The impact of ageing at regional level: Computing socio-demographic changes

by
Dr. Jörg Peschner
European Commission
Employment, Social Affairs and Equal Opportunities DG
D1 - Employment Analysis

Abstract

Over the next decade, the implications of demographic ageing on employment are expected to intensify. Eurostat demographic projections foresee a decline of the working age population already starting in 2013. On this issue, so far, the analysis of the implication of ageing in the labour market was almost exclusively focused at EU and national level. However, this approach seriously undermines the strong regional component of workforce ageing and the existing diversity of situations at regional level which are of critical importance given the relatively low intra-EU mobility.

So far, in the context of the EU2020, little analysis has been suggested concerning the regional labour markets. However, it is clear that given the ageing pattern and the foreseen growing scarcity of human resources, the analysis of the regional dimension will be of **critical importance for future labour market policies**, the identification of **future skill needs** and relevant **funding activities of the ESF** (local performance measurement). Regional labour supply has already substantially shrunk in a number of regions across Europe and more regions will experience similar or even more intense patterns in the coming years. For these reasons the author is developing a **software-based projection tool** for the EU Commission, Employment, Social Affairs and Equal Opportunities DG, to strengthen its analytical capacity in the area of regional labour markets on the basis of a projection model designed by *Coomans (2005)*[1]. Technically, the main objective is the projection of regional labour supply, broken down by age, gender, educational attainment level and employment status. Due to data availability, analysis concentrates on NUTS-2 territorial level[2] (there are some 300 NUTS-2 European regions considered).

[1] For the projection methodology, see Coomans, G., Atlas of Prospective Labour Supply 2005, p. US 8. Annex 1 shows an explanation for the demographic projection. Annex 2 depicts the projection method as concerns the educational shift (the share of people by age and gender holding low, medium and high educational attainment levels).

[2] NUTS: Nomenclature of Statistical Territorial Units, see http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/regional_statistics/nuts_classification

The demographic shift….

Some preliminary findings are presented in the following. Projections are carried out on the basis of the new software tool which is still in the making. The simple projection model is outlined in Annex 1 (demographics) and Annex 2 (educational attainment structure).[3]

Over the next two decades, ageing of the workforce and total population will impact severely on a number of European regions. There will be hardly any location able to maintain today's age structure. The demographic shift will start in the current decade as the post-war baby boom generation will turn 65 and, unless already dropped out of the workforce, exit the labour market as they reach pensionable ages. That is, the number of working age people (aged 20 to 64 years), after having slightly increased over the last 10 years, will begin to shrink this decade - accelerating demographic and economic dependency, see Chart 1.

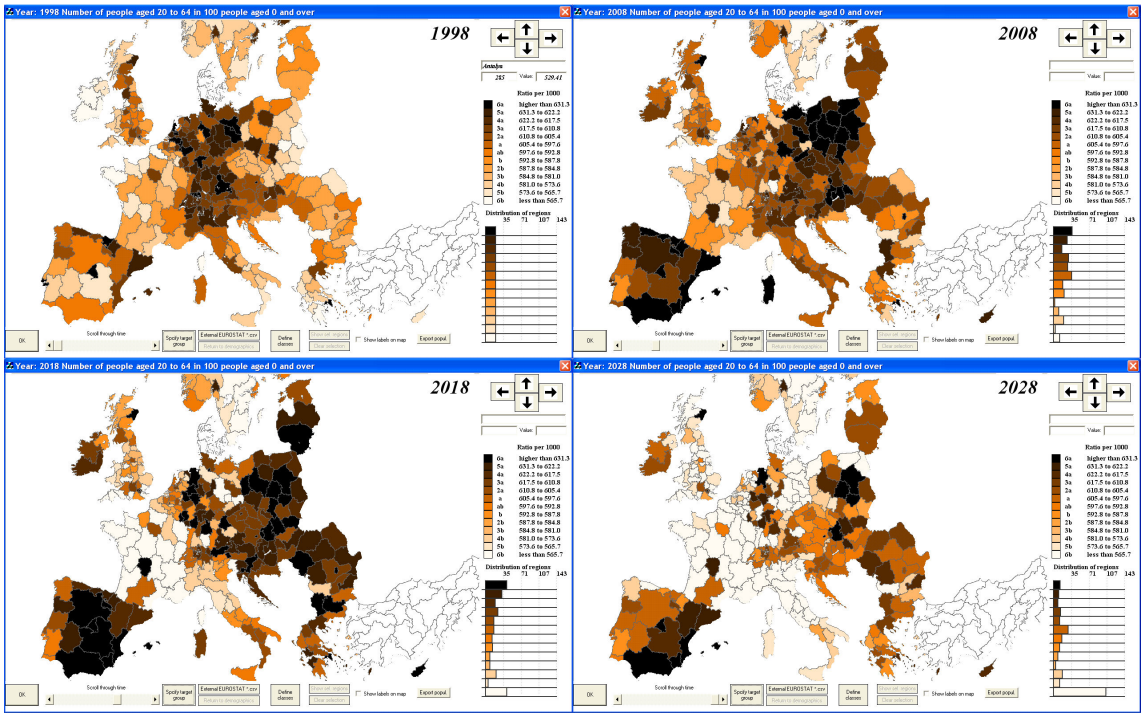


Chart 1: Number of people aged 20-64 per 100 total population in 1998, 2008, 2018, 2028. Own calculation, data source: Eurostat. No data for DK and TR.

Considering regional demographic dependency at NUTS-2 levels (some 280 regions for which data is available), more than 40% of the European regions are projected to see a decline in the number of working age people (aged between 20 and 64 years) already over the next decade, i.e., during the period 2008 to 2018. Ten years later, the share will be more than two out of three. A number of spots in F, Eastern DE or IT are set to experience heavy shifts of demographic dependency over the decades to come, further adding to regional development polarisation and imbalances across the continent.

The demographic decline is expected to speed up over the years until 2040 as life expectancy will further increase, baby-boomers continue to retire and low (and further declining) fertility levels will begin to unfold their impact on labour force in the years after 2020 - which is par-

[3] Map-based charts are screenshots from the software tool.

ticularly relevant in Central and Eastern Europe where the fertility drop was most considerable in the 1990s in the course of the Eastern economies' collapse.

… will impact on potential growth at national level…

As potential output is the sum of employment increase and productivity gains, the shrinking workforce is expected to pull down employment in the years after 2020 at latest - given that Europe will manage to reach the EU2020 strategy's overall employment target of 75% for the 20-64 year-old.[4] Chart 2 reveals that, even if so, EU27 faces a decline of total employment after 2020 averaging up to ½ percent per year. If EU27 was to achieve, say, 2% economic growth in order to maintain current welfare levels, this means that productivity shift would be needed of not less than 2 ½% per year in the decades after 2020 - much above the levels experienced in the recent past.

