

April 2009



## The ESPON 2013 Programme

### DEMIFER

Demographic and migratory flows  
affecting European regions and cities

Applied Research Project 2013/1/3

Deliverable 2

Causes and impacts of migration

Prepared by  
Daniel Rauhut  
NORDREGIO  
Stockholm, Sweden



EUROPEAN UNION  
Part-financed by the European Regional Development Fund  
INVESTING IN YOUR FUTURE

This report presents the interim results of an Applied Research Project conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on [www.espon.eu](http://www.espon.eu)

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

This basic report exists only in an electronic version.

© ESPON & NIDI, 2009.

Printing, reproduction or quotation is authorised provided the source is acknowledged and a copy is forwarded to the ESPON Coordination Unit in Luxembourg.

# Table of contents

Executive summary .....	i
1 Introduction .....	3
1.1 Background .....	3
1.1.1 Ageing .....	4
1.1.2 Depopulation .....	4
1.1.3 Migration.....	5
1.1.4 What do we know? .....	6
1.2 Aim and questions .....	7
1.3 A Road Map .....	7
2 Age structure and economic performance .....	9
2.1 Introduction.....	9
2.2 Theories on how age structure affects economic performance .....	10
2.2.1 The life-cycle hypothesis .....	10
2.2.2 The human capital theory .....	10
2.2.3 The structural change hypothesis.....	11
2.3 Theories on how economic performance affects age structure .....	12
2.3.1 Human capital theory and substitution effects ....	12
2.3.2 The relative income hypothesis.....	13
2.4 Summary .....	14
3 Migration and economic performance.....	15
3.1 Immigration.....	15
3.1.1 Theoretical interrelationships .....	15
3.1.2 Empirical Evidence.....	16
3.1.3 Conclusion.....	19
3.2 Emigration .....	19
3.2.1 Theoretical interrelationships .....	19
3.2.2 Empirical evidence .....	20
3.2.3 Conclusion.....	23
3.3 Summary .....	23
4 Methodological dichotomies and dilemmas.....	24
4.1 Introduction.....	24
4.2 Points of departure .....	24
4.2.1 Postulates and a priori assumptions .....	24
4.2.2 The question of causality .....	29
4.2.3 Short- and long-term effects.....	34
4.3 Spatial aspects.....	35
4.3.1 The national level .....	36
4.3.2 The regional level.....	37
4.3.3 The local level.....	40
4.3.4 One size fits all? .....	42
4.4 Policy making and governance.....	43

4.4.1	How policy makers can intervene.....	43
4.4.2	The linear approach.....	43
4.4.3	A systemic approach.....	44
4.4.4	Conclusion.....	45
4.5	Summary.....	45
5	Demography, migration and regional development.....	47
5.1	Demography.....	47
5.2	Production.....	48
5.3	Public consumption and social transfers.....	49
5.4	Does demography matter?.....	50
5.5	A synthesizing model.....	51
6	Policy implications.....	54
6.1	The points of departure.....	54
6.2	Ageing, age structure and economic performance.....	55
6.3	Migration and economic performance.....	56
6.4	Some recommendations.....	57
7	Concluding remarks.....	58
	Appendix A: A bivariate analysis.....	61
	Appendix B: A multivariate analysis.....	64
B.1	Introduction.....	64
B.2	Data and method.....	64
B.3	Results.....	65
B.4	Concluding remarks.....	67
	Appendix C: Immigration and the dependency ratio.....	68
	Appendix D: Immigration and the share of population aged 65+.....	69
	List of maps, figures and tables.....	71
	References.....	72

## Executive summary

This report is an annex to the DEMIFER (Demographic and migratory flows affecting European regions and cities) report and has been written by Dr. Daniel Rauhut, Nordregio, Sweden.

The causality – both in terms of direction and magnitude – between demographic changes and economic performance is, to say the least, unclear. Studies using different theories, based on different assumptions, show different results. Depending on the institutional and organisational changes that take place at the time of the demographic changes the demographic changes can result in both positive and negative economic developments. The estimations made indicate that the effects of immigration on economic growth is statistically significant, but the overall effects of demography, i.e. including immigration, on the regional GDP changes is only about 10 per cent of the total GDP changes. In other words, approximately 90 per cent of the regional GDP changes in the ESPON area is explained by factors other than demography.

The findings in this report indicate a vast number of methodological problems studies on the interrelationship between demography and economic performance face. Many studies take their point of departure in postulates and *a priori* assumptions that can be questioned, the questions of causality is a tricky one since it is easy to end up in a 'hen' and 'egg' reasoning (which came first?), and analyses on short- and long-term effects are often avoided which probably can be explained by the fact that they can be counter-acting each other.

Most analyses on the interrelationship between demography and economic performance are made at an aggregate, national level but regional and local analyses will probably reveal a better picture of the underlying processes regarding on the interrelationship between demography and economic performance. Sometimes the development in some regions is contradictory to the development at a national level, but the policies are made and implemented at a national level.

The policy implications discussed in this study have to take the fragmented knowledge of the interrelationship between demography and economic causality into account. The results point at the impact of demography on economic performance appears to be marginal and that the relationship between the two variables is systemic rather than linear. Unfortunately, we act as if it was linear. Furthermore, as the regional level probably is a more appropriate level for analysis on the interrelationship between demography and economic performance the focus should shift from the national level to a regional level whenever appropriate.



# 1 Introduction

## 1.1 Background

In the latest revision of the UN World Population Prospects Europe is expected to see a lowering of its share of the world population to 6 per cent as compared to 11 per cent today and almost 22 per cent in 1950. The total fertility rate is also assumed to fall in Europe, creating relatively more elderly persons, a relatively smaller labour force and a relatively lower share of children and young adults (UN 2007). Only three major areas in the world, however, are considered to see a continued population increase until 2050: Western Asia (*i.e.* Middle East, Turkey and sub-Caucasus), Northern Africa and India (Rauhut 2004).

At a regional level, European developments however show many differences. Some regions will experience a decreasing population, due to ageing and the out-migration of young adults, while other regions will continue to experience a population increase, with a relatively young population, a relatively high fertility and an in-migration of, especially, young persons (ESPON 2007).

Developments in Europe are related to what is happening in other parts of the world, not only in economic terms but also as regards demographics. Globalisation matters, also when it comes to the development in economic-demography. Europe's relatively small population can maintain a relatively high welfare level since globalisation enables an international division of labour, with the result that production can be allocated to geographical areas in the world with the most favourable comparative advantages. One example of this is that labour intensive production can be allocated to countries where labour is cheap, while specialised and capital intensive production is placed in Europe.

The implications of this development undoubtedly however have an influence on demographic development. Migrants from all parts of the world want to move to the relatively wealthy countries. As such, long-distance migration flows to Europe can be understood in the perspective. In addition, fertility in Europe is, however, influenced by the relative wealth of this continent: the higher education and wealth, the lower demand for children and *vice versa*. Thus, it must be remembered that Europe does not show a homogenous demographic development. That Europe and its regions remain an integrated part of the global economy is a basic condition for the relative wealth of Europe, while its labour force remains competitive in terms of competence and wage levels.

At a regional level in Europe, the potentials of individual regions may be closely linked to the issue of demographic change for their future economic, social and demographic development. In the future it can be

expected that regional development policies will take demography into account to a greater extent than is the case today.

### *1.1.1 Ageing*

The process of ageing is not a new phenomenon. Since the 18<sup>th</sup> century life-expectancy at birth has steadily increased and mortality has been postponed to higher ages due to e.g. new technology for disease control (Easterlin 1996, Foss & Juvkam 2005). Parallel to this process the fertility rates have dropped, especially during the 20<sup>th</sup> century. This is not only a European but rather worldwide phenomenon. Increased life-expectancy at birth has had an impact on ageing, but the major cause is the very low fertility – the base in the population pyramid has simply become smaller and smaller (Bengtsson & Scott 2005).

The process of ageing is not only a simple function of a higher life-expectancy at birth and fertility rates below the *replacement ration* (about 2.1 children/woman). To understand the process of ageing it is important to discuss on what geographic level – global, national, regional or local - the analysis is made and whether migration is included in the analysis or not. At the regional and local levels ageing (a higher life-expectancy at birth and very low fertility rates) can be augmented by the out-migration of young adults and an in-migration of persons in the upper middle-ages and pensioners. The result will be an even more distorted age-structure. Furthermore, a strong in-migration of young adults to one municipality in a region can conceal the ageing problems and distort the age-structure in the rest of the region (ESPON 2005).

The best way to fight ageing is to increase fertility. This is, however, a long-term measure, since it will take about 20-25 years until today's newly born children will be in the labour force and become productive. Immigration can only provide short-term, and uncertain, mitigation to ageing (Bengtsson & Scott 2005, ESPON 2005).

What implications ageing will have on economic performance are unclear (Foss & Juvkam 2005). The demographic changes to come will generate significant challenges for our societies – at all levels and in most aspects of our lives (from infrastructure and housing issues to labour supply and pension schemes). Notwithstanding this however much that passes for research into the effects of demographic change is often highly partial and generally short-sighted often culminating in "alarmist" conclusions and providing a clarion call for significant policy changes based, ultimately, on rather thin scientific justification. There is then a need for a more historical as well as a more holistic perspective to be taken.

### *1.1.2 Depopulation*

The concept of 'depopulation' is far from clear. Most often the word is used almost synonymously with population decline, but sometimes it is reserved for population decline of a certain enduring nature, or even more narrowly confined to processes that carry ominous signs of socio-



economic impacts.<sup>1</sup> In one or more of these senses of the concept, 'depopulation' has been discussed from time to time during most of the former century – in national and European terms as well as with reference to sub-national uneven territorial development.

Depopulation may be regarded as a special course of development in the process of population change, often indicated by certain probable demographic implications or impacts *with a problem potential* (for instance the so-called ageing of the population and the labour force, increasing dependency ratios, labour shortage, decreasing demographic vitality and natural growth potential etc.) and associated with long-term demographic process (notably the "modern" fertility decline and sometimes – and even combined with – enduring territorial patterns of uneven selective migration). To be able to indicate the presence of processes with depopulation potential, a relevant territorial scale and a reasonable temporal perspective are needed (ESPON 2005).

Migration trends seem to imply accelerating depopulation and ageing in sparsely populated rural and peripheral regions and in regions lagging in economic and labour market performance. Competitiveness policy will need to recognise the regional changes of the labour supply and the actual characteristics of the labour-force available in different types of regions. As the population will become increasingly older in certain areas the labour market will need to adjust. Even consumer needs and preferences probably change in the wake of demographic transformation while certain areas will be relatively more influenced by the upper segment of the age-pyramid. Ageing will not however impact uniformly on regions. Given the diversity of the impact on regions, the necessity to 'adapt to their demographic circumstances' will require different measures in different regions. This requires statistical analysis and research to be carried out at a more detailed territorial scale taking into account the fact that demographic trends are only a single factor among a very large and complex set of factors influencing socio-economic development, and – after all – probably the slowest and most predictable factor, traditionally considered to be the *outcome* rather than the *cause* of socio-economic change (ESPON 2005).

### 1.1.3 Migration

There is not one general theory on migration, but many. They are all based upon different assumptions, and they reach different conclusions on the impact of international migration on economic growth, unemployment, labour force participation, wages, taxes, and transfers. Therefore it is not surprising that there is no general consensus in respect of the economic benefits of migration (Rauhut *et al.* 2008).

---

<sup>1</sup> These kinds of concern may, as already indicated, relate to socio-economic implications of distortions of the age-pyramid, or of demographical "thinning-out" of already sparsely populated (and often remotely located) areas, or even – as was the case in some peripheral parts of the Nordic area from the 1960s on – complete depopulation in the sense that entire local communities are emptied of population and literally 'die out'.

#### 1.1.4 What do we know?

Actually, we have a limited knowledge on what impact changes in the age structure and immigration have on economic performance. To large extent the limited knowledge is available at the national level, while only fragmented knowledge exists at a regional level. Relatively little knowledge however exists regarding the impact ageing, labour immigration and fertility have on regional development.

The ESPON29 countries are not the only geographical area in the world facing these kinds of problems – they are a global problem. In a study by the U.S. National Research Council three specific problems were highlighted in respect of policy implications and policy recommendations:

“First, there are uncertainties about how some of the demographic forces will play out /.../ Second, because population ageing generally is a gradual phenomenon, its socioeconomic consequences tend to appear gradually as well, and in some cases with a high degree of predictability /.../ third, most statements about ageing individuals tend to reflect averages and mask a great deal of diversity in the population” (National Research Council 2001, p. 2).

The *first* point refers to the extent to which technological changes will interact with demographic changes and how demographic change will change our way of life which, in turn, will interact with e.g. ongoing technological change. The *second* point deals with the fact that even if we accept the reality of an ageing society we retain the ability to adjust policies, lifestyles, infrastructure, the labour market etc., to make the transition easier. Finally, the *third* point touches upon the fact that the analyses only deal with national analyses of the average population. Significant levels of individual diversity (e.g. gender, class, education, ethnicity), as well as regional and local diversity, however, also exist. This point also deals with the problem of the definition of “elderly”; who is an “elderly” person? Someone who has passed 50? Over 65 years old? Or someone over 80 years old?

Depending on how these three problems are dealt with the policy implications and policy recommendations in respect of demographic change and population ageing will vary, not only in the U.S., but also in the ESPON29 countries.

What we do know is that demographic ageing is not a phenomenon that has suddenly been aroused. During the 20th century, fertility has fallen sharply in most of the countries of the Western World while life expectancy has increased as people live longer. A simple indication of this is the higher median age of the population. This trend was pointed out by a number of demographers as far back as the 1940s (Notestein *et al.* 1944, Kirk 1946, Hofstee 1950). An example of the difficulties in interpreting the interrelationship between ageing and economic performance can be taken from the Nordic countries: although the median age has increased from 20 to 40 years since the mid-18<sup>th</sup> century and life-

expectance has doubled, from roughly 40 to 80 years, this period of ageing has led to an exponential increase in the GDP/capita and the aggregated welfare in these countries. Simultaneously, the share of persons 65+ years has increased dramatically (Rauhut & Kahila 2008). This development will most likely appear when analysing other European countries. The logical conclusion, contrary to common belief, is that ageing is good or is at least not negative. This example does, however, say nothing on the kind of interrelationship; are we talking about a direct or indirect causality, at which territorial level does the interrelationship exist, and are the short- and long-term effects divergent? Answering these questions may show that the interrelationship is very complex and multifaceted.

## 1.2 Aim and questions

The aim of this paper is to give an overview on the interrelationship between demography and economic performance. As demography includes a large number of aspects, the focus in this paper lies on the age-structure, ageing, immigration and emigration.

The paper proposes to answer the following questions: **(1)** what is the interrelationship between changes in the age-structure/ageing and economic performance? **(2)** What is the interrelationship between migration – both immigration as well as emigration – and economic performance? **(3)** Which are the commonly over-looked methodological considerations when analysing the interrelationship between demography and economic performance? **(4)** What is the territorial impact of the interrelationship between demography and economic performance? An attempt to construct a typology with regard to the territorial impact of the interrelationship between demography and economic performance will be made.

## 1.3 A Road Map

Chapter *two* will present an overview on the interrelationship between age-structure and economic performance, both how the age-structure influence economic performance and how economic performance influence age-structure. In chapter *three* the interrelationship between migration – both immigration and emigration – and economic performance will be outlined. The *fourth* chapter will discuss some important methodological questions when analysing the interrelationship between, on the one hand, age-structure and migration, and, on the other hand, economic performance. Which came first, the hen or the egg? This question can, and should, also be asked when undertaking analyses on the causality between demography, migration and economic performance. So should the questions on long- and short-term effects as well as if the causality is direct or indirect. Finally, the spatial effects of demographic change and migration on economic performance and vice versa are seldom discussed, although the regional can reveal more information.

In chapter *five* the interplay between demography, migration and economy is outlined and in chapter *six* some policy recommendations on

the interrelationship between demography, migration and territory with regard to economic performance is made. The findings of this study is concluded and discussed in chapter *seven*.

## 2 Age structure and economic performance

### 2.1 Introduction

The causality – both in terms of direction and magnitude – between a changing age structure and its economic effects is, to say the least, unclear.<sup>2</sup> Prominent scholars in the field have concluded that depending on the institutional and organisational changes that take place at the time of the population changes, a population decline could lead to positive as well as negative economic development (Rosenberg & Birdzell 1994, Easterlin 1996, Kelley & Schmidt 1994, and Coale & Hoover 1958).

Most analyses are based on *neoclassical* economic theory (human capital theory, the relative income hypothesis) and, to some extent, *new classical* economic theory (the life-cycle hypothesis). These theoretical approaches find very negative implications from demographic change. Other economic theories, with different points of departure, indicate other results, though they are seldom heard (*e.g.* Ohlsson & Broomé 2003, Bengtsson 2003).

---

<sup>2</sup> An example of this is the relationship between life-expectancy and economic performance. The development of mortality is conceptualised in the model of epidemiological transition, which can be seen as a part of the model of demographic transition. It explains the decline of several diseases (mainly infectious diseases), the increase of other diseases (such as cancer, heart diseases) and the overall decline of mortality. The main factors in the fight against epidemics were better nutrition and the improvement of the public infrastructure (water, waste and sewage). The advances made in medicine have moreover led to a significant increase in life expectancy, and particularly to a decline in infant mortality, which was essential to explaining this increased life expectancy. The decline in mortality in lower age groups was followed by a fall in morbidity, *i.e.*, the frequency of disease and poor health. This fall is related to the successful treatment of an increasing number of diseases. "The Mortality Revolution, like the Industrial Revolution, marks the onset of major technological change, with the Mortality Revolution reflecting a breakthrough in the technology of disease control. Both revolutions occur largely independently from each other, the later occurrence of the Mortality Revolution being due chiefly to the later development of the medical *vis-à-vis* the physical sciences," according to Easterlin (1996: 80f).

According to other researchers, the decline in mortality has to be attributed largely to the rising standard of living. Ohlsson states, "during the first half of [the 20th century], the increase in living standards combined with advances in medicine have successfully overcome the infectious diseases resulting in a significant fall in mortality among children and young people. After 1950, the decline in mortality among old people has been the main reason for the increase in life expectancy" (Ohlsson 1995: 7). The improved standard of living is directly related to good economic growth (Schön 2000). The fact that mortality has gone up among old people in Sweden (as well as in the Nordic countries) can be attributed to the considerable improvement in the standard of living of pensioners after Second World War (Ohlsson 1995, 1996, 1998).

## 2.2 Theories on how age structure affects economic performance

Two major theoretical approaches have, in general, been used to explain the causality between age and economic performance: *the life-cycle hypothesis* and *the human capital theory*. A third theoretical approach, *the hypothesis of structural change*, also deserves to be mentioned here.

### 2.2.1 *The life-cycle hypothesis*

In the *life-cycle hypothesis* the demographic aspects are placed at the centre of the analysis. Individuals are assumed to be utility-maximising and they aspire to a constant level of consumption throughout their lives. At the same time, the income needed to ensure their ability to consume in this manner can only be made during a limited period of their lives – after their childhood but before their retirement. Savings must then be substantial in the active years. These savings must be able to repay debts amassed from childhood and to compensate for the loss of income as a retiree. This means that these savings will be consumed and that the net savings over the life-cycle will be zero (Modigliani & Brumberg 1954, Modigliani 1986, Samuelson 1958).

The life-cycle hypothesis is a macro-model, focusing on national savings rather than on individual savings. The demographic influence on economic performance is considered to be the following: young adults settle down, marry and have children. The consumption of the children must be provided for. When the children have left home, incomes are saved for the coming retirement. A labour force in the middle ages is considered extremely favourable for savings, investments and growth. Since the group 65+ years has very negative savings a high share of middle-aged people in the population will put pressure on the national savings purse when they retire. In addition, a 'baby boom' will put pressure on aggregate savings.

### 2.2.2 *The human capital theory*

In *human capital theory*, the demographic aspects are allotted a somewhat different position. This remains the dominant theory on the analysis of wages and productivity at the micro-level. Wages are assumed to reveal the changes in the worker's productivity, while both the productivity level and the wage are the result of investments in education. The educational cost is based on the earnings forgone and the direct costs for education. The profit from education is considered to be higher future income. While in working life human capital is accumulated, *i.e.* human capital does not only consist of formal education but also of on-the-job-training. Investments in human capital for promoting productivity will result in a positive slope in earnings over time (Mincer 1958, Schultz 1961, Becker 1964).

The effects on economic performance would be more positive if a larger share of the labour force is relatively old, and a lower average age in the labour force would lead to relatively lower economic growth. A given age-group is assumed to possess a constant capital of work experiences, no matter *e.g.* the length of education, hours worked and the number of job changes. These are not realistic assumptions.

### 2.2.3 *The structural change hypothesis*

Bengtsson (2003) takes parts of the life-cycle hypothesis and the human capital theory and adds them to the *structural change hypothesis*. Since individual productivity changes over the life-cycle, different age-groups possess different kinds of human capital. Parallel to this process changes occur in the underlying economic structure, something which determines the demand for different kinds of labour and the conditions for using the different kinds of human capital in the most efficient way in production terms. Therefore, it can be assumed that during a period of structural change in the economy relatively young workers with a relatively high formal education will be more productive than relatively older workers with a relatively high accumulated human capital. During periods of structural rationalisation the opposite relation can be assumed to exist. The ability to adjust to changes and new conditions by companies and institutions at the labour market then becomes central.

The population structure and population development will influence the competence supply for employers, which will have consequences for production. Employers must, in one way or another, adjust to the new labour market situation (Ohlsson & Broomé 1988). The various branches and sectors of the economy will be affected differently depending on their ability to adjust and respond to the challenges raised by the labour force generation shift (Ohlsson & Broomé 2003). According to them, *quantitative changes* of the labour force have simply not occurred as they note that "the general fear that Sweden is heading towards a situation characterised by a weakening labour force is unfounded and incorrect" (p. 9). Other changes will, however, occur:

*"Qualitative changes* will occur due to the upcoming labour market generation shift, as 40 percent of the current labour force, which possesses the experience, insight, overview, adaptation capacity, mentorship and cross-sector capacity will disappear from the labour market. In a more or less difficult personnel restructuring process within companies, this group will be replaced by a somewhat larger group of young people who lack experience, but have a whole range of other skills and talents. This group of young people has knowledge and competence, particularly technical competency, in several new areas. They possess new values and outlooks, physical vigour, youthful energy and commitment. It is this qualitative change that the labour force generation shift is mainly about." (Ohlsson & Broomé 2003, p. 9. Italics by Ohlsson & Broomé)

The main argument in Ohlsson & Broomé (1988, 2003) is that the institutional structure of the labour market will have to adjust to the new situation due to the labour force generation shift and the outcome here will depend on how dynamic the institutions are.<sup>3</sup>

---

<sup>3</sup> See also the essays in Broomé & Ohlsson (1989) and Bengtsson (2003).

## 2.3 Theories on how economic performance affects age structure

Just as age-structure may affect economic performance, the economic performance may affect the age-structure. Generally, this has been analysed by the *human capital theory* and the *relative income hypothesis*.

