

Ageing and Economic Performance: Dilemmas and Dichotomies

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Abstract

The process of ageing is not a new phenomenon. What implications ageing will have on economic performance are unclear both in terms of magnitude and direction. 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.

The aim of this paper is to discuss the methodological and theoretical dilemmas and dichotomies concerning the interrelationship between ageing and economic performance. There is actually little evidence that demographic changes per se will cause changes in the economic performance. By considering demography as destiny or the determinant for economic development, an artificial dichotomy is created. Furthermore, the spatial aspects are in general left outside the analysis. Ageing and depopulation are not national problems, but local and in some cases regional.

Keywords: Ageing, economic growth, methodology, causality, regional and local differences, long- and short term effects, theoretical underdevelopment

Introduction

The process of ageing is not a new phenomenon. Since the 18th 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 and Juvkam 2005). Parallel to this process the fertility rates have dropped during the 20th century. This is a 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 and Scott 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 (Bengtsson and Scott 2010). Immigration can only provide short-term mitigation to ageing (Coppel et al. 2001).

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 to 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, 2007).

What implications ageing will have on economic performance are unclear (Foss and 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 a need for a more historical and a more holistic perspective to be taken.

To large extent the limited knowledge on what impact changes in the age structure have on economic performance is available at the national level, while only fragmented knowledge exists at a regional level. The European 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, 2).

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.

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-18th 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 et al. 2008). This trend will most likely also 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.

This paper aims at discussing the methodological and theoretical dilemmas and dichotomies concerning the interrelationship between ageing and economic performance. The paper proposes to answer the following questions: **(1)** what is the interrelationship between changes in the age-structure/ageing and economic performance? **(2)** Which are the commonly over-looked methodological considerations when analysing the interrelationship between ageing and economic performance? **(3)** What is the territorial impact of the interrelationship between ageing and economic performance?

Age structure and economic performance

The causality – both in terms of direction and magnitude – between a changing age structure and its economic effects is, to say the least, unclear. 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 (Coppel et al 2001; Rosenberg and Birdzell 1994; Easterlin 1996; Kelley and Schmidt 1994, and Coale and 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 and Broomé 2003; Bengtsson 2003).

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.

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 and 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.

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.

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 and 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 and Broomé 2003, 9). 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”. 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 and Bromée 2003:9. Italics in original)

The main argument in Ohlsson and 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 (see also Bengtsson 2003).

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*.

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).

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, which is in line with the theory of demographic transition.

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 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).

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).

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.¹ 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.²

Empirical findings

In a comparison of population changes and per capita income growth in 16 developed countries during the period 1870–1987, Massimo Livi-Baci concluded that the studied countries show no correlation between economic growth and demographic changes (Livi-Baci 1992). He reached a similar conclusion when he analysed 57 developing countries in the period 1965–1986 (Livi-Baci 1992).

Richard Easterlin argues that “in the last century growth rates of real per capita income in developed countries have trended upwards despite a downward trend in population growth. Also, in the post World War II period, economic growth rates have differed sharply between periods, with little or no differences in dependency” (Easterlin 1996, 125). The findings of Livi-Baci (1992) and Easterlin (1996) are consistent with the findings of other scholars in the field (Kutznets 1967, Rostow 1998).

A study by Lindh and Malmberg (1999) for the OECD countries 1950–1990 show that an increasing share of persons aged 50–64 will promote economic growth. An increasing share of persons aged 65+ and a growth of the labour force will have negative effects. The estimations made by McMillan and Baesel (1991) for the USA and by Lenehan (1996) for Australia during the post-war period up to the late 1980s show that an increasing ratio for the age groups 35–64/(15–34, 65–) have a positive effect on economic growth.

The dependency ratio can also be influenced by a change in the relative share of the non-working at the other end of the life-cycle: the age group 65+. 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 and Lindh 2000). 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 and Korpi 2000). A decreased economic growth is the most significant trait for an ageing society, partly because the share of elderly consumes an unproportionally high share of the resources (Sommestad 2002). Budget deficits and growing public expenditure are other typical hallmarks with pensions, elderly care and medical care as major parts in the public budgets. In order

¹ 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).

² 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.

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). Consequently, the financial stability of the welfare state is at stake (Andersen et al. 2007).

The studies referred to above analyse at the national level and over time. Will the same result be obtained in cross-section analyses as in time-series analyses? What about the regional level? Very few international comparisons have been made at the regional level. Rauhut and Kahila (2008) analyse 71 Nordic regions from the early 1990s until 2005. The results must, due to the short time period, be interpreted with caution. All except 4 of the regions showed an inconclusive result between the dependency ratio and changes in the gross regional product; Uusimaa, Kainu, Åland and Gävleborg even showed a statistically significant *positive* correlation between the dependency ratio and the gross regional product, while no region showed a statistically significant negative correlation.

