

Prospective Population Aging in Sweden: Economic Consequences and the Impact of Migration

Felix Roessger

Max Planck Institute for Demographic Research, Rostock (Germany)

E-Mail: roessger@demogr.mpg.de



Extended abstract for submission to PAA 2011

(Session: 902 Policy Challenges of Population Aging Around the World)

September 17, 2010

Abstract

In this article the economic consequences that are accompanied by the prospective demographic development in Sweden are explored. For this purpose data for age-specific consumption and labor earnings are incorporated. Thus, it is possible to estimate how much excess consumption on an aggregated level needs to be financed in different demographic scenarios during a time span until 2050. Currently, no combination of assumptions with regard to fertility, mortality and migration made by Statistics Sweden can detain excess consumption from increasing. Low migration, high fertility and low mortality alternatives reinforce this development, whereas the contrary alternatives would have a mitigating effect in contrast to a medium scenario. An in-depth investigation of the migration effect shows that a potential “migration gain” is estimated with excess consumption being eight percentage points lower in 2050 than without any migration, if recent levels of immigration remain constant.

Introduction

Due to demographic change, seen as a decline of mortality and fertility, the age-composition in many industrial countries is changing. The shares of the working age population are decreasing, whereas the shares of people in older ages are increasing. This process is forecasted to continue and even to accelerate during the next decades. Although the Swedish population has, for several decades, experienced comparatively high fertility rates, it is not precluded from this development. This is mainly explained by two points: Firstly, the fertility decline during the late 60s and 70s is having its effect on raising the shares of persons aged 65 or older within the next decades. Secondly, the recent improvements in mortality, as well as the ones that are anticipated for the future, are mainly based on gains in old age mortality (see Statistics Sweden 2009).

Policy makers are worried about which consequences these shifts might have and want to adapt their policy in order to face the respective challenges for their economies in general or labor markets, social insurance and tax systems in particular. In order to do this, adequate information regarding the real consequences of population aging and potential factors of influence is needed. The study on hand is dedicated to this need for the Swedish case.

The link between age structure and the economy lies in the fact that consumption and production also vary with age. The economic lifecycle is marked by two stages of excess consumption at the beginning and at the end and one stage of excess production in the middle. Depending on how this economic lifecycle looks like in particular and how the population is distributed across it, one can estimate what the aggregated outcome would be. The higher a potential excess consumption through shifts in the age structure is, the more the economy has to rely on savings, debts or international transfers – causing the effects of aging to be more severe. The study on hand uses a measure that refers to these considerations while taking age-specific consumption and production profiles into account rather than just the demographic development itself.

Research Context

Purely demographic approaches are only able to show the impact on demographic aging itself and have to rely on very rough estimates when it comes to elaborate on its consequences. The reason for this is the restriction to only age-related criteria. The most frequently used indicator is the potential support ratio, which is the ratio of people aged 15 to 64 (the potential working force) over people aged 65 and above. This number is used as an approximation for the economic balances (or imbalances) between net-producers and net-consumers in a population. Many authors criticize this kind of approximation for good reasons. For instance, age limits change over time due to changes in average ages at entry and exit from the labor force. Additionally, critics argue that age ratios do not sufficiently describe population intra-dependencies because other important aspects, like labor force participation or intergenerational transfers, have to be considered as well (e.g. Kleinman 1967, Bartram & Roe 2005). In other words, it really matters what people produce and consume at certain stages of their economic lifecycle and how their economic output is reallocated over age and time, if we want to estimate the consequences of population aging.

Lee (1994) stated that a joint approach of economics and demography is needed to take these considerations into account and provided the scientific community with a respective approach that uses age-specific schedules of labor earnings and consumption. Bengtsson and Scott (2010) refer to this need by applying a measure that is taking data on age-specific consumption and labor earnings for the case of Sweden into account. They analyzed the medium scenario of the official population forecast by Statistics Sweden to illustrate the economic consequences of Sweden's most probable prospective population development. The study on hand builds on that by additionally incorporating alternative scenarios for focusing on the effects that different demographic scenarios might have. A special focus is thereby laid on potential regulation mechanisms through migration since migration appears to be most open to intentional influence in comparison to fertility and mortality.

