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Understanding rural change – demography as a key to the future

Jan Amcoff and Erik Westholm

Intresset för framsyn – olika sätt att föreställa sig, diskutera och forma framtiden – har vuxit snabbt de senaste decennierna. Diskussioner har förekommit i både privat och offentlig regi, ofta under rubriken teknisk framsyn. Icke desto mindre har diskussionerna ofta tenderat att driva iväg mot samhälleliga frågeställningar snarare än tekniska. De är nämligen lättare att förutse än de tekniska landvinningar som kan komma, men ännu inte börjat utvecklas. Prognoser för samhällelig förändring bör emellertid baseras på solida kunskaper om förändring och kontinuitet. Snart sagt ingenting kan sägas om framtiden utan att det relateras till gången tid; framsyn och framtidsstudier handlar om att avtäcka historiens puls. Prognoser om framtiden måste sålunda utgå ifrån samhällsvetenskaplig empirisk forskning. En viktig förklaringsfaktor till samhällelig förändring kan sökas i demografiska förändringar. Befolkningsutveckling är dessutom hyggligt förutsägbar och den ålderstransition som följer på den demografiska transitionen har stor betydelse för en lång rad socioekonomiska förändringar. Inte minst för glesbygdens framtid är den demografiska utvecklingen av avgörande betydelse. Där är åldersstrukturen ofta skev och flyttningsutbytet instabilt. Som en följd inställer sig både en rad politiska frågeställningar och utmaningar för glesbygdsforkningen.

The last decades have seen a rapidly growing interest in foresight methodology. Methods have been developed in corporate and governmental communication exercises often labelled technology foresight. In reality, these foresights have often drifted into processes of social change, since technological change is hard to foresee beyond what is already in the pipe-line. Forecasting of social change, however, must be based on solid knowledge about the mechanisms of continuity and change. Virtually nothing can be said about the future without relating to the past; foresights and futures studies are about revealing the hidden pulse of history. Hence, the answer to forecasting the future is empirical research within the social sciences.
Demographic change has been recognised as a key determinant for explaining social change. Population changes are fairly predictable and the age transition can explain a wide range of socio-economic changes. For rural futures, demographic change is a key issue, since age structure in rural areas is often uneven and also unstable due to migration patterns. A number of policy related questions as well as research challenges are raised as a consequence.

From technology foresights to futures studies on social change

In this paper we shall draw on some results from research carried out at the Institute for Futures Studies, Stockholm, during a five year research programme based on demography as a forecasting tool. Demography plays an increasingly important role in attempts to forecast social and economic development. Population changes are rather predictable and the age structure of a population has proved ability to explain a wide range of socio-economic changes (Lindh 2003; see also Godet 2000). The aim of this paper is to exploit demographic change in rural areas as a means to forecast their possible economic and social futures. The demographic situation in many rural regions is raising a number of policy related questions as well as research challenges.

A common objection to demographically based prognoses is that they overlook two other central factors in social development, which are technological development and institutions/values such as laws, customs, religious traditions etc (Malmberg/Sommestad 2000). One response to this objection is that, although these are important factors in long term social transformation they are of limited value in constructing meaningful long term prognoses since they are hard to predict.

The increasing interest in the future development of society is obvious in both policy making and science. On a national basis most European countries are running initiatives like Technology Foresights, Forward Strategy Units etc. Many of these initiatives are building on a tradition stemming from military needs of forecasting technological change in order to be successful at war. Since the Second World War the methodology of technology foresights has been developing into the civil society in the industrialised world. Expert panels have been organised to communicate on technological change in order to foresee long term change.

Also on a European level several initiatives have been taken during the last few years in order to strengthen a systematic building of knowledge on the possible futures of society. The EU has set up a Futures Programmes, Cost Action on Foresight Methodologies and quite a few of the various programmes for developing Europe aims at building knowledge on the long term development. Conferences on foresight and futures studies are frequently held. In some countries (e.g. Finland and Hungary) futures studies are taking the shape of a separate academic discipline with Master programmes etc.

Many of these initiatives are broadening the field of foresight and futures studies. The limitations of the technology foresights have become obvious. Experiences from the last decade have revealed that technology breakthroughs cannot be forecasted over a longer period. First, technological innovations can not be forecasted until they are already in the pipe-line. This means that the foresight process will have to make the innovations in order to foresee them. Second, it is difficult to foresee with any certainty to what extent technological innovations will be implemented and their impact on society. Their use and their impact is depending on the development of the changing society in which the new technology will be introduced (Malmberg/Sommestad 2000.) Hence, the technology foresights have often drifted from focus on technology into foresights on the social and economic processes which they do not have the organisation or capacity to carry out (Westholm 2001.) Instead they often develop “stories on our own time” (Myrdal 2001; see also Cariola and Rolfo 2004), communication processes that circulates information that is already general understanding in contemporary society.

Also institutional change has its limitations when it comes to long term prognoses. While the institutional theories to date have been able to reveal the stability of institutional structures, *the path dependency*, it is less developed when it comes to foresee trend shifts and the formative moments when institutional shifts are taking place.

Focus on demography

The use of demographics for forecasting is empowered by exploring the links between socio-economic age dependent variables and the actual age structure in the past. In the long run and on a macro level this development takes the form of a demographic transition in which a country or a region goes from a situation with a high birth-rate and a high mortality rate to a low birth-rate and a low mortality. According to the UN (1998), five phases of age transition can be identified on a global scale. On the basis of the correlation between theses phases and economic growth, forecasts of economic growth have been made for all parts of the world (Lindh/Malmberg 2004)

The demographic structure has proved to be a powerful tool for forecasting the future also in more specific contexts. The key factor to open this field has been the recognition of the age structure as a determinant of a number of socio-economic indicators. While an increasing share of the population being adults in working ages increases the productive capacity, a rising number of children and senior citizens expose the economy to economic stress. Going into details, every cohort has its own patterns of production and consumption and these patterns are in a general sense fairly stable and similar over time and also in various economies. Even if there are variations in the age of starting school, entering the labour market, moving away from home or retiring from work, over time and from one society to the other, a fundamental stability in the life cycle pattern remains (Malmberg/Sommestad 2000).

Figure 1 shows the correlation between age structure and economic growth based on empirical data from 1950 to 1995 in Sweden.