### 2.3.1 Human capital theory and substitution effects

Women consciously avoid childbearing and 'children-dependency' in early adulthood in order to improve their career possibilities, to invest in higher education and to enjoy a more independent lifestyle. The average age of women having their first baby has increased markedly over recent decades. The rise in the female labour force participation rate and in investment in higher education (human capital) has resulted in higher family incomes while also having two contradictory effects with regard to childbearing – an *income effect* and a *price or substitution effect*. The income effect should result in higher fertility as households with higher incomes have more money to spend on children than households with lower incomes. The price or substitution effect, however, implies that higher incomes also result in an increase in the relative price of children, something which, in its turn, reduces the demand for children and increases the demand for other commodities (Becker 1960, 1965, 1993, Cigno 1994, 2001).<sup>4</sup>

In line with the income and substitution effects there is a difference between quality and quantity elasticity. Higher incomes result in an increased demand for children but also in an increased demand for children of 'better quality'. This also means higher expenditures on raising children and this has a negative effect on fertility development while hampering the quantity effect (Overbeck 1974). This explains the variations between different types of households and in various types of societies: the impact of quality and quantity elasticity is different in regions characterised by different economic structures – quantity elasticity is higher in agricultural regions than in urban and post-industrial ones with higher income levels. This is also in line with the theory of demographic transition.

In reality the substitution effect seems to have had a greater impact on childbirth than the income effect, at least in recent decades. Investment in higher education also has a decreasing effect of its own: having invested in a higher education, one is more oriented to capitalising on one's investment in human capital, even if the return is not as high, *ex post*, as it was supposed to be, *ex ante*. Education and working life should consequently also be included in the utility functions that differ between various categories on the labour market. This also means that the same income increase/decrease or the same income levels have different effects on TFR depending on the satisfaction with working life.

The theoretical construct of a total fertility rate expressing how many children a female will bear in her life is therefore a very useful indicator in

---

<sup>4</sup> A central ingredient in Becker's theory is that the demand for children is treated in the same way as the demand for consumer durables.



analyses of natural population development. In addition to indicators of fertility it is also necessary to measure the social environment to explain regional differences in fertility. The possibility to combine work with maternity is an important factor in lowering the indirect costs of children (ESPON 2005).

### 2.3.2 *The relative income hypothesis*

According to the *relative income hypothesis*, the size of a cohort has a significant impact on a number of economic and related activities throughout society. A large cohort – e.g. the 'baby boomers' in the 1940s and 1960s – will have fewer children, higher mortality and morbidity rates, and a higher divorce rate than persons born in a small cohort – e.g. in the 1950s and 1970s – and *vice versa*. Persons in a large cohort will also have lower relative incomes and a higher risk for unemployment over their life-cycle than persons born in a small cohort due to the relatively higher competition for the jobs. This relative competition also results in a higher educational level for persons born in a large cohort, and a lower educational level for persons born in a small cohort (Easterlin 1987).

Analyses of cohort-size and fertility and cohort-size and higher education have provided evidence for the *relative income hypothesis* on Swedish data (e.g. Ohlsson 1986, 1987). From the *relative income hypothesis* it has been deduced that larger cohorts will have a higher propensity to migrate and a higher geographical mobility than smaller cohorts (and *vice versa*), but no empirical evidence for this has been found (Bengtsson 1989). The relative size of a cohort will have an impact on the society as a whole, particularly economically (Easterlin 1987).

The *relative income hypothesis* is rather ambiguous to interpret. One example of this is that larger cohorts will demand a relatively higher educational level than smaller cohorts and that large cohorts will have relatively fewer children than smaller cohorts, and *vice versa*. Cohort-size is the determinant of educational demand and the demand for children. There are however causalities, which are ignored by the *relative income hypothesis* between educational level and fertility: the higher the education, the lower the fertility.<sup>5</sup> It is then rather difficult to determine whether it is the cohort-size or the educational level that leads to lower fertility for larger cohorts' relative smaller ones.<sup>6</sup>

---

<sup>5</sup> This is so *particularly* for women. The higher education and income a woman has, the higher is the opportunity cost of having children – resulting in a lower fertility (Becker 1960, 1993). The relative income hypothesis is however based on the behaviour and incomes of men only (Easterlin 1987)

<sup>6</sup> The same can be said regarding the causality between cohort-size and probability to migrate; there is no direct causality, but this is not the same as saying that there is no indirect causality. The causality can be indirect through a higher risk for unemployment and lower relative incomes, on the one hand, and a higher probability to migrate, on the other. Again, the focus on men in the *relative income hypothesis* skews analyses on migration.

## **2.4 Summary**

There is no theoretical evidence nor do empirically clear-cut results exist to show a direct causality between a change in the age structure and its economic effects. The results are dependant on the assumptions that have been made. Depending on the institutional and organisational changes that take place at the time of the population changes population decline can result in both positive and negative economic developments (Easterlin 1996; Kelley & Schmidt 1994; Coale & Hoover 1958; Rosenberg & Birdzell 1986).

## 3 Migration and economic performance

### 3.1 Immigration

Labour immigration can, at least theoretically, help the country of destination in three ways: (1) to increase the size of the labour force, (2) to change the age-structure of the population, and (3) generate income transfers to the native population. The underlying assumption in this kind of reasoning is that the immigrant is attractive on the labour market in the country of destination – otherwise the labour force will not be increased, nor will immigration generate income transfers to the natives. Very large numbers of immigrants are needed to change the age-structure in the population (Rauhut 2004). Coppel *et al.* (2002) also mentions a fourth aspect of how labour immigration can help the country of destination: bottle-necks at the labour market can be mitigated by labour immigration.

With these four aspects in mind, we will now turn to an overview of the theoretical and empirical interrelationships between immigration and economic performance.

#### 3.1.1 Theoretical interrelationships

##### The Neoclassical Macro Theory of Migration

According to *neoclassical macroeconomics* immigration will promote economic growth (Simon 1999, Friedberg & Hunt 1995. See also Borjas 1995). Immigrants will constitute substitutive labour. Given that the number of jobs is constant, wages will be lowered and the native workforce will have difficulty competing with cheap immigrant labour. If the number of jobs is constant, adding more workers to the labour market pool will lead to a competition for jobs. The equilibrium on the market will be changed, resulting in lower wages (Fassmann & Münz 1995, Zimmermann 1995). Low-income earners are the ones who will be hit most severely (Johnson 1980). The capital owners in the country of destination will gain from immigration (Layard *et al.* 1994) as well as the well educated (Johnson 1980). If the immigrant is young, well educated, has no dependents and finds a job immediately on arrival, the country of destination will gain from immigration: the tax contributions of this immigrant will exceed the transfers from the public purse (Layard *et al.* 1994). This kind of immigration ought to be encouraged. If the transfers to immigrants exceed their tax contributions, filters are needed in the immigration policy process to ensure that only the most profitable immigrants are allowed to immigrate (Borjas 1995).

According to neoclassical macroeconomics a completely different scenario in respect of the economic benefits of immigration is also possible: immigration can slow structural change in the economy (Wadensjö 1973, Straubhaar & Fischer 1996). Economically stagnating sectors can survive by employing cheaper immigrants, preserving and maintaining the

existing economic structure (Maillat 1974, Lundh & Ohlsson 1994, 1999). Access to immigrant labour may also lead to labour intensive investment, keeping productivity down (Wadensjö 1981, Elliott 1991).

#### The Dual Labour Market Theory

According to *dual labour market theory* we are accustomed to thinking of industrialization and economic growth as a process that in some basic way involves increasingly sophisticated technologies and a progressively more highly educated and well-trained labour force. At the same time unskilled and cheap labour is needed to do hard work under bad working conditions and for low salaries, the kind of work the native labour pool does not want to do. According to this theory, immigrant labour constitutes a complementary workforce. If labour at the lower segment of the labour market is missing, economic growth will slow. Substituting labour with capital is one solution, but since it is not possible to substitute labour with capital in labour intensive sectors hiring immigrants is another solution. Immigrant labour can then maintain economic growth on a short-term basis; on a long-term basis changes in society are however needed. Since immigrants work in the low-paid sectors their tax contributions will be lower than the tax contributions of natives. A physically hard and monotonous job will affect an individual's health, resulting in a need for public transfers. Since immigrants usually end up in hard and monotonous jobs, their need for public transfers will be bigger than for natives (Piore 1979. See also Schoorl 1995).

#### The New Economics of Migration

According to the *new economics of migration* continuing immigration will lead to lower economic growth, since the amount of low productive work increases and that the immigrants send home remittances to the family. Immigrants will take jobs in sectors with many other immigrants, which usually mean sectors in which natives do not want to work (Stark 1991). If the salary in the country of destination is much higher than that in the country of origin, *low-quality migrants* are the ones who are most willing to migrate. Since these immigrants are usually poorly educated and low skilled workers they will "experience a higher unemployment rate and have fewer hours of work per year" (Stark 1991, p. 393). Employers have asymmetric information of the productivity of the immigrant workers, and, together with the fact that immigrants in general do low qualified jobs, this is the reason why the immigrants receive lower salaries until the employers have improved their knowledge of their workers. As a result of having a low salary, or working in the informal sector, the tax contribution of the immigrants will be lower than the natives'. If the immigrants work in the informal sector they are not entitled to any public transfers. If they work in the formal sector they have low salaries, and they will receive less in public transfers than natives (Stark 1991).

#### *3.1.2 Empirical Evidence*

##### Income Transfers

The gains of immigration are difficult to calculate, and results very much depend on the method used (Kelly & Schmidt 1994) and on the spatial context. In general, immigration confers small net gains, in terms of *per capita* output, to the host country. However, the distribution of the

benefits is not even and depends, to a large extent, on the qualifications structure of the immigrants and the native workforce. Thus far the net impact at national levels on government expenditures and revenues seems to have been negligible for most countries (Rauhut & Blomberg 2003).

Only a limited number of studies have been made on the income transfers from immigrants to natives for Western countries or on the impact on economic growth of immigration. During the period 1950-1980 the income transfers from immigrants to natives in *Sweden* reached approximately 1% of GDP annually (Ekberg 1999). They peaked around 1970, when the transfers barely reached 2% of the GDP (Ekberg 2002)<sup>7</sup>. The income transfers were even 1980-1985, i.e. the immigrants paid as much in tax as they received in transfers (Gustafsson 1990. See also Gustafsson *et al.* 1990). During the 1990's income transfers changed direction: immigrants are now net receivers and the natives are net payers. The transfer of incomes to immigrants was about 0.9% of Swedish GDP in 1991, and in 1994 the transfers to the immigrants reached 2% of GDP. Income transfers from natives to immigrants have remained at that level throughout the 1990's (Ekberg 1999. See also Gustafsson & Österberg 2001). By using data for 2001 Rauhut & Blomberg (2003) estimated the effects of a hypothetical situation in Sweden – what would the budgetary effects be if the foreign-born population had the same labour force participation rate and income structure as the natives? The estimation showed that the tax base would be enlarged and the social transfers would be lowered by a amount equating to 1.4% of Swedish GDP for 2001. It is obvious that the gain from integration would be even higher if second generation immigrants were included in the analysis.

Several studies on income transfers have been made for *Denmark*; they show that income transfers from natives to immigrants were close to 1% of GDP in the 1990's (Christensen 1998, Økonomiministeriet 1997). This has been confirmed in a later study by Pedersen (2000). Wadensjö (2000) found that *labour immigrants* contributed with net income transfers to the Danish public finances, while *refugees* were net recipients of income transfers. In a study on *Norway*, for 1993, it was shown that refugees received income transfers close to 0.9% of GDP (Larsen & Bruce 1996). Another Norwegian study concluded that the annual income transfers from natives to immigrants were approximately 1% of GDP in the mid 1990's (Larsen 1996).

In *Canada* a positive net income transfer from immigrants to natives has been found (Akbari 1989), which is also the case for *Australia* (Kakwani 1986) and *Switzerland* (Straubhaar & Weber 1994). One study on *Germany* shows net income transfers from immigrants to natives (Miegel 1984), but another shows the opposite result (Ulrich 1994). The changed direction of income transfers can be explained by changing employment patterns for the immigrants since the 1960's, as well as the changing age structure among the immigrants (Ibid.).

---

<sup>7</sup> In Ekberg (1999) the income transfers from the immigrants to the natives are estimated to about 1% of GDP.

Estimations of the size and direction of these income transfers between immigrants and natives in the USA show divergent results. Some studies find net income transfers from immigrants to natives, and in 1998 the income transfer to natives was about 0.1% of GDP or USD 30 per native person. Furthermore, immigration has led to lower wages for native Americans (Borjas 2001). A newer study concluded that the income transfer from immigrants to natives in 1996 was USD 166-226 per native household (Hanson *et al.* 2002). Other studies find negative income transfers from immigrants to natives in the USA (Blau 1984, and Weintraub 1984). A study for 1990 finds that the income transfers from natives to immigrants reached USD 16 billion, which is close to 0.3% of American GDP (Borjas 1994).

#### Effects on Economic Growth

Some studies for the *USA* show a positive correlation between immigration and economic growth. The most well-known study was made by Julian Simon (1999), and he argues that immigration has a significant positive impact on economic growth. This conclusion is, however, not based on the result of empirical studies, but on a simulation exercise. Other studies on how immigration affects the American economy shows that the economic impact of immigration depends on the human capital of the immigrants, and particularly on their geographic and social mobility. Estimations show that a 1% increase in immigration to the USA leads to a 0.1% increase in economic growth (Friedberg & Hunt 1995).

The labour immigration of the 1960s counteracted the structural transformation of the Swedish economy, as stagnating trades and sectors were kept afloat through access to cheap immigrated labour. When the crisis came in the 1970s, the bubble burst and companies within these trades and sectors went under (Lundh & Ohlsson 1994, 1999, Wadensjö 1973, Jörberg 1984). As such then immigration should, primarily, be aimed at reducing the bottle-necks in production as indeed was the case in the 1950s in Sweden (Rauhut 2002), and this stimulated economic growth (Lundh & Ohlsson 1994, 1999).

A simulation study on the long-term gains of economic growth from immigration to Sweden concluded that the plausible economic gains were insignificant (Ekberg 1977). An estimation of the economic surplus of immigration to Sweden shows that it has been negligible (Ekberg 1998).

In a study on the economic effects of immigration to the Nordic countries were analysed. The result of immigration of important variables such as the effect on wages, qualification structure (human capital), cyclical effects and structural growth effects were assumed to be very low. The effect on investment rates, structural change and consumption/savings were inconclusive and the effect of remittances was zero (Fischer & Straubhaar 1996).

In a study on how the Swiss economy was affected by the labour immigration, Maillat (1974) concludes that the labour immigration counteracted the structural change of the Swiss economy.

### 3.1.3 Conclusion

There are no clear-cut results – neither theoretically, nor empirically – concerning the economic effects of immigration. Studies using different theories, based on different assumptions, show different results.

## 3.2 Emigration

The concept of 'brain drain' has frequently been used to refer to the movement of educated individuals from their homeland, where they have received their education, to another country (Sánchez-Arnau and Calvo 1987, Grubel 1987, Angell 1991, Mosterman 1991). This phenomenon could also be called the economics of the globalisation of human capital. A more thorough definition by Ian O. Angell (1991) not only covers the migration of educated individuals between countries, but also intellectual work, patents and other intellectual property, information and expert knowledge. It should also be noted here that brain drain has both positive and negative aspects. The negative aspects have traditionally been focussed on, i.e. those nations that lose highly educated people have to suffer an inferior standard of living and reduced income because of lost scientific and technological knowledge. The positive aspects, however, are found in the fact that the migration of educated people and science experts between countries has contributed to worldwide progress in science and technological development (Mosterman 1991).<sup>8</sup>

### 3.2.1 Theoretical interrelationships

#### Equalisation of wages and unemployment

According to the *neo-classical macro theory of migration*, individual workers from low-wage areas or countries seek to maximise their individual income by migrating to high-wage areas or countries. Since wages reflect the demand for labour, migration is caused by geographic differences in the demand and supply of labour. As a result, wages and unemployment will level out in both the area of origin and the area of destination (Lewis 1954, Ranis & Fei 1961, Harris & Todaro 1970).

In a theoretical elaboration Schmitt-Rink (1992) shows that national factor prices and factor shares tends to be equalised by international migration, also in the absence of international trade. One of the factor prices Schmitt-Rink (1992) discusses is for labour; changes in the factor prices for labour have an impact on wages and unemployment.

---

<sup>8</sup> The push-pull analysis in neoclassical migration theory is one of the migration methods which are based on the notion that migration is an individual choice based on a rational evaluation of various push and pull factors in the place of origin and the possible destinations along with an evaluation of the intervening obstacles (Lee 1966). The decision of individuals to move between countries is based on *e.g.* a better income, career and living conditions, a more favourable tax system, and better study opportunities (Sánchez-Arnau & Calvo 1987, Grubel 1987, Angell 1991, Mosterman 1991). Various circumstances have also been mentioned which create obstacles to migration between countries. Those are, among others, a limited interest in becoming an immigrant, upheaval of family life, nationalism and limited language skills (Angell 1991).

The theoretical effects on wages and unemployment by emigration are dependent on the selection of emigrants. If the emigrants in an area belong to the prime labour force, the economic performance in the area will be hampered. Implications on taxes, social transfers and public consumption will be affected negatively. Hence, if the emigrants are unemployed or belong to marginalised low-income group of the labour force, the effects for the sending area will be positive. To make an *a priori* assumption that the area of origin will either lose or win from emigration is pointless (Wadensjö 1973).<sup>9</sup>

### Remittances

Theoretically, remittances are supposed to have a positive effect on the economic activities in the sender countries of labour. Straubhaar & Vadean (2005:29) argue that “[i]n addition to direct impacts of remittances on migrants sending economies, *i.e.* poverty reduction, offset of balance of payments deficits, reducing of foreign exchange shortages, productive investments, etc., remittances also has positive indirect effects. These are the easing of capital and risk constraints, the release of other resources for investment and the generation of multiplier effects of consumer spending”.

Galor & Stark (1990) deduced a hypothesis saying that decision to stay or re-migrate determines the amount of remittances sent to the country of origin. In short, they argue that the longer a guest worker stays in the country of residence, the fewer remittances is sent home since the guest worker will spend more of his or her income on private consumption if he or she decide to stay and not re-migrate.

### *3.2.2 Empirical evidence*

#### Equalisation of wages and unemployment

Since ‘everybody knows’ that emigration is good for the sending countries or sending regions one could expect to find a vast number of studies to support this. In fact, there are few empirical studies made on the effects of emigration on wages and unemployment in the sender area.

Straubhaar (1992) analysed the effects of emigration from Turkey and he cannot find any evidence that emigration has harmed the overall economic development in Turkey, *i.e.* the analysis is not only focused on wages and unemployment. In fact, the overall macro effects are rather marginal. It is mainly from the less developed regions where emigration has been significant. “In these regions the macroeconomic indicators of economic and social development clearly indicate that the initial inequality was not eliminated. On the contrary, the initial inequality has increased during the decade of large emigration” (Straubhaar 1992:117). He also stresses that the results should be interpreted with some caution since relevant and reliable data is scarce; shaky data leads to shaky results.

---

<sup>9</sup> The 19<sup>th</sup> century Swedish political economist Knut Wicksell argued that poor persons in Sweden should be stimulated to emigrate since it would be profitable for Sweden (Lundahl 2005). Also John Stuart Mill reasoned this way in his analyses on poverty in the U.K. (Rauhut 2005).



In the study by Fischer & Straubhaar (1996) on the economic effects of intra-Nordic migration in the 1950s and 1960s the results for wages, qualification structure, structural and growth effects as well as effects on regional development are all inconclusive, insignificant or unknown.

O'Rourke & Williamson (2000) analyse the impact of the mass-migration on the labour markets in the emigration countries. Their analysis cover the period from the mid-1850s to WW1 and they pay special attention to Ireland, Italy and Sweden<sup>10</sup>. In the Irish case, mass-emigration improved the real wages on Ireland relative to the real wages in the U.K. and the USA; it is possible to talk about a convergence in terms of real wages and relative standard of living. Also the Italian emigration narrowed the wage gap between the USA and Italy, but not the standard of living. Finally, in the case of Sweden there the wage gap was narrowed between the USA and Sweden due to the Swedish emigration, but the pauper problem in Swedish agriculture was just marginally mitigated.

“Emigration increased real wages in Sweden by 8 to 12 percent between 1870 and 1910. U.S. immigration lowered real wages by between 8 to 15 percent. Mass migration accounted for all of the Irish real wage convergence on the United States and for 25 to 40 percent of the Swedish convergence” (O'Rourke & Williamson 2000:273).

At the same time, the Iberian countries, countries that had the most to benefit from emigration, were the ones to profit the least from migration. The poor countries in the European periphery responded very differently to the mass-migration during the 19<sup>th</sup> century; consequently they managed to profit to the opportunities in various degrees. There are lessons to be learnt from previous experiences, but we cannot copy old solutions and recycle them today. O'Rourke & Williamson (2000) state clearly that technological transfers and human capital accumulation did not play any important role for the convergence of real wages and standard of living during the 19<sup>th</sup> century, but the do today.

### Remittances

Over the last years the volume of remittances sent from OECD-countries to non-OECD countries has increased significantly. To increase the knowledge on migration, remittances and their role in development OECD arranged a conference on this topic, resulting in a publication (OECD 2005). Although remittances are a very important source of capital for developing countries, the foreign direct investments are still the most important source of capital. Remittances cannot, however, replace a sound macro-economic policy for promoting a stable economic development.

There are several problems in estimating the effects of remittances. (a) The central banks in many developing countries have severe difficulties of

---

<sup>10</sup> O'Rourke & Williamson (2000) use Sweden as an example of the development in Scandinavia. I think this is a bit daring and chose to name the case study as “Swedish”

distinguishing the remittances from other private transfers, and (b) "a significant part of the money remitted by international migrants goes to the transfer companies as profits rather than to the migrants' families in the developing countries" (Straubhaar & Vadean 2005:29).

In the literature review made by Straubhaar & Vadean (2005) the focus lies on three themes: (1) income distribution, poverty alleviation and individual welfare, (2) the effects of remittances on employment, productivity and growth, and (3) if remittances can cover deficits in the trade balance. Regarding (1) the conclusion is that research cannot come up with a decisive conclusion. When it comes to (2) remittances can have positive direct effects on employment and growth if they are spent in entrepreneurial investments. A majority of the remittances seem, however, to be spent on consumption, housing, purchasing of land and financial savings. Finally, (3) depending on if the remittances can stimulate an increased economic activity in the home country, the increased demand for goods and services can be met by domestic producers. This will have a positive effect on the balance of payments and trade balance; if the remittances trigger an increased import of consumer goods studies show that the effects will be negative.

In her conclusions of the OECD conference the OECD Deputy Secretary-General Berglind Ásgeirsdóttir says:

"Part of the leitmotif for this conference comes from the stylised fact that the global total of remittances in recent years has exceeded official development aid flows from OECD to non-OECD countries. This has led some observers to argue that remittances could play a greater role in stimulating productive investments in the countries of origin, thereby spurring economic and social development.

However, the conference has revealed that this argument, despite its superficial attraction, is often a dead end. We were reminded, time and again, that remittances are *private* transfers and that the savings involved belong to the migrants and their families, who also decide on their allocation. Now governments may offer incentives to migrants to increase their volume of remittances and to influence the uses to which they are put in the countries of origin. We have heard of many attempts to do this which have been unsuccessful because they have failed to recognise the primacy of *individual* choice in this area" (Ásgeirsdóttir 2005:361).

Actually, relatively few empirical studies have been made on the actual effects of remittances. One reason for this is probably the methodological problems discussed by Straubhaar & Vadean (2005). Some studies do, however, exist. In a study using data for guest-workers in Germany 1988, Merkle & Zimmermann (1992) show that the guest-workers' savings and remittances are strongly influenced by their plans to re-migrate. The planned future stay in Germany has a significantly negative effect on the remittances and on their aggregate savings, *i.e.* the longer the stay the

more private consumption in the country of residence and fewer remittances are sent to the country of origin.