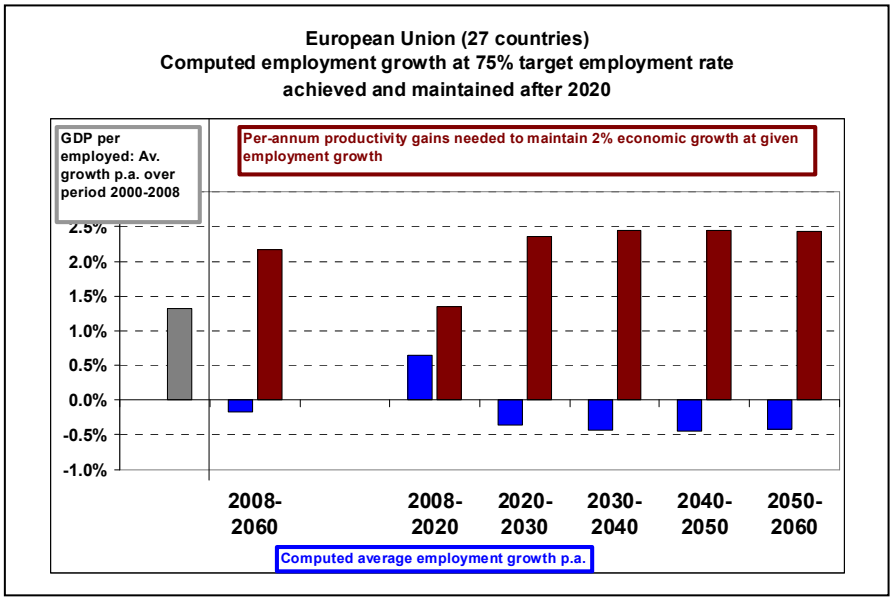


Chart 2: Productivity shift needed to maintain 2% GDP growth in the EU27 at EU2020 target employment objectives; Own calculations, data source: Eurostat LFS

For a number of Member States the situation will become even more serious. DE, for example, is expected to see employment declines of up to 1% in the decades to come after 2020 if there was no further shift in the employment rates - implying necessary productivity shifts of up to 3% if economic growth was to be kept at 2% levels.

… putting the pressure also on regional productivity gains and mobility.

The picture is a quite similar one at regional levels. As there is no way (yet) to translate EU2020 employment target to regional targets, one may consider local employment rates to hypothetically be kept at **today's** levels instead and ask for the necessary local productivity

[4] For the EU2020 core objectives see the Communication from the Commission "Europe 2020 - A Strategy for smart, sustainable and inclusive growth". The EU2020 strategy was adopted by the European Council on June 17, 2010.

shift to obtain economic growth rates experienced in the recent past: let reference be average real GDP growth during the period 2003 to 2007, i.e., well before the crisis. Over that period growth was considerable all across Europe with +2.6% on average for EU27. Eastern European Member States (except HU) experienced growth rates not less than 5% on their long-term path to catch up with Western European standard. If, hypothetically, after exiting the crisis, European regions were to re-achieve these pre-crisis growth levels over the two decades to come, this would imply that half of European regions would have to see annual productivity shifts beyond 3% during the period 2008 to 2028. More than a quarter would need 4% or higher productivity growth, see Chart 3. This is not only due to the relatively ambitious growth scenario set as the reference but also due to the workforce set to decline in some 60% of the European regions considered.

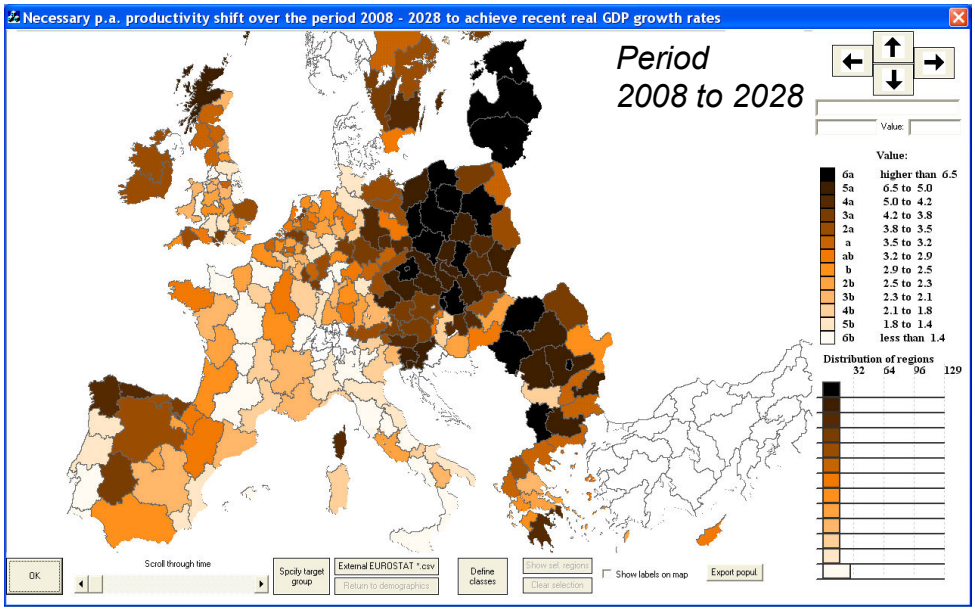


Chart 3: Annual local productivity shift necessary to maintain average 2003 to 2007 local GDP growth rates at today's employment rates; Own calculations, data source: Eurostat No data for HR, DK, TR, NO, CH

Many regions are poised to successfully speed up productivity via education…

Necessary productivity increases bring up the question of education. The model supports the projection of educational attainment level per 10-year age group, beginning at age 25 to 34 years, i.e., young workforce for which part of the educational progression observed in the past is assumed to be seen in the coming two decades as well. Regional LFS time series are taken on board as concern educational attainment levels per age group and gender as from 1997 up to 2008. However, there are a number of data gaps in the 12-year series so that the share of 25-34 year-olds holding high educational degrees (tertiary level, ISCED classification 5-6)[5] cannot be projected by using log-linear extrapolation for every region considered.

Hence, in line with *Coomans*, in order to apply the same model across all regions, „educational progress" for the respective youngest cohorts (aged 25 to 34 years) is being modelled by extrapolating part of the difference between the youngest (25-34) and the second youngest (35-44) age group's percentage of high educated people observed as an average over the most

[5] ISCED: International Standard Classification of Education, see http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:ISCED

recent years for which data is available.[6] If, on average, the 25-34-year-olds in year t hold higher educational degrees than people aged 35-44 then this implies that part of this cross-sectional educational shift will be extrapolated into t+10 for the then 25-34 year-olds. That is, when projecting the number of people by age, gender and educational attainment levels, a certain **structural age-specific educational progress** is being implicitly assumed (see Annex 2).

