

Generational distribution of consumption and income in Poland in the context of population ageing¹

Population ageing in Poland will lead to pronounced changes in the age structures, which will have significant macroeconomic consequences and impact the levels of consumption and labour income of future generations.

One of the analytical approaches that allows the economic consequences of population ageing to be identified is the assessment and analysis of the National Transfer Accounts (NTA). This method was developed by Lee and Mason (see Lee and Mason, 2011) and is currently applied in over 60 countries worldwide, including 26 EU member states². The National Transfer Accounts are designed to provide a systematic and comprehensive approach to measuring and analysing economic flows from a generational perspective. It is based on the concept of generational economy, as defined by Lee and Mason (2011). For each age, the total (public and private) consumption and labour income is assessed in accordance with the National Accounts system. Consequently, we can see whether particular cohort's consumption is financed from labour income or whether it requires additional transfers (public or private) or financing from savings or other asset reallocations³.

The National Transfer Accounts profiles for Poland were estimated for 2012. They show that Poles have one of the earliest ages at which labour income is insufficient to cover consumption. The economic dependency level, measuring the aggregate life-cycle deficit of those outside the productive age group, relative to the total labour income in Poland, is relatively high given the current demographic structure of the Polish population. If the current consumption and labour income patterns are maintained, population ageing will lead to a faster decline in labour income, compared to consumption, which would increase the aggregate life cycle deficit, particularly related to the older population.

¹ The research presented in this chapter is based on the preliminary results of the NTA profiles estimated for Poland in the project POLNTA "Narodowy Rachunek Transferów oraz Narodowy Rachunek Transferów Czasu dla Polski" financed by the National Science Centre (UMO-2013/10/M/HS4/00466) and implemented by the Institute of Statistics and Demography at Warsaw School of Economics (SGH). The age profiles were developed by the project team that includes the author and Wojciech Łątkowski.

² The harmonised NTA dataset for EU countries was developed in the AGENTA project, financed from the 7th Framework Programme (www.agenta-project.eu).

³ A short methodological note on the NTA is presented in the annex.

The potential impact of changing age structures on consumption and labour income in Poland

The NTA-based consumption and labour income profiles estimated for Poland indicate that the borders of productive age in Poland are between 26 and 56. These borders are set as the age levels when labour income exceeds consumption. For younger cohorts (up to 25) and older ones (above 57) the deficit between consumption and labour income requires additional financing from public or private transfers or from savings.

Figure 1. Per capita age profiles of labour income and consumption, 2012

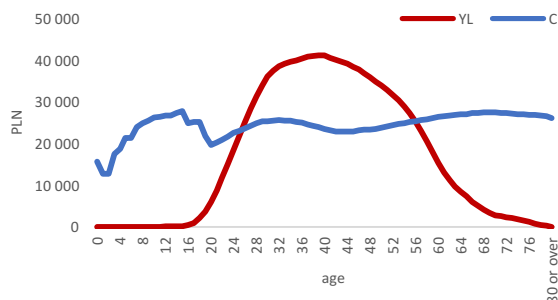
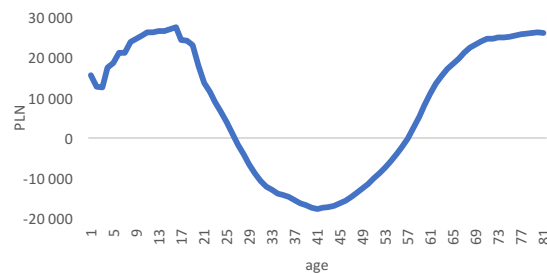


Figure 2. Per capita age profiles of lifecycle deficit, 2012



Source: Initial estimates in the POLNTA project, SGH

These NTA labour income and consumption profiles allow the aggregate level of consumption and labour income to be estimated, as shown in Figure 3 (panel a). In 2012, the aggregate life cycle deficit for the population below 26 (PLN 201 bn.) was higher than for the population above 56 (PLN 182 bn.).