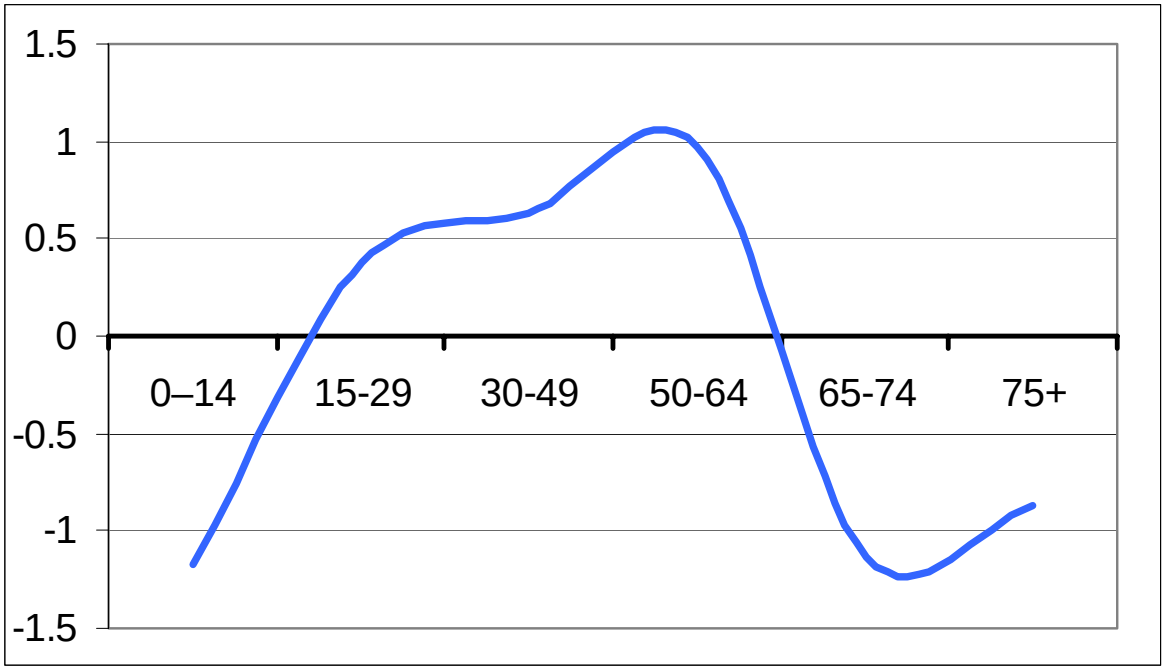


Figure 1. The impact of age structure on the growth rate - an experience based model. Update from Lindh/Malmberg(2000).

On a national level, the future cohort sizes can be predicted with a high degree of certainty decades into the future. Therefore, the demographic approach has its obvious advantages in efforts to foresee periods of heavy investments, of urban growth, of migration etc beyond the economic booms and recessions.

In the last phase of the demographic transition, the aging phase, the heaviest population increase takes place in the oldest age groups while the share of the population being in the working ages declines. This is the situation that most of Europe is facing and which has been recognised as a major challenge for Europe during the coming decades. Many parts of rural Europe are in the forefront of this development and are already experiencing both population decline and a declining share of the population being in the working ages. The aging phase of the demographic transition in the rural periphery is the focus of this paper.

Demography in rural studies

So far, the presentation has been drawing on results from demographic studies on a national level. To what extent can the demographic transition be useful in a study of smaller regions or even rural areas within a country? Two important factors are changing with the geographical scale.

1. While in a national forecast of the age structure, the estimated birth rate is the critical factor; migration may be of greater relevance in a “smaller” region (Rogerson 1997). The smaller the region that the analysis is confined to, the higher is the migration as a share of the population and therefore, the more important is in- and out-migration for the estimated future age structure. Also, as the migration is higher, demographic change may be quicker in smaller regions, both in absolute numbers and as variations between the cohorts. Therefore, migration is the vital factor to understand the future development both in declining rural areas and in rural areas where there is a net in-flux of migrants.

2. The economy in a smaller (sub national) region is more integrated with the “outside” economy. The smaller the region is the more dependent on external factors is the regional economy. For instance, the welfare state re-distributes incomes between the regions in order to compensate for some of the effects of the age structure, for industrial decline etc. Therefore, the correlation between age structure and income may not reflect the conditions in that specific region.

Population change in Sweden

From these general observations we draw some conclusions relevant for our study on future population changes in rural regions. In Sweden, with a rather stable population of 9 million inhabitants, about 1.5% of the population changes every year through deaths, births and migration. Thus, to more than 98% the population consists of the same individuals from one year to another. Their sex and birth dates are fixed and their ageing is completely foreseeable. We also know the historical connections between age/sex and a number of human activities and, as we have argued, they are fairly stable. People tend to migrate, give birth and die at certain ages. By varying the assumptions regarding these factors it is possible to establish different scenarios. These simple facts are the basis also of traditional population forecasts. Such forecasts are carried out on a national basis as well as a regional and even at the local level. They are used for anything from estimating future tax rates or the need for housing to planning the extent and localisation of elderly care. In these cases the forecasts are often limited in time looking 5-6 years ahead.

The aim of our current research is to increase the knowledge on the crucial factors for the future settlement pattern in Sweden. In order to do that the methodological problems with long term demographic analyses for smaller areas has to be approached. Obviously, the prerequisites for population forecasts become poorer as the geographical resolution is increased and with a smaller study area a higher proportion of the inhabitants will be registered as migrants (let be internal) by definition. For example, at NUTS 3 level in Sweden – equal to the subdivision of this country into 21 "län" ("counties") – the share of the population that changes from one year to another increase to 4%. In the following, we will present some population forecasts for a longer period and for even smaller areas, in this case Local Labour Markets (LA)[1], regions defined by commuting patterns. These can be described as functional regions for the every-day life of many individuals in which they have to find their job and must have access to every-day services. We will then discuss some policy implications of our results and also how to overcome the methodological weakness related to this kind of demographics.

