thus, future orientated regional policy should find new tools to enable more equal human capital allocation. Otherwise, the implementation made might remain as a decelerator of an unavoidable evolutionary process.

Acknowledgements

This study is part of project, no. 757717, supported by the Academy of Finland. The author would like to thank professor Hannu Tervo, professor Jaakko Pehkonen, professor Markku Rahiala and senior researcher Kari Hämäläinen for their valuable comments on this paper.

References

- Antolin, P. & Bover, O. (1997) Regional Migration in Spain: The Effect of Personal Characteristics and of Unemployment, Wage and House Price Differentials Using Pooled Cross-Sections, *Oxford Bulletin of Economics and Statistics*, 59, pp. 215-235.
- Barro, R. J. & Sala-i-Martin, X. (1995) *Economic Growth* (New York, McGraw-Hill).
- Camagni, R. P. (1995) The concept of innovative milieu and its relevance for the lagging regions in the 1990s, *Papers in Regional Science*, 74, pp. 317-340.
- Davelaar, J. E. & Nijkamp, P. (1997) Spatial Dispersion of Technological Innovation: A Review, in: C. Bertugilia, S. Lombardo & P. Nijkamp (Eds.) *Innovative Behaviour in Space and Time* (Berlin, Springer-Verlag).
- Greene, W. H. (1997) *Econometric Analysis* (New Jersey, Prentice-Hall).
- Greene, W. H. (1998) *Limdep version 7.0 / User's Manual* (Castle Hill, Econometric Software).
- Hansen, N. (1992) Competition, trust, and reciprocity in the development of innovative regional milieux, *Papers in Regional Science*, 2, pp. 95-102.
- Hughes G. A. & McCormick B. (1987) Housing markets, unemployment and labour market flexibility in the U.K., *European Economic Review*, 31, pp. 615-645.
- Krugman, P. (1991) Increasing Returns and Economic Geography, *Journal of Political Economy*, 3, pp. 483-499.
- Kuusi, O. & Loikkanen, T. (1996) In search for new approaches in technological change, in: O. Kuusi (Ed.) *Innovation systems and competitiveness* (Helsinki, ETLA).
- Levine, P. (1996) Migration Theories and Evidence: an Assessment, *Journal of Economic Surveys*, 10, pp. 159-198.
- Lucas, R. E. (1988) On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22, pp. 3-42.
- Lyons, D. (1995) Agglomeration Economies among High Technology Firms in Advanced Production Areas: The Case of Denver/Boulder, *Regional Studies*, 3, pp. 265-278.
- Maillat, D. (1998) Innovative milieux and new generations of regional policies, *Entrepreneurship and Regional Development*, 1, pp. 1-16.
- Molho, I. (1987) The migration decision of young men in Great Britain, *Applied Economics*, 19, pp. 221-243.
- Moulton, B. R. (1986) Random Group Effects and the Precision of Regression Estimates, *Journal of Econometrics*, 32, pp. 385-397.
- Moulton, B. R. (1990) An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units, *The Review of Economics and Statistics*, 72, pp. 334-338.
- Moulton, B. R. & Randolph, W. C. (1989) Alternative Tests of the Error Components Model, *Econometrica*, 57, pp. 685-693.

- Myrdal, G. (1957) *Economic Theory and Underdeveloped Regions* (London, Duckworth).
- Nijkamp, P. & Poot, J. (1997) Endogenous Technological Change, Long Run Growth and Spatial Interdependence: A Survey, in: C. Bertugilia, S. Lombardo & P. Nijkamp (Eds.) *Innovative Behaviour in Space and Time* (Berlin, Springer-Verlag).
- Owen, D. & Green, A. (1992) Migration patterns and trends, in: T. Champion & T. Fielding (Eds.) *Migration Processes & Patterns* (London and New York, Belhaven Press).
- Porter, M. E. (1990) *The competitive advantage of nations* (Worcester, The MacMillan Press).
- Richardson, H. W. (1995) Economies and Diseconomies of Agglomeration, in: H. Giersch (Ed.) *Urban Agglomeration and Economic Growth* (Berlin/Heidelberg, Springer-Verlag).
- Ritsilä, J. (1999) Regional differences in environments for enterprises, *Entrepreneurship and Regional Development*, 11, pp. 187-202.
- Ritsilä, J. & Tervo, H. (1999) Regional Differences in the Role of Migration in Labour Market Adjustment: The Case of Finland, in: G. Crampton (Ed.) *Regional Unemployment, Job Matching and Migration*, Series on European Research in Regional Science (London, Pion).
- Romer, P. M. (1990) Endogenous Technological Change, *Journal of Political Economy*, 98, pp. 71-102.
- Schaeffer, P. (1985) Human Capital Accumulation and Job Mobility, *Journal of Regional Science*, 25, pp. 103-114.
- Seater, J. J. (1977) A Unified Model of Consumption, Labour Supply, and Job Search, *Journal of Economic Theory*, 14, pp. 349-372.
- Sjaastad, L. A. (1962) The Costs and Returns of Human Migration, *Journal of Political Economy*, 70 (Supplement), pp. 80-93.
- Statistics Finland (1996) *Kuntafakta* (Helsinki, Tilastokeskus).
- Weiss, Y. (1971) Learning by Doing and Occupational Specialization, *Journal of Economic Theory*, 4, pp. 189-198.
- Zavoina, R. & Mcelvey, W. (1975) A Statistical Model for the Analysis of Ordinal Level Dependent Variables, *Journal of Mathematical Sociology*, summer 1975, pp. 103-120.