How is the number of high-educated people in European regions projected to evolve, then? Chart 4 shows the percentage of high educated people (with a tertiary degree) in the total age range from 25 to 64 years - the upper chart being the situation in 2008. The lower chart shows a projection of the share holding high educational degrees in the year 2018[7] taking on board the structural educational progress described. The chart depicts that it is well possible to boost the share of high educated in many Member State regions: Almost 90% of the European NUTS-2 regions considered are projected to see an increase of that share, though the level of the shift varies significantly.[8] The majority of Member States see all their regions improve their educational profile. Roughly a third of the European regions see the share of high-educated shift by 5%-pts or more. Amongst the bigger Member States this is particularly true for regions in F, ES and PL: With age-specific educational progression continuing, those regions are set substantially increase the share of high educated people despite changing age structure (ageing effect - which in itself decelerates educational progression as older people normally hold lower educational degrees). On the other hand, there is scope for improvements for countries like DE and IT where the model projects the relatively slow progress observed in the past into the future and/or progress by cohort might be paced down by the increasing share of older people.

In order to depict the impact of the structural educational progress, the middle chart shows the projection for the share of high-educated people with the structural effect being "switched off" in the model. Of course, the magnitude of the educational shift from 2008 to 2018 is lower on average compared to the model with structural progress working - only little improvement is visible for a number of Member States compared to the situation in 2008. But still some 90% of the regions under consideration show a rise in the share of people holding high degrees, in 14% of the regions the rise is 5%-pts or higher. This result reflects the cohort effect: The young cohort's relatively favourable educational profile will lead to an educational shift across the entire age range 25-64 also in the future as more and more (well educated) younger grow into the total cohort and more and more older (less educated) people drop out. So even if the respective young cohorts will not see any further educational progress in the future, the cohort effect will lead to an overall increase of the percentage of people holding high educational degrees. A further improvement is then being added by the structural educational progress (see lowest plot in Chart 4).

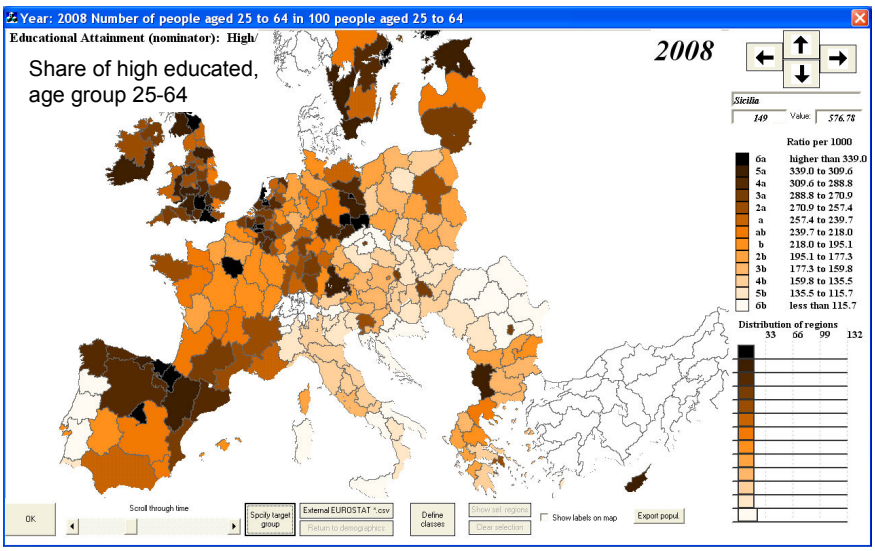
[6] The same is being done with the share of low educated people, the medium educated being the residual.

[7] Given high uncertainty for longer projection periods we leave it with the 10-year horizon though, in principal, the software supports projection of 10-year age groups by educational attainment levels and employment status up to the year 2028.

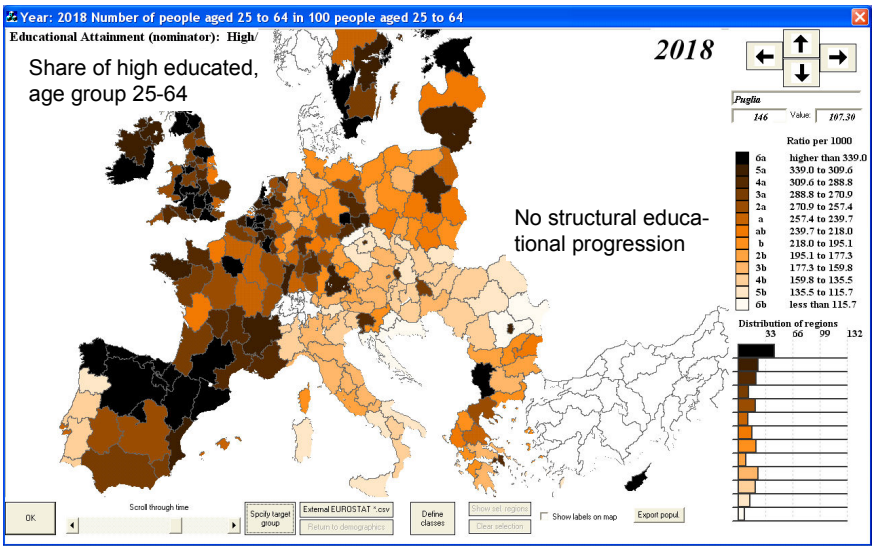
[8] See also the frequency plot at the bottom (right) of each chart. The tool distributes all regions across 13 equal quantiles in the initial situation (here: the year 2008) - the frontiers of each class being given by the chart middle-right. Hence, when scrolling through time (having in view the frequencies bottom-right), the user will see the distribution change and can relate these changes to the profile in the initial situation.