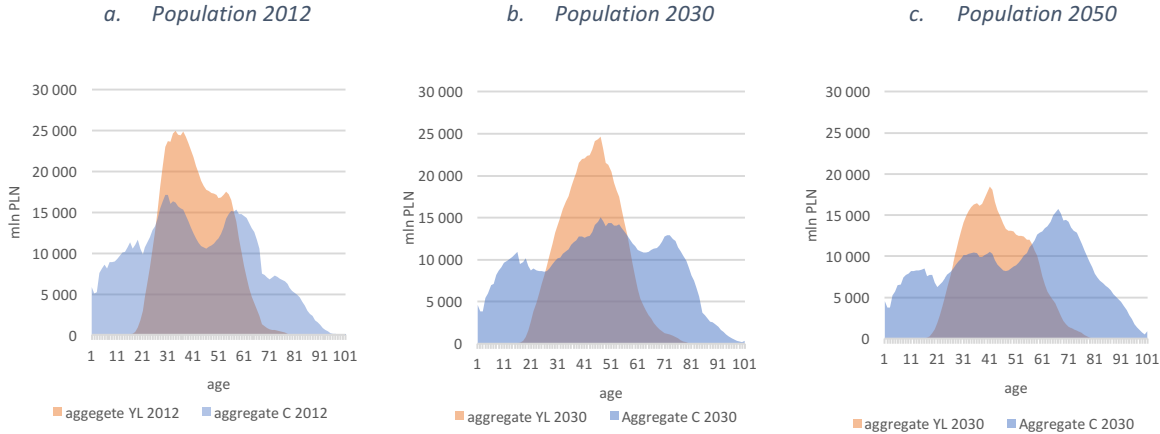
If we apply constant per capita age profiles to demographic projection, we can estimate the impact of the changing age structure of the population on the level of potential aggregate life cycle deficit in the future, when the ageing process becomes more pronounced. With this assumption, **the amount of the aggregate life cycle deficit would increase to 128 per cent of the base 2012 level by 2030, and reach 166.6 per cent in 2050.**

While this assumption is, of course, unrealistic, it allows an assessment of the impact of changing age structures on aggregate income, consumption and the resulting life cycle deficit. The results of the simulation are shown in Figure 3 (panels b and c). If the current consumption and labour income per capital profiles remain constant, this means that both the aggregate labour income and aggregate consumption will shrink due to the declining size of the total and working age populations. In 2030, the aggregate labour income would be below 91 per cent of the 2012 level, and in 2050 it would drop further to less than 74 per cent, i.e. by more than a quarter. Aggregate consumption would drop moderately to 98.4 per cent in 2030 (compared to 2012) and 92.4 per cent in 2050. Additionally, the level of the aggregate life cycle deficit for the population over 57 would exceed the aggregate life cycle deficit for the population under 27.

The rising lifecycle deficit means that the **current levels of consumption would be impossible to maintain with the current level of labour income.** Reducing the aggregate life

cycle deficit would require either an increase in labour income or a decrease in consumption levels (or both). One of the potential directions is to shift the per capita labour income by extending working lives and increasing the age limit from which the life cycle deficit becomes positive. Another potential direction is to increase labour productivity and, as a result, per capita and aggregate labour income.

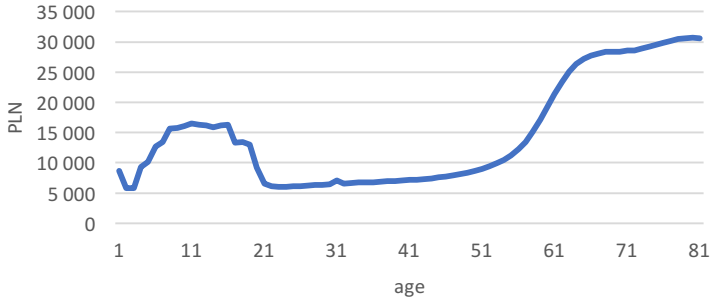
Figure 3. Aggregate labour income and consumption based on 2012 NTA profiles



Source: Author’s calculations based on the initial estimates in the POLNTA project, SGH, GUS demographic data (2012) and Eurostat population projection (data for 2030 and 2050).

The contribution of the population above 56 to the aggregate life cycle deficit will increase with time (Figure 3). This has important implications from the policy perspective as the public transfers needed to cover this deficit are expected to increase. This is because the life cycle deficit of the older population is financed almost fully from public transfers, which include pension cash transfers as well as public consumption, such as health benefits. Furthermore, as the labour income of the population over 60 is declining with each age cohort, the financing of private consumption at older ages comes mainly from public transfers, predominantly pensions (see Figure 4). On the other hand, the life cycle deficit of the younger population is, to a large extent, financed from private transfers (namely parents financing the consumption of their children). In the future, because less children are being born, the level of the aggregate transfers needed from parents to children will be lower.