CHAPTER 7

SUMMARY AND CONCLUSIONS

1	MAIN RESULTS	125
2	CONCLUDING REMARKS AND POLICY IMPLICATIONS	132
2.1	Cumulative causation and the spatial concentration of human capital	132
2.2	Knowledge spillovers	133
2.3	Efficiency versus equality	133
2.4	Integration of development strategies of the core and periphery	135
2.5	Suggestions for further research	137
	REFERENCES	139

The aim of this thesis has been to give empirical evidence on the ongoing process of human capital concentration in Finland. The thesis first discussed the phenomenon of human capital concentration across space in general, and then focused on issues that are connected with inter-regional migration in particular.

This chapter will give a concluding summary of the issues raised by the studies. The chapter first summarises the main results, discusses the significance and reservations of outcomes reached, and finally, offers some concluding remarks with implications for regional policy.

1 Main results

The overall result of the thesis is that there exists a tendency towards regional concentration of human capital and economic activities. Thus, the results support the idea of spatial concentration presented in “new economic geography”. Even though the findings are not shockingly surprising, they provide strong empirical evidence, in the context of Finland, as support for the current discussion on spatial concentration. The results of the thesis can be further classified into three broad categories, following the main division of the studies in previous chapters. The results reached under theme I express the potential environments for the conglomeration of business activity and human capital. The results of theme II mainly deal with the labour-market adjustment role of human capital flows. The outcomes of theme III express the selective nature of inter-regional human capital flows.

Theme I focused the examination onto the demand dimension of human capital. It endeavoured to map out the picture of different types of regions as business environments. Furthermore, the findings of *chapter two* deal with the identification of potential innovative milieus, and the examination emphasised the role of innovation and synergy as prerequisites for the development of regional agglomeration benefits, competitiveness and further conglomeration of human capital.

The regions observed in the study were classified into municipality classes (urban, densely populated and rural regions) and support areas matching European Union objectives (“white regions”, objective 2 regions, objective 5b regions and objective 6 regions). It is the first time that this type of analysis has been carried out with Finnish data. The indices formed in the analysis predictably expressed that the urban regions of Finland possess better prerequisites of innovation and synergy compared to densely populated and rural regions. Thereby, the results indicate that economic activities tend to concentrate in prosperous regions with an educated labour force, innovation networks, an active research and development sector, as well as a high quality of infrastructure.

The outcomes presented in the study for the use of mapping out the general characteristics and possibilities of different types of local milieus are quite enlightening. However, the problem of the approach chosen is that it disregards the heterogeneity within the regional classes. In order to take the heterogeneity

into account, the exploitation of smaller and more precisely determined (individual local milieus) regional units would be necessary. Furthermore, developing more sophisticated indicators would give a more realistic picture of specific local milieus. This kind of analysis would provide more detailed information for political and strategic purposes.

Another problem that arises from the analysis is that it does not include dynamic observation of local development. Such an analysis would require longitudinal data sets of such a kind that were not available for all the indicators presented in the study. This kind of analysis would make the examination more growth and future orientated.

The results of the **theme II** mainly deal with the interrelation between migration and unemployment. The objective of *chapter three* was twofold. The study focused on the effect of personal and regional unemployment on the likelihood of migration, as well as the employment prospects of migrants at the micro level. However, the study also provided many other interesting empirical outcomes about the effect of individual characteristics, as well as regional factors, on migratory behaviour.

Perhaps, the most interesting outcome of the study is that the regional unemployment level seems to have a stronger effect on migration decisions than personal unemployment. This means that both the unemployed and employed migrate out of high unemployment regions. This can lead to a critical shortage of skilled labour and distortion of demographic structure in already lagging regions. Or vice versa, from the viewpoint of prosperous centres, this would result in the further conglomeration of human capital.

The other interesting result relates to the second objective of the study – post-migratory employment prospects. The overall results of the multivariate analyses accomplished suggest that migration alone does not improve the employment prospects of migrants. The re-employment prospects of migrants vary between destination regions. Migrants that move to Uusimaa seem to confront the best re-employment prospects.

As a whole, the results suggest that the future prospects of high unemployment areas will probably further worsen, while successful areas benefit from the centralising path of development.

Several reservations about the results, however, have to be mentioned. First, it was possible for a worker to become unemployed during the five-year period, even though she or he was not unemployed at the beginning of the period, and moved as a response. The experience of unemployment decreases the chances of getting a job, and thus also decreases the average probability of the migrant's re-employment. In the same way, the situation in which a worker moves for reasons other than those related to the labour market may have an effect on this outcome.

Second, the observation year, 1990, was still a period of full employment in Finland. The results might be quite different, for example, in the analysis of the period 1991-95, when unemployment was at a high level as a consequence of multiple internal and external factors.

Third, the analysis of re-employment prospects includes a selectivity problem. Migrants may differ from non-migrants in characteristics that are essential for re-employment. The analysis herein exploited "selectivity variables", which control the problem of selectivity on observables, but not the problem of selectivity on unobservables. Controlling the selectivity on unobservables would require a special test and estimation structure which was not completed in the study.