Share of people holding high educational degrees within the age group 25-64 years

*.. in **2008***



*.. in **2018** assuming **no** structural educational progression for the 25-34 year-olds*



*.. in **2018** including structural educational progression for the 25-34 year-olds*

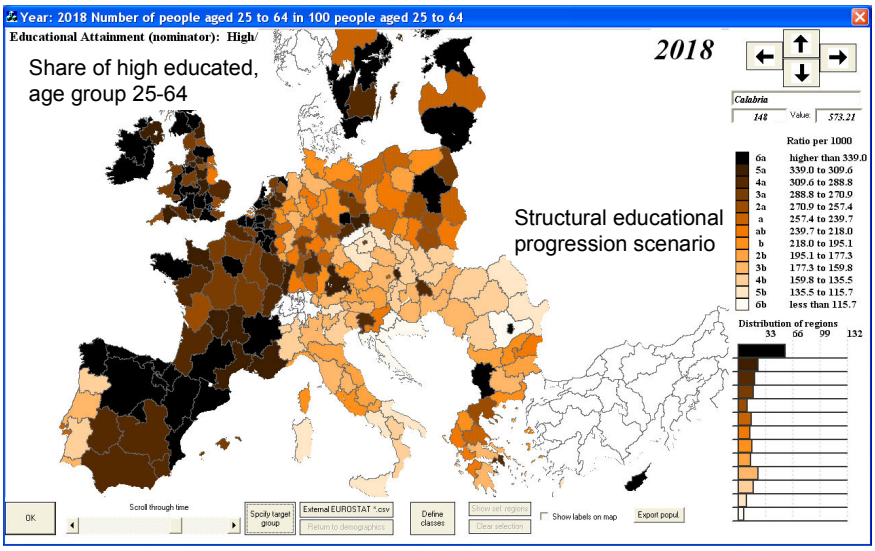


Chart 4: Regional educational attainment: Share of high educated people in 100 people aged 25-64 today (in 2008) and projected for 2018; Own calculations; data source: Eurostat LFS, no data for HR, TR, CH, DK, part of UK, NO.

… but regional mobility is low.

Recently, thanks to some success brought about by the Lisbon 2010 employment strategy, a number of Member States managed to improve regional employment rates in the recent past. Chart 5 shows the picture for the years 2002 and 2008. However, the chart also reveals that geographical dispersion of labour supply and labour demand is still considerable in Europe, low inter- as well as intra-national workforce mobility being amongst the main driving forces.

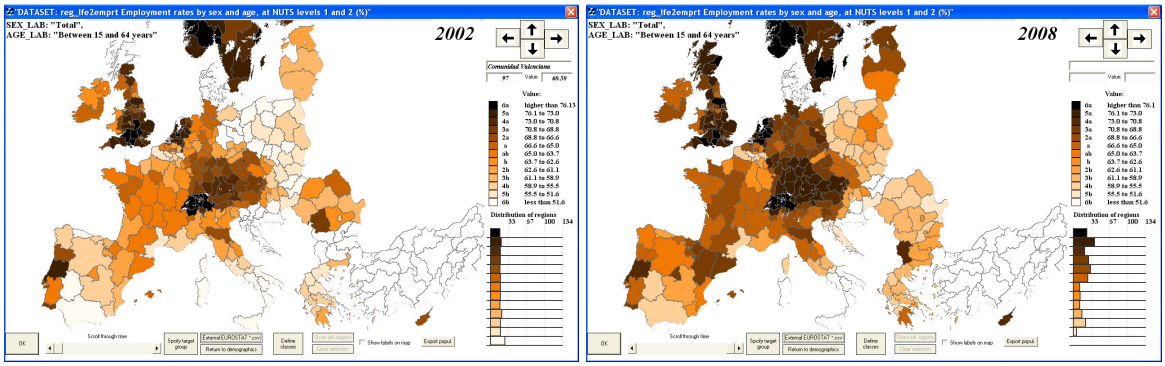


Chart 5: 2002 and 2008 regional employment rates (age group 15-64 years), data source: Eurostat LFS

It becomes evident that a considerable number of regions face unused labour resources while others are successfully activating their local workforce. Clearly, activation measures need to be implemented.

On the other hand, provisions to promote **intra-regional mobility** are also key to better locally match labour supply and demand. According to the 2008 UN World Population Prospects, net migration across Western Europe is only 1.7 in 1.000 population over the period from 2005 to 2010, just half the level of the US (3.3 in 1.000) - with big Member States DE (1.3), F (1.6), NL (1.2) below average.[9] A balanced stance towards cross-border mobility is needed as qualified migrants might fill vacancies contributing to alleviate local employment decline **and** boost productivity. In terms of stocks, however, the share of foreigners living in the EU is low in many regions, see Chart 6.

Foreigners in the EU, 2001

Foreign-borns *Citizens from other EU15 countries* *Citizens from CEE*[1)]

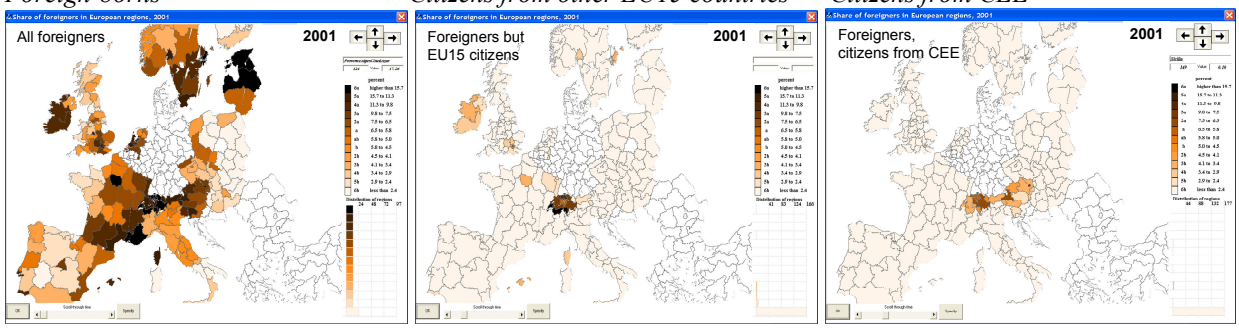


Chart 6: Data Source: Eurostat, based on census 2001.
No data for DE, DK, BE, HR, RO, BG, EL, TR
[1)] Central and Eastern European countries: BG, HR, CZ, EE, HU, LV, LT, PL, RO, SK, SI, AL, BA, MK, CS

limited. Chart 6, left hand side, shows European regions' share of foreigners in total population in countries for which data is available at NUTS-2 level. The plots are based on census

[9] Western Europe includes AT, BE, F, DE, LU, NL, CH, Monaco, Liechtenstein). See http://esa.un.org/unpp/index.asp?panel=2

information from 2001 with a number of countries not represented. It appears that less than a quarter of the European regions considered in Chart 6 saw a share of minimum 10%. In roughly half of the regions the share was 5% or less.

If one considers only European expatriates, it becomes evident that mobility **within** Europe is particularly low. The middle and right hand side of Chart 6 (which use the same colour scheme as the left hand chart) show only citizens from another European country, i.e., exclude third-country nationals. It is obvious that for the European countries considered, foreign people mainly stem from countries beyond Europe, except for CH, AT and IE which are special cases. However, a number of capital regions have a considerable number of residents from other European countries.

These findings confirm *Gáková and Dijkstra's (2008)* results on intra-regional mobility across Europe: The share of EU residents in 2006 who arrived in another EU region represented less than 1% of working-age population - compared to 2% in the US. Moreover, some 85% of these moves happend between regions of the same country - implying that international mobility across Europe is even very much lower.