Rauhut (2011a) analysed 253 European NUTS3 regions and 71 Nordic NUTS3 regions in two multivariate regression models with data for 2005 for the EU regions and 2006 for the Nordic regions. The dependent variable is the regional GDP growth in %, and the independent variables are total population change/1000 inhabitants, immigrants/1000 inhabitants, the annual changes in the share of the age groups 30–49, 50–64 and 65+ years in the regional population. Although none of the used variables are statistically significant the model explains about 11 percent of the total regional GDP growth in the Nordic regions. In other words, almost 90 percent of the regional GDP growth in the Nordic regions is explained by other factors than demography. For the EU NUTS3 regions the regional demographic variables used in the regression explain 5.1 percent of the total regional GDP growth, *i.e.* about 95 percent of the regional GDP growth is explained by other factors than demography. None of the coefficients were statistically significant.

Methodological dichotomies and dilemmas

The causality in terms of direction and magnitude between, on the one hand, changes in the age structure, and, on the other hand, economic performance is everything but clear. To some extent this relates to methodological issues; postulates and assumptions pose a significant impact on the outcome of an analysis. Methodology is not a black box, but a way to facilitate, systemise and organise work in order to analyse information. A number of dilemmas and dichotomies may arise due to this. 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*.

Points of departure

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 and 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 and 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, 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).³ Somestad (2002, 148) is worried about the ageing society since its “most significant distinguishing feature is a decreasing economic growth. Growing public spenditure 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 percent 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 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.⁴

³ The author admits himself that his conclusions “cannot yet be considered as scientifically proven” (Lindh 2008: 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.

⁴ 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.

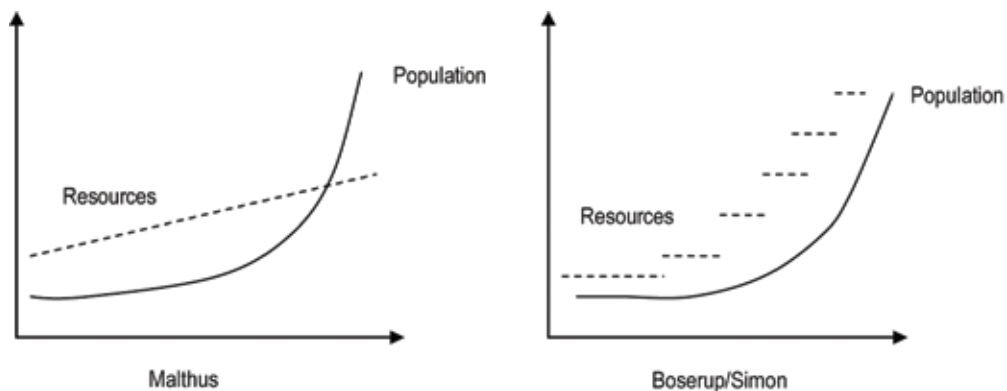


Figure 1. The Malthusian vs. Boserup/Simon models. Source: Rauhut (2010).

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 (Ehrlich and Ehrlich 1970). According to Simon (1981) population is the solution to resource scarcities and environmental problems, since people and markets innovate.

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 2010). 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, but it is merely a postulate.

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. 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, can be questioned.

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 and 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).

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 are 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 2010).

The question of causality

Which came first – the hen or the egg? Earlier in this paper it was argued that the median age in the Nordic countries has increased from 20 to 40 years since the mid-18th century and life-expectance has doubled from 40 to 80 years while the share of persons 65+ years has increased dramatically. Parallel to this period of ageing an exponential increase in the GDP/capita and the aggregated welfare in these countries has occurred (Rauhut et al. 2008). The question which must be raised is if an ageing population will cause labour shortage and economic stagnation. 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 and scientifically proven beyond reasonable doubt?

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 and Wonnacott 1986; Elliott 1991; Fallon and Verry 1988; Schön 1994, 2000).

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; Landes 1998). Technological, institutional and organisational changes, however, requires, a dynamic economic structure (Rosenberg and Birdzell 1994; Easterlin 1996; North 1999).

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 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.

Direct and indirect causality. 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 bi-variate 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 and 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 and 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. 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 (Kahila and Rauhut 2009).

Demography actually explains a rather marginal impact on the GDP growth. If this is so the demographic changes ahead will not be the determinant of the future economic development. Gaspar et al. (2005) shows 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.

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 2010). Alas, this does bias the policy making.

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, 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 (Abramovitz 1956, 1995; Gerschenkron 1952; Kuznets 1966; Lucas 1988; Romer 1986, 1987, 1990; Rostow 1960, 1990; Solow 1956, 1957).

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 (ESPON 2005; Eðvarðsson et al. 2007).

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.

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 ageing and economic performance is focused on short-term measures the policy outcome will be biased and, ultimately, not solve the problems.

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, dependency ratio and the post-active dependency ratio – show regional geographical differences. Within each region we can also expect to find a rich local variation for these indicators 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.

It is not very surprising that countries in Europe show heterogeneity for demographic variables; on the contrary, we expect to find different developments in different countries. The average nation share of population aged 65+ years in 2010 for the EU member states range from 11.3 to 20.7 percent; the dependency ratio is between 1.51 and 1.71 for the member states and the post-active dependency ratio lies between 0.185 and 0.34.