Fourth, the estimation of re-employment prospects did not include a direct variable for the ability of a potential migrant. The ability was controlled only by the variable of educational level. A more realistic picture would be reached by using an ability proxy based on, for example, the work experience of an individual.

Finally, the number of observations in regional examinations was quite low, since the migrants were further divided into four subgroups. Thus, the generalisation of the outcomes of regional variables is not unambiguous, and in this sense it is only trend-setting.

Chapter four analysed regional migration in the 85 Finnish subregions during the period 1975-95 using data on net in-migration rates. The basic idea was that both origin and destination regions have characteristics that cause in- and out-migration to occur, the difference between which is net in-migration. Observing net in-migration makes sense herein, since it directly indicates the surplus of human capital in a region. The study exploited both cross-section and panel data methods. The regression analysis accomplished indicated that the direction of net in-migration flows can be explained by a set of regionally differing characteristics.

The explanatory variables exploited in the analysis included the growth of logarithmic income, the share of population with higher education (at least the lowest level of tertiary education), the tax level, the share of labour force in primary production and the unemployment rate. Naturally, the variables chosen give only a simplified picture of the factors involved in the observed phenomenon, but the data set available and the modelling procedure exploited set the restrictions for the use of explanatory variables.

The main finding, as regards the labour adjustment role of migration, is that regional unemployment seems to have a negative effect on net in-migration. The results of cross-sectional and panel estimations differ herein regarding the significance of the estimator. All the cross-sectional estimates reached a statistically significant coefficient at the 10% level, while the coefficient of the unemployment variable failed to reach any reasonable significance level in the panel estimation. However, the sign of the unemployment variable corresponds to the cross-sectional estimate, and hence, the result roughly indicates that migration possesses a labour-market adjustment tendency.

The results also suggest that high tax rates and the share of primary production slow down in-migration, whereas an increasing number of highly educated persons, as well as the growth of regional income, seems to accelerate in-migration. According to the outcomes of the panel estimations, the most reliable

variables explaining in-migration rates are the share of primary production and the growth rate of regional income.

As a whole, the results imply that prospering regions attract migrants, while lagging regions tend to lose a remarkable proportion of their labour. Thus, the overall disparities may not be alleviated by migration regionally, but even further accumulated. The results of the study support the general opinion that migration tends to cumulatively strengthen the regional ability of production, even though differences in regional incomes do not increase.

Interpreting the results of the study involves some reservations. First, a certain level of linear correlation between explanatory variables is likely to occur in the analysis carried out. However, some correlation is common in the case of economic variables. Multicollinearity is a typical problem of time series analysis and this dimension of multicollinearity was examined in the study to some extent. The similarity between panel data and cross section estimates shows that the results are relevant and quite robust. Multicollinearity may exist also in cross-sectional samples. Simultaneous testing of multicollinearity in cross-sectionals and time series would need a specific testing procedure, which, however, was not exploited herein. Nevertheless, reasonable R^2 - and t -values, especially in simplified models, indicate that correlation between explanatory variables of the sample is not harmfully large.

Second, the arrangement of the examination involves a generally recognised simultaneity problem of migration and growth. This problem is not fully controlled by using the lags of explanatory variables, since the lag of growth and migration of the observation period still strongly correlated in time. A more relevant procedure would be exploiting a 2SLS estimation procedure, which however, involves some problems as well. Nonetheless, the panel estimation procedure exploited gives a rough picture of the interrelation under examination.

Theme III investigated the selective nature of migration flows. The analysis emphasised the effects of a person's educational attainment, as well as the characteristics of her/his origin and destination region, on migratory behaviour. The theme attempted to define the regional reallocation of human capital from several viewpoints, and the findings of both studies form an important piece in considering the whole picture of the phenomenon.

Chapter five examined how the human capital and skills of society reallocate and concentrate spatially. The migration decision of an individual was described in the study as a function of the expected utility in different locations. Empirical estimation exploited the cross-sectional binary logit model in order to analyse inter-provincial migration. The examination herein used several explanatory variables (respecting the procedure of analysis as well as the requirements of estimation procedure) describing the characteristics of an individual and the regions of origin and destination. The main idea of the study was to estimate the effect of both origin and destination regions on the migration decision simultaneously. The analysis only focused on internal migration in Finland. Migration abroad is excluded from the analysis, since the character-

istics of the destination region would not be traceable in the cases of emigration in the data set exploited.

The results of the study were predictable. Highly educated persons are more likely to move than the whole population on average. The results also suggest that the regional characteristics of both origin and destination areas have a considerable impact on migration flows. The probability of out-migration increases if the region of origin is small and has a high unemployment level. Likewise, a high unemployment level decreases, and a high urbanisation rate increases, the likelihood of in-migration. As a result, individuals are likely to migrate from remote regions to centres of economic activity. Thereby, it shows that the reallocation of human capital takes place in Finland and human capital reserves tend to further concentrate.