"Winning" regions will continue to attract migrants…

Data on migrants and people moving from one region to another one is insufficient at regional level in the sense that it does not allow for explicitly taking on board the issue of mobility in the projection model. Hence, as it stands now, the model does not have a mobility sub-model. Instead, regional population by gender and age group (as well as educational attainment level and employment status) is being projected in total - not broken down further by socio-economic characteristics which might be of interest, such as the country of origin. However, there is an indirect technique to extract what could be **intra-national mobility**'s contribution to projected local population changes - albeit at high uncertainty. If one plots a region's (local) population as projected by the model against the local population projected on the basis of national average assumptions about survival rates and fertility (project location X using national instead of local drivers of change), the difference could be attributed to population changes due to intra-national mobility, i.e., people moving from one region to another one within the same country (see Annex 3 for further explanation).

Doing so, Chart 7 shows the region's population changes over the period 2008 to 2018 (solid blue curve) and the contribution to these changes which could come from intra-national mobility (red curve). Note that the 280 NUTS-2 regions taken into consideration here are ordered alongside the x-axis by their projected proportional change in ascending order. As a consequence, the blue curve indicating those changes is continuously increasing. The unstable red line then depicts the population change over the period 2008 to 2018 resulting from intra-national mobility.

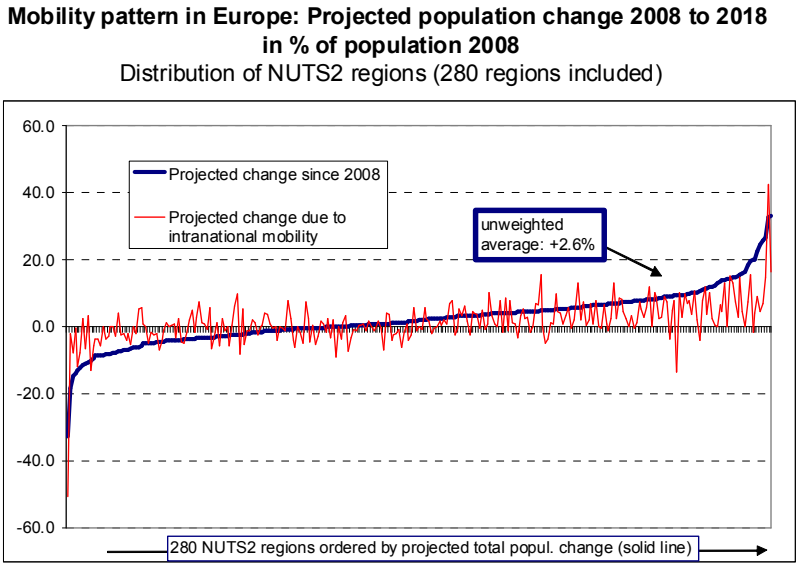


Chart 7: Mobility in Europe. Source: Own projections, data source: LFS

In the middle area where the changes aren't that significant, the two curves seem to coincide well. There is moderate projected total change and moderate contribution of in-country mobility to that change. On the other hand, at the extremes there are more significant deviations. Where this is the case, there is high dynamics in terms of population change **and** other factors on top of intra-national mobility also play a decisive role in explaining future population changes.[10] On the left where regions lose people it is often the decreasing number of potential mothers that combine with low birth rates. As a result, a low number of births make regional populations decrease fast - as is the case in some spots in the Eastern Member States and Eastern Germany. On the other side of the scale, many regions in Spain are projected to remain among those to win the most people (see right) as they did in the past. For the winning regions, it is international immigration which will continue to play a strong role in explaining positive population changes.

… where the role of urbanity and population density in non-uniform.

A location's degree of urbanity plays a certain role in explaining population changes. We use the software tool to take it on board - though analysis on that question is certainly more pertinent at smaller geographical entities than NUTS-2.

We know especially from Asian and African regions that big cities grow bigger as they continue to magnetize workforce due to the lack of employment possibilities on the landside. *Westin and Westin (2008)* reveal that according to the UN Urbanisation Prospects 2007, some 15% of the world population in 2007 lived in cities with minumum 5m inhabitants - the share being projected to incrase to 17% already by 2025. Using the UN concept of "urban population"[11], still some 40% in Asia or Africa live in urban areas in 2007. However, these shares will soar to levels around two thirds by 2050. This of course, contributes there to a certain rejuvenation of urban population. So far, there is no such severe trend in Europe - with urban-

[10] These are the factors which, by assumption, impact on the national demographic development as they do locally.

[11] De facto population living in areas classified as urban according to the criteria used by each area or country, see http://esa.un.org/unup/, (glossary)

ity levels today above 70% already but expected to increase by a mere 11%-pts over the next 40 years.

Defining the degree of urbanisation according to *Eurostat (2000)*[12] and analysing the linkage between population and economic decline at NUTS-3 level, *Gáková and Dijkstra (2010)* conclude that urban area population change between 2000 and 2006 was around 3% compared to less than 1% in rural regions. But the picture was a very diverse one. For example, EU average population decline affects urban just as much as intermediate and rural areas: The share of population 2006 living in regions with population decline between 2000 and 2006 was around one third for each category. In the EU15, population decline is more likely to occur in rural regions whereas in Central and Eastern European Countries population decline is most frequent in intermediate regions. It appears that European regions' demographic performance in terms of population change is reflected by their economic performance only to a very limited extent.

Indeed, using the projection tool and plotting the projected population growth at NUTS-2 level over the decade to come against current GDP levels as percentage of EU average, it still holds true that there is a rather loose linkage between European regions' population and their real GDP growth, see Chart 8.

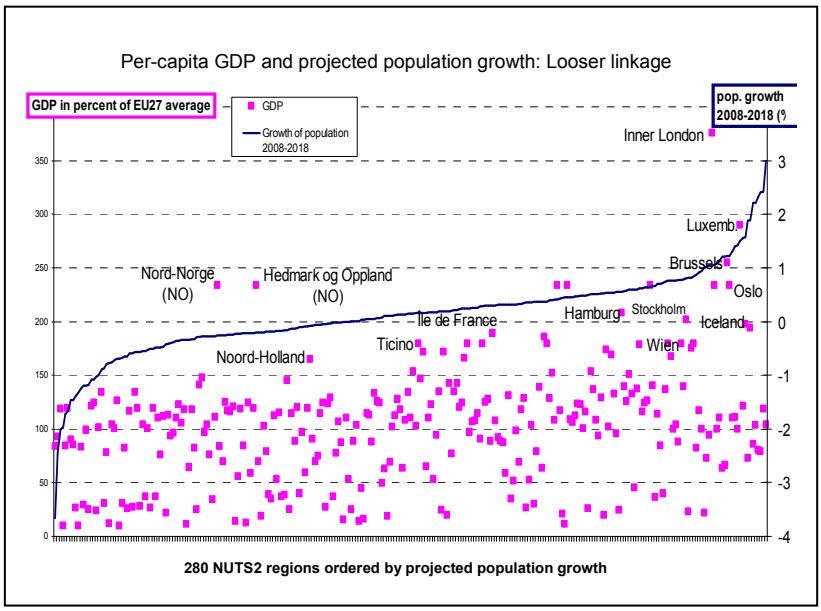


Chart 8: Mobility in Europe. Source: Own projections, data source: LFS

Again, the 280 regions considered in Chart 8 are ordered alongside the x-axis according to their population growth over the period 2008 to 2018 (depicted by the solid line). The Western European capital regions belong to the ones growing fastest and continuing to attract the most people. But all in all there is no strong relation between population growth and economic performance.