The 1990´s: a new wave of population concentration

One of the problems in forecasting the regional population re-distribution for a smaller region is the unevenness in space and time of the process. A long term urbanisation and concentration is interrupted by periods of stability and periods of counter-urbanisation to some rural regions. After 25 years of relative regional stability the 1990s saw a new wave of population concentration in Sweden. During the second half of the decade more than 200 of the 290 communes had a population decline (Magnusson and Turner 2000). The city regions and their hinterlands grew quickly while rural and peripheral areas were generally worst off. The growing imbalances caused an increased interest in population forecasts both at the regional and the national level (e g Nygren and Persson 2000, Nygren and Persson 2001, Landstingsförbundet 2000). These forecasts had their focus longer into the future and they were national in the sense that the total sum of regional change was compatible with the national figures. The risk of over-optimism that has normally been reflected in locally and regionally produced scenarios had thus been reduced or at least controlled.

The last few years the regional population redistribution has slowed down. In 2003 128 communes lost population and 161 gained. These uneven waves of population change means that the forecasts come out very differently depending on which period that is chosen as the base-line.

Regional forecast for 2025

In the following section we present a simple population forecast from which we will discuss the research challenges raised by the methodological problems of uneven development and high shares of migration for the studied region. The data employed are based on the LAs and presents for each LA population, mean population, crude death rates and net migration rates 2003 and 2004. Each sex and 1-year age group is separated. Fertility rate per female 1-year age group 2003 and 2004 is also included in the data.

[1] Here the delimitation based on data from 1998, LA98, have been employed.

The years 2003 and 2004 were in a few decades perspective fairly normal in terms demographic standards. Fertility rates and migration risks have been calculated for every region separately, but for the calculations of death risks we have used larger regions. The reason for this is to avoid ending up with 0% death risks, a phenomenon caused by the fact that there are very few or no individuals in the oldest age/sex groups these years in some of the smallest LA. Thus, we have supplied every region with death risks based on the average death risk in its e-zone[2] on NUTS2[3] level. Thereby regard is paid both to geography and type of area. Note that the death risks are somewhat overestimated in the oldest age groups since there are no data for ages 100+. Thus, not a single individual is expected to become older than 100 years.

These data have been completed with assumptions concerning future changes in life expectancy and fertility as of Statistics Swedens national forecast (Statistics Sweden 2005). While there is an agreement among demographers that the life expectancy probably will increase in general, the extent of the increase and its regional variations are hazardous to estimate. Here, we have assumed that every region will have the same relative increase in life expectancy, setting out from their different figures 2003-2004 and modified as described above. The increase in fertility rate expected by Statistics Sweden is less certain. Since the all-time-low 1999 at 1.5 the TFR have increased to 1.7, but the pace of the increase has slowed down considerably the last two years. From a theoretical point of view the hypothesis of a second demographic transition (Lesthaeghe and Surkyn 2004) means that the long-term decrease in fertility may well keep on.

However, in accordance with Statistics Swedens national forecast we assume a somewhat increasing life expectancy (2 years for women and 3 years for men) and total fertility rate (to 1,85 children per woman) for every region. The assumed migration patterns on the other hand differs from Statistics Swedens national projection. While Statistics Sweden discuss the future situation in the world to motivate assumptions about future international migration patterns, our regional forecast is based entirely on the actual migration (national and international) 2003-2004 in every region. These differences in presumptions mean that while Sweden would end up with 9,8 million inhabitants 2025 according to the national population projection carried out by Statistic Sweden but 9,9 million inhabitants according to the forecast employed here.

The left map in Figure 2 illustrates the population change in Sweden's 100 LA-regions from 2004 to 2025 given our assumptions of changes in life expectancy and fertility and given that the regional populations beside that develop the same way they did in 2003-2004. To the right in figure 2 the migration has been excluded. The LAs are delimited in black. For the purpose of orientation, also commune borders are shown in the maps, in white.

[2] Employment zones (Förvärvsregioner) are based on a clustering of local labour markets into groups consisting of similar properties regarding variables of importance for the functioning of the labour market; see Carlsson et al 1996.
[3] Equivalent to the regional subdivision of Sweden into eight "Riksområden".