Prudence is necessary in interpreting the results herein also. First, the study described the migration decision as an outcome of the utility maximisation process. From the viewpoint of economics, it is natural to perceive the phenomenon this way. However, the modelling framework chosen is not able to point out the exact factors that clinch the actual choice, since the expectations of an individual about his/her possibilities in different locations dominate the examination. Furthermore, the interrelation between human capital and spatial concentration is founded partly on externalities, and hence, the phenomenon is not fully covered by the model of utility maximisation at the individual level.

Second, a general analysis, such as the one accomplished in this study, is not able to observe the applicability dimension of human capital very precisely. The value of the human capital of an individual greatly depends on its application possibilities. Therefore, specialised skills are more valuable in centres; and by the conglomeration process, the application possibilities of the human capital of an original population in a growing region also increases.

Third, the analysis of regional characteristics in the study only referred to the whole sample. The study did not endeavour to map out the effect of regional characteristics on migration decisions specifically in the case of highly educated individuals. However, this subject is very interesting from the viewpoint of human capital concentration, and the next chapter dealt with this issue.

The examination of *chapter six* continued in the same theme as the previous chapter, discussing the selective nature of inter-regional migration. However, this study endeavoured to analyse the migration destinations of the highly educated separately. The analysis focused on actual migrants, and it exploited the ordered probability model and micro-level data set in econometric analyses. The research procedure of the analysis was constructed according to the viewpoint of spatial concentration. The dependent variable herein directly refers to the indicators of human capital concentration. The dependent variable had three different ordered classes based on the amount of population and the degree of urbanisation of the municipalities of destination. The procedure exploited makes it possible to treat the destinations as ordered choices, based on the human capital concentration characteristics of a region. This viewpoint is not reached by using, for example, a multinomial logit model.

The results of chapter six suggest that highly educated migrants are likely to move to urban regions. The probability of moving to urban regions (over 50 000 inhabitants and the level of urbanisation over 90%) increases by 13.2% if an individual is highly educated. In contrast, the probability of moving to rural regions (less than 15 000 inhabitants and the level of urbanisation below 70%) decreases by 18.5% if a person is highly educated. This means that highly educated migrants intensify the conglomeration of human capital by their migratory behaviour. Reserves of human capital withdraw from remote regions and concentrate in big centres.

As in previous chapters, the interpretation of results achieved needs some critical reservations. First, the analysis may involve a selectivity problem. In other words, it can be asked if the individuals classified herein as highly educated migrants would move to centres even if they did not possess a high level of educational attainment. As in chapter two, the analysis exploited a “selectivity variable” in order to control the problem of selectivity on observables. However, the procedure accomplished does not control the problem of selectivity on unobservables (i.e. are there some unobserved factors that direct individuals to acquire a high level of education, and do the same factors affect the destination choices of highly educated migrants?). Controlling this kind of selectivity would require a special test and estimation structure that was not conducted in this study.

Second, the econometric analysis of the study used municipality level data. Exploiting the municipal moves enables a larger sample size, but the problem of a municipal level sample is that the migrations of the sample include a number of moves that are not labour market based. However, this problem was reduced to some extent by forming a relevant data set (e.g. an individual being of working age) and by using the explanatory variables that control the relevant labour market characteristics (e.g. an individual being a student) of an individual.

Third, the estimation procedure was based on an ordered choice model. Thereby, the settlement exploited assumes that migrants choose their destination region according to a proxy that describes the regional level of human capital concentration in the destination region. The phenomenon under examination could have exploited the procedure of the multinomial logit model, making no attempt to classify the regions in ordered classes. However, the exploitation of an ordered probit model can be justified since it yields very interesting and relevant information from the viewpoint of spatial concentration. Actually, the procedure exploited considers the destination regions of migrants as ordered levels of spatial concentration.

Table 1 summarises the main findings of the thesis. This thesis is an anthology of five separate studies. An anthology of studies does not naturally focus on one fixed theme as clearly as a monologue would. Accordingly, the results expose the phenomenon of human capital concentration from various viewpoints. The next sub-chapter offers some concluding remarks and discusses the policy implications of the thesis.

TABLE 1 Summary of the main focus and results of the thesis

THEME I:		
Potential milieus for the conglomeration of human capital		
Chapter	Main focus	Main results
2	The existing differences in environments for enterprises in Finland. The identification of potential innovative milieus.	The study forms indices for innovation and synergy, and further maps out the potential innovative milieus in Finland. Urban regions possess better prerequisites of innovation and synergy compared to densely populated and rural regions. Demand of human capital tends to concentrate in prosperous regions.
THEME II:		
Migration and labour-market adjustment		
Chapter	Main focus	Main results
3	The labour-market adjustment role of migration.	Both personal and regional unemployment encourage out-migration. Migration alone does not improve the employment prospects of an individual. The role of migration in labour-market adjustment varies between regions. As a whole, the results suggest that future prospects of high unemployment areas will probably further worsen, while successful areas benefit from the centralising process.
4	The interrelation between regional characteristics and net in-migration flows.	The direction of net in-migration flows can be explained by a set of regionally differing characteristics. High tax rates and the share of primary production slow down in-migration, whereas an increasing share of the highly educated, as well as the growth of regional income, seems to accelerate in-migration. High regional unemployment has a negative effect on net in-migration. As a whole, the results imply that prospering regions attract migrants, while lagging regions tend to lose a remarkable proportion of their labour. Thus, the overall regional disparities may not be alleviated by migration. In fact, they may be even further accumulated.
Section III:		
The selective nature of migration and human capital flows		
Chapter	Main focus	Main results
5	The effect of the characteristics of origin and destination regions on the likelihood of migrating.	Highly educated persons are more likely to migrate than the whole population on average. Migration tends to take place from remote districts into urban regions. Redistribution of human capital seems to take place and human capital reserves tend to further concentrate.
6	The effect of educational attainment on the destination choices of migrants.	Highly educated persons tend to move into urban regions. Highly educated migrants intensify the conglomeration of human capital by their migratory behaviour.