Straubhaar (1992) concludes that emigration only under certain preconditions may have a positive influence on economy of the sending country. In the case of Turkey, the remittances from Turkish emigrants lead to an increased domestic demand for consumer goods in the 1960s and to an increasing inflation in the 1970s; the remittances did not lead to the development goals of sustained capital investment, increased productivity and job expansion. On the contrary, the Turkish economy became more dependent on the immigration policies of the North West European countries.

In a study on the economic effects of intra-Nordic migration by Fischer & Straubhaar (1996) the economic effect of remittances to the country of origin was estimated as zero.

### *3.2.3 Conclusion*

The economic implications of emigration for the sender countries are inconclusive, both theoretically and empirically (Rauhut & Johansson 2006).<sup>11</sup> More research is needed on the implications, economic and others, to the sender countries.

## **3.3 Summary**

The findings in this chapter indicate that the interrelationship between migration and economic performance are everything but clear-cut.<sup>12</sup> This applies both to the theoretical as well as empirical results. Different studies using different theories and methods produce different results.

One reason for this may not lie on the researchers doing the analyses; they have to rely on the available statistical data. In fact, the quality of migration data is relatively bad, especially when international comparisons are made. The national statistical institutes use different definitions of e.g. who is an immigrant and who is an emigrant. The absence of homogeneous migration data in Europe does not improve the situation.

More research efforts are needed with regard to theoretical, methodological and data aspects before research can bring clarity in the interrelationship between migration and economic performance.

---

<sup>11</sup> Rauhut & Johansson (2006) give an overview of economic, social, demographic and political implications on the sender countries of emigration. They conclude that the demographic implications may be exacerbated, studies over the effects of a large-scale brain-drain indicate that this will lead to a poverty of the educational system and a poverty of health in the sender country and that a large scale emigration from the sender countries may trigger extremist political activities in these countries, something which will have indirect negative implications on the economic effects of emigration.

<sup>12</sup> This is illustrated well in Appendix D.

## 4 Methodological dichotomies and dilemmas

### 4.1 Introduction

Ageing, labour shortages and migration call for action. It is not surprising to see that they are all on the policy agenda. Policy-makers will have to take difficult decisions; voters have to accept that changes in the general welfare will take place and administrators, as welfare services change, will see their situation change as well.

As we have seen in the previous chapters the causality in terms of direction and magnitude between, on the one hand, changes in the age structure and migration, and, on the other hand, economic performance is everything but clear. To some extent this is related to several methodological problems. A number of dilemmas and dichotomies will arise due to this situation. Knowledge cannot evolve and the demographic challenges and their impact (if any) on economic performance cannot be met.

A dilemma is considered to be a situation in which a choice must be made between undesired alternatives; a dichotomy can (a) be viewed as a set of antagonistic concepts that are inherent conflict and cannot be combined, and (b) display extremes or poles where practice is found somewhere along the *continuum*.

In this chapter several dilemmas and dichotomies regarding demographic changes and economic performance will be discussed. The discussion will focus on methodological aspects when addressing this question, on the spatial aspects of the interrelationship between demographic changes and economic performance and, finally, how policy-making and governance is viewed.

### 4.2 Points of departure

#### 4.2.1 Postulates and a priori assumptions

##### Fixed resources

The demographic ageing ahead of us will lead to an increasing population; the number of persons aged 65+ will increase both in absolute and relative numbers while the number of persons in working ages will decrease in relative numbers (Malmberg & Lindh 2002). This will lead to a situation where fewer persons will have to support an increasing number of persons. Given a fixed amount of resources this reasoning is analogous with the Malthusian model (Malmberg & Korpi 2000). Other researchers describe the challenges the following way:

“The Nordic welfare model will face substantial pressure in the future /.../. The number of elderly is increasing at the same time

as the work force is shrinking. The balance between those working and those not working will thus change dramatically, which in turn affects both labour markets and public finances /.../. In short, the financial sustainability of the welfare state is at stake" (Andersen *et al.* 2007, p. 63).

In order to pay for the increasing expenditures on pensions and elderly care the economically active population will have to relinquish from a larger share of their income and to lower their own consumption (Lindh 2008).<sup>13</sup> Sommestad (2002, p. 148) is worried about the ageing society since its "most significant distinguishing feature is a decreasing economic growth. Growing public expenditure and budget deficits are other typical hallmarks, with pensions, elderly care and medical care as major parts in the public budgets". In 1997 the share of population aged 65+ used 40 per cent of all public consumption and transfers in Sweden, which is about 2.5 times this age group's relative share of the population. Other researchers have suggested that medical care should be withheld or denied to elderly since they otherwise will consume more resources than society has (Callahan 1987).

The description here is not unique for the Nordic countries, but for most parts of the world with well-developed welfare systems. Common for the mentioned visions are that they postulate a static society with fixed resources and that the increasing share of elderly will have larger demands than can be met by the available resources.

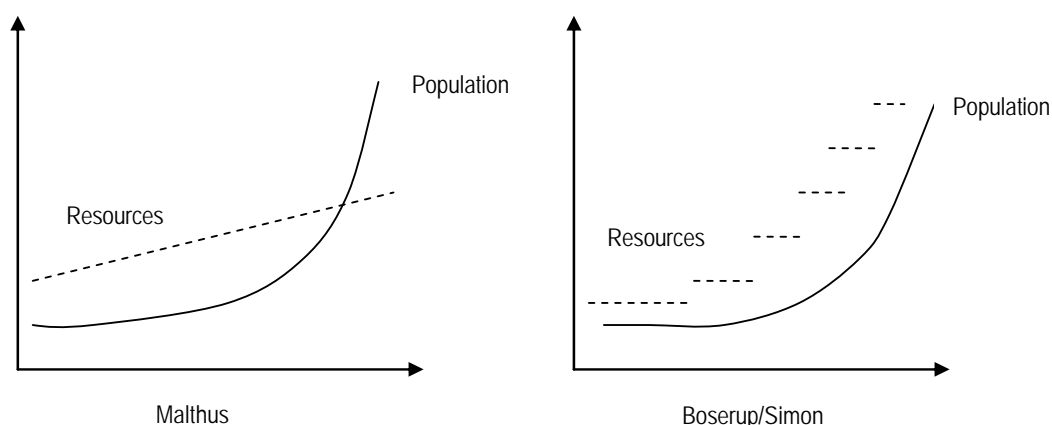
In the field of economic-demography Malthusianism is since long regarded as an obsolete theory. Malthus failed to include the implications of technological improvements and progress into his analysis; in modern science the presence of technological changes is a natural point of departure.<sup>14</sup> The Malthusian analytical scheme has been analysed thoroughly by *e.g.* Ester Boserup and Julian Simon.

---

<sup>13</sup> The author admits himself that his conclusions "cannot yet be considered as scientifically proven" (Lindh 2008, p. 10). These conclusions are based on the assumptions that we cannot increase productivity in public services or services for the elderly *and*, at the same time, we cannot maintain or improve the return on the pension fund investments. In a static society this will most certainly cause problems, but not in a dynamic one.

<sup>14</sup> The Malthusian argument is simple: when the population increases the same amount of resources must be divided by a higher number of persons which results in a smaller part for each person. At a certain point there will be more persons than the resources can provide for. Malthus suggested that the poor should not be given any support since they would only get more children, which would put even more pressure on the resources. By using *positive* and *negative checks* the population increase could be controlled (Malthus 1993). The *Malthusian trap* occurs when the resources are not sufficient to feed the population anymore, *i.e.* the population has become too numerous relative the available resources.

**Figure 4.1** The Malthusian vs. Boserup/Simon models.



Source: Rauhut (2009)

According to Malthus' model the size and growth of the population depends on the food supply and agricultural methods. Boserup (1965) opposes this by saying that the agricultural methods depend on the size of the population. While Malthus argues that in times when food is not sufficient for everyone the extra people will have to die, Boserup proves that in times of pressure people will find out ways to increase the productivity of food by increasing workforce, machinery, fertilizers, etc. A major point of her study is that "necessity is the mother of invention".

Simon (1981) launches a criticism of the conventional wisdom on population growth, raw-material scarcity and resource consumption. He argues that our notions of increasing resource-scarcity ignore the long-term declines in wage-adjusted raw material prices. Viewed economically, increasing wealth and technology make more resources available; although supplies may be limited physically they may be viewed as economically indefinite as old resources are recycled and new alternatives are developed by the market (Simon 1986). He challenged the notion of a pending Malthusian catastrophe, *i.e.* that an increase in population has negative economic consequences; that population is a drain on resources; and that we stand at risk of running out of resources through over-consumption. According to Simon (1981) population is the solution to resource scarcities and environmental problems, since people and markets innovate.<sup>15</sup>

<sup>15</sup> Simon (1981) was a response to Ehrlich & Ehrlich (1970). Julian Simon and the environmental Malthusians Anne and Paul Ehrlich have fought many debates (see e.g. Ehrlich & Ehrlich 1996). Simon's arguments about the beneficial nature of population growth were not generally accepted when he presented them, but, nevertheless, he contributed to a shift in opinion in the literature on economic demography from a strongly negative Malthusian view of population growth to a more balanced view.

The conclusion is that the Malthusian theory on population and its effects on economy do not stand up to an empirical examination, nor did it when Malthus presented his ideas. Malthus' ideas have never been proved as accurate in empirical studies, but it has been empirically proven that his theory is not valid. His ideas do, however puzzling, still turn up in the debate occasionally and lately in the debate on an ageing society (Rauhut 2009).

The inclusion of the postulate in the analysis that our resources are fixed creates an artificial and intriguing dichotomy; the starting point is that there are no more resources to add. Both Boserup and Simon have convincingly proved that resources are not fixed and limited.

### Static society

Another troublesome artificial dichotomy which has been included in the analyses of the impact of demographic changes on economic performance is the postulate of a static society. There is an inherent conflict between a static and a dynamic or evolving society. These two views cannot be combined. Rauhut (2009) opposes the theoretical arguments linking population to slower economic growth, in general, either concerning the impact of population change on the aggregate demand for goods or relating to the supply or production capabilities of the economy.

The *demand-side* argument postulates that the population growth rate governs the growth rate of the market and thus of the demand for both consumer goods and capital goods (e.g. housing, factories and machinery). Hence a declining population growth will discourage business since markets expand less rapidly, if at all (Easterlin 1996, Rostow 1998). The demand side arguments must be questioned since they postulate a *ceteris paribus* demand from the ageing consumers. Do the persons aged 65+ have the same preferences year 2008 compared to 1950 or 1873? No, they do not. Why should the preferences of this age-group be the same in 2050 as in 2008 then? A more likely development is that as the consumers become older their consumption will change which will open up new markets for services and products for this consumer group. Furthermore, the group of elderly persons is not a marginal consumer group, but a very large and thereby a politically influential voter group; if the market will not give them what they want, they will vote for it. Again, new markets will open up. New markets mean economic growth.

The *supply-side* arguments focus on the effects of factor supply and factor productivity. It is postulated here that a low or negative population growth will lower the average quality of the labour force, reduce the rate of capital accumulation and lessen the rate of technical change. In fact, it is postulated that there will be no institutional, organisational or technological adjustment or change at all as a response to a reduction in labour (Easterlin 1996, Rostow 1998). The supply-side postulates are a-historical and not based on empirical facts since we know that history is full of institutional, organisational or technological change as a respond to reductions in labour. The outcome has until now always been an increased productivity, wealth and welfare (Dillard 1967; Rider 1995; Easterlin 1996, Cameron 1997; Landes 1998, Schön 2000).

To sum up, both demand side and supply side arguments assume that society is static – no changes, neither technological nor organisational or institutional will occur. Furthermore, (1) most predictions are mere extrapolations of the current demographic situation, government expenditures, etc. That things actually could change in the future is seldom included in the models. (2) Most predictions keep all but the demographic variable constant, *i.e.* they are *ceteris paribus* calculations. If one variable changes, so will other variables – they will not remain unchanged. To base the predictions on *ceteris paribus* calculations is simply not realistic (Rauhut 2009).

#### Transferability of experiences

The United States have experienced many positive economic effects from immigration, historically to present times (O'Rourke & Williamson 2000, Borjas 2001). Can these positive experiences be transferred to the European countries if they try to open up for immigration by copying the U.S. immigration rules? Borjas (2001) argues that the relative success of immigration in the USA is unique. If the USA is an exception, it can be questioned whether the American experience can be transferred to the European countries.

A comparison of the labour market legislation in the U.S., the U.K., Germany and Sweden shows that all four countries represent different 'models' regarding labour market legislation, but the U.S. labour market legislation differs the most in the sense that it is very liberal indeed (Rönmar 2006). The ability of the labour market to absorb the immigrated labour is the key for a successful integration and economic utilisation of the immigrated labour something which makes the labour market legislation most important. The conclusion is that all experiences regarding immigration are not transferable between countries.

That the US has benefited from its immigration historically is beyond doubt (O'Rourke & Williamsom 2000); the same can be said until the 1970s. In the 1980s and 1990s the new immigrants to the US have started to face difficulties on the labour market which earlier cohorts did not face. At the turn of the Millennium the USA experienced similar problems with weak labour market integration, social problems etc. as many European countries experienced long before (Borjas 2001). The positive experiences of immigration to Sweden in the 1950s and 1960s have been replaced by less positive experiences in the 1980s and 1990s (Lundh & Ohlsson 1999). The conclusion is that experiences of immigration may differ over time.

It is not only when it comes to immigration when it can be questioned whether the positive effects are transferable or not. Fertility (family policy) and ageing (social policy) are highly dependent upon the national context. A policy on fertility or elderly care which has been successfully implemented in one country, may turn out to be a complete failure in another country since the policy context is different.



### Remittances over time

Merkle & Zimmermann (1992) confirm the hypothesis by Galor & Stark (1990) saying that the longer a guest worker stays in the country of residence, the fewer remittances is sent home since the guest worker spends more of his or her income on private consumption. After a certain point the country of origin will profit less of its emigrated labour and the country of residence will profit more of its immigrants. Furthermore, Straubhaar & Vadean (2005) conclude that remittances are usually spent on consumption, purchase of land and financial savings in the country of origin, which does not generate positive effects on the economy. This is in line with the findings of Straubhaar (1992) on the effects in Turkey of remittances from Turkish guest workers in Germany.

The two aspects mentioned here creates a dilemma – how long should guest workers stay or be allowed to stay to be as profitable as possible for both countries of origin and of destination? This dilemma is most likely related to the fact that this is a political highly sensitive question.

### *4.2.2 The question of causality*

Which came first – the hen or the egg? The question is very much the same if we discuss immigration: do immigrants head for regions with a high GDP growth or do regions with a high share of immigrants have a high GDP growth due to the immigrants? The question could also be raised in other areas: will an ageing population cause labour shortage? An ageing population will lead to relatively fewer persons in working ages, and a relative reduction of the labour force will then lead to a labour shortage. This seems logical, but is it true? Or will a labour shortage cause an ageing population?

The discussion here will focus around causality in the following issues: labour shortage, immigration, direct and indirect causalities and if demography is destiny.

### Labour shortage

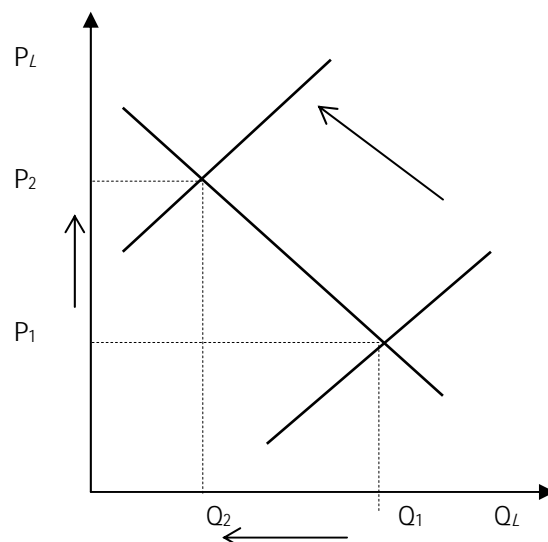
A labour shortage occurs when the overall number of new job openings exceeds the number of qualified new entrants in a national economy for a period of time. This does however not mean that there are an insufficient number of persons at the labour market. In a market economy, there is really no such thing as a true shortage. If you want more of something, you can pay more and have it. When employers say that there is a shortage of workers, what they really mean is they cannot get enough workers at the price they want to pay.

It is seldom that a country faces a labour shortage in its total economy at one and the same time. Usually, labour shortages spread across a wide range of occupations and skill groups. Furthermore, labour shortages can also be concentrated to certain geographical areas. In fact, matching problems, i.e. when labour has the wrong competence for the jobs or is allocated where it is not demanded for, is usually considered as “labour shortage”.

According to standard economic theory, the demand for labour depends on the fluctuations of short-term business cycles. In a short-term perspective, the opportunity cost of replacing labour with capital, i.e. investing in new technology, will be too high. If the labour shortage continues, or even worsens, over time, the opportunity cost of not replacing labour with capital will be too high. In a long-term perspective, labour shortage is not about being short of labour, but about lacking the capacity to adjust to the structural changes in the economy (Begg et al., 1987; Wonnacott & Wonnacott, 1986; Elliott 1991; Fallon & Verry, 1988; Schön, 1994, 2000).

A consequence of labour shortage is that the cost for labour will increase, which is illustrated in figure 4.2. When the quantity of labour,  $Q_L$ , diminishes, and the quantity moves from  $Q_1$  to  $Q_2$ , the price for labour,  $P_L$ , will move from  $P_1$  to  $P_2$ . As a result, a new equilibrium will be achieved.

**Figure 4.2** The Relation between the Quantity of Labour and the Price of Labour



It is possible to estimate the effects of changes in the relative prices of a factor commodity, according to economic theory, especially when it comes to the demand for that specific factor commodity and substitution effects. Given the assumption that a company is profit-maximising, the shortage of a factor commodity will result in an increase in its price. As a consequence, this specific factor commodity will be replaced by another, cheaper, factor commodity. If it is labour that is in relative shortage, capital will be substituted for labour. Elliott states that the “substitution effect distinguishes the firm’s reaction to the change in the relative price of capital and labour, holding constant the scale of production” (Elliott, 1991: 236).

Begg *et al.* state that “the substitution effect leads the firm to produce a given output using a technique which economizes on the factor that has become relatively more expensive. Thus, a rise in the wage rate of labour

leads to a substitution effect towards more capital-intensive production methods at each output" (Begg *et al.*, 1987: 214). According to Wonnacott & Wonnacott (1986: 723):

[I]n a competitive, fully employed economy, the wage rate increases as productivity increases. This conveys a clear message to those producers who can no longer afford the higher wage. The message is: society can no longer afford to have its scarce labour employed in your activity. There are now too many other, more productive pursuits. This may seem harsh, but it is the sign of economic progress.

An increase in wages is to be expected when labour is scarce, which leads to an increasing wage ratio in the production. When the marginal cost of a continued increase in production is higher than the marginal cost of substituting capital for labour, institutional, organisational and technological changes will be required in order to replace the scarce and expensive factor commodity labour in production. Despite using less labour, production will be kept up due to increased productivity. This is so not only because firms are profit maximising, but also because they are cost minimising! (Fallon & Verry, 1988).<sup>16</sup>

This reasoning is true given that the company is profit maximising and cost minimising. But what happens in the public sector? One way to deal with a relative change in the price of labour on a short-term basis in the public sector is that the increase in cost will be paid by the consumer of the commodity or service, *i.e.* the tax payers (Rauhut 2003).<sup>17</sup>

Historically, situations of long-term labour shortage have led to labour being replaced through technological, institutional and organisational changes. This has meant that productivity improvements have resulted in increased growth. The creation of an economic surplus through economic growth is a condition of welfare (Dillard, 1967; Rider, 1995; Cameron, 1997 and Landes, 1998). Technological, institutional and organisational changes, however, requires, a dynamic economic structure (Rauhut 2002, Rauhut & Kahila 2008).

Systemic labour shortages have been recorded historically when nations transition from wartime economies to peacetime economies, when widespread health problems or plagues devastate an economy, or when major innovation cycles such as the Industrial Revolution transform work organizations. Today, national and global demographic changes are a potential catalyst for a long-term systemic imbalance. Before we can say

---

<sup>16</sup> Fallon & Verry (1988) also provide an overview of the theoretical models used to describe the substitution of labour for, primarily, capital.

<sup>17</sup> In a long term perspective this is not possible. When the tax-pressure reaches a certain point the voters may react and call for an increased productivity to keep down the costs, and thereby the wage costs. If a labour shortage is a pricing problem, the public sector will face difficulties to deal with labour shortage. How will the public sector attract an adequate number of workers with an adequate competence when they cannot be paid a competitive salary?

something about the outcome of the predicted long-term systemic imbalance we need to know something about the causality, its direction and magnitude.

By regarding labour shortage as something negative *per se* we create a dichotomy in the sense that we include artificially extremes or poles in the analysis where reality is found somewhere along the *continuum*. Furthermore, this may also include a set of antagonistic concepts that are inherent conflict and cannot be combined in the analysis. What has been showed here is that the implications of a labour shortage depend on the context, *i.e.* it may sometimes be good and sometimes bad.

### Immigration

As was shown in chapter 3.1 there is no theoretical or empirical evidence that immigration *per se* will lead to positive or negative effects. Still immigrants tend to cluster around a few metropolitan areas in Europe, areas with a relatively high regional GDP (Vandermotten *et al.* 2004, 2005, ESPON 2005). In which direction is the causality – do immigrants head for regions with a high GDP growth or do regions with a high share of immigrants have a high GDP growth due to the immigrants?

In table A7 in appendix A it is shown that regions with high immigration can have both positive and negative regional GDP growth. Furthermore, although the regional number of immigrants per 1000 inhabitants showed positive effects on the regional GDP growth in the multiple regression models in appendix B, the overall explanation of demography on economic performance was about 10 percent. If regions with a high share of immigrants have a high GDP growth due to the immigrants the main explanation may be that these regions have well-functioning labour markets which are able to utilise the competence of immigrants labour rather than immigration will lead to a higher regional GDP growth *per se*. We cannot find any evidence for the latter in the results in appendices A and B.

If regions with a high share of immigrants do not have a high GDP growth due to the immigrants do immigrants head for regions with a high GDP growth? Not according to the *neoclassical macro theory* on migration, but according to the *Network theory* of migration and the *institutional theory* this is very likely. The *Refugee theory* and the *Migration Systems Theory* would also support this (Massey *et al.* 1993, Schoorl 1995).<sup>18</sup>

Some wise words regarding what effect immigration has on economic performance is made by Borjas (2001:ix): “Part of the problem is that the immigration debate, like most debates in social policy, frames the issue in black and white: one must be in favour either of wide-open borders or of highly restrictive immigration policies /.../ However, as with most things in life, there is a large range of options in varying shades of grey”. If we

---

<sup>18</sup> Recent studies on the immigrants' settlement patterns in Sweden show that the main determinant for the regional settlement is the share of previous immigrants in the regional population, while labour market related factors are unimportant (Rauhut & Johansson 2008, 2009).

consider immigration as either black or white, we run the risk to corner ourselves in a dichotomy of two antagonising extreme positions. This will, as Borjas, points out, not lead the debate on immigration and its effects forward.