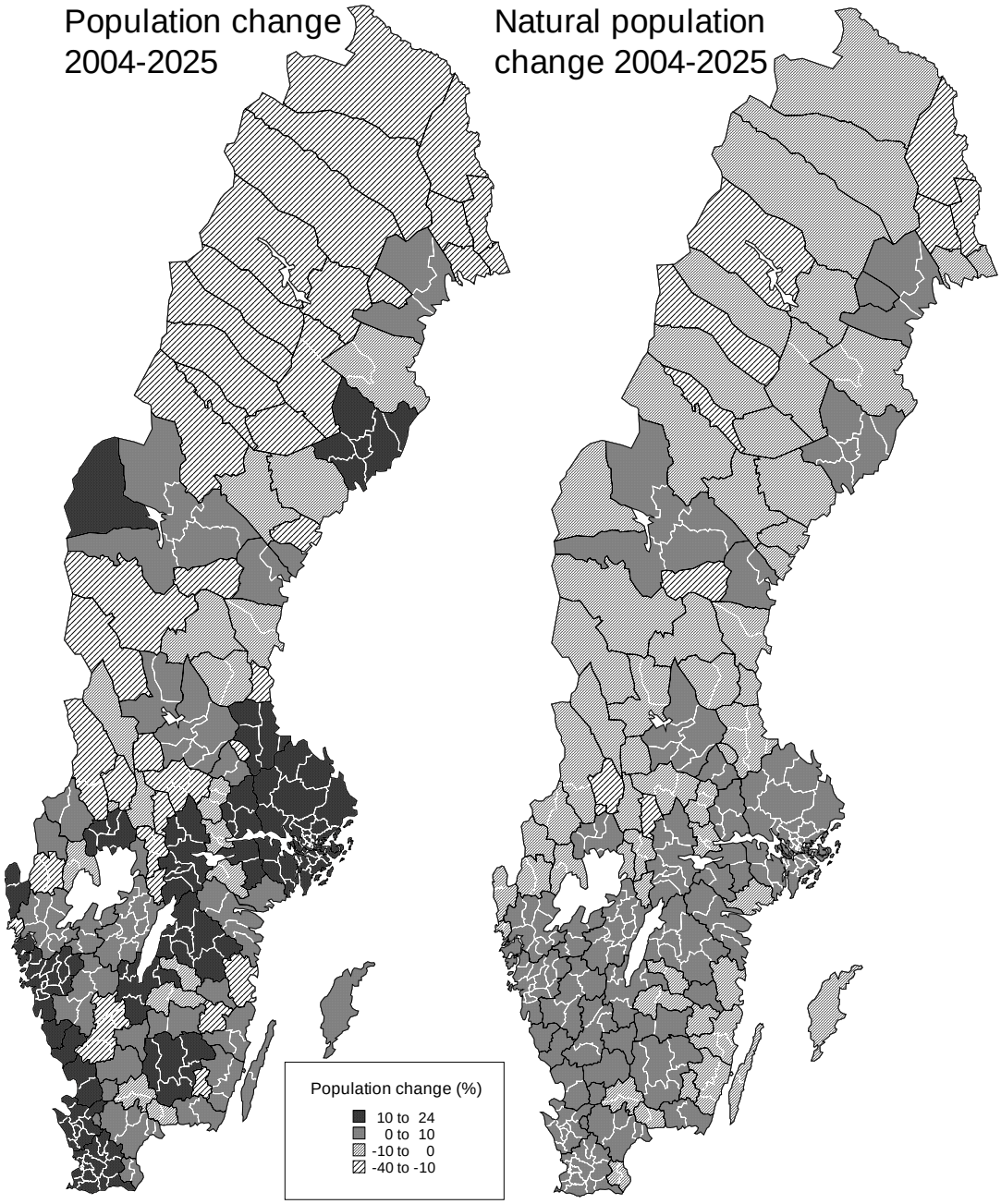


Figure 2. Population change in Sweden 2003-2025 per Labour market Area (LA) Source: Data computed from Statistics Sweden

The map to the left illustrates clearly a continued geographical concentration of the population. The large-city areas and a few university regions would obtain a growing population while the peripheral regions with few exceptions would suffer population loss. A cross-check with some alternative years as starting points reveals that the main trend is stable although the map varies to some extent when fertility rates, death and migration risks obtained other periods are employed. They all point at a continued concentration and a substantial population decrease in rural/peripheral LAs.

Indeed, there is nothing new about this. It is a tendency that could be observed decades ago. But what is new is the magnitude of the population decrease in the worst affected LAs. While the 10 weakest LAs 1984-2004 lost 22% of their population during that period of time, their

equivalents in the coming 20 years will lose 32% of their population, given our assumptions. Thus, the population decrease in the declining regions is expected to speed up, and – as the map hint at – most of the affected LAs are to be found in the sparsely populated areas in the northern inland.

However, the LAs showing most improved population development in the coming decades do not belong to the top 10 of the growth list. Rather, they can be found in the middle part of it, and either their population decrease can be expected to diminish or their population increase can be expected to be enhanced.

The map to the right which shows the population forecast without migration serves just analytical purposes. It illustrates what would happen if no migration at all would occur. As can be seen, the net population growth would be reduced considerably, were it not for the migration. In sum, the population would only grow marginally, from 9,0 to 9,2 million inhabitants. Even worse, this natural growth is generated by increased life expectancy rather than fertility; as the fertility rate is assumed to stay well below the 2,1 children per woman needed for long time reproduction of the population throughout the period.

In terms of geographical range, the natural growth is limited to about one third of the regions, mainly in the denser populated southern parts of the country. This is not primarily an effect of varying fertility or death rates. Actually the highest fertility rates in the country are found in Tornedalen – along the Finnish border in the far north and the life expectancy does not show enough geographical variations to supply an explanation for the pattern revealed in the map. Instead the map reflects variations in the regional age structures. The regions centered around big cities and university locations take the demographic advantages of a young population which means high birth rates and low death rates while the situation is reversed in the peripheral regions. In contrast to other factors influencing the population change, certainly migration components, the age structure tends to be stable, which makes the situation in the periphery certainly problematic. The age structure is in turn – of course – consequences of earlier migration which has tended to geographically concentrate the population.

Thus, 2/3 of the LAs are dependent on net in-migration just to keep the population constant. By comparing the two ways we can see that – given the assumptions – this will in fact be the case in a number of LAs with natural population decrease, but far from all. Certainly in the northern inland both a negative natural population change and a net out migration can be expected to contribute to the decreasing populations. So far we have noted that – given our assumptions – the population growth will continue at a slow pace. The tendency to geographical concentration will persist too, but it will change to the advantage of LAs with an average population change at the cost of the ones worst affected by population decrease. This means that a number of peripheral LAs would lose more than 30% (in some cases close to 40%) of their population in the coming 20 years.

In sum, most regions (and certainly the rural/peripheral), and in the longer run also the country as a whole, are dependent on net in-migration to balance the natural population loss. Sweden and its regions have passed all the way through the demographic transition and in the case of the rural/peripheral regions the ageing has been reinforced by decades of (out) migration. The fertility rate is well below replacement level while the big cohorts from the early 1940´s are getting old and thereby increase the death rates in decades to come. Many rural regions are entering an age structure which could be described as a phase of advanced ageing, with a connected natural population decline, often combined with net out-migration.

Population in growth and decline

Population pyramids are an often used and effective means to illustrate the age and sex structure of a population. These structures are of importance not only from a demographic point of view. As we have argued, a changing age structure has consequences for the society at large too. Here we present population pyramids for three different LAs in Sweden. Göteborg LA is the second largest in Sweden and represent a growing city region. Falun-Borlänge LA is of medium-size and represents an average LA. Finally Övertorneå LA represents a peripheral region with a declining population. The LAs 2025 are estimated as in previous national forecast with 2003 as a model year from which we repeat the migration pattern, fertility rate and death rate in the model.