2 Concluding remarks and policy implications

2.1 Cumulative causation and the spatial concentration of human capital

From the viewpoint of inferences and regional policy implications, this thesis provides several interesting insights. The studies of this thesis provided clear evidence of the concentration of population. Furthermore, the significance of the population movements is even strengthened if we consider that it is actually the young and highly educated part of the population that tends to move to urban centres. This redistribution of human capital resources will certainly affect the regional distribution of welfare as well. The regional divergences in demographic, economic and social prerequisites are likely to increase in the future.

According to recent theories and empirical studies, access to qualified, skilled manpower can be considered as the most influential determinant in the locality evolution of modern information based production. Thereby, the in-migration of skilled labour further strengthens the position growth poles. The net receiving regions of human capital increase their reserve of skilled and young labour force, which in turn increases the purchasing power and tax revenues of regions. This leads to a further agglomeration of enterprises and population, as well as increasing the competitiveness of the growth centres.

Intense in-migration may also result in some adaptation problems and more permanent agglomeration diseconomies. They can be pecuniary diseconomies like high land and property prices, traffic expenses, increasing costs of social services, as well as expanding infrastructure needs (see e.g. Kangasharju et al., 1999; Lankinen, 1998; Littow, 1989; Okko, 2000; Okko et al., 2000; Richardson, 1995). In addition, there exists many kinds of social costs. Adaptation costs involved in the congestion of centres might become extensive, and hence, slow down the centralisation process at the later stages of urbanisation.

However, intense redistribution of human capital probably most strongly affects remote districts. Population losses, even if they are minor in actual numbers, may have a considerable impact on these regions. Due to the distorted demographic structures of remote districts, the effects of out-migration might even prove to be fatal. Out-migration would then further distort the age and know-how structures of these regions. The availability of basic education and other crucial services will be endangered if appropriate labour input becomes too scarce and the demand for these services becomes too minor (cf. Kangasharju et al., 1999). Furthermore, the application possibilities of human capital resources become slim when the jobs available diminish both in the private and public sector.

As a result, the differences between remote districts and urban regions concerning human capital reserves would further increase. This scenario would even strengthen if we considered regional development being determined by a cumulative process. The self-feeding cumulative process would lead to a situa-

tion wherein urban regions would further increase and develop in terms of human capital and economic welfare due to agglomeration benefits. The weakened competitiveness of remote districts would further feed the weakening of factors that are crucial to economic activity and development.

2.2 Knowledge spillovers

The findings of the thesis indicated that economic activity is related to the characteristics of a local milieu. A local milieu that offers both qualified labour and business networks encourages business activities. The significance of a favourable environment for enterprises is even strengthened in the case of high technology enterprises. Operation of high technology enterprises is often based on intensive vertical/horizontal networks and co-operation with other enterprises, business interest groups such as subcontractors, research and development centres, universities and financiers of high risk projects. Such a network is particularly important in the case of new enterprises. An excellent idea is usually not enough. A long explication process and intensive co-operation with various institutes is usually needed even before the high technology "business idea" reaches the stage where an actual firm is founded and production started.

Therefore, it seems that prospering regions are in a dominant role in respect to the high tech production of the age of the information society. The prosperous regions meet the prerequisites for modern production. They supply co-operative networks, an educated labour force, financial possibilities and advanced resource and development services. Local technology centres are good examples of operations which actively aim at joining local forces for increasing competitiveness in the field of high technology production (cf. Erkkilä et al., 2000). However, this kind of operation is only profitable if some potential strengths already exist in a region, such as educational institutes or an active enterprise base. These potential strengths can be more often found in urban settings than in remote districts. In contrast, the survival possibilities of remote and already economically lagging regions do not seem bright. Relating to this juxtaposition of growing centres and lagging regions, we may ask: what will be the role of different types of regions in the economic and social entity of Finland in the future?

2.3 Efficiency versus equality

The central finding of the thesis is that both human capital and economic activity tend to concentrate into prosperous regions. The concentration process can be further considered against the framework of regional policy. Thus, we may ask ourselves whether this development is desirable. The answer to this question involves the evaluation of different objectives. Broadly speaking, regional policy measures can be justified by three different arguments (cf. Camagni, 1992; Kangasharju et al., 1999; Richardson, 1978):

- i. The policy argument justifies regional policy measures by aiming at equality.
- ii. The economic argument justifies regional policy measures by ensuring the efficiency of resource allocation.
- iii. The economic policy argument justifies regional policy measures as compensation tools linked up to other policy instruments.