This could be the result of a certain "saturation effect": *Gáková and Dijkstra (2010)* point out that urban regions begin touching the limits of positive economies of agglomeration (such as developed infrastructure, favourable labour force education and business environment) as those become more widely available also in less densely populated areas. At the same time the cost of agglomeration become more significant (crime, congestion, unemployment). As a

[12] Densely-populated areas have a density of minimum 500 inhabitants per km^2 and living in places with 50.000 inhabitants or more.

result, for EU15, rural regions experienced the strongest increase of GDP per capita over the period 2000 to 2006. *Dijkstra (2009)* points out that only half of EU metropolitan areas have a higher level of economic development (GDP per capita) than the respective national average.

Another reason which plays a role in explaining the looser relation between demographics and the local economy should be commuting, i.e., the workforce's increasing readiness to travel longer distances to work as people prefer to reside in neighbouring areas rather than in bigger cities. The effect of commuting on loosening the linkage should be the better visible the smaller the geographical entities considered: It will certainly be obvious at NUTS-3 level but is visible also at NUTS-2, see Chart 9 which (for the sake of simplicity) shows the projected *total* population change over the period from 2008 to 2018:

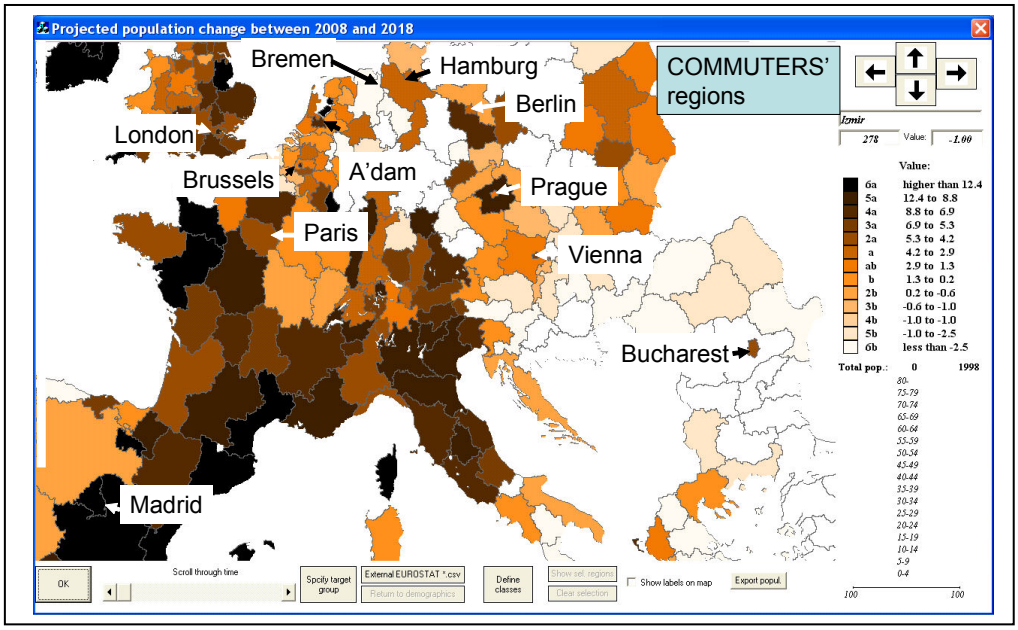


Chart 9: Projected population change between 2008 and 2018, typical commuter's regions; Own projections, data source: LFS

Take a number of European capitals as an exemplified selection of urban areas: The chart highlights those capital regions' demographic performance. It is obvious that the neighbouring areas are often projected to win relatively more people than the capitals themselves (as they did in the past) or equally as many. This seems to be particularly true for lower expanse, high density agglomerations where the commuting distance from outside would be lower (see Berlin, Prague, Hamburg). But some other neighbouring, more spread out areas are also projected to perform well in terms of "winning" people, see the surroundings of Île de France (Paris), Outer London, Communidad de Madrid as examples. Bucharest, on the other hand, is an exception confirming the Eastern European pattern of fast-growing agglomerations attracting numerous people from all over the country in search for work opportunities.

Besides the degree of a region's urbanisation (the fraction of population living in urban areas within a region) one may also take the whole region's **population density** as a different measure[13] and divide the 280 NUTS-2 regions considered into four equal quarters of 70 each, see Chart 10, left. We consider only the two quarters where the population density is highest (blue curve) and where it is lowest (red curve). Take again, for the sake of simplicity, change of *total* population over the next decade, i.e., the period from 2008 to 2018. As expected, aver-

[13] Population density and the degree of urbanity are different concepts. The best example is the continent of Australia where there is the lowest populaton density but the highest level of urbanity as people mainly live in the cities.

age population change is higher for the more densely populated areas. But this is not true all across the scale: Interestingly, amongst the regions where the projected population changes are highest, less densely populated NUTS-2 areas appear to be overrepresented.