#### Direct and indirect causality

Massimo Livi-Bacci, a prominent scholar in economic-demography, compared population changes and per capita income growth in 16 developed countries during the period 1870-1987. His conclusion was that "the economic performance of the countries considered bears no apparent relation to the intensity of demographic growth" (Livi-Bacci 1992:138). He reached a similar conclusion when he analysed 57 developing countries in the period 1965-1986: "The correlation between these two variables is nonexistent and the points on the graph are spread about in complete disorder" (Livi-Bacci 1992:186f.). The finding of Livi-Bacci (1992) is consistent with the findings of other scholars in the field (Kutznets 1967, Easterlin 1996, Rostow 1998). A similar result at a regional level was obtained in appendices A and B.

This discussion refers to the *direct* causality between demography and economic performance. An *indirect* causality can also, at least theoretically, exist between these two variables. An example of this is the economic effects of ageing in Sweden. A negative correlation exists between the GDP growth and the share of persons aged 65+ when a bivariate analysis is done. Does this mean that there is a *direct* causality between ageing and economic performance? No, it does not, but an *indirect* may exist: the increasing share of persons aged 65+ has led to an increased demand for low productive and labour intensive elderly care; the expansion of low productive and labour intensive services has led to a reduction in the GDP growth – not ageing *per se* (Rauhut & Malmberg 2003). The link in between demography and economic performance can actually be influenced and obtain an increased productivity through institutional, organisational and technological changes (Rauhut 2002, Rauhut & Kahila 2008).

#### Demography as destiny

No consensus exists on either the effects of demography on economic performance, or on how to solve (or at least mitigate), them. Firstly, our *knowledge is rather limited* in respect of the causality between demographic change and economic performance. In the Nordic countries the population has been gradually ageing since the mid-18<sup>th</sup> century. Nobody can however argue that the last 250 years have been a stagnant economic period (Rauhut *et al.* 2008). More research is then needed to fill the knowledge gaps in respect of the relationship and causalities between demographic change and economic performance. The second point deals with how to deal with these *challenges*. These demographic challenges are only to a minor extent really *demographic*. If central *institutions*, such as the labour market and the welfare systems/models, are dynamic, they will be able to adjust to whatever challenges lie ahead. This leads us to a third point, which is that the level of *policy awareness* regarding these and related issues is low (Rauhut & Kahila 2008).

The results in appendices A and B indicate that demography actually explain just 10 percent of the changes in the regional GDP growth, which is rather marginal. If this is so the demographic changes ahead will not be the determinant of the future economic development. Gaspar *et al.* (2005) showed in their study that an annual labour productivity increase of 1 percent in the ESPON area would lead to a lowered demand of foreign labour with 100,000 persons per year. Two remarks can be given to that result: (1) an average annual labour productivity increase of 1 percent in the ESPON area is a quite modest increase, and (2) an average annual total factor productivity increase of 1 percent in the ESPON area would decrease the demand for foreign labour even more.

There is actually little evidence that demographic changes, including migration, *per se* will cause changes in the economic performance. By considering demography as destiny we create an artificial dichotomy – we create two contradictory positions which cannot be combined: we either accept demography as a determinant of economic performance or we do not; consequently, by linking demography to economic performance, we hereby also support economic growth or we do not. That this political rhetoric is flawed is of little comfort as people tend to listen to it (Rauhut 2009). Alas, this does bias the policy making.

#### 4.2.3 Short- and long-term effects

It is of the utmost importance however to distinguish between long-term and short-term problems in relation to the issue of labour supply. Situations of long-term labour shortage have led to labour being replaced through technological, institutional and organisational changes historically, leading to productivity improvements. This has resulted in increased growth, and the creation of an economic surplus through economic growth as a condition of welfare. Short-term labour shortage is however a constantly recurring problem.<sup>19</sup> If the distinction between long-term and short-term labour supply problems is not made, the risk of an attempt being made to solve long-term problems with short-term measures, and *vice versa*, becomes very high. If this happens, the challenges now faced, be they demographic or otherwise, may become even more troublesome (Rauhut *et al.* 2008, ESPON 2005, Gaspar *et al.* 2005, Eðvarðsson *et al.* 2007, Rauhut & Kahila 2008).

The methodologically troublesome aspect here is that long-term demographic processes (e.g. ageing and fertility decline) and long-term economic processes (structural changes in the economy) occur simultaneous as short-term economic processes (business cycles) and short-term demographic processes (e.g. migration). This makes it even more difficult for policy makers to take the right decisions – the causes are multifaceted, the effects are blurred, and they must do something before the next general election. This will favour short-term actions to the demographic and economic processes we are experiencing.

---

<sup>19</sup> Who has not heard about the shortage of construction workers during an economic boom, and who has not heard of the abundance of construction workers during economic recessions?

The size of the labour force and the share of the labour force that is actually in work are, however, short-term aspects of economic growth, prosperity and welfare. Long-term economic growth, prosperity and welfare are determined by factors such as *e.g.* the capability to produce technological innovations, the social capability to adapt to new technology, the educational level of the labour force and the values in society towards economic activity and existing institutions. This has been pointed out by a number of prominent scholars in the field as well as Nobel Laurates (Abramovitz 1956, 1995; Gerschenkron 1952; Kuznets 1966; Lucas 1988; Romer 1986, 1987, 1990; Rostow 1960, 1990; Solow 1956, 1957). Still, the policy debate is dominated by short-term issues such as labour immigration and how to make elderly workers postpone their retirement.

In one sense the issue on long- and short term perspectives constitutes a dilemma – we are in a situation in which a choice must be made between undesired alternatives – but we are also facing dichotomies: (a) the long- and short term perspectives can be viewed as a set of antagonistic perspectives that are inherent conflict and cannot be combined, and (b) the long- and short term perspectives display extremes or poles where the solution is found somewhere along the *continuum* or in both of them. As long as the issue of long- and short-term perspectives in the policy making related to the interrelationship between demography and economic performance the policy outcome will be biased and, ultimately, not solve the problems.

### 4.3 Spatial aspects

Neither the economic performance nor demographic development is spatially neutral, *i.e.* we can expect geographical differences. Some regions are rich, with high employment rate, low unemployment and a high regional GDP growth, while other regions show the opposite performance. Also demographic indicators – *e.g.* age structure, fertility and net migration – show regional geographical differences.

Within each region we can also expect to find a rich local variation when it comes to demography and economic performance. Despite this well-known fact almost all studies on the interrelationship between demography and economic performance is undertaken at a national level.

**Table 4.1** Spatial aspects of demography

	Age	Migration	
	Structure	Immigration	Emigration
National			
Regional			
Local			

In this subchapter the different spatial demographic development will be discussed as it can be assumed to have some sort of impact on the interrelationship with economic performance and vice versa.

#### 4.3.1 The national level

It is not very surprising that countries in Europe show heterogeneity for demographic variables relative the EU average value; on the contrary, we expect to find different developments in different countries. The EU average share of population aged 65+ years in 2005 was 16.4 percent, but the national values range from 11.1 to 19.8 percent. Nor is it surprising to find that the national net migration rates per 1000 inhabitants vary between -2.6 and 19.2, with an EU average on 3.4. Also the total fertility rate shows a variation between countries (see table 4.2).

This description is not only valid for demographic indicators, but also for economic. The economic structure is different in different countries, the GDP growth is different, the share of economically active persons and unemployed differs between different countries.

**Table 4.2** Three demographic indicators at national level and EU level 2005

	Share of population aged 65+ years 2005	Annual net migration per 1000 inhabitants 2005	Total fertility rate (TFR) 2005
EU	16.4	3.4	n/a
BE	17.2	4.9	n/a
BG	17.1	0.0	1.31
CZ	14.0	3.5	1.28
DK	15.0	1.2	1.80
DE	18.6	1.0	1.34
EE	16.5	0.1	1.50
IE	11.1	16.1	1.86
GR	18.1	3.6	1.33
ES	16.8	14.9	1.35
FR	16.2	1.4	1.94
IT	19.8*	5.2	1.32
CY	11.9	19.2	1.42
LV	16.5	-0.2	1.31
LT	15.1	-2.6	1.27
LU	14.1	13.2	1.66
HU	15.6	1.7	1.31
MT	13.3	2.4	1.38
NL	14.0	-1.4	1.71
AT	16.0	6.9	1.41
PL	13.1	-0.3	1.24
PT	17.0	3.6	1.40
RO	14.5	-0.3	1.32
SI	15.3	3.2	1.26
SK	11.6	0.6	1.25
FI	15.9	1.7	1.80
SE	17.2	3.0	1.77
UK	16.0**	2.9**	1.78
IS	11.8	13.2	2.05
LI	11.1	4.0	1.49
NO	14.7	4.0	1.84
CH	15.8	4.3	1.42

\* 2006

\*\* 2004

Source: Eurostat

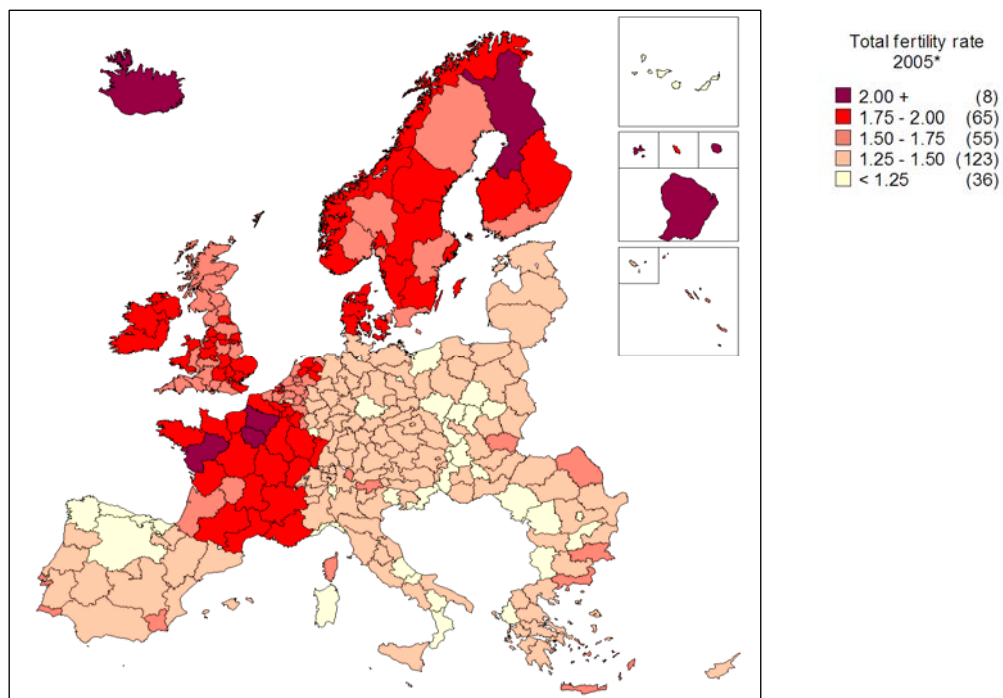


#### 4.3.2 The regional level

Just as differences between countries in Europe exist, differences between regions of the European countries exist. This is true for both demographic as well as for economic indicators. Maps 1-3 illustrate the regional heterogeneity regarding the total fertility rate, the annual net migration per 1000 inhabitants and the share of population aged 65+ years in Europe. The description of the European territory in maps 1-3 is completely different from the description in table 4.2.

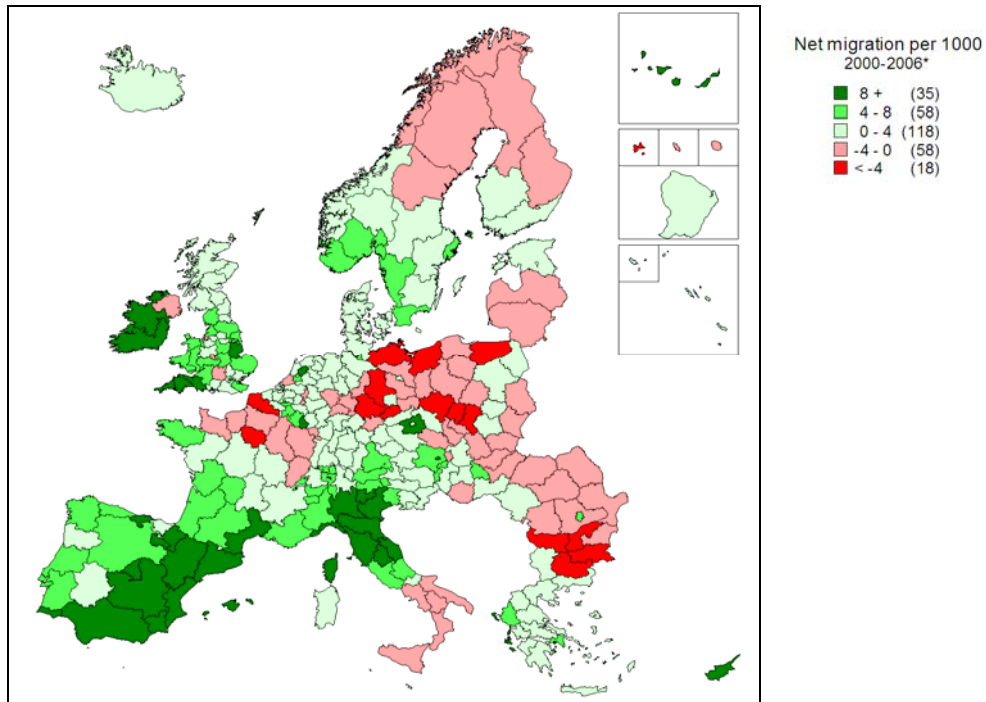
Regarding fertility, countries like e.g. Finland and France show large regional differences, while Denmark and Czech Republic show almost no regional differences in the total fertility rates. When it comes to the average annual net migration per 1000 inhabitants 2000-2006 the Nordic countries, Italy and France show a marked north/south division – outmigration areas in the north and immigration areas in the south. In Italy the out migration areas are in the south and the immigration areas are in the north.

Map 1 Total fertility rate (TFR), EU NUTS 2 regions, 2005\*



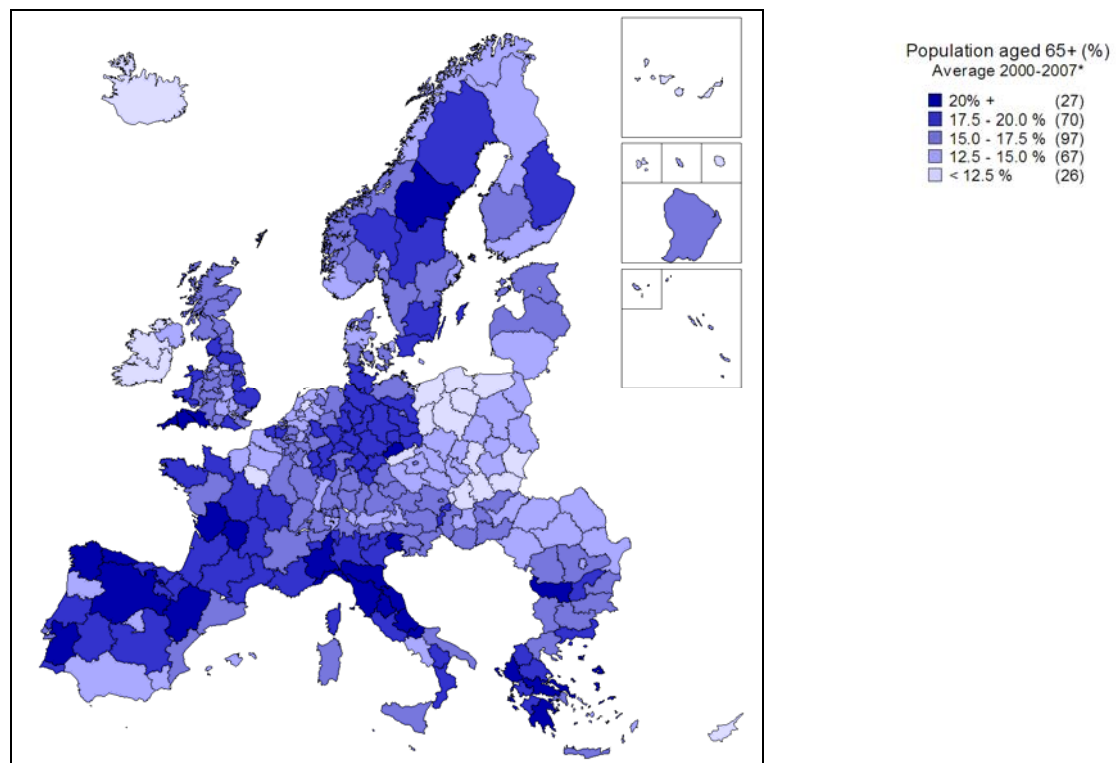
\* BE estimated, DE41 & DE42 aggregated, DK 2006, UK 2004 (UKM5 & UKM6 aggregated)

Map 2 Annual net migration per 1000 inhabitants, EU NUTS 2 regions, average 2000-2006\*



\* AT,BE,CY,IS,LI,LU,PL 2000-05, CH 2001-06, DE 2003-06 (DEE0 03-05), DK aggregated, IE 2000-01,04-05, IT 2000-01,03-05 (ITG2 00-05), MT 2003-05,UK 2002-04 (UKM5 & UKM6 aggregated)

Map 3 Share of population aged 65+, EU NUTS 2 regions, average 2000-2007\*



\* AT,BE,FR 2000-06, BG,SI 2006-07, DK 2001-07, UK 2000-04 (UKM5 & UKM6 aggregated)

The regional settlement patterns by immigrants are of interest here as well. It is implicitly assumed that immigrants will allocate themselves evenly in geographical term. This is however not the case. Approximately six out of 10 immigrants to Denmark, Finland, Norway and Sweden settle in the capital area and one or two of the major cities (Eövarðsson *et al.* 2007). London, Paris and Milan/Rome attract approximately 40 per cent of the immigrants to each country; in Germany a majority of the immigrants settle in the major metropolitan areas around e.g. Ruhr, Hamburg, Munich and Berlin, while the rural areas dominated by agriculture are the areas attracting most immigrants to Spain (Vandermotten *et al.* 2004, 2005, ESPON 2005).

Although there is a metropolitan focus of international migration exceptions exist. International migrants from within the European Union have a much more even spread of destinations across cities and regions than extra-European immigrants. Migrants from central and Eastern Europe countries that joined the EU in May 2005 are found throughout the UK and particularly in rural areas (Bauere *et al.* 2007). The attractive regions to immigrants have also changed over time in Sweden. The three metropolitan regions in Sweden have always attracted most immigrants, but the attractiveness of the other regions has changed (Johansson & Rauhut 2008a, Rauhut & Johansson 2008).

Furthermore, immigrants are not a homogeneous group; different groups of immigrants have different settlement patterns. In the U.K. the black Africans are concentrated to London (Rees & Butt 2004). Significant differences in the settlement patterns for 10 different immigrant groups have been identified in Sweden (Johansson & Rauhut 2008b, Rauhut & Johansson 2009).

Most rural regions with high immigration in Europe are mostly just transit camps for refugees and asylum seekers. These immigrants stay until they have acquired resident status and then move to cities where jobs are available through their ethnic communities.

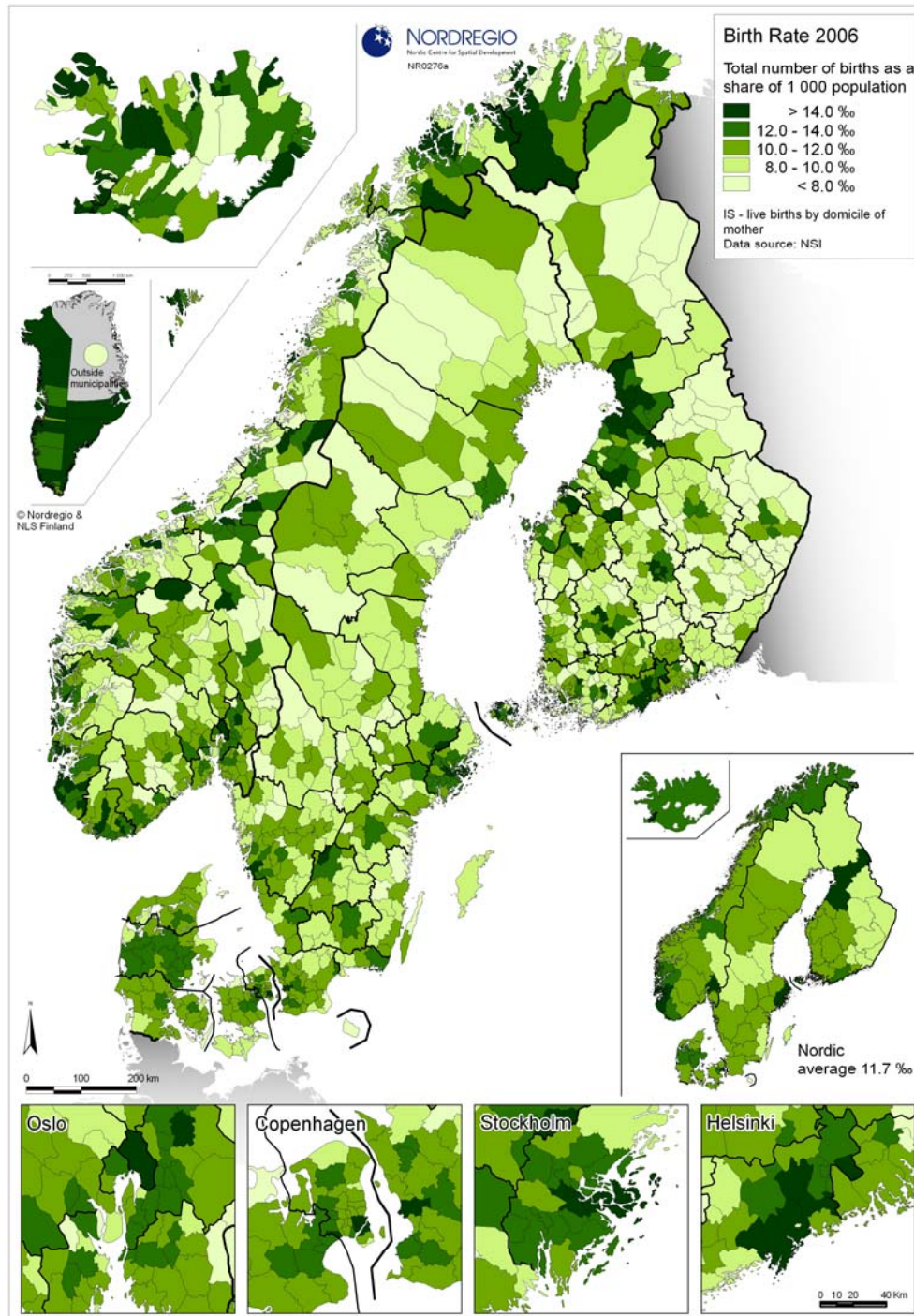
Map 3 illustrates the share of persons aged 65+. Regions in peripheral Europe – Sweden, Finland, Bulgaria, Greece, Italy, and the Iberian Peninsula – appears to have more marked areas with very high shares of persons over 65+ years in the population. At the same time peripheral countries like e.g. Poland, Slovakia, Cyprus, Ireland and Iceland have very low shares of persons over 65+ years in the population. The only thing for sure regarding the share of persons over 65+ years in the population in Europe is that it is not evenly distributed spatially.

Common for all the three illustrated indicators is that they all show that the demographic development in Europe is heterogeneous and that the demographic development is spatially differentiated. The same can be said about economic indicators. This spatial differentiation regarding demographic development and economic performance has been identified in previous research (ESPON 2005, Gaspar *et al.* 2005).