The viewpoints of policy and economic policy arguments relate to the objective of equality, whereas the economic argument emphasises the efficiency of the national economy. Therefore, we may reduce the objectives into two: (1) Efficiency, i.e. the maximisation of growth in the national economy, which implies an optimal allocation of resources over time. (2) Equity, i.e. the reduction of inter-regional disparities in the indices of income, welfare and growth. In practise, regional policy attempts to take both of these viewpoints into account.

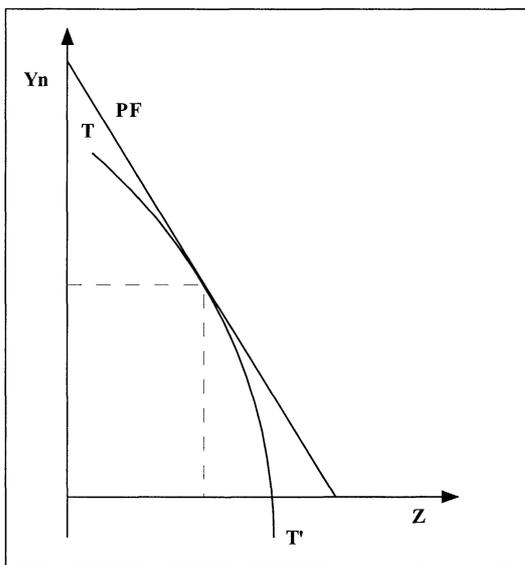


Figure 1 The trade-off between national growth and inter-regional equity (adapted from Richardson, 1978)

According to agglomeration economies, economic preferences all tend to favour prosperous regions. This leads to a trade-off situation wherein policy makers usually have to stress one of these objectives at the cost of the other (see Kangasharju et al., 1999; Richardson, 1978). For instance, let us assume that policy makers accurately represent societal preferences. We may further assume that the trade-off function has been derived, and society's preference substitutions between growth and equity are linear. Thus, the preference functions can be represented by straight lines sloping downwards to the right (see Figure 1).

The optimal point on the trade-off curve is where the highest of the preference functions (PF) is tangential to TT' . This gives a preferred trade-off between growth (Y_n) and inter-regional equity (Z). The steeper the set of preference functions the society represents, the more receptive it is towards inter-regional redistributive measures. In fact, it is possible that the preferred trade-off can even result in a negative growth rate (Richardson, 1978).

Let us consider the spatial concentration of firms and population from these starting points. At first sight, the picture appears clear-cut. The regional concentration of population and enterprises seems to support efficient resource allocation, whereas regional inequality appears to further increase. However, the picture becomes much more complicated if we consider it more carefully.

Firstly, it is not certain that the operation of market mechanisms results in efficient resource allocation. The main cause of inefficient operation is based on externalities. The congestion of population and economic activities involves costs (traffic problems, pollution, housing shortage, social problems, etc.) which, however, are not fully noticed in the markets (Kangasharju et al., 1999). Secondly, the negative effects of the concentration process might only occur in the long run. The decision making should, in these circumstances, be able to anticipate future costs involved in the process. Thirdly, the centralisation process does not affect every individual equally in prosperous and lagging regions. The positive and negative effects of concentration affect certain population groups more strongly. This may lead to circumstances wherein some population groups benefit from the concentration of population and economic activities, while other groups suffer from the centralising development. Fourthly, in the long run, the positive effects of centralisation may result in an ex post distribution of the fruits of economic growth to remote districts as well. It would hardly be surprising that the economic benefits of national growth would spill over to remote districts by regional policy measures. National success gives scope for extensive regional policy measures.

Consequently, the concentration process involves many good possibilities as well as a number of harmful threats. The policy measures implemented are also contradictory, some of them aim at decentralisation of economic activities, while others aspire after the further concentration and agglomeration of production. This is partly due to separate regional development programmes of urban and remote districts. One part of the policy measures aims at utilising the agglomeration benefits in centres, while another part endeavours to maintain the population, business activities and basic services in remote districts.

2.4 Integration of development strategies of the core and periphery

The regional policy measures should react to the threats that come along with accelerating inter-regional migration, the problems of unequally dispersed prerequisites of economic activity, and finally, the challenge of efficient resource allocation (human capital and firms) at the national level. The question of how to develop the insufficient milieus in remote districts is complicated. The centralising process of economic activity is very strong, and influencing this ten-

dency conversely is troublesome. As a result, the effects of the measures aimed at breaking this process have remained minor.

The objectives of equality and efficient resource allocation would be most likely reached if implemented strategies would simultaneously consider the development of urban centres and lagging districts surrounding them as an integrated spatial economic system. This would involve measures that aim at the simultaneous development of economic core and peripheral regions under the same objectives (the idea of the simultaneous development of the core and periphery can be thought of as a policy scheme considering the viewpoint of centralisation in Krugman's core-periphery model).

The developmental aim presented above would mean that a strategy targeted at "traditional" core based agglomeration benefits should be changed to consider the core and periphery as an integrated networking entity. Herein, horizontal and equality based linkages between the regional economic pole (core) and the surrounding lagging areas (periphery) create a spatially more extensive seed-bed for innovation and knowledge diffusion. The formation of agglomeration benefits can be considered as taking place normally. They are a result of efficient labour markets, facilitated horizontal and vertical specialisation, as well as intensified dissemination of information and innovations.