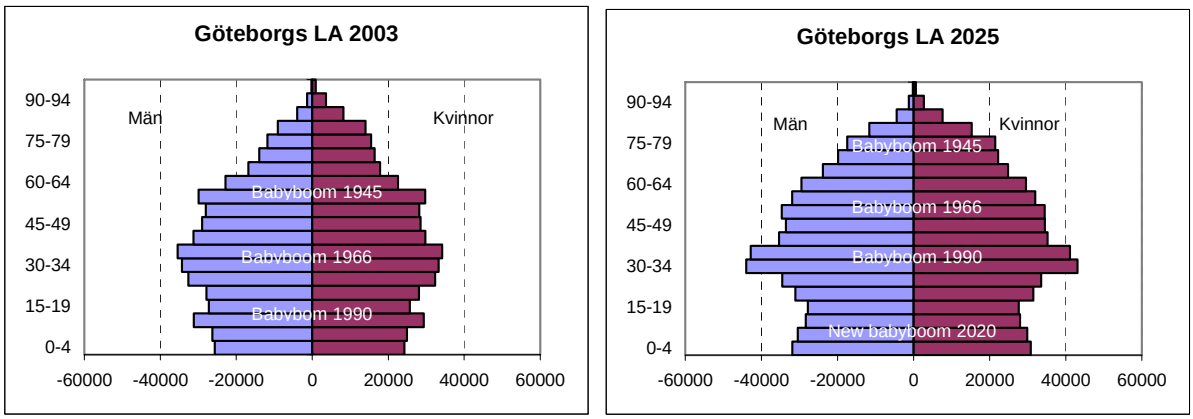


Figure 3. Population pyramid for a growing LA 2003 and 2025. Source: Data computed from Statistics Sweden

Göteborg LA is growing from 886 000 inhabitants 2003 to 1 040 000 inhabitants 2025. From the 2003 pyramid the large cohorts born during the 1940s, 1960s and around 1990 are apparent. The latter cohort is even more marked in the 2025 pyramid as a lot of its individuals are expected to move to Gothenburg (and the two other large city regions in the country). Women tend to migrate when they are younger than men, and are therefore slightly overrepresented in the population of Götegorg LA compared to Sweden as a whole. However, the sex structure would be more balanced 2025 compared to 2003 according to the forecast. Following the in-migration of young adults, a new baby-boom can be expected around 2020. The cohorts born during the 1940s and 1960s are less sharp 2025 as they are expected to decrease their presence in the LA following death risks and net out-migration in ages over 50.

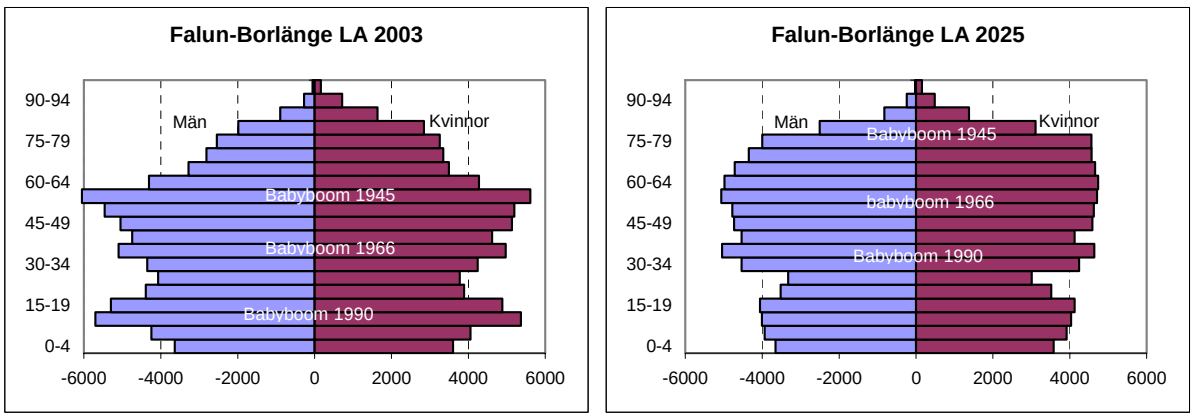


Figure 4. Population pyramid for an average LA 2003 and 2025. Source: Data computed from Statistics Sweden

Falun-Borlänge LA had 149 000 inhabitants 2003. The population is expected to be slightly smaller in 2025, but older. The average age is expected to rise from 41 to 44. From the population pyramid 2003, the large cohorts can be identified again. In 2025, the two older large cohorts are still marked, although reduced, mainly due to death risks increasing with age. Many from the big cohorts around 1990 have left the region and moved elsewhere. Thus, the small children are rather few, and the baby-boom that was foreseen in the Göteborg case can hardly be noticed here. On the other hand Falun-Borlänge LA appears to have a net in-migration of children. The sex structure is essentially balanced although men are slightly overrepresented. Here we find hardly any differences in migration patterns between men and women.

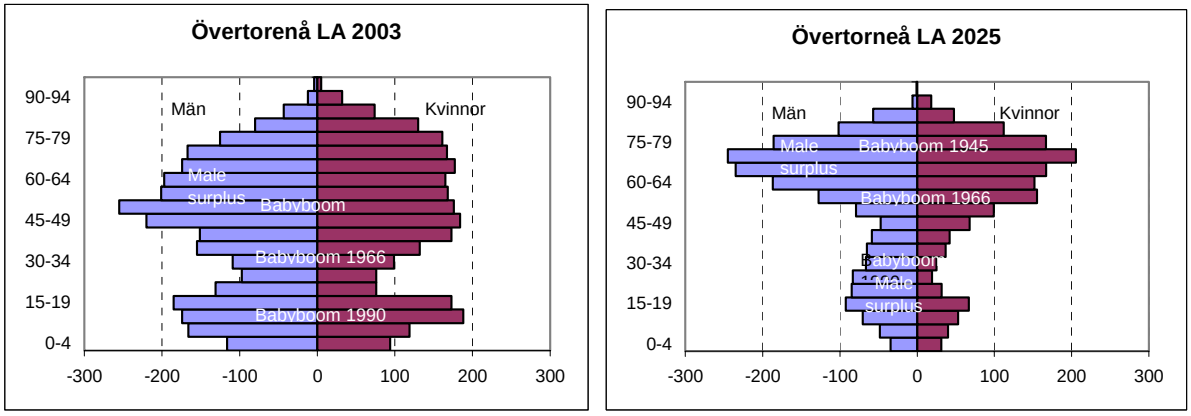


Figure 5. Population pyramid for a declining LA 2003 and 2025. Source: Data computed from Statistics Sweden

Övertorneå LA, in the far north, is sparsely populated at 1.4 inhabitants per square kilometre 2003. (This can be compared to a sparsely populated area in continental Europe like Auvergne at 50; the EU average is 120 inhabitants per square kilometre.) Övertorneå LA has 5 500 inhabitants 2003 and is expected to have 3 500 inhabitants 2025. Once again the large cohorts can be seen in the 2003 pyramid. Note the uneven sex structure with men dominating in all the younger and middle aged cohorts. Although the 1960s cohort is not as large as elsewhere, the baby-boom of 1990 is apparent. This area has in fact the highest fertility rate in Sweden.