### 4.3.3 The local level

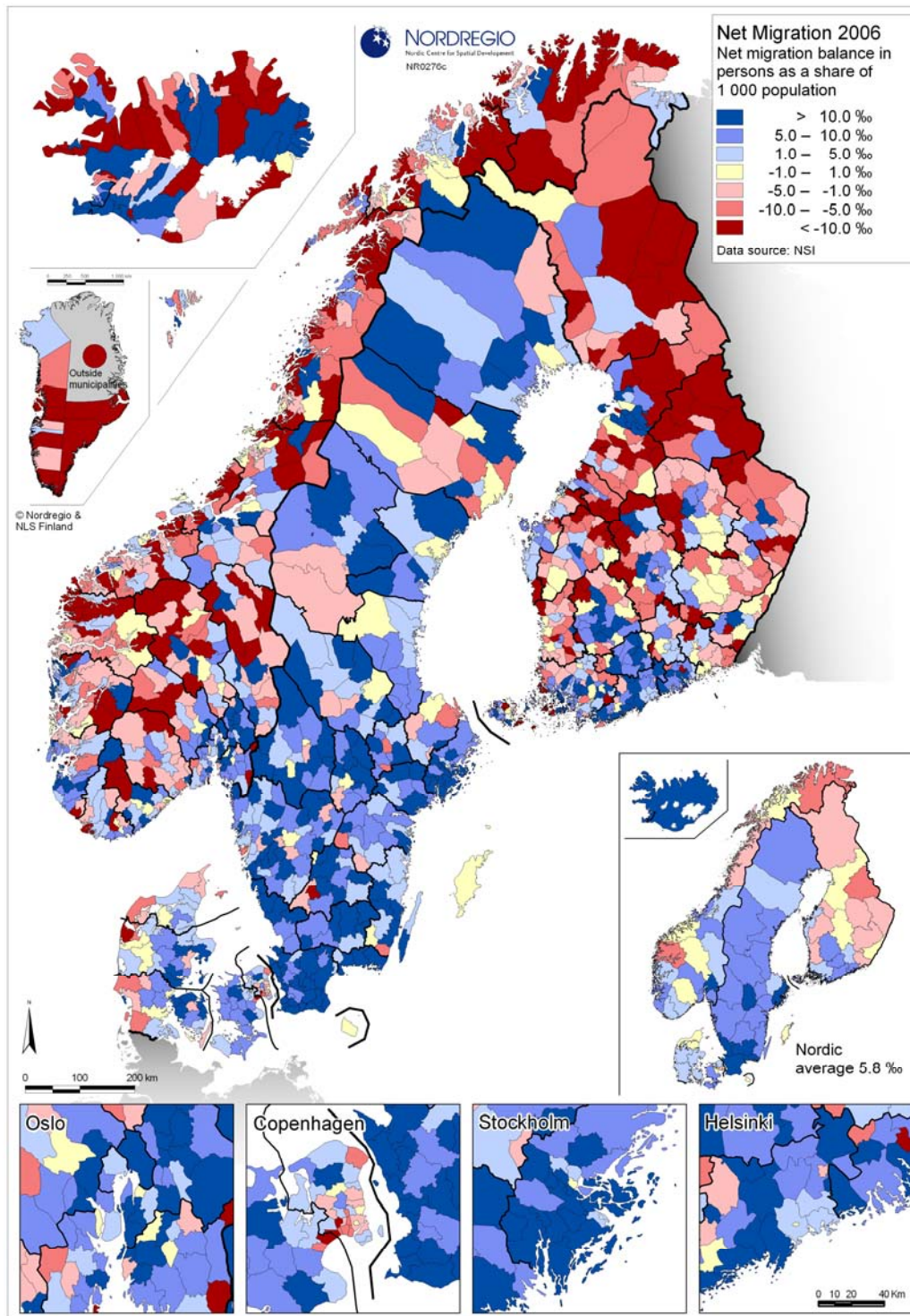
It would be ambitious to make an analysis of the three different spatial levels on the interrelationship between demography and economic performance for all countries and regions covered in this study. Only one geographical area will be discussed here – the Nordic regions – but the implications of differing findings at different spatial levels can be assumed to be the same in any European country.

**Map 4** Birth rate in the Nordic Countries in 2006, NUTS3 and NUTS5 levels



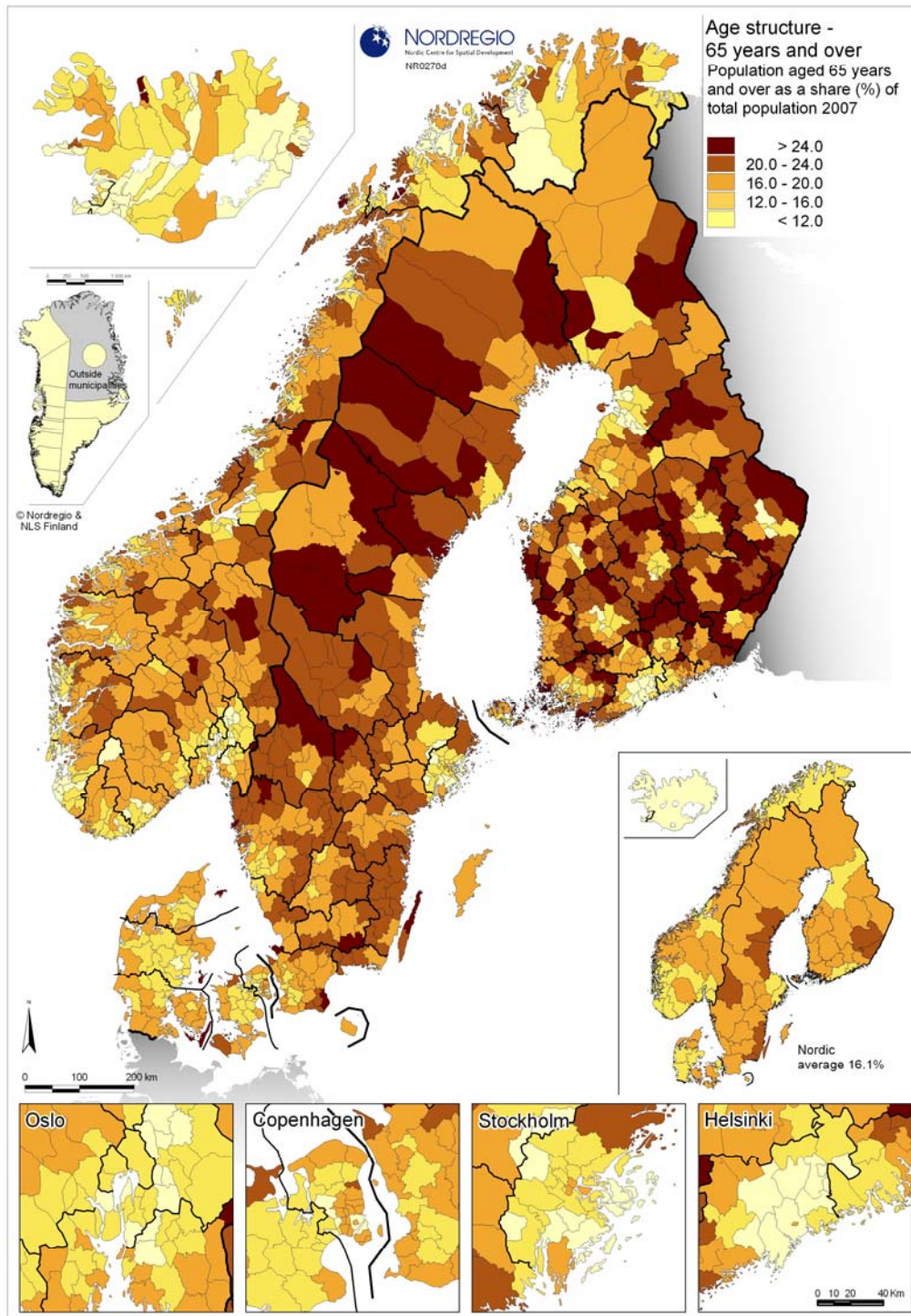
Source: Rauhut *et al.* 2008.

**Map 5** Net migration rate in the Nordic Countries in 2006, NUTS3 and NUTS5 levels



Source: Rauhut *et al.* 2008.

**Map 6** Share of population aged 65+ in the Nordic Countries in 2007, NUTS3 and NUTS5 levels



Source: Rauhut *et al.* 2008.

#### 4.3.4 One size fits all?

As this chapter 4.3 on spatial aspects of demography has shown, the demographic development in Europe is very multifaceted indeed. "One-size-fits-all"-policies addressed at the interrelationship between

demography and economic performance will simply fail due to this heterogeneity.

The average share of persons aged 65+ years in the Nordic countries 2005 was 17.2 per cent in Sweden, 15.0 in Denmark, 15.9 percent in Finland and 14.7 per cent in Norway (table 4.2). As indicated in map 3 they were not distributed evenly at a NUTS2 level, and at a NUTS3 level the uneven distribution was marked even more (map 6). In map 6 the local distribution (NUTS5) of the share of persons 65+ years in the population actually illustrates a patchwork: the whole range from below 12 per cent of the population to as much as 40 per cent of the population is covered. If e.g. net migration rates and fertility are analysed the findings on the national, regional and local levels are just as different as for the share of population 65+ years.

The conclusion is that the aggregated numbers at especially the national level, but also the regional levels, actually disguise a lot of regional and local diversity in the population structure. It is doubtful if policies aiming at mitigating demographic imbalances can be national – according to the principle ‘one size fits all’ – as the spatial diversity is so marked (Rauhut *et al.* 2008).

#### 4.4 Policy making and governance

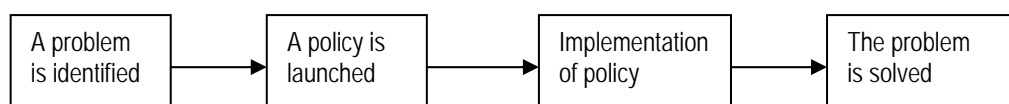
##### 4.4.1 How policy makers can intervene

In order to solve, mitigate or stimulate the effects of the interrelationship between demographic changes and economic performance, politicians and policy makers can intervene in the process. In general, they can do this by using two different approaches, a linear approach and a system approach.

##### 4.4.2 The linear approach

Let us now turn to a linear approach on the causality between demography and economic performance. First of all, in a linear approach to the causality between these two variables is given: it is assumed, *a priori*, that demographic changes will have an impact on economic performance. Secondly, the model for explaining the causality is endogenous – if exogenous variables are included the *a priori* assumption on a direct causality will not be valid anymore – which implies a demographic determinism on economic performance. Thirdly, the linear approach also implies that policy makers have a full control over the process: when a problem is identified policies can be launched and implemented, and it is assumed *a priori* that the policies will solve the problem.

**Figure 4.3** A linear approach



A fourth aspect worth mentioning is that the linear approach also implies a spatially homogenous process: the problem will be identical geographically and on different geographical scales. As soon as age groups or migrants are not evenly distributed geographically exogenous variables have to be brought into the explanatory model, and this will violate the original *a priori* assumptions.

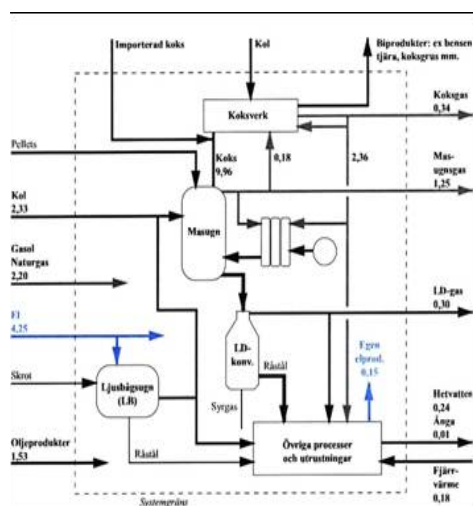
Furthermore, the linear approach has difficulties to include a time variable on the effects of demographic change to economic performance. Ageing is a long-term gradual process while labour shortage and a need for labour immigration is a short-term effect of the business cycle. As the causes of these to demographic problems different explanations are needed: if labour shortage and the need for labour immigration are effects of the economic business cycles the problem cannot be explained by demographic changes alone, i.e. variables others than demographic must be included in the analysis. This means, once again, that the original *a priori* assumption of demographic determinism is violated.

Finally, the linear approach implies a transferability of solutions between countries. As the economic performance is assumed to be determined by demography solutions in one country can be successfully transferred to another country. All differences in the institutional context – e.g. different labour market legislations, family policies, pension systems and legislation on immigration – are ignored. One such example is the belief that the successful experiences of immigration of labour to the USA can be transferred to other countries.

#### 4.4.3 A systemic approach

Contrary to the linear approach the system approach does neither postulate any demographic determinism nor any a priori assumptions on causality. Exogenous components are included in the process and loops between different variables exist. This opens up for potential adjustments and adaption to new conditions in the system.

**Figure 4.4** A systemic approach





It is difficult for policy makers to control the process and relationship between demography and economic performance as exogenous components are included. Implementation of policies to change the direction of the process in a desired direction may be counteracted by exogenous components or by loops in the system.

The implications of the system approach are so different from the linear approach. As exogenous components are included it can be assumed that the spatial effects of the relationship between demographic changes and economic performance will differ in process and outcome. Furthermore, it can also be assumed that there will be distinct differences in the short- and long-term effects of the relationship between demographic changes and economic performance. This is a logical result of the fact that the causality is not determined by an a priori assumption in the system approach. The result from the regression models in appendix B shows that about 10 per cent of the changes in economic performance can be explained by demographic factors, i.e. 90 per cent are explained by other factors than demography. Finally, since the 'system' is highly contextual, the system approach implies a limited transferability or even non-transferability.

#### *4.4.4 Conclusion*

The linear approach is based on several rather shaky assumptions, while the system approach appears to be less shaky. In terms of being realistic, the system approach is probably more realistic than the linear approach; few policy makers will however agree to this. This subchapter on policy making and governance indicates that there is a strong dichotomy present: the linear and system approaches are antagonistic and cannot be combined.

### **4.5 Summary**

Chapters 2 and 3 focused on the theories on the interrelationship between, on the one hand, changes in the age structure and economic performance, and, on the other hand, migration and economic performance. These chapters also presented the main findings from empirical studies regarding the mentioned interrelationships.

This chapter has focused on the methodological aspects of the interrelationship between demography and economic performance. The findings indicate a vast number of methodological problems studies on the interrelationship between demography and economic performance face. Many studies take their point of departure in postulates and *a priori* assumptions that can be questioned, the questions of causality is a tricky one since it is easy to end up in a 'hen' and 'egg' reasoning (which came first?), and analyses on short- and long-term effects are often avoided which probably can be explained by the fact that they can be counter-acting each other.

Most analyses on the interrelationship between demography and economic performance are made at an aggregate, national level but regional and local analyses will probably reveal a better picture of the underlying processes regarding on the interrelationship between demography and

economic performance. Sometimes the development in some regions is contradictory to the development at a national level, but the policies are made and implemented at a national level.

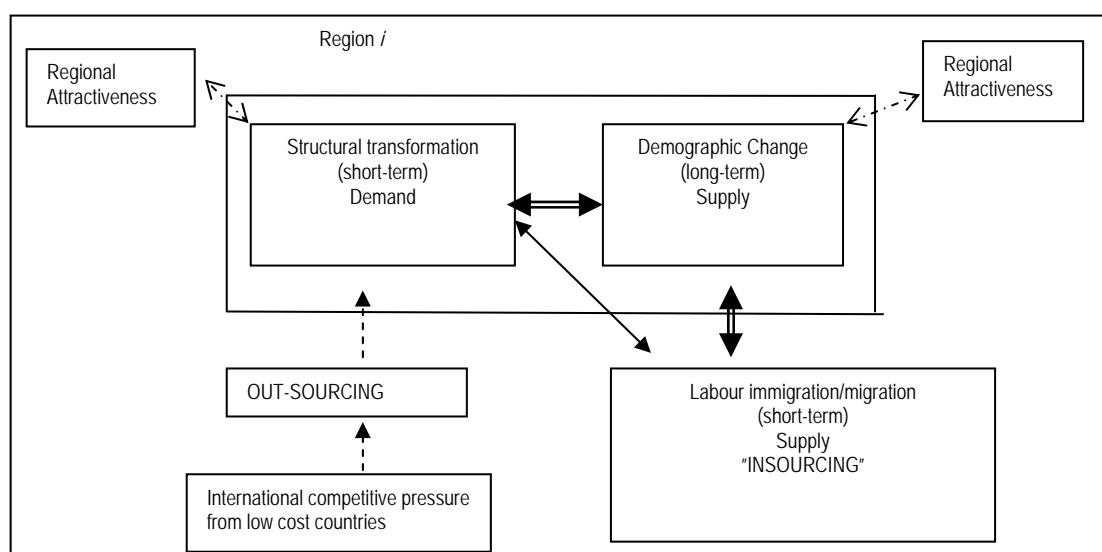
A last question which was addressed in this chapter dealt with the question on how policy makers can intervene: is the interrelationship between demography and economic performance a linear one, or is it systemic? The interrelationship between demography and economic performance is systemic, but we act as if it was linear. This is not a good method for approaching the challenges ahead.

## 5 Demography, migration and regional development

### 5.1 Demography

Eðvarðsson *et al.* (2007) argue that regional trends are to a large extent determined by the demographic changes in the incumbent population. Changes in fertility rates will gradually change the natural reproduction rate, which will in turn impact on the labour supply. It may potentially also change the quality of the labour supply due to endogenous mechanisms of adapting competences towards the service sector providing services for the increasing share of elderly people in the population. Demographic changes stand at the core of a “sustainable” economic development based on incumbent resources. The actual extent of such sustainability will depend on two factors. Policies directed towards families and children and its relative importance for different kinds of regions and the nature of regional attractiveness for families with children. The first of these reflects a policy mix determined at the national level designed according to national goals on demographic issues. The second will to a greater degree be in the hands of regional and local policy agents, as regional attractiveness for families with children could be expected to depend on the extent of public service provision for these kinds of families. These dynamics enter figure 5.1 under the label “Demographic Change (long-term) Supply”. They reflect long-term issues of labour supply. As indicated above they are also, to a certain extent, region specific.

**Figure 5.1** Regional intersections between demographic changes and economic performance



Source: Eðvarðsson *et al.* (2007)

## 5.2 Production

According to Eðvarðsson *et al.* (2007) each region undergoes structural transformation at the industrial level, which renders changes in the labour demand for given skills in the short and medium term. Changes in the composition of, and product portfolio within, sectors will change the demand in the regional labour market for low, medium and highly skilled labour and for specific competences associated with sector specificities. The impetus for these changes may originate from both regional trends as described above but also from the international competitive pressure associated with internationalization and the enlargement processes in e.g. the EU. The competitive pressure from “outside” may originate from changes in policies or from cross-sector externalities such as the reduction in transport costs due to technological changes in the transportation sector. This may lead to the exhaustion of previously regionalised strongholds in the production process in specific sectors. Policy change may relate to national or international measures. Such national measures could relate to the location of national knowledge resource centres, which may be pivotal for the location of specific sectors. The international policies discussed here relate to the inexorable move towards the integration of product markets and from the enlargement of supranational geographies of cooperation and integration. EU enlargement is one such example of the emphasis on extending market access to increase international trade thereby increasing the pressure on regional structural change. The importance of this issue is stressed by the large gap in GDP/capita measures for the accession countries relative to the incumbent countries.

The pressure to attain structural change may also originate from regional trends towards the exhaustion of regional resources. The presence of bottlenecks on the labour market and the resulting potential increases in regional wages will influence individual firms’ location choice relative to regions with ample labour resources at their disposal. The extent to which such pressures in relation to a dearth of regional resources in respect of regional competitiveness will materialize depends on the labour market mechanisms available to individual regional labour markets which have previously been analyzed in a number of studies.<sup>20</sup>

Individual firm choices will through these mechanisms be interconnected with the mass of individual choices taking place in a region. Individual choices by the incumbent population will in the medium and long run change the natural labour supply. Migration to other regions will add to the problem of sufficient and qualitatively inappropriate labour. Demographic changes in the incumbent population of the region will change the natural labour supply through ageing and the amending of fertility rates. Demographic renewal from other regions is one solution through intra-national migration. A counter argument here would pertain to the in-migration and immigration of low-skilled labour that prevents the necessary regional structural changes needed to preserve international

---

<sup>20</sup> At a Nordic scale they have been analysed in e.g. Stambøl *et al.* (1997, 1999), Persson (2001, 2004), Eðvarðsson *et al.* (2002, 2007).

competitiveness from occurring. In-migration and immigration may therefore be seen as both *the solution* and *the problem* at the same time depending on the match of competences in the flow of migrants and immigrants relative to the needed regional processes of industrial renewal.

Above all these mechanisms of interaction between regional trends determined by the choices of incumbent firms, individuals and international trends, in respect of competition from low cost countries and in-migration and immigration to a region, provide only a rather intangible form of regional attractiveness. This regional attractiveness will influence both the choices of individual firms and those of individuals and is thus endogenously determined. Regional attractiveness is to a large extent endogenous. It may however also capture trends in regional policies and preferences among individuals for certain characteristics of the region of residence. The exact outcomes in respect of regional attractiveness are accordingly diverse depending on the location of regions and the different policy measures at hand to promote regional attractiveness. The current approach is therefore to use the concept of *revealed regional attractiveness*. Regions are attractive if individuals and firms reveal their attractiveness by staying in or moving to a given region. This allows for a rather broad interpretation of regional attractiveness and avoids doubt as to on the proper measure to use when dealing with regional attractiveness.

One further aspect should however be stressed before proceeding with some of the theories that support the current setup. Figure 5.1 implies a potential timing problem. While regions may see structural transformation changing labour demand in the short-run, the demographic changes take place over the long-term. If firms make location and investment decisions based on current structural changes, supplemented by expectations of future changes in the demographic change, the temporary labour supply may not match the labour demand adapted to future regional demographic changes (Eðvarðsson *et al.* 2007).

### **5.3 Public consumption and social transfers**

Thus far only the regional relationships between demographic changes and *production* have been discussed. There is no doubt that the outcome of these processes affects *public consumption* and *social transfers* as well as the *tax base*. The tax base is directly linked to the size of the population in the working ages. If the tax base is too small to maintain a reasonable level of social services (consumption), tax transfers can be made from the state to the regions or between regions to compensate for an unfavourable age-structure in some regions. Social transfers, e.g. pension, sickness insurance and unemployment insurance, are financed by individual contributions and national taxes, and are thus not so vulnerable to a region's age-structure.

It is difficult to do a European comparison on the regional effects of demographic changes on public consumption since the welfare state is not

organised in the same way in the European countries.<sup>21</sup> An example of this e.g. that in Sweden elderly care and childcare are, predominantly, financed by local taxes and produced at a local level, which is not the case in all ESPON29 countries. Again, a negative age-structure will limit the ability to maintain these social services given the present institutional setting and organisation of welfare.

#### 5.4 Does demography matter?

Current trends in respect of demographic development have consequences for welfare production in the European countries. Not only have the increasing number of elderly burdened the welfare system, but they have also burdened those who constitute single households. Although the demographic changes ahead are well known and can be carefully planned for, not all parameters are certain. The demographic dependency ratio is not as important as the economic dependency ratio. While population projections can be made with a high degree of certainty, projections on e.g. unemployment are notoriously susceptible to error. We also know that technological innovations, as well as institutional and organisational changes, will occur and improve the conditions for welfare production, but we do not know which and when they will occur (Kautto 2002, Rauhut 2002).