Figure 4. Per capita age profile of public transfers (cash transfers and public consumption), 2012



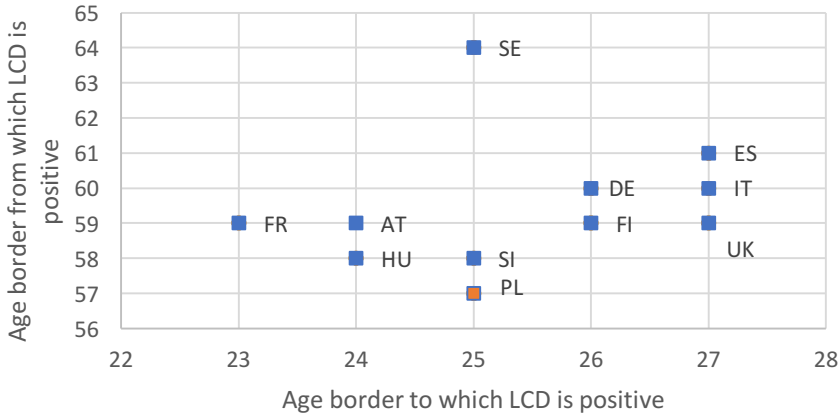
Source: Initial estimates in the POLNTA project, SGH

The level of per-capita public transfers received by people in the age group of over 60 rises very quickly, as people retire and claim old-age benefits. Again, with the ageing population this would increase the risk of rising public expenditure. However, this risk is mitigated by the pension reform introduced in 1999. The pension reform affects the age profiles of pension transfers received, reducing the amount of transfers received by consecutive generations, which can already be observed (see for example Chłoń-Domińczak, Strzelecki, and Łątkowski 2016).

Measuring economic dependency

In comparison to other EU countries, the range of productive age groups which exhibit a negative lifecycle deficit is narrow in Poland (i.e. age groups where labour income exceeds consumption) and covers only 31 cohorts. In other countries, for which the NTA databases were estimated, this deficit ranges from 31 cohorts (in the UK) to 38 cohorts in Sweden (see Figure 5). Compared to other countries, Poland is characterised by having a relatively late age until which the life cycle deficit is positive, and the earliest age from which it becomes positive again.

Figure 5. Age borders until and from which the life cycle deficit is positive, selected EU countries (2010/2011) and Poland (2012)



Source: Loichinger et al. (2017) and initial estimates in the POLNTA project for Poland

Due to the narrow productive age range, the level of economic dependency of younger and older cohorts in Poland is relatively high compared to the demographic dependency.

Given the differences in the productive age limits as well as differences in the level of consumption and labour income between countries, the traditional demographic dependency does not reflect the actual level of transfers needed to finance the aggregate life cycle deficit. The NTA profiles can be used to assess economic dependency that takes into account flexible productive age borders and the level of consumption and labour income age profiles.

A comparison of the two dependency ratios - demographic⁴ and NTA-based economic dependency proposed by (Loichinger et al. 2017) - for selected EU countries and for Poland is shown in the Table 1. Poland has an economic dependency level comparable to the levels noted in Hungary, Germany or Finland, which have higher demographic dependency ratios, particularly due to larger relative size of the older part of the population. At the same time, in Sweden a high level of demographic dependency is combined with lower level of economic dependency⁵.

Table 1. Demographic dependency ratio (DDR) and NTA dependency ratio (NtaDR) for young age, old age and total population (2012 for Poland and 2010 for all other countries)

Country	Demographic Dependency Ratio			NTA Dependency Ratio		
	Young	Old	Total	Young	Old	Total
Austria	0.33	0.28	0.61	0.20	0.26	0.46
Finland	0.38	0.29	0.67	0.26	0.26	0.52
France	0.42	0.29	0.71	0.26	0.29	0.55
Germany	0.31	0.34	0.65	0.19	0.31	0.50
Hungary	0.33	0.27	0.60	0.24	0.26	0.50
Italy	0.31	0.34	0.65	0.26	0.34	0.60
Slovenia	0.30	0.26	0.56	0.24	0.24	0.48
Spain	0.31	0.27	0.58	0.25	0.21	0.46
Sweden	0.40	0.32	0.72	0.26	0.22	0.48
UK	0.40	0.28	0.68	0.27	0.26	0.53
Poland	0.32	0.22	0.54	0.27	0.24	0.51

Source: Loichinger et al. (2017) and initial estimates in the POLNTA project for Poland

Conclusions

The generational economy provides more insight into the economic consequences of population ageing. **The changing age structure of the Polish population leads to numerous challenges that can be identified and, more importantly, quantified** using the National Transfer Accounts method. Based on the projected demographic change, the potential level of aggregate life cycle deficit, i.e. the gap between aggregate consumption and aggregate labour income, may increase. This is due to the faster decline of the potential aggregate labour income compared to aggregate consumption.

This means that one of the most important policy recommendations for Poland is **to introduce policies to increase the aggregate labour income**. There are several ways to achieve this goal. Firstly, by prolonging the working life and shifting the per capita age profile to the right. As a result, the age border when the life cycle deficit becomes positive would

⁴ Relating the ratio of populations in age groups 0-19 and 65 and over to the population at working age, i.e. 20-64.