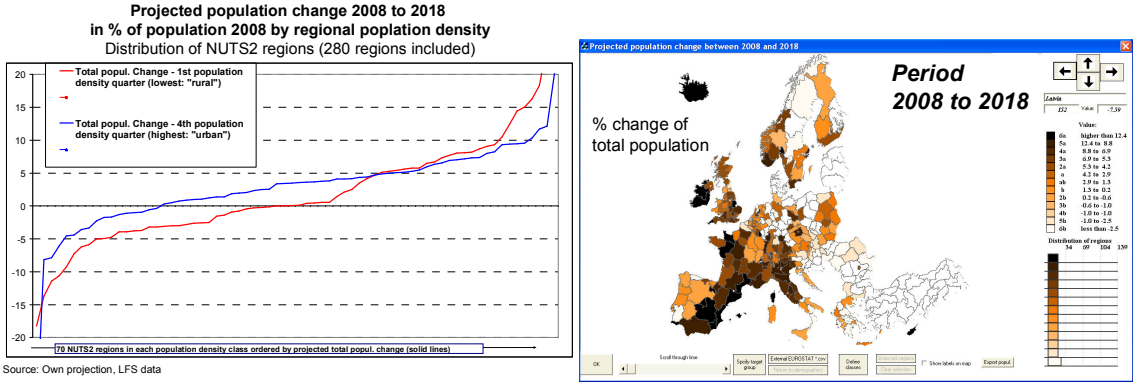


Chart 10: The issue of urbanity (left), projected population change over the period 2008 to 2018 No data for DK, TR. Source: Own projections, data source: Eurostat

A look at the map completes the picture, see right. Among others, a number of more sparsely populated Mediterranean regions and IE are projected to win people over the next decade (as they did in the past) - most of which belong to the classical areas of immigration.

Conclusions

The analysis suggests that ageing will impact severely on most European regions. The previous decade has for the last time seen an increase of working-age population in many regions, but demographic and economic dependency due to progressive ageing will intensify - beginning already in the current decade. Considerable **productivity shifts** will be needed soon in order to maintain recent pre-crisis growth rates also in the future as employment will inevitably shrink all across the continent.

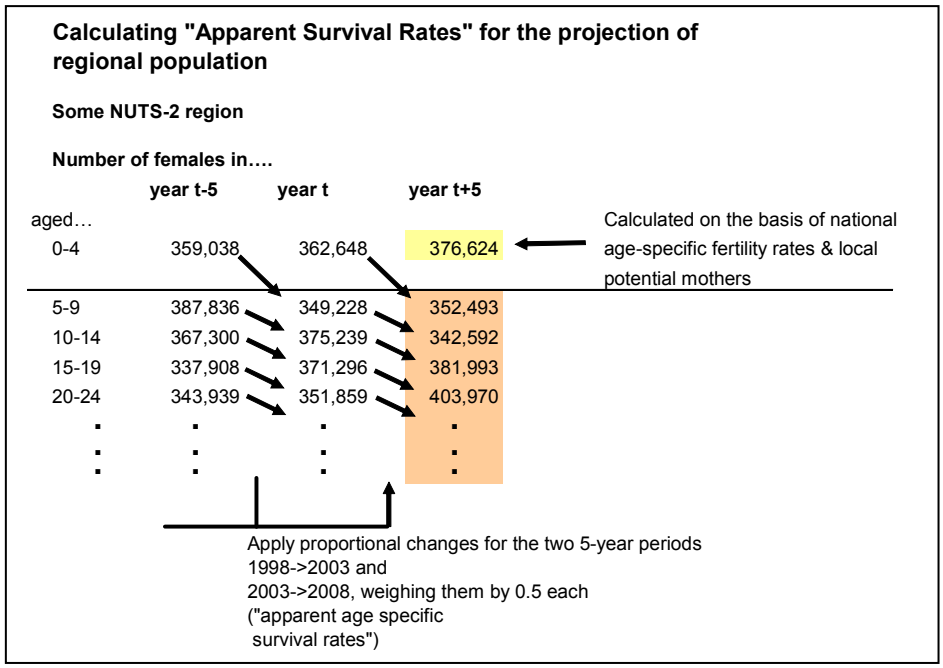
Urban areas still attract more people than rural regions. But all in all, loosing people is not at all a typical rural-spot phenomenon. On the other hand, many larger European agglomerations begin feeling the limits of economic as well as population growth.

At NUTS-2 level, highly populated regions continue to attract people, and on average the declining workforce affects less populated regions to a higher extent than areas with a high population density. A number of thinly populated regions certainly need particular policy attention, some are projected to face further exodus (areas in Eastern DE are prominent examples), others are expected to win the most people over the next two decades (for example, in ES, IE). That is, the tendency towards further ageing-driven polarisation needs to be tackled unless Europe accepts growing imbalances in terms of regional development.

Mobility in Europe is low and needs to be sped up. This is particularly true as concerns the share of European expatriates in local population. On the other hand, third-country migrants are expected to continue being attracted by a number of growing regions. High-skilled migrants contribute there to tackling local labour supply mismatches and help increase employment levels *and* generate regional productivity gains. In terms of educational attainment levels, people in most European regions have achieved considerable progress in the sense that cohorts improve their standards compared to the cohorts before. The trend is set to continue in most of the regions. Most European regions are projected to see further educational progres-

sion. Some, however, will need further policy effort and support: Their progress was slow in the past with no or little progress foreseeable over the next decade.

Annex 1: The model's "shifting population projection"

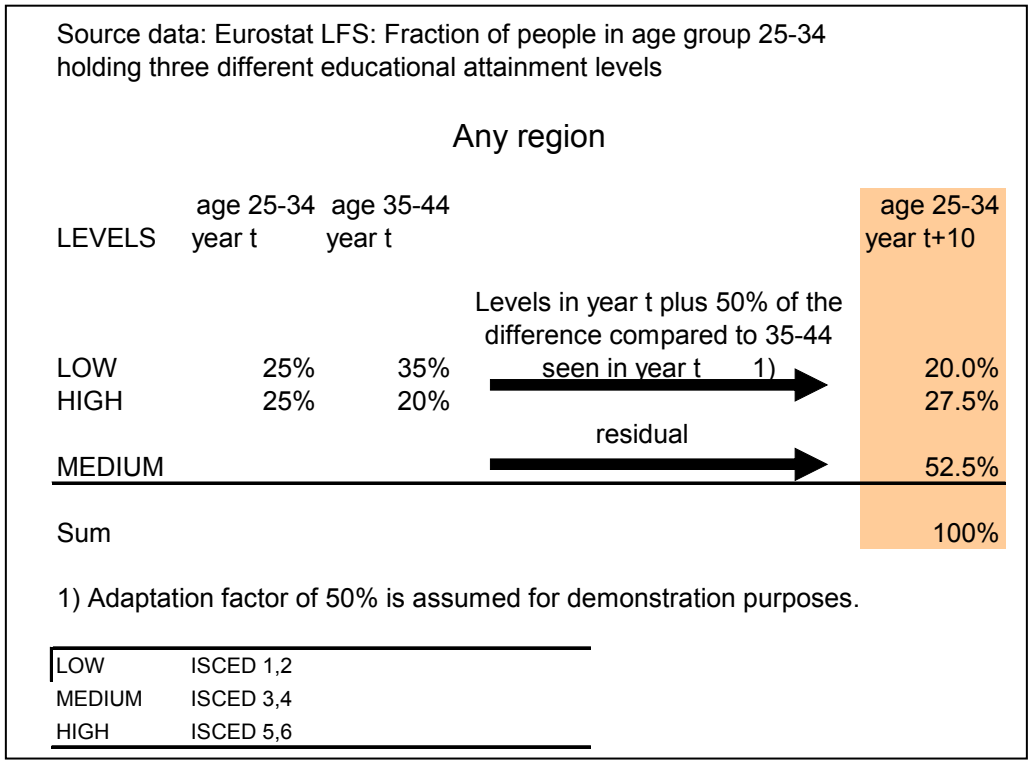


The number of people in the youngest age group (0 to 4 years) is calculated on the basis of national average age-specific fertility rates and the local number of potential mothers.