However, a glance at the pyramid of 2025 is startling. Via an hourglass-shaped pyramid around 2015 we end up with a mushroom-shape 2025. Very few young people remain. The older cohorts are reduced in number too, but not at all to the same extent as the young. The average age is expected to rise from 45 years to 55. Of the total population 45% will be 65+ years and 13% will be 0-19. Besides the remarkable age structure, the sex structure is also extremely uneven with a marked male surplus in all the productive ages. A large share of each generation of women in ages 18-24 tends to leave the small local labour market areas in northern Sweden. In the ages 25-35, women show a net in-migration, although of a smaller magnitude. The male net out-migration is of a smaller extent and is distributed over the whole migration-intensive period in the life cycle (ages 18-35). A minor male net in-migration can be noticed around retirement age. In this case Övertorneå ends up at a 55% male population 2025 (52% in 2003). In ages 15-39 the proportion of men would amount to 68% according to this model (55% in 2003).

Increased fertility can do little to change the mushroom-shape to the right into a pyramid as there are relatively few women in fertile ages already today. The low potential of birth rates is resulting from decades of out migration of young adults giving the area an age structure unfavourable for natural population growth. The ageing in years to come is reinforced by expected continuing out migration of young adults. The key factor to understand this case is migration, but the driving forces for their migration are manifold and labour market-related objectives is only a minor explanation (Garvill m fl 2000). Rather, the rural periphery seems to become an environment with less attraction on the young generation. The latter is confirmed by the limited effect campaigns trying to attract young families to a few communes in the north with free housing and child-care have had.

Although migration is the key determinant for the future population in this region it is obvious that not even a substantial in-flux of young people would be sufficient to avoid the declining and aging figures. It seems that Övertorneå has reached the advanced ageing phase, a situation in which population decline seems unavoidable in a few decades future.

Now we hope to have given a picture of the age and sex distribution in three labour market areas. Although they represent three different patterns there might be of interest to see the whole picture. To be able to give that the age structure is represented by the dependency rate (rate of 0-17 and 65+ years) in figure 6.

Fertility below reproduction rate (2.1 children per woman) as such contributes to an aging of the *Swedish* population. Increased life expectancy works in the same direction. However it is clear from the three population pyramids that aging has its own geography too. While Gothenburg LA is hardly affected at all, almost only retired people seem to be left in Övertorneå LA. Falun-Borlänge LA is somewhere in between. However, there are 97 other LAs in Sweden. Figure 6 illustrate their shares of population in dependent (not included in the work-force) ages in 2004 and 2025, respectively.

The first impression of the pair of maps is the darker shades in general 2025 compared to 2004 indicating a general aging population. The dependency rate in the total population of Sweden would increase from 42% to 48% during the 21 year period. Nonetheless, there are a few exceptions (among them Gothenburg LA) and a number of LAs with rather modest change. This means that there are other areas the more concerned. Many LAs obviously run the risk of a shock of aging beside the sharp population decline which often awaits them. Most of them are to be found in the northern inland. In Jokkmokk LA for example, the dependency rate 2004 was 42%, close to the national average. In 2025 we have calculated it to have increased 14 percentage points to 56%. During the same time this LA would have lost one third of its population, according to the forecast. But we need not go to the far north to find this kind of LAs. Lysekil LA, on the western coast, provide an example too. The dependency ratio would, according to our forecast, increase from almost average 42% 2004 to 53% in 2025, and the population would decrease with 11%.