Two aspects of the conclusions by Kautto (2002) are of interest here: (1) the regional aspect is missing, and (2) a development we currently consider to be troublesome can be mitigated or even solved by the occurrence of institutional, organisational and technological changes. We should perhaps ask ourselves two questions: (a) what are the spatial implications of the interrelationship between demographic changes and economic performance? The implications on economic performance by demographic changes can be expected to have different impact depending on if we are analysing the national, regional or the local level. The present organisation of welfare is produced given the present governance structure. If we know that this organisation of our welfare is not sustainable with regard to the demographic changes and the assumed economic performance we have to consider what the real problem is – the implications of the demographic changes or our unwillingness to revise a non-sustainable organisation of welfare production?

(b) What time frame are we analysing? Or is the interrelationship between demographic changes and economic performance indifferent to short- and long-term effects? The size of the labour force and the share of the labour force that is actually in work are, however, short-term aspects of economic growth, prosperity and welfare. Long-term economic growth,

---

<sup>21</sup> Healthcare, which is a public consumption good highly vulnerable to changes in the age-structure, is financed and produced at a national level in Norway. An unfavourable age-structure in some regions will be levelled out by favourable age-structures in other regions. In Sweden, healthcare is financed and produced at a regional level. In this case, an unfavourable age-structure will have a negative impact on the production and financing of this public consumption good.

prosperity and welfare are determined by factors such as e.g. the capability to produce technological innovations, the social capability to adapt to new technology, the educational level of the labour force and the values in society towards economic activity and existing institutions (Abramovitz 1956, 1995; Gerschenkron 1952; Kuznets 1966; Lucas 1988; Romer 1986, 1987, 1990; Rostow 1960, 1990; Solow 1956, 1957).

In the political debate today the short-term aspects of economic growth have a tendency to constitute the main focus of debate while the long-term aspects are seldom considered. The postulate that demography is a destiny should be questioned. Rauhut & Kahila (2008) argue that the future will be influenced not only by demographic processes (low birth rate, ageing population etc.), but also by the political and economic choices made by individuals and institutions in the ongoing adjustment process designed to help utilise scarce resources more efficiently.

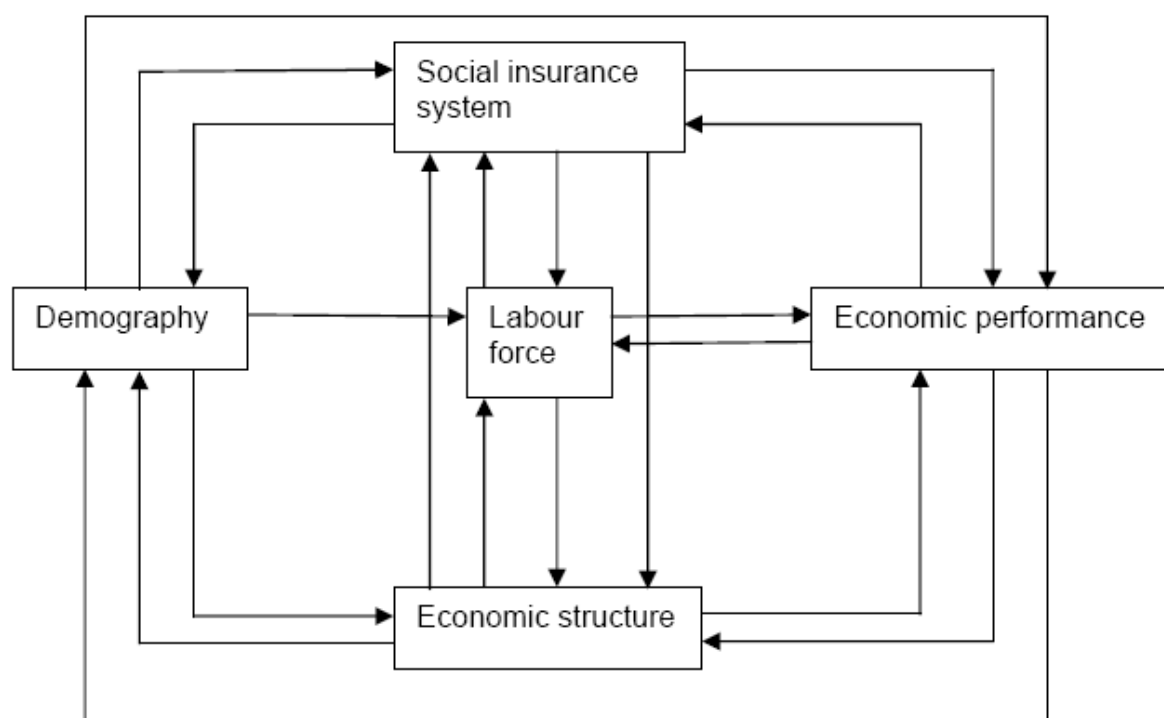
### **5.5 A synthesizing model**

That demography and demographic changes can influence the size of the labour force is not a controversial statement; baby booms and baby busts will influence the future size of the labour force, sudden changes in mortality will influence the size of the labour force and so will migration. The opposite causality, the size of the labour force, does not appear to be present; the size of the labour force does not influence demography and demographic changes. This is illustrated in figure 5.2.

Demography and demographic changes will influence the social insurance system. When the fertility increases more children are entitled to child allowances and the parents to the maternity/parental insurance, which will put some economic pressure on the social insurance system. The same is true when the number of persons reaching the retirement age. But the social insurance system can also have an impact on demography and demographic changes. Child allowances, housing allowances and maternity/parental insurance reduce the relative cost of children, something which stimulate fertility. Housing allowances and pensions have increased the standard of living for pensioners, which, in combination with generous sickness insurance, have increased the longevity.

The larger the relative size of the labour force is in relation to the total population the more persons are contributing financially to uphold the social insurance system. By its generosity the social insurance system have a great impact on the size of the labour force: a too generous social insurance system will create moral hazards.

**Figure 5.2** A synthesising model



The relative size of the labour force will have an impact on the economic performance and the economic performance also has an impact on the relative size of the labour force. During economic booms the good economic performance will encourage also marginal groups at the labour market to increase their participation rate and vice versa. Bad economic times will also lead to a rejection of parts of the labour force.

Related to this is the relationship between the labour force and economic structure. The structure, size and competence of the labour force have an impact on the economic structure. The economic structure has also an impact on the labour force: the economic structure demands a specific type of labour depending on the composition of the economic structure; computer engineers are not the first choice of demand in an economic structure based on agriculture, and fishermen are not the first choice of labour demand in an economy based on bio-tech industries.

Demography and demographic changes has an impact on the economic structure. An increasing number of pensioners will raise the demand for low productive and labour intensive services in the care sector. So will an increased fertility. An increasing number of immigrants may either stimulate the structural change in the economy – as the natives leave the sectors with many immigrants for other sectors – or it will counteract the structural change as low productive and labour intensive sectors will be kept going by cheap immigrant labour.

The economic structure has an impact on demography and demographic changes in the sense that areas with an old and stagnating economic



structure can cause an out-migration of young persons. This will bias the age structure and, as young women leave, the reproduction potential. Areas with an expanding and dynamic economic structure will attract young adults, which will create a favourable age structure in that region.

Furthermore, the economic structure influences the economic performance; the economic performance will differ between areas with an old stagnating economic structure and an expanding and dynamic economic structure. The economic performance can also stimulate a structural change of the economic structure.

A good economic performance will be able to finance a social insurance system, either directly or through the contributions of the policy holders. At the same time a too generous social insurance system can be an obstacle for good economic performance; parents, who are in the prime working ages, may leave the labour force for relatively long periods to be with their children instead of working and persons with valuable competence, human capital and experiences may choose to retire early leaving a gap in the labour force.

The economic performance is also influenced by demography and demographic changes. The magnitude of this impact is relatively limited, but it exists. This was shown in appendices A and B. Immigration may improve economic performance while total population increases and an increasing share of persons aged 65+ may reduce economic performance. At the same time economic performance has an impact on demography and demographic changes. Fluctuations in the business cycles impact migration and fertility.

The size of the social insurance system can have an impact on the economic structure as labour and resources are allocated to it and the economic structure can have an impact on the social insurance system. Given path-dependency an economic structure based upon a large public sector, including the social insurance system, can regenerate a large public sector, including the social insurance system and vice versa.

## 6 Policy implications

### 6.1 The points of departure

It is very difficult to list policy implications on the interrelationship between demography and economic performance. Some reasons for this can be stated: **(1)** the knowledge on what impact changes in the age structure and immigration have on economic performance in general is limited. The causality – both in terms of direction and magnitude – between demography and economic performance is, to say the least, unclear. Furthermore, there are no clear-cut results – neither theoretically, nor empirically – concerning the interrelationship between demography and economic performance. Studies using different theories, based on different assumptions, show different results.

**(2)** To large extent the limited knowledge we actually have is available at the national level, while only fragmented knowledge exists at a regional level. Relatively little knowledge however exists on the interrelationship between demography and economic performance at a regional level.

**(3)** It is also of importance to decide whether the interrelationship between demography and economic performance should be addressed with a linear policy approach or a systemic. A linear approach implies demographic determinism. In Appendix A and B it is shown that the presence of demographic determinism can be questioned. A systemic approach will limit the toolbox for policy-makers to control the process of the interrelationship between demography and economic performance.

**(4)** Last, but not of less importance, is the fact that much of the policy areas related to fertility, ageing, pension schemes, elderly care, labour market participation and integration of immigrants are subject to national policies. Even if the demographic development was identical all over Europe, we would find national differences in the interrelationship between demography and economic performance due to the national policy context in these policy areas (Vogel 2003). Policy areas such as economic growth and immigration are to some extent coordinated at a European Union level, but still the national policy context is of importance.

Given these important restrictions the scope of the policy implications will be relatively narrowed and limited. These restrictions are however so important that they simply cannot be neglected when discussing the policy implications of the interrelationship between demography and economic performance.

The policy implications described below are not listed in a hierarchical order, but are given the same weight and importance.

## 6.2 Ageing, age structure and economic performance

Policy questions regarding the policy implications of the interrelationship between age structure and economic performance are intimately related to the nation context. "The European Union displays a large variation in family structure, family formation, separations, fertility, and caring for the elderly and young. This variation reflects social practices of family traditions, as well as necessities given by the performance of labour market and welfare state in their role as welfare producers" (Vogel 2003:69). The demographic factors mentioned here are highly related to age and age structure, and as such they consequently affect the economic performance.

Ageing, *i.e.* the increase of the share of elderly persons, is not only caused by an increased longevity, but also by young adults moving out from, especially, rural and peripheral areas. The age structure is then biased and, if the out-migration of this group is significant and continues over time, the reproduction potential in the affected regions will be reduced. As the young women in fertile ages migrate fewer children will be born in these regions. To counteract this process especially the young women must be encouraged to stay or to return. In Norway young adults who move to the northernmost region get tax reductions and their study loans are written off if they move in and stay for a certain period of time. So far the effect appears to be positive. The external effects have been an enhanced territorial cohesion within the country. This policy should be appraised and reviewed to see if it can be adapted, with national modifications, to other remote, rural and peripheral areas in order to counteract the out-migration of young adults and thereby mitigate the process of ageing in these regions.

Other regions experience a rapid ageing due to the in-migration of elderly. An example of this is the pensioners' resort areas in Mediterranean regions. If the young adults migrate from these regions the ageing process will be further accentuated. To counteract this, an in-migration of a relatively young population of persons in working ages is desirable.

An increased fertility will affect the age structure and in a long term perspective mitigate ageing. The implemented policies on stimulating fertility have however so far been less successful than expected (Vogel 2003). To some extent this can probably be explained by the fact that the decision to have a child cannot be controlled by policy makers, *i.e.* the process is not linear. Successful policies to stimulate fertility should aim at reducing the alternative costs for having children, especially for women (ESPON 2005), which implies significant changes in the areas of family policy, social policy and labour market policy in many countries. These policy areas are national policy areas, and a coordination of these policy areas at a European level would lead to high transaction costs. Although a higher fertility is most desired the final decision on having children lies in the hands of the parents. The conclusion is that policies on stimulating fertility may be most desired, but difficult to implement successfully.

### 6.3 Migration and economic performance

Three important policy questions regarding the policy implications of the interrelationship between migration and economic performance will be addressed here. **(i)** Migration of labour is a short-term instrument for mitigating labour shortages caused by fluctuations in the business cycles. There is a spatial variation over the EU and ESPON territory regarding how the business cycles fluctuate and the composition of economic structures as well as in the employment ratio, unemployment, retirement age, share of different levels of education and economic activity of the population. We cannot expect the demand for labour to be evenly distributed over the EU and ESPON territory. Therefore policies aiming at stimulating mobility of the intra-EU mobility, including associated countries, should be promoted. This requires, however, coordination at a European level. The free mobility of labour is also one of the three central pillars in the EU-treaty. A promotion of the intra-EU mobility, including associated countries, will optimise the economic performance in the European Union since vacancies will be filled and high employment rates and low unemployment rates will enhance territorial cohesion within the European Union as well as international competitiveness.

**(ii)** The policies regarding immigrants from extra-EU countries should be reviewed and coordinated. Immigration is neither beneficial for the countries and regions receiving too many nor for the countries and regions receiving too few. This will neither enhance territorial cohesion nor international competitiveness. The issue is very much the same when different groups of immigrants are discussed. If immigration should be a stimulus to economic performance, both at a national level as well as at a regional level, a balance between labour immigrants, refugees, tied movers, exchange students etc must be reached. Coordination at European level will improve the possibilities of reaching such a balance, leading to an enhanced territorial cohesion and international competitiveness.

**(iii)** To ensure that extra-EU immigrants are distributed over the EU territory, so that the economic performance of the EU can be optimised, the Green cards should be issued to specific geographic areas. If labour is needed in remote and peripheral regions of the European Union extra-EU immigrants should be allocated there. Today extra-EU immigrants, in general, cluster around the 2-3 largest metropolitan areas of the western EU member states.<sup>22</sup> This does neither enhance territorial cohesion nor international competitiveness.

---

<sup>22</sup> Previous research has shown that the relative need of extra-EU immigration is larger in the new member states in Eastern Europe than in the member states in Western Europe. The demographic challenges with ageing are more accentuated in the East European countries than in the West European countries. Therefore extra-EU immigration should be allocated towards the areas with the greatest need to optimise the economic performance of the whole European Union (Gaspar *et al.* 2005).

## 6.4 Some recommendations

The results in appendices A and B indicate that it is difficult to talk about demography determining economic performance. In appendix A it is shown that the direct causality between demography and economic performance is significant, which indicates that we are not talking about a linear process. In appendix B the results from the multivariate regression model show that approximately 10 per cent of the changes in economic growth can be ascribed to demographic changes, i.e. approximately 90 per cent can be ascribed to other factors than demography. The consequences of this is that demographic determinism is questionable. Furthermore, the interrelationship between demography and economic performance is most likely systemic rather than linear. This result is of great importance for policy making; the recommendation is (a) to regard the impact of demography on economic performance as marginal, and (b) that the relationship between the two variables are systemic rather than linear.

Most studies on the interrelationship between demography and economic performance have been made at an aggregate national level. An aggregate national level shows, however, just the average of the different regions or municipalities. To implement policies aimed at mitigating problems that have occurred in the interrelationship between demography and economic performance at a national or to stimulate the development at a national level in a desired direction may not be very efficient. Some regions will receive too much stimulus while others will receive too little. The policy recommendation is that the focus shifts from the national level to e.g. a regional level whenever this is appropriate.

Some policy issues can and should be reserved for national policy making while other policy areas with regard to the interrelationship between demography and economic performance would be more efficient if they were coordinated at a European Union level. The different aspects of immigration policy are a good example of this.

Immigration is probably the best way to deal with the challenges to economic performance that might occur due to the process of e.g. ageing and a changed age structure. As shown in this report the causality between immigration and economic performance is not completely clear. Appendix B suggests that the effects of immigration on economic growth is statistically significant, but the overall effects of demography, i.e. including immigration, on the regional GDP changes is only about 10 per cent. Nevertheless, immigration is probably the most useful tool the policy makers have at disposal. The recommendations are that the intra-EU mobility should be stimulated; in case that the EU labour demand cannot be met by increased intra-EU mobility extra-EU immigration should be allowed. The extra-EU immigrants should be allocated to where they are needed, not to where they want to live. Finally, it must be kept in mind that labour immigration is a policy measure on short-term basis only – it cannot solve long-term problems.

## 7 Concluding remarks

Fertility, mortality and migration are analysed in demography via different theories and models, indicating that a unified and general theory of these demographic processes does not yet exist. Although the theoretical approaches to births, deaths and migration are quite different in terms of explanatory power, all are important in respect of the selection of indicators and in arguing for certain analyses. Population increase is, historically, predominantly a function of natural population increase in pre-industrial society with small migratory movements. Today, with higher mobility, low fertility rates, and in many cases natural population decreases, population development with regard to size and structure has increasingly become dependent on external migratory movements.

It must be emphasised that the causality – both in terms of direction and magnitude – between demographic changes and economic performance is, at best, unclear. To some extent we appear to be stuck in ‘the-hen-and-the-egg’ dilemma as science has not been able so far to show which came first. Personally I think that it is more likely that changes in the economic performance have a larger probability to trigger off demographic changes than vice versa. Still the issue on causality remains unclear.

The first argument for grounding this stance on a blurred causality relates to a number of theoretical issues. Most analyses are based upon parts of the *neoclassical* economic theory and, to some extent, *new classical* economic theory.<sup>23</sup> These two theoretical approaches find very negative implications from demographic changes (i.e. ageing, depopulation and labour shortage). There are, however, other economic theories, with different points of departure – and definitely not so market-oriented – indicating other results. The question is what result these theories produce. Furthermore, although it is a good starting point to analyse the *direct* economic effects of demographic change, several *indirect* effects - dealing with e.g. political, institutional, social and psychological aspects - undoubtedly also exist. These aspects can probably be better analysed by other disciplines. The question here is then what results these disciplines produce.

The second argument for grounding the conclusion that the economic effects of demographic change is that we tend to treat the issue as a novelty, something which has never previously occurred in history. This is very erroneous. Things like ageing, depopulation and, mass-migration labour shortage has happened before and we probably have lots to learn

---

<sup>23</sup> *Neoclassical economic theory* is a very market-oriented theory – all state activity will create bias on the market. The leading economists advocating the *new classical economic theory* are also leading neo-liberals. The relative income hypothesis and human capital theory have their roots in neoclassical economic theory and the life-cycle hypothesis has its roots in the new classical economics.

from how these problems were dealt with previously. It is probably not very difficult to find 'best' as well as 'worst' practices on how to deal with the problem when looking back in history.

There is also a third argument for grounding the above statement on indistinct causality between demographic changes and the economic effects which is related to methodological aspects. (1) The choice of indicators is dependent on what theoretical point of departure is used. As noted above only a few theories have been used to analyse this problem so far. (2) Most of the previous studies do not distinguish between the long and short term effects of ageing, depopulation and labour shortage when they analysing the economic effects of these processes. What can be seen as a devastating effect in the short term can also produce positive effects in long term, and *vice versa*. This *lacuna* in respect of our understandings of the long and short term effects economic of e.g. ageing, depopulation and labour shortage however narrows the ability of policymakers to make good decisions. (3) The final aspect worthy of mention here is the choice between a *macro* and *micro* economic approach to the problem. Thus far the *lifecycle* hypothesis has utilised a macro-approach while *human capital theory* has used a micro approach. It is undoubtedly the case, moreover, that the economic effects of e.g. ageing, depopulation and labour shortage will affect the state finances and all individuals of that country. There are, nevertheless, a number of public services produced by public actors other than the state – regional and local producers produce welfare and educational services. (4) The spatial aspects have, in general, been left outside the analysis. The results from any analysis depend on what spatial level is studied. Depending on what the population structure looks like in each and every region the implications of demographic changes will differ. Thus far most analyses have only dealt with national-level analyses of the average population while existing regional and local diversity is ignored. This is surprising since e.g. the European Union continues to advocate stronger regions. The absence of a *meso* level in the analyses is then rather puzzling. The *structural change hypothesis* operates however well at the meso level.

When putting all of these arguments together it is clear that we still have only a very fragmented knowledge of the causality between demographic change and economic performance – both in terms of direction and magnitude.

The policy implications discussed in this study have to take the fragmented knowledge of the interrelationship between demography and economic causality into account. The results point at the impact of demography on economic performance appears to be marginal and that the relationship between the two variables is systemic rather than linear. Furthermore, as the regional level probably is a more appropriate level for analysis on the interrelationship between demography and economic performance the focus should shift from the national level to a regional level whenever appropriate.

Some policy issues can and should be reserved for national policy making while other policy areas with regard to the interrelationship between

demography and economic performance would be more efficient if they were coordinated at a European Union level. The different aspects of immigration policy are a good example of this.

Immigration policies are probably the best tool the policy makers have to meet demographic and economic challenges. It must however be remembered that the causality between immigration and economic performance is not completely clear and that immigration is a short-term measure only and cannot solve long-term problems.



## Appendix A: A bivariate analysis

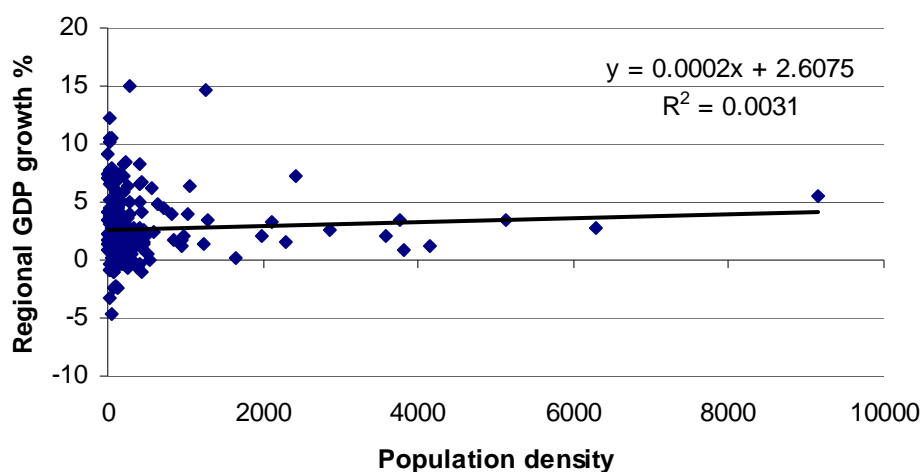
NUTS1 Germany and Scotland

NUTS2 Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, the United Kingdom (excl. Scotland)

No data on the regional GDP growth in % for Switzerland.