The number of people in each five-year age group is calculated using the methodology of "shifting projection" - according to the method first applied by *Coomans (2005)*. Consider 100 males in a certain five-year age cohort x in 1998. Five years later (in 2003) the number of males of age group x+5 may be 105: The cohort has thus gained population by 5% - the Apparent Survival Rate (ASR) for this cohort being 1.05 over the period 1998 to 2003. If 2003 to 2008 resulted in an ASR of 1.02 (resulting from a further 2% increase), this means that for the projection periods an ASR for age cohort x equalling
(1.05 + 1.02) /2 = 1.025 would be assumed.

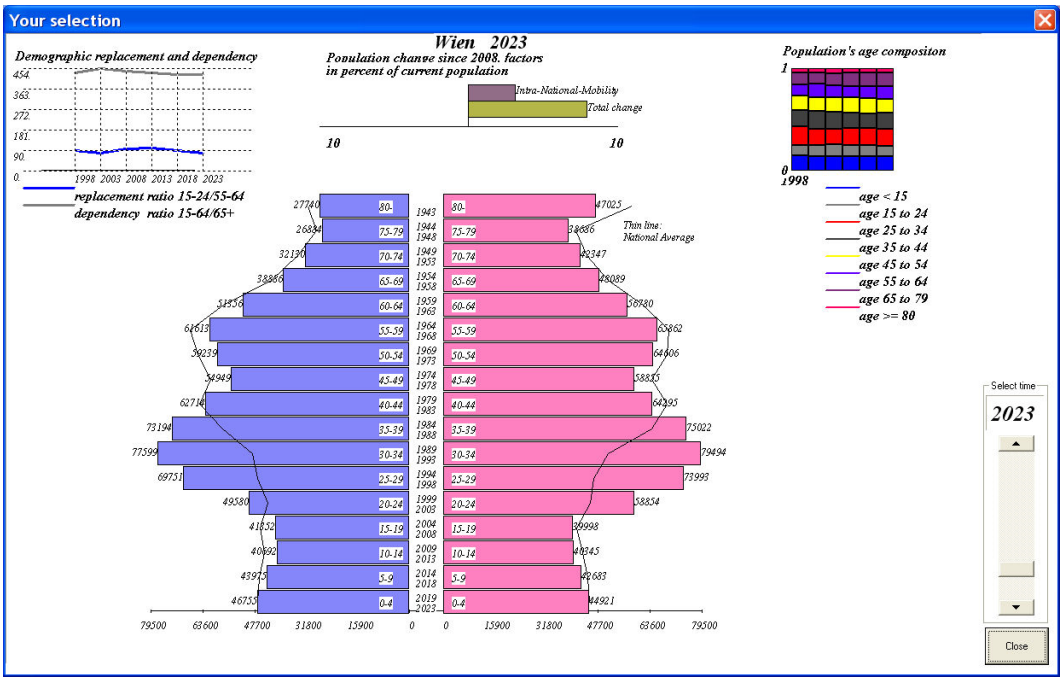
The software tool will take the ASRs and the age-specific fertility rates as default parameters which can be changed by the user - facilitating sensitivity analyses. On top of that, any region can be projected on the basis of any other region's or the national average assumptions.

Annex 2: Modelling educational progression



Educational attainment levels will be modelled for 10-year age cohorts. LFS data comprises the educational attainment levels at NUTS-2 geographical level over the period 1997 to 2008. The share of high-educated people (by gender) will be modelled explicitly for the youngest workforce (aged 25 to 34 years). Log-linear projection for the share of high-educated would be possible if there were no lacks in the data over the 12-year time series. However, (numerous) data missings in a number of regions make it impossible to apply this technique for every region considered. As a consequence, in order to model educational change the same way for all regions, a very simple and static technique is applied. The starting point is the average of the share of high-educated over the most recent years where there is data available. Considering this average as the base year t (which currently is 2008), the share of high-educated in t+10 will be the share in t plus a fraction of the cross-sectional progression in t, i.e., the difference between the share of high-educated aged 25-34 compared to the share of high-educated aged 35-44 years. That is, when projecting the number of people by age, gender and educational attainment levels, a certain progress is being implicitly assumed. As for pure demographics (Annex 1), all parameters are considered default values by the software tool and will be subject to changes by the user.

Annex 3: Intra-National mobility



If **national average** (instead of regional) Apparent Survival Rates (ASR, see Annex 1) were applied to a region's 2008 initial **regional** population then this would result in a projection for the regional population corresponding to the one indicated by the thin line in the chart above. In the example shown there, Vienna's total population projected for 2023 (depicted by the tree) which would result from applying the genuine region-specific ASR-assumptions would be higher compared to the "fictive" one calculated on national average assumptions. It is obvious that the main reason lies in Vienna's relative attractiveness for young working age population offsetting slightly lower projected populations across the other age groups. Hence, one would conclude that the intra-national mobility balance for the region selected here would be positive. In other words: Intra-national mobility's contribution to the region's total population shift would be positive at least over the projection period 2008 to 2023 (see bar "Intra-National Mobility" on top).

However, these assumptions are subject to high uncertainty.

References

Coomans, G., Atlas of Prospective Labour Supply 2005, esp. p. US 8

Dijkstra, L., ”Metropolitan regions in the EU“, EU-Commission, DG REGIO, Regional Focus 01/2009.

European Commission, Communication “Europe 2020 - A Strategy for smart, sustainable and inclusive growth”, COM(2010) 2020 of March 3, 2010.

Eurostat, "REGIO database - User's guide", 1999 Edition, Office for Official Publications of the European Communities, 2000, p.48.

Gáková, Z. and Dijkstra, L., ”Labour mobility between the regions of the EU-27 and a comparison with the USA“, European Commission, DG REGIO, Regional Focus 02/2008.

Gáková, Z. and Dijkstra, L., „Does population decline lead to economic decline in the EU rural regions?“, EU-Commission, DG REGIO, Regional Focus 01/2010.

Westin C., Westin, N., “Projections of Urban Development”, IMISCOE Working Paper No. 25, Centre for research in International Migration and Ethnic Relations, Stockholm University, 2008