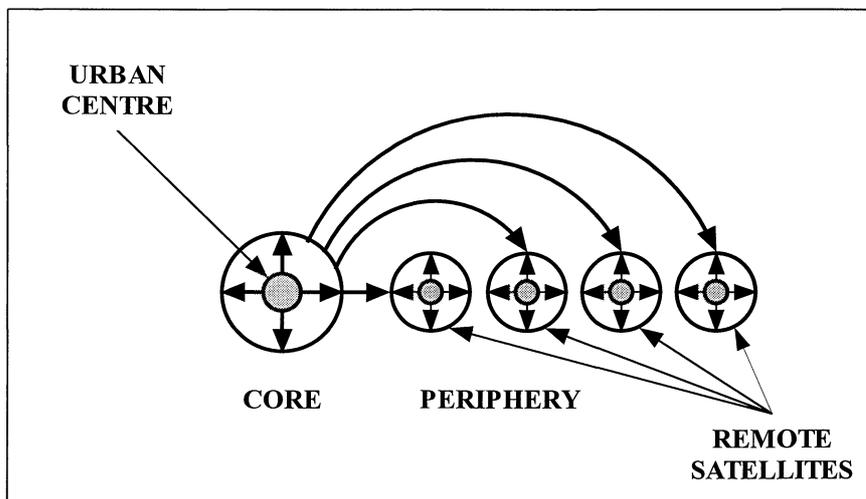


Figure 2 The core-periphery satellite strategy and diffusion of agglomeration benefits

Recent efforts at advancing the spatial diffusion of innovation and technology between core and periphery regions seem quite promising. A few politicians and researchers have expressed the possibility of peripheral "satellites" as one solution to the spatial diffusion of agglomeration benefits between the core and periphery (see Figure 2).

The basic idea is that the regional system would consist of economically strong core regions that would support the operation of a few "satellites" in the periphery. This actually means that some of the production, research and de-

velopmental activities, as well as consulting, would be moved to these "satellites" from the core region. The agglomeration benefits, innovations, etc., would first diffuse from the core region into the immediate surroundings and into "satellites" in the periphery, and then further into the immediate surroundings of these "satellites" (cf. Shefer & Frenkel, 1998). This strategy involves unavoidable simultaneous considerations of urban and peripheral regions, and hence, has great potential to integrate the regional policy aims of these regions. However, ensuring the efficiency of this framework would certainly postulate a number of other regional policy measures that aim at developing the infrastructure, etc., in remote districts.

Initial phases of core-periphery networking strategy can be observed already in the high tech poles of Finland. The region of Oulu is a good example of a county in which economic growth is mainly caused by the competitiveness of the region's high tech industries (Erkkilä et al., 2000). Oulu has focused its economic and developmental activities on attracting high tech companies to its region and creating suitable conditions for local innovation and knowledge spillovers. Technopolis Plc is a high tech real estate and service group operating in Oulu. It organises the building of business premises, and hires these to the high tech enterprises in the Oulu Technopolis Park. A spatial extension of the Technopolis group, its partnership company of Micropolis in the municipality of Ii, forms an excellent example of a core-periphery networking system in the early stages. Herein, the periphery region of Ii benefits from networking with the high tech pole of Oulu in terms of strengthening economic activity and positive in-migration (Seppänen, 1998).

2.5 Suggestions for further research

This thesis has produced some viewpoints, and hopefully also some insights, into the recent discussion on regional concentration. Although it gives some answers to questions asked, it certainly raises as many new questions. Hence, I would still like to suggest some topics for further studies. First, more comprehensive insight into the ongoing concentration process of human capital and economic activity would be fruitful. It would be interesting to map out the interplay between social and economic factors behind the concentration process, and take a further look at the pressure for change caused by the so-called "information society" in this process of interaction. It would also be rewarding to examine the real causality of factors behind the process of concentration. This would give a better clue as to which would be the most effective targets of policy measures, and what the indirect effects are of the incentives already implemented.

Furthermore, analysis of migration patterns, as well as examination of the effect of local milieus on new firm formation, could be much deepened. The investigations of local milieus could involve inquiries mapping out more specifically the significant regional factors behind new firm formation. The analysis of local milieus could also use more growth orientated statistical analyses, examining the phenomenon in a more formal context. The investigation of migra-

tion patterns could move on to analyses of causality between migration flows and regional characteristics. This could partly resolve the basic question of human capital accumulation, whether population follows jobs or jobs follow population.