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, and the share of economically active persons and unemployed differs between different countries.

Just as differences between countries in Europe exist, differences between regions of the European countries exist. Table 2 illustrate the regional heterogeneity regarding the share of population aged 65+ years in Europe, the dependency ratio and the post-active dependency ratio. The description of the European territory in table 2 is multifaceted than the description in table 1.

It would be ambitious to make an analysis of the three different demographic indicators for all EU member states. Only one country will be discussed here – Finland – at the local level but the implications of differing findings at different spatial levels can be assumed to be the same in any European country. The min./max.-values, together with mean and median vales as well as the quartiles, show what great heterogeneity there is at the municipal level in Finland for the dependency ration, the post-active dependency ratio and the share of persons aged 65+.

Table 1. Three demographic indicators at national level for EU countries 2010

	Dependency ratio	Post-active dependency ratio	Share of 65+ age
Belgium	1,67	0,286	17,16
Bulgaria	1,58	0,276	17,53
Czech Republic	1,54	0,235	15,22
Denmark	1,69	0,275	16,31
Germany	1,65	0,341	20,66
Estonia	1,62	0,276	17,07
Ireland	1,63	0,185	11,32
Greece	1,51	0,286	18,94
Spain	1,58	0,266	16,84
France	1,70	0,283	16,62
Italy	1,64	0,333	20,23
Cyprus	1,59	0,207	13,06
Latvia	1,60	0,278	17,36
Lithuania	1,62	0,260	16,05
Luxemburg	1,60	0,224	13,95
Hungary	1,60	0,265	16,61
Malta	1,59	0,235	14,80
Netherlands	1,64	0,251	15,31
Austria	1,62	0,286	17,62
Poland	1,54	0,209	13,52
Portugal	1,62	0,290	17,87
Romania	1,56	0,233	14,94
Slovenia	1,56	0,257	16,52
Slovakia	1,52	0,187	12,26
Finland	1,66	0,283	17,01
Sweden	1,71	0,310	18,10
United Kingdom	1,67	0,275	16,45

Source: Eurostat

Table 2. Three demographic indicators at regional level (NUTS2) for EU27, Iceland, Norway and Switzerland 2005.

	Dependency ratio	Post-active dependency ratio	Share of aged 65+
Number of regions (NUTS2)	253	253	253
Mean	1,6858	,3130	18,5244
Median	1,6916	,3088	18,4023
Std. Deviation	,06463	,06502	3,52765
Minimum	1,48	,08	3,95
Maximum	1,94	,53	30,07
Percentiles			
25	1,6363	,2673	16,2243
50	1,6916	,3088	18,4023
75	1,7263	,3579	21,0356

Source: ESPON (2010).

Table 3. Three demographic indicators at municipal level in Finland and the national average 2010.

	Dependency ratio	Post-active dependency ratio	Share of aged 65+
Average for Finland	1,6722	0,2928	17,5068
Number of municipalities	336	336	336
Mean	1,7903	,3844	21,3470
Median	1,7904	,3838	21,4508
Std. Deviation	,09132	,10344	5,11341
Minimum	1,51	,16	7,93
Maximum	2,17	,79	37,18
Percentiles			
25	1,7360	,3117	17,7362
50	1,7904	,3838	21,4508
75	1,8436	,4565	25,2803

Source: Statistics Finland, Population database.

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 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).

Since the ‘one-size-fits-all’ policies are favoured politically, a dichotomy is created: (a) regionally adjusted policies and the ‘one-size-fits-all’ policies can be viewed as a set of antagonistic perspectives that are inherent conflict and cannot be combined, and (b) regionally adjusted policies and the ‘one-size-fits-all’ policies display extremes or poles where the solution is found somewhere along the *continuum* or in both of them. As long as the focus lies on the national perspective, although the regional and even the local aspect are interesting ones the policy outcome will not solve the problems as the most appropriate spatial level is not addressed.

Policy making and governance

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.

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. The 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.

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. 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 percent of the changes in economic performance can be explained by demographic factors, i.e. 90 percent 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.

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.

Concluding remarks

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. 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. 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 indicating other results. 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. Not very surprisingly these disciplines come up with the conclusion that the ‘doomsday demography’ does not stand up for empirical examination (Easterlin 1996; Gee and Gutman 2000; Ohlsson and Broomé 2003).

The second argument is that we tend to treat the issue as a novelty, something which has never previously occurred in history. This is erroneous. Ageing, depopulation and mass-migration and labour shortage has happened before and we probably have lots to learn 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 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) A further 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 are, in general, 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 well at the meso level.

The empirical results point at the impact of demography on economic performance appears to be marginal and that the relationship between the two variables appears 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.

When summarising these arguments 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. There is actually little evidence that ageing, *per se* will cause changes in the economic performance. By considering demography as destiny or as the determinant for economic development, an artificial dichotomy is created – two contradictory positions which cannot be combined emerge: 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 2011).

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