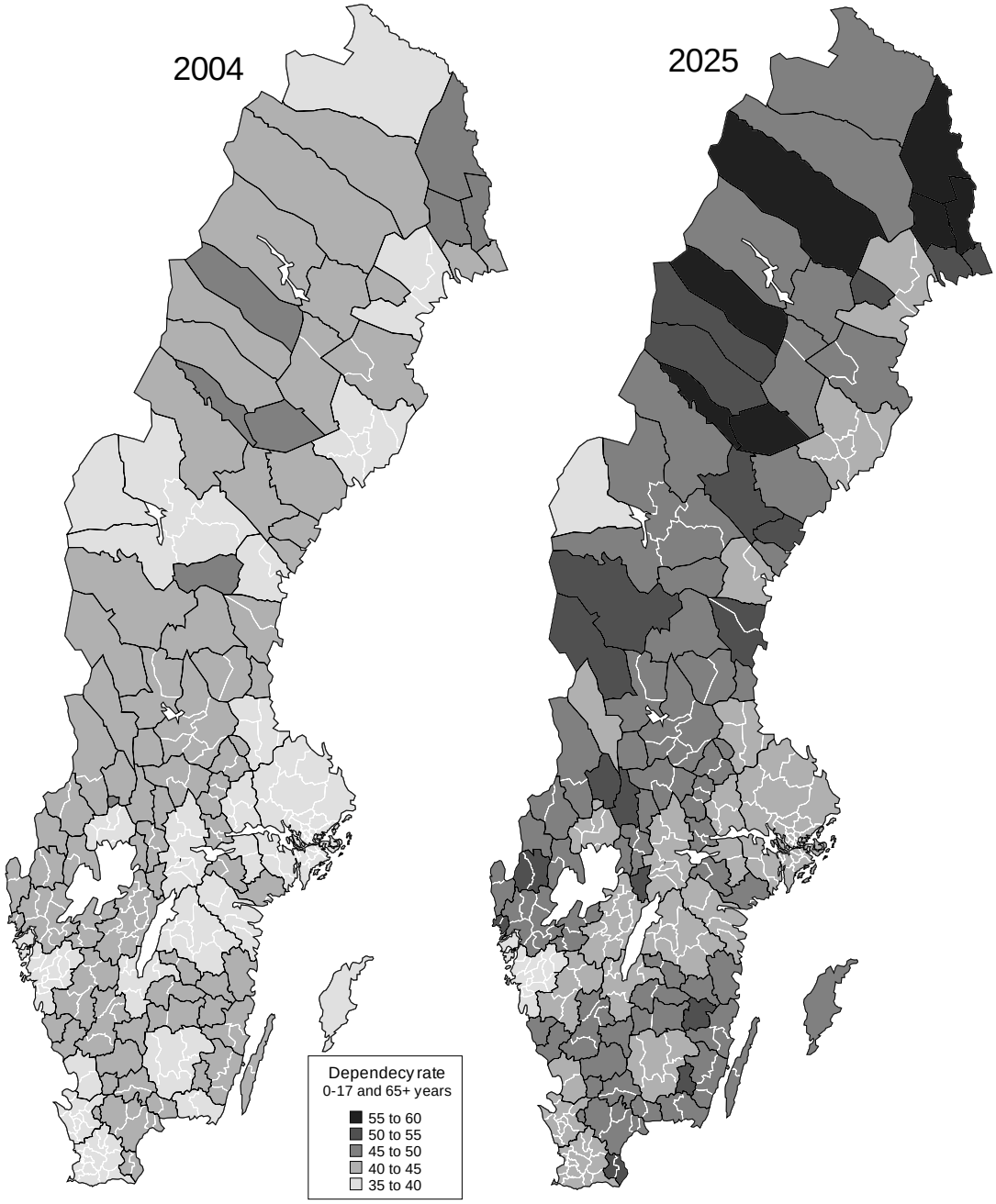


Figure 6. Dependency rate2004 and 2025 per Labour market Area (LA). Source: Data computed from Statistics Sweden

Table 1 summarise the most important features of the population forecast. It shows the population development and changes in the dependency rate for the ten fastest decreasing LAs 2005-2025 – according to the forecast. For purposes of comparison, the corresponding data for the period 1984-2004 and the national figures are also presented.

LA	Population development	Dep rate start	Dep rate end
10 most decreasing LAs 1984-2004	-21,1%	43%	44%
10 most decreasing LAs 2005-2025	-32,4%	45%	56%
Sweden 1984-2004	+8,0%	39%	38%
Sweden 2005-2025	+10,3%	38%	43%

Table 1 Population development 1984-2004 and 2005-2025 (forecast) and dependency rates in the 10 most decreasing LAs and in Sweden.

From Table 1, a few things are clear. Firstly, in the coming 20 years the population of Sweden will continue to grow – given our assumptions – at a rate similar to the growth in the past 20 years. However, the population is ageing and – as a consequence – the dependency rate can be expected to increase. The tendency towards a lower dependency rate which could be noticed for the period 1984-2004 would reverse. Secondly, in regional terms the changes may be more extensive, certainly when it comes to the weakest LAs. Although the tendencies towards declining populations and heightened dependency rates are not new, the magnitude of these developments will increase. Compared to the development in the weakest LAs during the past 20 years, the population decrease would speed up considerably in the coming 20 years and may be accompanied by a shock of aging as the dependency rate increase from 45% to 56%. This could become very problematic on the local level, but as the populations in the affected LAs tend to be small it is a problem of uneven development rather than a strain on the national level. However, the other side of this coin can be noticed as a slightly better development for LAs close to average population change.

Methodological challenges

The method we use in order to forecast the age structure is fairly traditional in the sense that it is built on an extension in time of today's pattern. The uncertainty of such forecasts is often handled by the means of stochastic prognoses or the carrying out of several alternative forecasts. However, also the in-data to these stochastic or alternative forecasts are based on the uncertainties that uneven migration patterns causes.

These population forecasts have also been criticised for their deterministic approach; that they fail to foresee trend shifts or take into account possible actions taken to avoid negative scenarios from becoming reality. As the comics Dilbert states: "*the problem with dystopias is that there is always someone there to avoid them coming true*".

The conclusion we draw from our last case, the rural/peripheral region Övertorneå, is precisely that: Övertorneå will not develop the age structure in 20 years time that our model forecast is predicting. Neither the local economy, nor the labour market or vital service functions, as for instance the elderly care, would sustain the pressure from a population where the retired is in such a vast majority. Before the local labour market reaches the phase of such an advanced ageing a number of mechanisms would alter the course of events.

The situation is similar to the one which sometimes has been described as a "system flip" in natural ecological systems. The "flip" is the transition from one quasi-stable condition to another. The term is used for instance in water environments that are exposed to heavy nitrate deposit which at a certain point turn the system in an irreversible way. In Övertorneå the "demographic flip" could mean a transition into a situation where a balanced population can not be established within reasonable time and where the situation calls for major restructuring of the society in order to fulfil basic needs for its inhabitants. The "demographic flip" in Övertorneå means that we must expect a trend shift.

Having dismissed our own forecast, the research challenge is to develop the method so that we can foresee the adaptive steps that leads away from our prognosticated future; that is how will the trend sift that seems unavoidable appear? As migration is already identified as the crucial factor in analysis on this geographic scale we must find ways for early detection of shifts in migration patterns also for a delimited region such as the local labour market (Övertorneå LA).

A first step is to go beyond the sex/age distribution and look at the migration pattern in various sub-groups of the population. A number of studies on contemporary migration have already opened this research field (Amcoff 2003, AMS 1999; Garvill et al 2000, Nordiska rådet 2002). In a study in progress we are looking at how the migration pattern is correlated to income, education, ethnic back-ground, prosperity, household composition etc. The aim is to separate changing patterns within each sub-group from changes caused by variations in the size of the sub-group. This would open up for more detailed and reliable forecasts of the future population re-distribution.

A second step is to deepen the analysis on the purpose of migration. Such an objective also draws attention to the importance of the appropriate geographical scale of analysis. Although this is not at all a new issue (e g Rogerson 1997) it is too often ignored. Traditionally it has been taken for granted that migration is a function of labour-market related factors. Thus the LAs (Labour market Regions) have been the appropriate spatial level to study. The motives of migrants have been thoroughly studied in Sweden in recent years, again as a consequence of the increasing migration in the 1990s. Although a migrant is defined as someone who has moved from one geographical LA to another, surprisingly few (generally 20-30% of respondents) refers to labour market related factors to motivate and explain their move (e.i Garvill et al 2000, Nordiska rådet 2002, Amcoff 2000). Register data support these studies showing that only 35% of movers also change their job (Johansson et al 2004). The traditional correlation between vacant posts/employments and migration is becoming less pronounced (AMS 1999). Increased commuting and IT-technology have added to a spatial separation between job and place to live. Therefore, when choosing the level of the analysis, it is increasingly necessary to consider the actual choices that people make (Amcoff 2003).