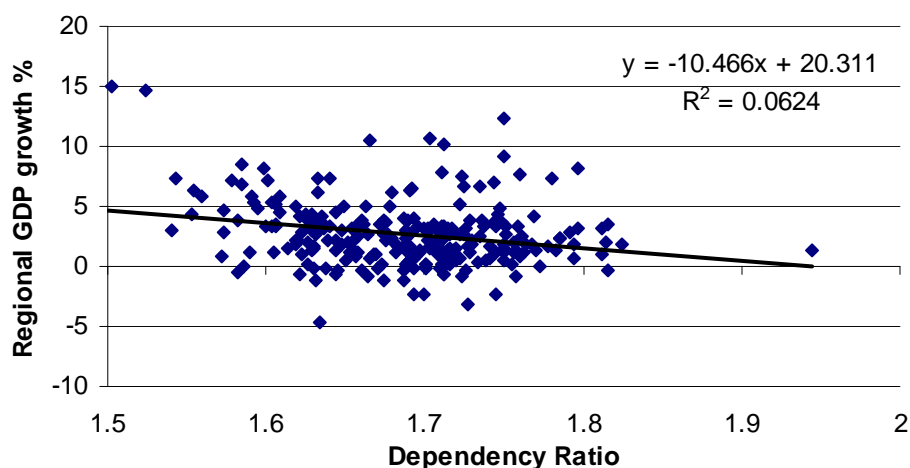
Source: Eurostat

**Table A1** Correlation between the regional GDP growth (%) and population density in 2005 (N=253).

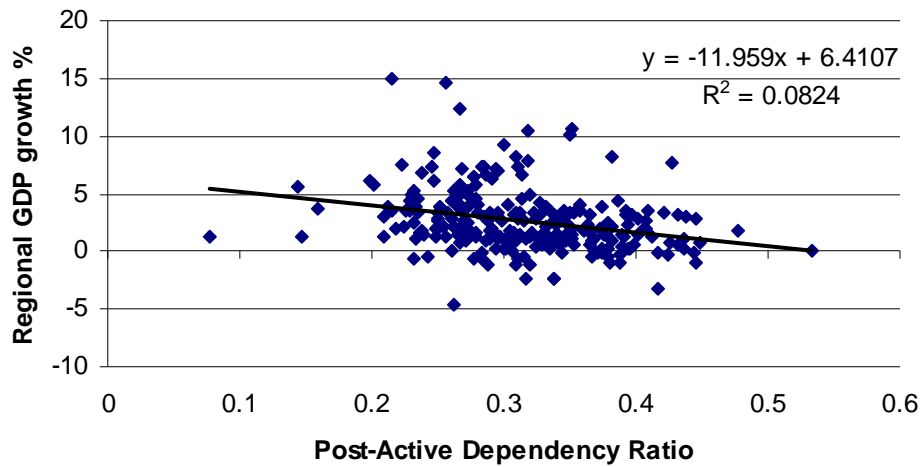


Note: Data on population density in the UK is from 2004.

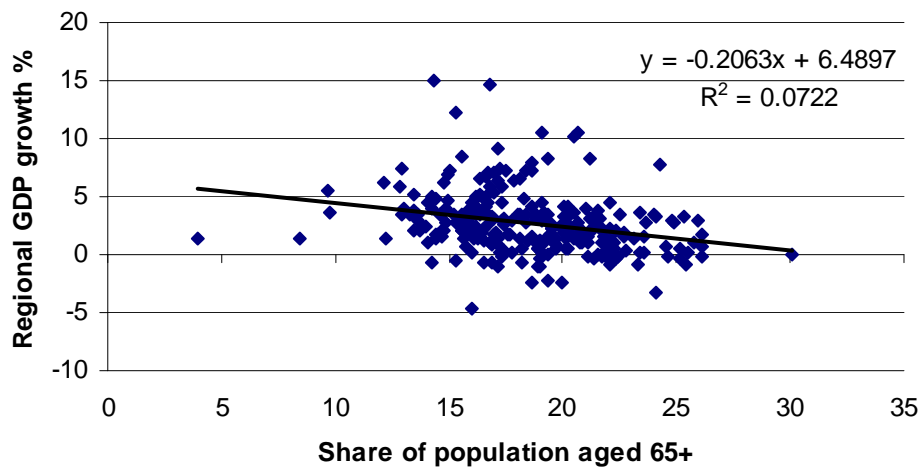
**Table A2** Correlation between the regional GDP growth (%) and dependency ratio in 2005 (N=253).



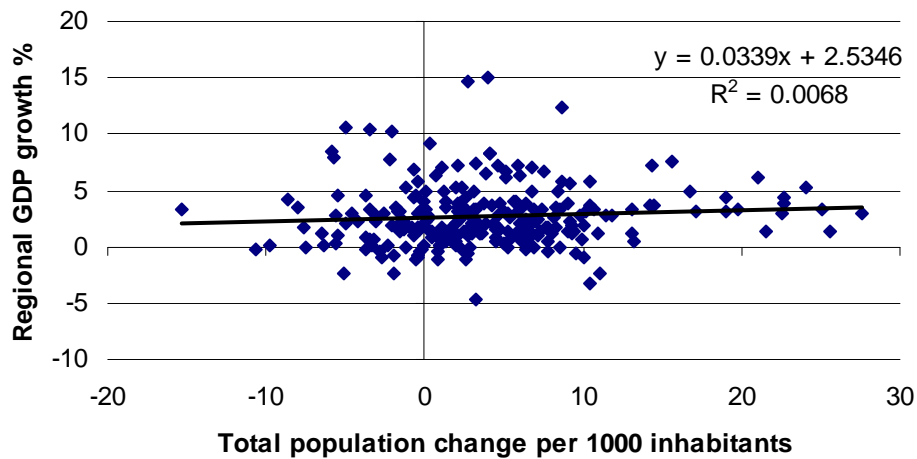
**Table A3** Correlation between the regional GDP growth (%) and post-active dependency ratio in 2005 (N=253).



**Table A4** Correlation between the regional GDP growth (%) and the share of persons aged 65+ in 2005 (N=253).

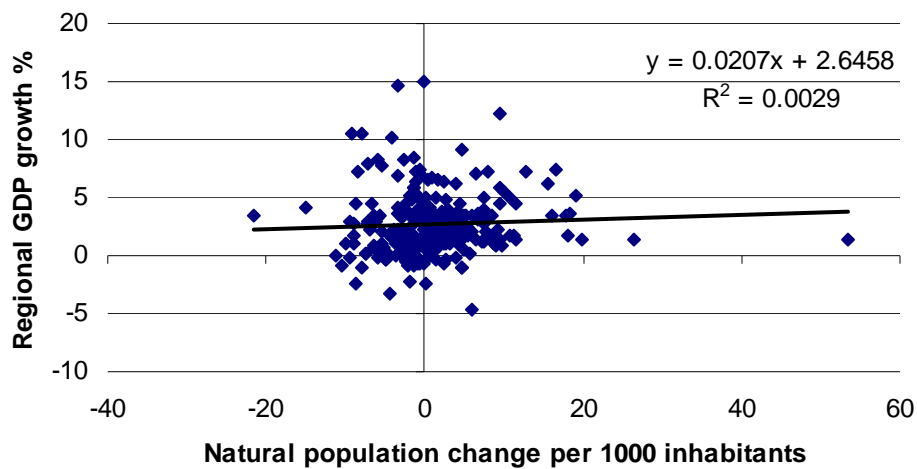


**Table A5** Correlation between the regional GDP growth (%) and the total population change per 1000 inhabitants in 2005 (N=253).



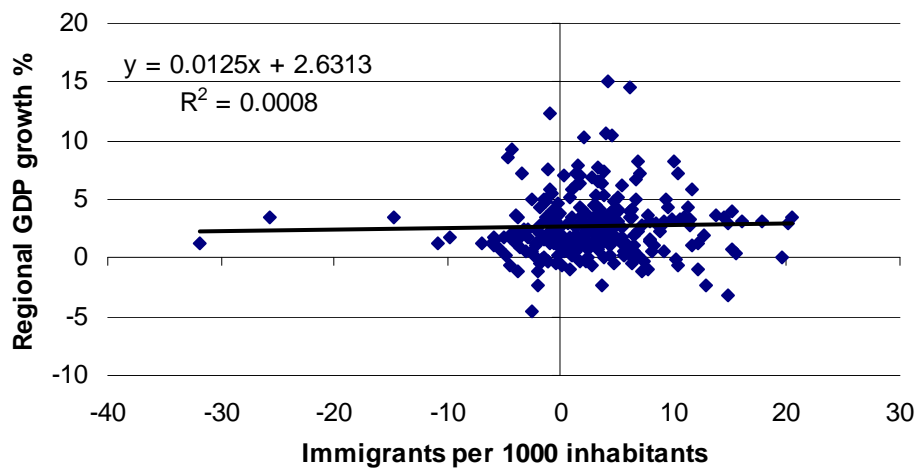
Note: data on total population change in the UK is from 2004

**Table A6** Correlation between the regional GDP growth (%) and the natural population change per 1000 inhabitants in 2005 (N=253).



Note: Estimated number of births for the two Irish regions; data on natural population change in the UK is from 2003.

**Table A7** Correlation between the regional GDP growth (%) and immigrants per 1000 inhabitants in 2005 (N=253).



Note: the number of immigrants is estimated as the residual from total population change and the natural population change. Estimated number of births for the two Irish regions; data on natural population change is from 2003 and total population change in the UK is from 2004.

## Appendix B: A multivariate analysis

### B.1 Introduction

In appendix A a bivariate analysis was made between the regional GDP growth (%) and seven demographic indicators. In this appendix a multivariate analysis will be made, in which the dependent variable Y (the regional GDP growth %) will be related to several independent demographic variables,  $X_1-X_n$ , at the same time. This method enables us to control for a subset of explanatory variables and examine the effect of a selected independent variable.

This appendix aims at analysing the direct impact of seven demographic variables on economic performance at a regional level in 2005.

### B.2 Data and method

The data used is the same as in Appendix A. A test for multicollinearity showed that the correlation between the variables *post-active dependency ratio* and *share of persons aged 65+* was  $r = 0,986$ . Since these two variables basically show the same thing the variable *post-active dependency ratio* has been omitted. There was no sign of multicollinearity between the other variables.

The number of analysed regions is 253. A multivariate cross-section OLS regression model is used for estimating the effect of demographic variables on economic performance in 2005. The dependent variable is the regional GDP growth in %, and the independent variables are population density, total population change/1000 inhabitants, natural population change/1000 inhabitants, immigrants/1000 inhabitants, the dependency ratio and the share of persons aged 65+.

Model A is specified as

$$\Delta Y_t = \alpha_1 + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \beta_5 X_{5,t} + \varepsilon$$

and model B and C are specified as

$$\Delta Y_t = \alpha_1 + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \varepsilon$$

The natural logarithm has not been calculated as the variables regional GDP growth (%), total population change/1000 inhabitants, natural population change/1000 inhabitants and immigrants/1000 inhabitants contain negative values. Therefore the coefficients will not express elasticities.

### B.3 Results

The results from the regressions are shown in table B.1. A large number of regressions were made, where the different independent variables were included/omitted in different constellations. The three 'best' models are shown below. They have the biggest explanatory results regarding the demographic impact on economic performance.

In model A the number of immigrants per 1000 inhabitants has a positive effect on economic performance which is statistically separated from zero at a 5 percent level. The share of persons aged 65+ has negative effect on economic performance which is statistically significant at the 0.1 percent level. The other variables have no statistically significant coefficients. In short, Model A shows that the higher regional number of immigrants per 1000 inhabitants the higher regional GDP growth and the higher regional share of persons aged 65+ the lower regional GDP growth.

How much does model A actually explain of the total regional GDP growth? The determination coefficient,  $adj.-R^2$ , show us that the regional demographic variables used in the regression explain 10.7 percent of the total regional GDP growth, i.e. about 90 percent of the regional GDP growth is explained by other factors than demography. Furthermore, the Durbin-Watson value should be as close to 2 as possible; in model A the D-W value is 1,476, which indicate that the model suffers from a first order serial correlation. The most common reasons for the presence of a first order serial correlation are 1) the relationship is quadratic instead of linear, 2) important variables are missing or 3) that the time-lags have been specified accurately (Ramanathan 1995). The problem here appears to be in line with number 2).<sup>24</sup> The conclusion is that the model is inaccurately specified as important variables are not included. This study, however, just focuses on the impact of demography on economic performance, so no attempts will be made at identifying the missing variables as they are not demographic.

---

<sup>24</sup> The regressions were run with quadratic residuals without any improvements. A 1-year time-lag was also included in the models, but then the D-W value was even lower.

**Table B.1** Multi-variate regression models. Dependent variable is Regional GDP growth (%) 2005. *t*-statistics within brackets

	Model A	Model B	Model C
Constant	14,526** (3,024)	9,104*** (7,540)	20,929*** (4,492)
Population density	-,008 (-,126)	,013 (,217)	-,025 (-,382)
Population change/1000 inhab.	-,135 (-1,586)	-,172* (-2,174)	
Natural pop change/1000 inhab.			,088 (1,232)
Immigrants/1000 inhabitants	,250* (2,447)	,314*** (3,654)	,021 (,293)
Dependency ratio	-,089 (-1,166)		-,259*** (-3,965)
Share of 65+ years old	-,397*** (-3,972)	-,463*** (-5,570)	
Adj. $R^2$	,107	,105	,054
Durbin-Watson	1,476	1,473	1,350
<i>F</i> -value	7,023***	8,427***	4,563***
d.f.	247	248	248

\*\*\* Statistically significant at 0.1 per cent level.

\*\* Statistically significant at 1 per cent level.

\* Statistically significant at 5 per cent level.

In model B the number of immigrants per 1000 inhabitants has a positive effect on economic performance which is statistically separated from zero at a 0.1 percent level. The share of persons aged 65+ has negative effect on economic performance which is statistically significant at the 0.1 percent level. The total population change per 1000 inhabitants has a negative effect which is separated from zero at a 5 percent level. The other variables have no statistically significant coefficients. In short, Model B shows that the higher regional number of immigrants per 1000 inhabitants the higher regional GDP growth, the higher regional share of persons aged 65+ the lower regional GDP growth and the higher total regional population increase per 1000 inhabitants the lower regional GDP growth. Since the total population change per 1000 inhabitants is very dependent on migration, the results for total population change and immigration are contradictory (immigration is good, but population increase is bad).

Model B has the same low explanatory value as model A – the demographic variables can explain about 10 percent of the regional GDP growth – but also the same low D-W value, which indicates that the model is misspecified.

In model C only the regional dependency ratio has a coefficient which is statistically significant: the coefficient for the variable dependency ratio indicate a negative effect which is statistically separated from zero at a 0.1 percent level. Model C only can only explain about 5 percent of the regional GDP growth and the D-W value is even lower than in models A and B.

#### **B.4 Concluding remarks**

The results by models A-C indicate that the *direct* impact of demographic variables on economic performance is rather limited. The *indirect* impact may be higher, but this has not been tested for in the regressions made. A second important conclusion is that since the direct impact of demography on economic performance appears to be rather limited the demographic changes will not be the determinants for economic performance in the future.

## Appendix C: Immigration and the dependency ratio

The dependency ratio, DR, is estimated by dividing the total population,  $POP_{tot}$ , with the number of persons in the assumed working ages 20-64,  $W_{20-64}$ :

$$DR = \frac{POP_{tot}}{W_{20-64}} \quad (C.1)$$

If  $x$  number of persons aged 20-64 immigrate,  $I_{20-64}$ , and these persons are assumed to have no families or dependants accompanying them and they are not assumed to be sick or become parents, the  $x$  number of persons belonging to  $I_{20-64}$  will be added both in the nominator as well in the denominator. Mathematically they neutralise each other, leaving no effect on the dependency ratio  $DR^*$ .

$$DR^* = \frac{POP_{tot} + I_{20-64} + D}{W_{20-64} + I_{20-64}} \quad (C.2)$$

If the  $x$  number of immigrants in the group  $I_{20-64}$  has dependents,  $D$ , accompanying them without working or they become sick or parents,  $D$  will be added in the nominator, but not in the denominator. The two  $I$ 's will neutralise each other leaving  $D$  in the nominator. The formula can then be re-written as:

$$DR^* = \frac{POP_{tot} + D}{W_{20-64}} \quad (C.3)$$

The effect will be that the dependency ratio without immigration, DR, will be lower, i.e. more favourable, than the dependency ration with immigration,  $DR^*$ . This can be expressed as:

$$DR < DR^* \quad (C.4)$$

This shows, mathematically, that immigration can lead to negative effects on the dependency ratio. It must, however, be remembered that the economic effects of immigration may be so large that the negative effects on the dependency ration shown here are marginal. An example of this could be that the immigrants are specialists with key competence, which the host country cannot do without. The economic consequences of them *not* coming are more troublesome than their impact on the dependency ratio. After all, as shown in appendices A and B, demography does not determine economic performance.

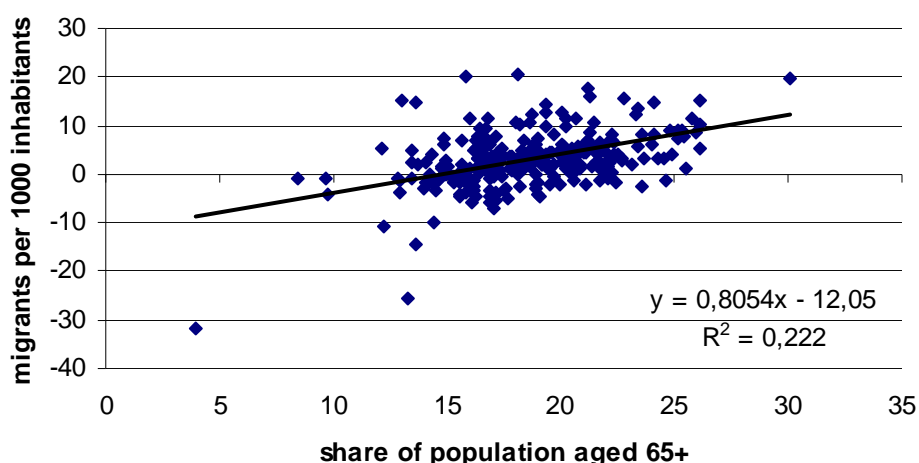


## Appendix D: Immigration and the share of population aged 65+

The migration data at the regional level in the ESPON countries is estimated as the residual between the total population change and natural population change. A consequence of this is that the shares of domestic migrants and international migrants are unknown. In Figure D.1 the number of migrants per 1000 inhabitants is correlated to the share of the population aged 65+ at a regional level in the ESPON countries. The result indicates a positive correlation between the two variables: the higher regional share of population aged 65+ the higher is the number of migrants per 1000 inhabitants.

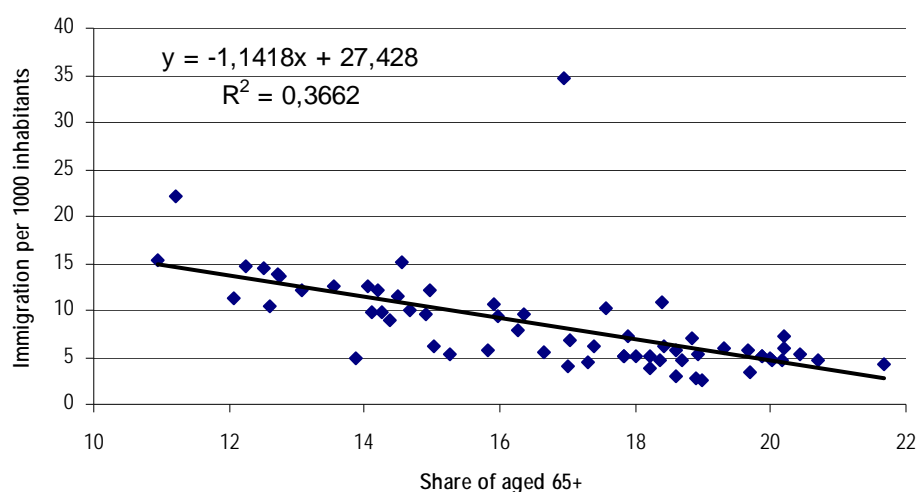
The policy implications of this result would be that immigration should be encouraged to regions with a high share of persons aged 65+. Figure D.1 implies that this process may be ongoing already. Areas in Germany, Spain and Italy all have a large share of persons aged 65+ as well as they receive many immigrants. Many peripheral regions with a high share of persons aged 65+ throughout Europe have refugee centres in which the refugees, if they receive a permit to stay, officially immigrates to; that they immediately move to metropolitan areas is not always visible in the migration statistics.

**Figure D.1** The correlation between migrants per 1000 inhabitants and the share of population aged 65+ in 2005 for the ESPON countries at NUTS2 level except for Germany and Scotland (NUTS1).



Data: See appendix A

**Figure D.2** The correlation between immigrants per 1000 inhabitants and the share of population aged 65+ in 2006 for the five Nordic countries at NUTS3 level.



*Data: Rauhut & Kahila (2008)*

The NUTS2 level (Germany and Scotland at NUTS1 level) is however a relatively aggregated territorial level which conceals a significant regional variety. A more appropriate level of analysis would have been at NUTS3. In figure D.2 the number of immigrants is correlated to the share of persons aged 65+ at NUTS3-level for the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). The result differs from the previous one.

Figure D.2 shows that there is a statistically significant negative correlation between the number of immigrants and the share of persons aged 65+ at NUTS3-level in the Nordic countries; the higher share of persons aged 65+ in the regional population the fewer immigrants per 1000 inhabitants. The policy implications of this result are quite different from the policy implications in D.1.

First of all, the data in D.1 and D.2 are not fully homogenous which means that the results should be interpreted with caution. Secondly, the results show, nevertheless, that the demographic processes at NUTS2 and NUTS3 levels can be completely different, i.e. the territorial level is of importance when analysing these kinds of problems. Thirdly, a result obtained for the whole ESPON territory may not be valid for meta-regions in the ESPON area, i.e. the demographic processes in the Nordic countries may actually diverge from the average process in the ESPON countries. This is important to acknowledge for policy makers.