Data and Methods

The aim of the study is to elaborate on the potential economic consequences of aging with a special focus on the downside potential of migration. Eventually, population projections shall be presented where the results will enable insight on this topic through a particular setting of assumptions. The basis for this is the official population forecast by statistics Sweden published in 2009. This forecast consists of seven variants. Beside the main alternative, assumptions for respectively low or high fertility, mortality and migration are incorporated. The six alternative scenarios to the main variant include the respective medium assumptions for the two demographic components that were not modified within it. Consequently it is not possible to see aggregated effects of, for instance, a high mortality and high fertility scenario. To enable this and to incorporate even more assumptions with regard to migration, a separate projection model was set up, which allows recalculating the official forecast in a very precise way. Because of this, variations between different scenarios provided by this study are really due to a different set of assumptions and not a different projection model. The model used for this study is a cohort component model that projects, based on the considerations of Dinkel (1989), the populations of immigrants and out-migrants separately to the natives, as well as their following generations by order.

As stated before, traditional demographic measures are unsatisfying when it comes to estimating the consequences of aging. Therefore, this study uses a measure that seems to be more suitable. Instead of using fractions of the population in certain age-limits as for the potential support ratio, a life cycle deficit ratio (LCDR) is calculated that weights the age-specific population in the numerator with its age-specific consumption $c(x)$ and with its age specific labor earnings $y(x)$ in the denominator,

$$(1) \quad \text{LCDR}_t = \frac{\sum_{x=0}^z N(x, t) \cdot c(x, t)}{\sum_{x=0}^z N(x, t) \cdot y(x, t)}$$

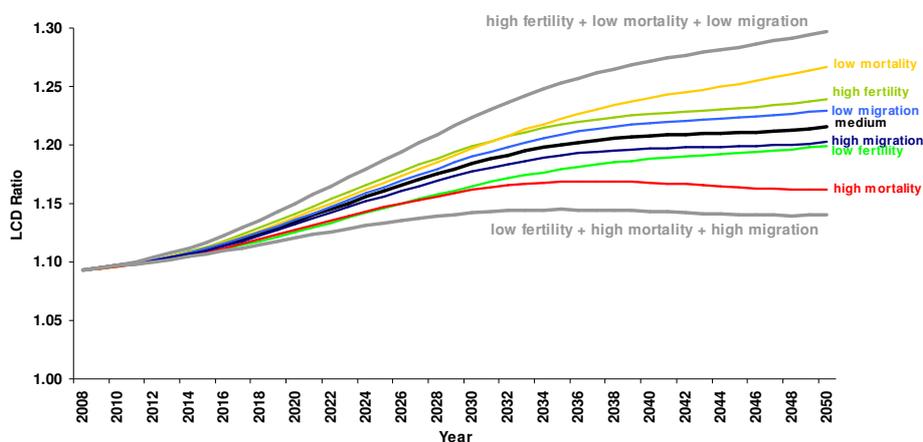
where x is age, $N(x)$ the age-specific population, z the highest observed age and t the year where this measure was calculated. Unfortunately data regarding age-specific consumption and labor earnings is hard to measure and even harder to project. Until a few years ago they were not available in a broader range and researchers had to rely on their own estimates. But the National Transfer Accounts (NTA) project, which aims among others to provide the

scientific community with these and other related data, was founded in 2004. Currently, data, for 33 different countries from all continents is for at least one year available through this project (see www.ntaccounts.org). Presently for Sweden, data for the year 2003 is available. This will be used to estimate the economic consequences of aging within this study, with help of the LCDR-measure. Thereby the profiles will be held constant over the entire analyzed projection period. Although it is for sure that the numbers themselves will change in the future or have already changed since 2003, the profile itself might be roughly constant unless there are massive policy changes. Using a ratio instead of a difference (which would imply interpreting absolute numbers) accounts for this. In this case only conclusions like “consumption would exceed/deceed labor earnings by x per cent” are possible. Moreover, it has to be mentioned that capital income is not considered by the profiles, but could also be used to finance a potential excess consumption. Consequently, the values presented for the LCD-ratios within this study are systematically biased towards higher values. Hence, the estimations for excess consumptions that are suggested by this ratio should not be interpreted as serious measure for a particular amount, but are still good estimates for tendencies with respect to consequences of aging, unless dramatic changes of the relation of labor and capital income are expected. In addition to this, it must be declared that the profiles are not sex-specific and can consequently not be used in this way. Admittedly, some preliminary attempts to compile them exist but they are not available in a reliable form yet (see Lindh et al. 2010).