REFERENCES

- Braunerhjelm, P., Faini, R., Norman, V., Ruane, F. & Seabright, P. 2000. *Integration and the Regions of Europe: How the Right Policies Can Prevent Polarization*. London: Centre for Economic Policy Research.
- Camagni, R. P. 1992. Development Scenarios and Policy Guidelines for the Lagging Regions in the 1990s. *Regional Studies* 4, 361-374.
- Erkkilä, J., Simonen, J. & Svento, R. 2000. Regional effects of the high technology industry in Finland. Faculty of Economics and Industrial Management, University of Oulu, Research Reports, 42.
- Kangasharju, A., Kataja, J. & Vihriälä, V. 1999. Is There a Case for Regional Policy? (in Finnish) Pellervo Economic Research Institute Working Papers 18.
- Krugman, P. 1991. *Geography and Trade*. Cambridge: The MIT Press.
- Lankinen, M. 1998. Effects of Migration on Expenditure of Municipalities (in Finnish). In H. Helin, S. Laakso, M. Lankinen & I. Susiluoto (Eds.) *Muuttoliike ja kunnat, Kunnallisan kehittämissäätiön julkaisut*, 15. Vammala: Vammalan kirjapaino, 39-92.
- Littow, P. 1989. The Price of Concentration (in Finnish). Ministry of the Interior, Department for Regional Development. *Aluepoliittisia tutkimuksia ja selvityksiä* 1983: 3.
- Okko, P. 2000. Growth, Human Capital, and Agglomeration Economies. In T. Reponen (Ed.) *Management Expertise for the New Millennium*, In Commemoration of the 50th Anniversary of the Turku School of Economics and Business Administration. Turku School of Economics and Business Administration Series A-1: 2000.
- Okko, P., Miettälä, A. & Oikarinen, E. 2000. Migration forces structural change (in Finnish). *Kunnallisan kehittämissäätiön tutkimusjulkaisut*, 24.
- Richardson, H. W. 1978. *Regional & Urban Economics*. Middlesex: Penguin Books.
- Richardson, H. W. 1995. Economies and Diseconomies of Agglomeration. In H. Giersch (Ed.) *Urban Agglomeration and Economic Growth*. Berlin/Heidelberg: Springer-Verlag, 123-156.
- Seppänen, J. 1998. Micropolis in a central position in the development of Ii (in Finnish). *Hitech Oulu News*, 2.
- Shefer, D. & Frenkel, A. 1998. Local Milieu and Innovations: Some Empirical Results. *The Annals of Regional Science* 32, 185-200.

SUMMARY IN FINNISH (TIIVISTELMÄ)

Tämä väitöskirja esittelee viisi empiiristä tutkimusta, jotka tarkastelevat inhimillisen pääoman uudelleen allokoitumista. Väitöskirjassa inhimillisen pääoman liikkuvuuden katsotaan olevan yksi keskeisistä alueellisen keskittymisprosessin elementeistä. Väitöskirjan varsinaiset tutkimukset voidaan jakaa kolmen pääteeman alle: (I) Inhimillisen pääoman kasautumisen potentiaaliset miljööt (II) Muuttoliike ja työmarkkinoiden tasapainottuminen (III) Muuttoliikkeen ja inhimillisen pääomavirtojen selektiivisyys. Väitöskirjan empiiriset tarkastelut liittyvät Suomeen.

Varsinaisia tutkimuksia edeltää johdantoluku, joka esittelee väitöskirjan teoreettisen taustan ja rajaa tutkimusongelman sekä käsittelee lyhyesti väitöskirjan keskeiset tulokset. Toinen luku jatkaa keskustelua inhimillisen pääoman liikkumisen taustatekijöistä, seuraten innovatiivisen miljöö -viitekehystä. Luku pyrkii erityisesti kartoittamaan alueellisia eroja yritysten toimintaympäristöissä. Luvussa toteutettu inhimillisen pääoman kysyntäpuolen analysointi johdattaa tarkastelun loogisesti väitöskirjan pääasialliseen teemaan, inhimillisen pääoman alueelliseen liikkuvuuteen.

Luvut 3 ja 4 analysoivat muuttoliikkeen ja työttömyyden välisiä yhteyksiä. Molemmat tutkimukset painottavat muuttoliikkeen roolia työmarkkinoiden tasapainottamisessa. Mikro- ja makrotason analyysien keskeinen tulos on, että henkilökohtaisella ja alueellisella työttömyydellä on merkittävä vaikutus ihmisten muuttokäyttäytymiseen. Vallitsevan muuttoliikkeen seurauksena alueelliset erot todennäköisesti kasvavat edelleen.

Luvut 5 ja 6 tarkastelevat muuttoliikkeen ja inhimillisen pääomavirtojen selektiivisyyttä. Luvuissa painotetaan erityisesti korkeasti koulutettujen muuttajien merkitystä inhimillisen pääoman uudelleen allokoitumisessa. Tutkimusten tulokset osoittavat, että muuttoliike on valikoiva koulutuksen suhteen. Korkeasti koulutetut ovat herkempiä muuttamaan ja he ovat taipuvaisia muuttamaan urbaaneille alueille, jotka tarjoavat paremmat työllistymismahdollisuudet sekä runsaasti vaihtoehtoja itsensä kehittämiseen ja vapaa-ajan harrastuksiin. Korkeasti koulutettujen muuttokäyttäytymisellä on hyvin keskeinen rooli inhimillisen pääoman uudelleen jakautumisessa.

Luku 7 päättää väitöskirjan. Luku aloittaa kertaamalla väitöskirjan keskeiset tulokset. Tulosten tarkastelun ohella luku pyrkii tuomaan esille tutkimuksissa ilmenneitä ongelmia ja tulosten tulkitsemiseen liittyviä varauksia. Keskeisiä tässä yhteydessä ovat empiiristen mallien estimointiin ja estimaattien tulkintaan liittyvät kysymykset. Luvun lopuksi keskustellaan väitöskirjan kontribuutioista ja tuloksiin liittyvistä aluepoliittisista näkökulmista.