## List of maps, figures and tables

### Figures

4.1	The Malthusian vs. Boserup/Simon models	p. 26
4.2	The Relation between the Quantity of Labour and the Price of Labour	p. 30
4.3	A linear approach	p. 43
4.4	A systemic approach	p. 44
5.1	Regional intersections between demographic changes and economic performance	p.47
5.2	A synthesising model	p. 52

### Maps

1	Total fertility rate (TFR), EU NUTS 2 regions, 2005	p. 37
2	Annual net migration per 1000 inhabitants, EU NUTS 2 regions, average 2000-2006	p. 38
3	Share of population aged 65+, EU NUTS 2 regions, average 2000-2007	p. 38
4	Birth rates in the Nordic Countries 2006, Nuts 3 and NUTS 5	p. 40
5	Net immigration rate to the Nordic countries 2006, Nuts 3 and NUTS 5	p. 41
6	Per cent 65 years and older in the Nordic Countries 2007, Nuts 3 and NUTS 5	p. 42

### Tables

4.1	Spatial aspects of demography	p. 35
4.2	Three demographic indicators at national level and EU level 2005	p. 36

## References

- Abramovitz, M. (1956) "Resource and Output Trends in the United States Since 1870", *American Economic Review*, Papers and Proceedings (May 1956), 5-23
- Abramovitz, M. (1995) *Tankar om tillväxt*. Finland: SNS förlag
- Andersen, T., Holmström, B., Honkapohja, S., Korkman, S., Tson Söderström, H. & Vartiainen, J. (2007) *The Nordic Model – Embracing globalization and sharing risks*. Helsinki: ETLA
- Angell, I. O. (1991) " 'Brain Drain' in the United Kingdom", in Angell, Ian O. and Kouzminov, V. A. (eds.) *Report of the Working Party on „Brain Drain Issues in Europe“*. UNESCO Regional Office for Science and Technology for Europe.
- Akbari, A.H. (1989) The Benefits of Immigrants to Canada: Evidence on Tax and Public Services", *Canadian Public Policy* 15
- Ásgeirsdóttir, B. (2005) "Conclusions", in *Migration, Remittances and Development*. Paris: OECD Publishing
- Bauere, V., Densham, P., Millar, J. & Salt, J. (2007) "Migrants from central and eastern Europe: local geographies", *Population Trends* 129, 7-91
- Becker, G. S. (1960) *An Economic Analysis of Fertility*. NBER: USA.
- Becker, G. S. (1964) *Human Capital. A Theoretical and Empirical Analysis with Some Special References to Education*. Chicago & London: University of Chicago Press
- Becker, G. S. (1965) "A Theory of the Allocation of Time". *The Economic Journal*, vol 75, no 299.
- Becker, G. S. (1993) *A Treatise on the Family*. First Harvard University Press. USA.
- Begg, D., Fischer, S. & Dornbusch, R. (1987) *Economics*. McGraw-Hill
- Bengtsson, H. (2003) *Ålder och ekonomisk omvandling. Sveriges tillväxthistoria i ett demografiskt perspektiv 1890-1995*. Lund: Almqvist & Wiksell International.
- Bengtsson, T. (1989) "Påverkar generationsstorleken migrationen?", in Broomé & Ohlsson (red.) *Generationseffekten*. Kristianstad: SNS förlag
- Bengtsson, T. & Scott, K. (2005) "Varför åldras Sveriges befolkning? Vad kan vi och vad kan vi inte göra åt det?", *Sociologisk forskning* nr3 2005
- Blau, F.D. (1984) "The Use of Transfer Payments by Immigrants", *Industrial and Labour Relations Review* 37
- Borjas, G. (1994) "Tired, Poor, on Welfare", in N. Mills (Ed.) *Arguing Immigration*. Simon & Schuster
- Borjas, G. (1995) "The Economic Benefits from Immigration", *Journal of Economic Perspectives* Vol. 9 no. 2
- Borjas, G. (2001) *Heaven's Door. Immigration Policy and the American Economy*. Princeton University Press.
- Boserup, E. (1965) *The Conditions of Agricultural Growth: The Economics of Agricultural Change under Population Pressure*. Chicago: Aldine

- Broomé, P. & Ohlsson, R. (1989) "Generationseffekten", in Broomé & Ohlsson (Eds.) *Generationseffekten, Befolkningsekonomiska problem*. Kristianstad: SNS förlag
- Callahan, D. (1987) *Setting Limits. Medical Goals in an Ageing Society*. USA: Simon & Schuster.
- Cameron, R. (1997) *A Concise Economic History of the World*. Oxford University Press
- Christensen, L (1998) "Immigration, arbejdsmarkedet og de offentlige finanser i Danmark", *Bager & Rezaei (Eds.) Indvandringens økonomiske konsekvenser i Skandinavien*. Sydjysk Universitetsforlag
- Cigno, A. (1994) *Economics of the Family*. Guildford & King's Lynn: Oxford University Press
- Cigno, A. (2001) "Economic Considerations in the Timing of Births: Theory and Evidence", in Ermisch & Ogawa (Eds.) *The Family, The Market and The State in Ageing Societies*. USA: Oxford University Press
- Coale, A. & Hoover, E. (1958) *Population and Economic Development*. Princeton
- Coppel, J., Dumont, J.C. & Visco, I. (2001) *Trends in Immigration and Economic Consequences*. OECD Economics Department Working Papers No. 284
- Dillard, D. (1967) *Economic Development of the North Atlantic Community*. Prentice-Hall
- Easterlin, R. (1987) *Birth and Fortune. The Impact of Numbers on Personal Welfare*. USA: The University of Chicago Press
- Easterlin, R. (1996) *Growth Triumphant*. University of Michigan Press.
- Eövarðsson, I.R., Heikkilä, E., Johansson, M., Persson, L.O. & Stambøl, L.S. (2002) "The performance of metropolitan labour markets: A comparison based on gross-stream data", *Jahrbuch für Regionalwissenschaft* 22, pp.81-102
- Eövarðsson, I.R., Heikkilä, E., Johansson, M., Jóhannesson, H., Rauhut, D., Schmidt, T.D., Stambøl, L.S. & Wilkman, S. (2007) *Demographic Changes, Labour Migration and EU-enlargement – Relevance for the Nordic regions*. Nordic Research Programme report 2: Nordregio
- Ehrlich, P.R. & Ehrlich, A.H. (1970) *Population, Resources, Environment – Issues in Human Ecology*. San Francisco: W.H. Freeman & Co.
- Ehrlich, P.R. & Ehrlich, A.H. (1996) *Betrayal of Science and Reason: How Anti-Environmental Rhetoric Threatens Our Future*. Washington DC: Island Press
- Ekberg, J. (1977) "Long-term Effects of Immigration", *Economy and History vol. XX*
- Ekberg, J. (1998) "Economic Surplus genom invandring. Något att bry sig om?", *Rapporter från Högskolan i Växjö* nr 10 1998
- Ekberg, J. (1999) "Immigration and the public Sector: Income Effects for the Native Population in Sweden", *Journal of Population Economics Vol. 12 no. 3*
- Ekberg, J. (2002) "Finns det plats för invandrare på den svenska arbetsmarknaden?", *Hela folket i arbete?* FAS
- Elliott, R.F. (1991) *Labor Economics*. McGraw-Hill.
- ESPON (2005) *The Spatial Effects of Demographic Change and Migration*, Final Report Project 1.1.4 Edited by M. Johansson and D. Rauhut. Luxembourg: European Spatial Planning Observation Network

- ESPON (2007) *Spatial scenarios in relation to the ESDP and EU Cohesion Policy*. Final Report Project 3.2. Luxembourg: European Spatial Planning Observation Network
- Fallon, P. & Verry, D. (1988) *The Economics of Labour Markets*. Philip Allan
- Fassmann, H. & Münz, R. (1995) "The Future of East-West Migration", van der Erf & Heering (Eds.) *Causes of International Migration*. NIDI
- Fischer, P.A. & Straubhaar, T. (1996) *Migration and Economic Integration in the Nordic Common Labour Market*. Nordic Council of Ministers: Nord 1996:2
- Foss, O. & Juvkam, D. (2005) *Patterns of Demographic Ageing and Related Aspects in the Nordic Peripheries*. Nordregio Report 2005:2
- Friedberg, R.M. & Hunt, J. (1995) "The Impact of Immigrants on Host Country Wages, Employment and Growth", *Journal of Economic Perspectives Vol. 9 no. 2*
- Gaspar, J., Marques da Costa, N., d'Abreu, D., Marques da Costa, E., Barroqueiro, M., Estevens, A. & Rauhut, D. (2005) *Ageing, Labour Shortage and 'Replacement Migration'*, Annex report B to ESPON project 1.1.4 Final Report. Centro de Estudos Geográficos, Universidade de Lisboa
- Gerschenkron, A. (1952) "Economic Backwardness in Historical Perspective", in B.F. Hosilitz (Ed.) *The Progress of Underdeveloped Areas*. Chicago: Chicago University Press
- Grubel, H. G. (1987) "The Economics of Brain Drain", in G. Psacharopoulos (ed.) *Economics of Education: Research and Studies*. Oxford, Pergamon Press.
- Gustafsson, B. (1990) "Public Sector Transfers and Income Taxes Among Immigrants and Natives in Sweden", *International Migration Quarterly Review No. 28*
- Gustafsson, B. & Österberg, T. (2001) "Immigrants and the Public Sector Budget – Accounting Exercises for Sweden", *Journal of Population Economics 14*
- Gustafsson, B., Zamanian, M., & Aguilar, R. (1990) *Invandring och försörjning*. Bokförlaget Daidalos
- Hanson, G.H., Scheve, K.F., Slaughter, M.J. & Spilimbergo, A. (2002) "Immigration and the US Economy: Labor Market Impacts, Illegal Entry and Policy Choices", in Boeri, Hanson & McCormick (Eds.) *Immigration Policy and the Welfare System*. Oxford University Press
- Harris, J.R. & Todaro, M. (1970) "Migration, Unemployment and Development: A Two-Sector Analysis", *American Economic Review Vol. 60 No. 1 pp.126-142*
- Hofstee, E.W. (1950) "Population Pressure and the Future of Western Civilization in Europe", *The American Journal of Sociology Vol. LV No. 6:523–532*.
- Johansson, M. & Rauhut, D. (2008a) "Invandrarnas bosättningsmönster i ett regionalt perspektiv 1950 och 2005", in Cars & Engström (red.) *Stadsregioner och utvecklingskraft*. Stockholm: KTH
- Johansson, M. & Rauhut, D. (2008b) *From Labour to Refugee Immigration and the Effects on the Settlement Pattern in Sweden 1950-2005*. Paper presented for the European Population Conference, Barcelona, 9-12 July 2008

- Johnson, G. (1980) "The Labor Market Effects of Immigration", *Industrial and Labor Relations Review* Vol. 33 No. 3: 331-341
- Jörberg, L. (1984) *Den svenska ekonomiska utvecklingen 1861-1983*. Meddelanden från Ekonomisk-historiska institutionen, Lunds universitet, nr 33
- Kakwani, N. (1986) *Analysing Redistribution Policies. A Study using Australian Data*. Cambridge University Press
- Kautto, M. (2002) "Changes in age structure, family stability and dependency", in Kautto, Heikkilä, Hvinden, Marklund & Ploug (Eds.) *Nordic Social Policy: Changing Welfare States*. Guildford & King's Lynn: Scandinavian University Press
- Kelly, A.C. & Schmidt, R.M. (1994) – *Population and Income Change: recent Evidence*. World Bank Discussion Papers, no 249.
- Kirk, D. (1946) *Europe's Population in the Inter-war Years*. League of Nations.
- Kuznets, S. (1966) *Modern Economic Growth: Rate, Structure, and Spread*. New Haven and London: Yale University Press
- Kuznets, S. (1967) "Population and Economic Growth", *American Philosophical Society Proceedings* 111, no. 3:170-193
- Landes, D.S. (1998) *The Wealth and Poverty of Nations*. New York: W.W. Norton & Company, Inc.
- Larsen, K.A. (1996) *Invandring og offentlig økonomi*. Rapport 46/1996 Senter for økonomisk analyse. Oslo
- Larsen, K.A. & Bruce, E. (1998) "Virkinger av innvandring på de offentlige finanser i Norge", in Bager & Rezaei (Eds.) *Indvandringens økonomiske konsekvenser i Skandinavien*. Sydjysk Universitetsforlag
- Layard, R., Blanchard, O., Dornbusch, R. & Krugman, P. (1994) *Invandringen från öst*. SNS.
- Lee, E. S. (1966) "A Theory of Migration", *Demography* 3, 1: 47-57.
- Lewis. W.A. (1954) "Economic Development with Unlimited Supplies of Labour", *Manchester School* Vol. 22:139-191
- Lindh, T. (2008) *Sverige i en åldrande värld – framtidsperspektiv på den demografiska utvecklingen*. Underlagsrapport nr 13 till Globaliseringsrådet
- Livi-Bacci, M. (1992) *A Concise History of World Population*. Cambridge, Mass.: Blackwell
- Lucas, R..E. (1988) "On the Mechanics of Economic Development", *Journal of Monetary Economics* 22:1, 3-42
- Lundahl, M. (2005) "Knut Wicksell and the Causes of Poverty: Population Growth and Diminishing Returns", in Rauhut, Hatti & Olsson (Eds.) *Economists and Poverty*. New Delhi: Vedam Books.
- Lundh, C. & Ohlsson, R. (1994) "Immigration and Economic Change", T. Bengtsson (ed.) *Population, Economy and Welfare in Sweden*. Germany: Springer Verlag
- Lundh, C. & Ohlsson, R. (1999) *Från arbetskraftsimport till flyktinginvandring*. Kristianstad: SNS
- Maillat, D. (1974) "The Economic Effects of the Employment of Foreign Workers: the Case of Switzerland", *The Effects of Employment of Foreign Workers*. OECD
- Malmberg, B. & Kropi, M. (2000) *Befolkningsutveckling och välfärd*. Stockholm: Fritzes förlag

- Malmberg, B. & Lindh, T. (2000) *Fyrtioåringarnas uttåg – Om tjugohundratalets demografiska utmaningar*. Stockholm: Fritzes förlag
- Malthus, T.R. (1993[1798]) *An Essay on the Principle of Population*. Aylesbury: Oxford University Press
- Massey, D. S., J. Arango, G. Hugo, A. Kouaouci, A. Pellegrino and E. J. Taylor (1993) Theories of International Migration: A Review and Appraisal, in: *Population and Development Review* 19: 3, pp. 431-466.
- Merkle, L. & Zimmermann, K.F. (1992) "Savings and remittances: Guestworkers in Germany", in Zimmermann, K.F. (ed.) *Migration and Economic Development*. Germany: Springer Verlag
- Miegel, M. (1984) *Arbeitsmarktpolitik auf Irrwegen*. Bonn
- Mincer, J. (1958) "Investment in Human Capital and Personal Income Distribution", *Journal of Political Economy* Vol. 66 No. 4
- Modigliani, F. (1986) "Life-cycle, Individual Thrift and the Wealth of Nations", *American Economic Review*, Vol. 76 No. 3
- Modigliani, F. & Brumberg, R. (1954) "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data", in K. Kurihara (Ed.) *Post-Keynesian Economics*. New Brunswick: Rutgers University Press
- Mostertman, L. (1991) "The Challenge of the Impending Scientific Brain Drain Inside Europe", in Angell, Ian O. and Kouzminov, V. A. (eds.) *Report of the Working Party on „Brain Drain Issues in Europe“*. UNESCO Regional Office for Science and Technology for Europe.
- National Research Council (2001) *Preparing for an Ageing World*. Washington D.C.: National Academic Press
- Notestein *et al.* (1944) *The Future Population of Europe and the Soviet Union*. League of Nations.
- OECD (2005) *Migration, Remittances and Development*. Paris: OECD Publishing
- Ohlsson, R. (1986) *Högre utbildning och demografisk förändring*. Lund: Ekonomisk-historiska föreningen
- Ohlsson, R. (1987) "Om mellankrigstidens befolkningsutveckling", in Krantz & Ohlsson (red) *Ekonomisk-historiska vingslag*. Lund: Studentlitteratur
- Ohlsson, R. (1995) "Det svenska välfärdssamhällets framväxt – tacka kvinnorna för det!", *Socialvetenskaplig tidskrift* 1995: 1.
- Ohlsson, R. (1996) "Befolkningsekonomiska aspekter på det svenska välfärdssamhällets framväxt", Berggren (Red.) *Kvinnorna och välfärden*, FRN.
- Ohlsson, R. (1998) "Generations- och könsaspekter på det svenska välfärdssamhällets framväxt", *SOU 1998:3 Välfärdens genusansikte*, Fritzes.
- Ohlsson, R. & Broomé (1988) *Ålderchocken*. Kristianstad: SNS förlag
- Ohlsson, R. & Broomé, P. (2003) *Generationsväxlingen och de sju dödssynderna*. Kristianstad: SNS förlag
- Økonomiministeriet (1997) "Økonomiska konsekvenser av invandring", *Økonomisk oversigt*. København
- O'Rourke, K. & Williamson, J. (2000) *Globalisation and History*. USA: MIT Press



- Overbeek, J. (1974) *History of Population Theories*. University of Rotterdam Press
- Pedersen, S. (2000) "Overførselinkomster til invandrere", in G.V. Morgensen & P.C. Matthisen (eds.) *Integration i Danmark omkring årtusindskiftet. Invandrerens møde med arbejdsmarkedet og velfærdssamfundet*. Aarhus Universitetsforlag
- Persson, L.O. with contributions by Eövarðsson, I.R., Heikkilä, E., Johansson, M. & Stambøl, L.S. (2001) *Local labour market performance in the Nordic countries*. Nordregio R2001:9
- Persson, L.O. with contributions by Eövarðsson, I.R., Heikkilä, E., Johansson, M., Korkalainen, S., Schmidt, T.D. & Stambøl, L.S. (2004) *Economic Renewal and Demographic Change*. Nordregio R2004:8
- Piore, M. (1979) *Birds of Passage*. Cambridge University Press
- Ramanathan, R. (1995) *Introductory Econometrics*. USA: Dryden Press
- Ranis, G. & Fei, J.C.H. (1961) "A Theory of Economic Development", *American Economic Review* Vol. 51, pp. 533-565
- Rauhut, D. (2002) *Arbetskraftsbrist och arbetskraftsinvandring: hot eller möjlighet för ekonomisk tillväxt?* Östersund: Institutet för tillväxtpolitiska studier
- Rauhut, D. (2003) *Den omöjliga ekvationen. Om prognoser, finanser och behovet av arbetskraft i den kommunala sektorn*. Östersund: Institutet för tillväxtpolitiska studier.
- Rauhut, D. (2004) *Replacement Migration to Sweden. An overview of possible sender countries*. Östersund: Swedish Institute for Growth Policy Studies
- Rauhut, D. (2005) "Saving the Poor: J.S. Mill on Poverty", in Rauhut, Hatti & Olsson (Eds.) *Economists and Poverty*. New Delhi: Vedam Books.
- Rauhut, D. (2009) "On the ideology of apocalyptic ageing", *Regionale Trender*. Accepted for publication
- Rauhut, D. & Blomberg, G. (2003) *Ekonomiska effekter av invandring och integration*. Östersund: Institutet för tillväxtpolitiska studier
- Rauhut, D. & Johansson, M. (2006) "Replacement Migration – Implications for the Sender Countries", *Ageing Horizons* No. 4 (Spring-Summer 2006): 19-26
- Rauhut, D. & Johansson, M. (2008) "The Regional Distribution of Immigrants to Sweden 1967-2005", *Regionale Trender* 1-2008
- Rauhut, D. & Johansson, M. (2009) *Regional Settlement Patterns for 10 Immigrant groups in Sweden 1975-2005: A Cross-Section Analysis of Period Data*. A paper presented for the Western Regional Science Association's 48<sup>th</sup> Annual Meeting, February 22-25 2009, Napa Valley, California, USA
- Rauhut, D. & Kahila, P. (2008) *The Regional Welfare Burden in the Nordic Countries*. Nordregio Working paper 2008:6
- Rauhut, D. & Malmberg, G. (2003) *Vem försörjer vem? Försörjningsfrågan och ekonomisk tillväxt*. Institutet för tillväxtpolitiska studier
- Rauhut, D., Rasmussen, R.O., Roto, J., Francke, P. & Östberg, S. (2008) *The Demographic Challenges to the Nordic Countries*. Nordregio Working Paper 2008:1
- Rees, P. & Butt, F. (2004) "Ethnic change and diversity in England, 1981-2001", *Area*, 36(2): 174-186.
- Rider, C. (1995) *An Introduction to Economic History*. South-Western College Publishing

- Romer, P. (1986) "Increasing Returns and Long-Run Growth", *Journal of Political Economy* 94:5, 1002-1037
- Romer, P. (1987) "Growth Based on Increasing Returns Due to Specialization", *American Economic Review*, 77:2, 56-62
- Romer, P. (1990) "Endogenous Technological Change", *Journal of Political Economy* 98:5 part II, 71-102
- Rönmar, M. (2006) "Den svenska arbetsrätten i internationell belysning", in Rauhut, D. & Falkenhall, B. (red.) *Arbetsrätt, rörlighet och tillväxt*. Östersund: Institutet för tillväxtpolitiska studier
- Rostow, W. W. (1960) *The Stages of Economic Growth*. Cambridge: University Press
- Rostow, W.W: (1990) *Theorists of Economic Growth from David Hume to the Present*. USA: Oxford University Press
- Sánchez-Arnau, J. C. & Calvo, E. H. (1987) "The Brain Drain Towards the Developed Countries", *Higher Education in Europe* 12, 3: 62–68.
- Samuelsson, P. (1958) "An Exact Consumption Loan Model of Interest with or Without the Social Contrivance of Money", *Journal of Political Economy* Vol. 66 No. 6"
- Schmitt-Rink, G. (1992) "Migration and International Factor Price Equalization", in Zimmermann, K.F. (ed.) *Migration and Economic Development*. Germany: Springer Verlag
- Schoorl, J. (1995) "Determinants of International Migration: Theoretical Approaches and Implications for Survey Research", in van der Erf & Heering (Eds.) *Causes of International Migration*. NIDI.
- Schultz, T.W. (1961) "Investment in Human Capital", *American Economic Review* Vol. 51 No. 1
- Schön, L. (1994) *Omvandling och obalans*. Bilaga 3 till LU94. Stockholm: Fritzes förlag
- Schön, L. (2000) *En modern svensk ekonomisk-historia. Tillväxt och omvandling under två sekel*. Borås: SNS förlag
- Simon, J. (1981) *The Ultimate Resource*. Oxford: Martin Robertson's
- Simon, J. (1986) *A Theory of Population and Economic Growth*. New York: Basil Blackwell
- Simon, J. (1999) *The Economic Consequences of Immigration*. 2<sup>nd</sup> edition. The University of Michigan Press
- Solow, R. (1956) "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics* Vol. 70 No. 1, 65-94
- Solow, R. (1957) "Technical Progress, Capital Formation, and Economic Growth", *Review of Economic Statistics* (August), 312-320
- Sommestad, L. (2002) "Ålderstransitionen: Ett befolkningsperspektiv på ekonomisk och social utveckling", i Malmberg & Sommestad (red.) *Befolkning och välfärd*. Stockholm: Institutet för framtidsstudier & LO
- Stambøl, L.S., Johansson, M., Persson, L.O. & Rissanen, E. (1997) *Flyttning och sysselsetting i nordiske land. Bruttoströmsanalyser og tilbudssidetilpasninger i de regionale arbejdsmarkedene*. Nordisk Ministerråd: TemaNord 1997:599
- Stambøl, L.S., Heikkilä, E., Johansson, M., Nygren, O. & Persson, L.O. (1999) *Regional arbejdsmarkedsmobilitet i nordiske land. Bruttoströmsanalyser og etterspørselsbetragtninger i de regionale arbejdsmarkedene*. Nordisk Ministerråd: TemaNord 1999: 551
- Stark, O. (1991) *The Migration of Labour*. Blackwell.

- Straubhaar, T. (1992) "The impact of international labor migration for Turkey" in Zimmermann, K.F. (ed.) *Migration and Economic Development*. Germany: Springer Verlag
- Straubhaar, T. & Weber, R. (1994) "On the Economics of Immigration: Some Empirical Evidence for Switzerland", *International Review of Applied Economics* 8
- Straubhaar, T. & Vadean, F.P. (2005) "Introduction: International Migrant Remittances and Their Role in Development", in *Migration, Remittances and Development*. Paris: OECD Publishing
- Ulrich, R. (1994) "The Impact for Foreigners on Public Purse", in Spencer (Ed.) *Immigration as an Economic Asset*. Trentham Books Ltd.
- UN (2007) *World Population Prospects Population Database – the 2006 revision*. UN Population division
- Vandermotten, C., Van Hamme, G. & Medina Lockart, P. (2005) "The Geography of Migration in Europe from the Sixties to the Present Day", *Belgeo* vol. 1-2. pp. 19-34
- Vandermotten, C., Van Hamme, G., Medina Lockart, P. & Wayens, B. (2004) *Migrations in Europe – The Four Last Decades*. Roma: Società Geografica Italiana
- Vogel, J. (2003) *European Welfare Production*. The Netherlands: Kluwer Academic Publishers
- Wadensjö, E. (1973) *Immigration och samhällsekonomi*. Lund: Studentlitteratur
- Wadensjö, E. (1981) "Arbetsmarknad, invandring och ekonomi", in Hamberg & Hammar (Eds.) *Invandringen och framtiden*. Liber förlag
- Wadensjö, E. (2000) "Immigration, the Labour Market, and Public Finances in Denmark", *Swedish Economic Policy Review* 7:59-83
- Weintraub, S. (1984) "Illegal Immigrants in Texas: Impact on Social Services and Related Considerations", *International Migration Review* 18
- Wonnacott, P. & Wonnacott, R. (1986) *Economics*. McGraw-Hill
- Zimmerman, K. (1995) "Tackling the European Migration Problem", *Journal of Economic Perspectives* Vol. 9 No. 2