Results

Figure 1 displays the LCDR for all variants of the official forecast for the Swedish population from 2009. In addition to the variants that are provided by the publication, extreme variants were calculated and are displayed, which combine either positive or negative deviating assumptions from the medium scenario. These variants are supposed to illustrate a range of potential future developments. That namely fertility will only progress as assumed in the low scenario, in combination with the medium scenarios for mortality and migration, is just probable or improbable as if it would do so with other combinations of the respective assumptions.

Figure 1: Life cycle deficit ratio within the variants of the official population forecast for Sweden



Data source: Statistics Sweden (2009), National Transfer Accounts Project, own calculations

According to these calculations none of the thinkable combinations of the assumptions made by Statistics Sweden can detain the LCDR from increasing. Even if the assumptions for low fertility, high mortality and high migration, which are the ones that deviate positively (in terms of lower LCD-ratios) from the medium scenario, eventuate together, aggregated consumption would exceed aggregated production by 5 % more in 2050 than it did in 2008. The other extreme scenario, a combination of high fertility, low mortality and low migration assumptions would yield a LCDR that is 21 % higher than in the base year of the forecast. These numbers mark a range in which the future ratio of aggregated production and consumption in all likelihood will fall.

By taking a closer look at the range of assumptions regarding immigration, it becomes obvious that even the high migration variant is comparatively conservative in comparison to the most recent numbers. The actual number of immigrants in 2009, the first year of the forecast, was already almost 10 % higher than it was assumed in the high migration alternative. Incorporating a scenario without any migration and a modified high migration scenario, which assumes stability of the most recent levels of immigration, shows that there is a remarkable potential through migration effects. A possible “migration gain” is estimated with reducing excess consumption by eight percentage points through comparing the modified high migration scenario with a scenario without any migration.

Conclusion

Low migration, high fertility and low mortality alternatives for the future demographic development in Sweden imply more severe economic consequences, whereas the contrary alternatives would have a mitigating effect in comparison with the medium scenario. Even though an increase in fertility is in many demographic publications considered as the only realistic way to counteract aging, it appears to be rather counterproductive to offset its consequences in the foreseeable future. The reason for that is that only net-consumers were added in the short-or medium-term and positive effects can only arise decades ahead. A high migration scenario, in contrast, can indeed have positive effects, so that future research should focus on more specific aspects of this finding

References

- Statistics Sweden (2009): The future population of Sweden 2009–2060.
- Bartram, Lisa, Brenda Roe (2005): Dependency ratios: Useful policy-making tools? In: *Geriatrics & Gerontology International*, Volume 5, Issue 4, pp. 224 – 228.
- Lee, Ronald D. (1994): The Formal Demography of Population Aging, Transfers, and the Economic Life Cycle. In: Linda Martin and Samuel Preston, eds., *The Demography of Aging* (National Academy Press, 1994), pp.8-49.
- Bengtsson, Tommy and Kirk Scott (2010): The aging population. In: Bengtsson, Tommy (Ed.): *Population Ageing - A Threat to the Welfare State? The Case of Sweden*. Demographic Research Monographs, Springer.
- Dinkel, Reiner H. (1989): Die Auswirkung von Einwanderungen auf die Bevölkerungsentwicklung im Zuwanderungsland (Chapter 6.2.2.). In: Dinkel, Reiner H.: *Demographie, Band 1: Bevölkerungsdynamik*. Verlag Vahlen, München.
- Lindh, Thomas, D. Hallberg and J. Žamac (2010): Intergenerational transfers for men and women in Sweden 2003: A first look at flows in the formal sectors. Presentation at the EWC Conference on Population and the Generational Economy, Honolulu.