⁵ The NTA method also allows other measures of economic dependency to be assessed, based on the relationship between labour income and asset-based reallocations and consumption, or fiscal dependency that takes into account public transfers that are paid or received (see for example Chłoń-Domińczak, Abramowska-Kmon, et al. 2016; Chłoń-Domińczak, Kotowska, et al. 2016; Lee and Edwards 2002; Loichinger et al. 2017; Prskawetz and Sambt 2014).

increase. A comparison with other European countries indicates that there is room for such change. However, the recent decision on the reduction of the retirement age in Poland will have the opposite effect (Chłoń-Domińczak 2016). The second possibility is **speeding up transition to the productive age**. As already stated, young Poles start their productive lives relatively late. School should start at the age of 6, although unfortunately the age was recently increased again to 7 by the government. Speeding up the school-to-work transition is also important. The third potential policy direction is **to increase the level of productivity that would increase the labour income per capita profile**. This would require a national skills development strategy, including the promotion of lifelong learning. While in recent years the share of young people with tertiary education in Poland has increased significantly to 43.4% (2015), exceeding the EU average, at the same time, however, the share of the adult population participating in education and training remains, at 3.5% (2015), one of the lowest in the EU. Some improvements could be also sought by reducing the skills mismatch on the labour market. However, according to the assessment of McGowan and Andrews 2015, this could contribute to an increase of around 2% in productivity gains. Productivity increases can be also achieved by introducing technological changes.

Population ageing also represents a challenge when it comes to **financing the increasing life cycle deficit of the population in the post-productive age group**. This deficit in Poland is currently financed almost exclusively from public transfers, as the level of pension savings remains at a very low level. As discussed earlier, **the implementation of the pension reform will lead to gradual improvements in the balance in the old-age pension system. It is important to monitor the level of other public transfers to the elderly, including public health care consumption, which is rising quickly in this age group**. In particular, greater focus on health prevention to support longer and healthier lives, can be seen as an important contribution to maintaining this expenditure at a sustainable level in the context of population ageing.

In more general terms, **it is important to monitor the generational dependency, focusing not only on the demographic age structure, but also economic flows**. Using these measures to assess the implications of population ageing across the EU could complement the existing practices included in the Ageing Reports (European Commission DG ECFIN 2015 and earlier). This would provide an opportunity for the policy makers to gain more insight into policy challenges in the context of the national developments that shape the labour income, consumption and public transfers.

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Annex – Methodological notes

National Transfer Accounts in brief

At each stage in their life, generations have different patterns of consumption and labour income that result in the lifecycle deficit. This can be denoted as:

$$C(x) - Y^l(x) = \tau^+(x) - \tau^-(x) + Y^A(x) - S(x), \text{ where:} \quad (1)$$

$C(x)$	– consumption
$Y^l(x)$	– labour income
$\tau^+(x)$	– transfers received
$\tau^-(x)$	– transfers paid
$Y^A(x)$	– income from assets
$S(x)$	– savings

The left-hand side of the equation (1) denotes the lifecycle deficit, while the right-hand side is comprised of net transfers ($\tau^+(x) - \tau^-(x)$) and the reallocation of resources ($Y^A(x) - S(x)$). The NTA method is designed to assess these flows, divided into public and private parts, taking into account cross-sectional age profiles for each of the parts in the equation (1). The assessment is based on existing administrative, demographic and survey data, including income and household budget surveys. Age profiles are estimated in nominal currency values as well as in relative terms, as a percentage of the labour income of cohorts in the age groups 30-49.

Measuring economic dependency

The NTA-based measure of economic dependency is proposed by Loichinger et al. 2017. To obtain a measure for the dependency across individual ages in childhood and old age respectively, they calculate the average measure of economic dependency at each age, multiply it by the corresponding population size and then add them up over the age groups where the difference between consumption and labour income is positive (also referred to as positive life cycle deficit).

Based on these values, they calculate two dependency ratios $NtaDR_{young}$ and $NtaDR_{old}$ by relating the total dependency of young and old, i.e. the part of consumption that is not financed from the labour income, to total labour income. This measure reflects both the population structure (as the traditional demographic dependency rate) and the design of the economic life course.

$$NtaDR_{young} = \frac{\sum_{i=0}^L (C_i - YL_i)}{\sum_{i=0}^{80+} (YL_i)} \quad (2)$$

$$NtaDR_{old} = \frac{\sum_{i=O}^{80+} (C_i - YL_i)}{\sum_{i=0}^{80+} (YL_i)} \quad (3)$$

where the index L stands for the age when the life cycle deficit at young age is still positive and where index O stands for the lowest old age at which the life cycle deficit turns positive again. By adding up these two values, the total NTA-based dependency is calculated, relating the total positive lifecycle deficit of the two generations to total labour income.