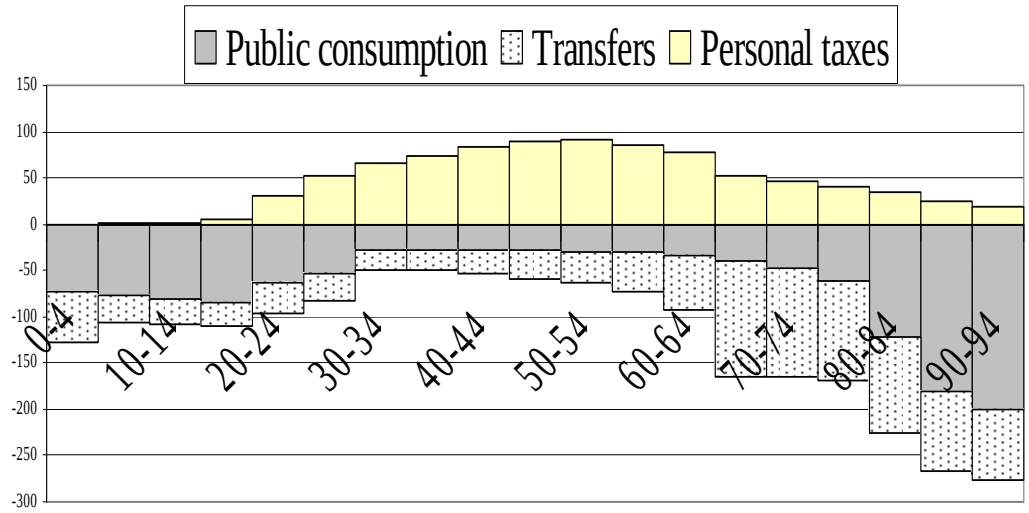
As the most frequent incentive to move relates to an attraction to a certain living milieu, the driving force is place-based rather than related to the labour market regions. These migration patterns can only be interpreted on data revealing the specific place based conditions. Therefore, our aim is to study migration on data for smaller areas, in reality on village or residential area level. The reason to regard this geographical question important is the awareness that the composition of living milieus varies a lot between the different LAs.

Obviously, not only the housing preferences but also the possibility to achieve them varies between the socio-economic sub-groups. Besides that, the motives and drivers may change over time and each of the sub-groups will change its relative size over time. In Sweden data is available on a high geographical resolution on the migration patterns for different sub-groups. By the employment of GIS (Geographical Information System) such data can be used to monitor migration and population development at any geographical scale, but still paying attention to the importance of geographical scale in the analysis. Our aim is also to increase the possibility to detect trend shifts (early warnings). In the end we are aiming at giving a better empirically grounded picture of the possible settlement pattern in Sweden a few decades ahead.

Political implications

The forecasted age structure in peripheral rural regions is also raising a number of policy related questions. The current Swedish regional policy has the main objective to facilitate “growth and development in all Labour market Areas (LAs) in Sweden. Whether “growth” is defined as population growth or as GDP growth it seems to be an unlikely scenario in these regions.

To the opposite, the mushroom shape of the population pyramid indicates that the numbers of adults in working ages will be far from enough to compensate for the increasing numbers of retirees. Figure 6 points at this problem as a public sector dilemma. In general terms the public sector can be described as a mechanism for the re-distribution of incomes between ages. Generally, the childhood and the time after the working ages are periods when we have to be taken care of while the working age is mainly producing the surplus to distribute to other ages.



The Public Sector Dilemma

Fig 7. Public consumption and transfers per capita distributed on age groups 1998 (Nordén and Olsson 2000) . Personal tax payed distributed on ages groups from the Swedish income panel 1997 (Johansson, 2002).

The high degree of transfers and consumption of public services needed to the oldest cohorts indicate the public sector dilemma that Övertorneå (and many rural regions in Sweden) is facing. The relatively few young people expected to remain in the area add to the problem. The declining tax-base will call for growing re-distribution of tax payer's money from the growing city regions to make possible for the local authorities to offer elderly care on today's standard. Also the health care system, today founded on county level, will have to negotiate resources needed to be transferred from other regions (Westholm 2004.) So, from an economic point of view, the uneven age structure is a problem of both spatial and generational re-distribution.

What may make the situation even more critical though, is the forecasted labour deficit. It appears that many peripheral rural regions (among them Övertorneå) will have a labour force too small even to handle the basic public services as they are organised today (Nygren and Persson 2001). A diversified and well-functioning labour market is hard to imagine in this kind of economy.

The age structure in Övertorneå is in a European comparison extreme. Still it provides an example of problems that most of Europe is facing in a few decades time. At a national level a few Mediterranean countries including Italy are among the most affected. Golini (2001) have pointed at a number of measures to increase the fertility rate and thereby counter the tendencies to aging and finally population decrease. However, it should be noticed that in this respect the causes of this demographic situation is different in the areas focused here. It is not primarily a low TFR that is causing the aging and population decrease in areas like the inland of northern Sweden. In fact, the TFR in Övertorneå LA is among the highest in the country.

The problem is that the young people are leaving and have done so for a long time. In theory, measures to change the migration could seem to be the right cure here, but given the insights referred to above, that migration to a larger and larger extent is driven by factors related to the living milieu and other factors not directly related to the labour market, it is hard to see how this could be done. Rather, these obvious problems may trigger others: they may even develop a circle of quicker decline as young adults choose to leave the area rather than face the problems decline. Another possibility is that the situation will initiate an exodus of old people, either as a consequence of a re-organisation of services or as an "escape" to relatives in other parts of the country.

A third possible solution to the foreseen problems with labour supply is some kind of commuting into the area or a fly in – fly out-solution. The deficit can also cause an increased immigration from other countries. The fact that the surrounding labour markets are seeing the same problems indicate that any solution to the problem must be some kind of long distance relations; recruitment of foreign labour, long distance migration etc.

Today, these problems are only emerging and still it is hard to foresee the adaptation strategies that will be implemented on various political levels and/or in the private and the voluntary sectors. How can the public services be re-organised in a resource effective way without putting the quality at risk?

As the countries and regions of the world pass through the phases of the demographic transition their populations will experience an age transition. First in line on a national level of scale are some European countries, but finally the whole population of the earth will experience aging and maybe even a population implosion (Yea 2004). The peripheral rural areas of Europe will experience these problems earliest and in a more extreme way and the solutions/adaptations that will be introduced may provide models of the welfare mechanisms as well as new ways of commercial and public service provision.

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