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Evolution of the generational distribution of income, consumption and lifecycle deficit in Poland between 2004 and 2016: Facing the EU convergence and demographic challenges

Abstract

The National Transfer Accounts approach is used to assess lifecycle deficit in Poland between the EU accession in 2004 and 2016. In this period, the overall consumption remained relatively stable relative to wages while labour income increased, mainly due

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to the increased economic activity at higher ages. There is a shift in the generational distribution of consumption and public transfers towards the older age groups, that reflects the changes in the age structure of the population. At the same time, the per capita age profiles of labour income, consumption, life cycle deficit and public transfers in Poland converge to the average levels observed in Europe, however, the gap remains, particularly in public transfers, including public consumption on health. With the continued population ageing it is important to maintain policies that stimulate growth of the labour income that is faster than consumption increases in order to maintain the balance between lifecycle deficit of the young and older generations and lifecycle surplus of the active generation.

Key words: national accounts, national transfer accounts, population ageing, generational accounting

Introduction

Population ageing in developed countries raises concerns about maintaining intergenerational stability. This is mainly related to the need of financing the increasing aggregate consumption of the more numerous senior generations, that is relying mainly on public transfers, such as pensions or public health care. The population ageing in Poland is an important concern from the perspective of both intergenerational stability and ability to meet the consumption needs of the non-active population. It is a rising challenge for social policies that shape the public transfers addressed to people at different stages of their life course.

In the paper, we focus on the evolution of the consumption, labour income and resulting lifecycle deficit in Poland between 2004 and 2016, as well as public transfers that finance a part of consumption of different generations, with particular focus on generations in non-active ages, who are the main beneficiaries of intergenerational transfers. These changes indicate the future challenges for the public policies from the perspective of maintaining generational stability in the light of the projected population ageing.

This article contributes to the generational economy by providing an assessment of the development of lifecycle deficit in Poland — the country that faces very dynamic social, economic and demographic changes. We focus on the period from 2004 to 2016, i.e., after the accession to the European Union until recent time. During these years Poland experienced dynamic economic growth and remarkable social progress. The real GDP increased by 56.1%, the employment rate for people aged 20–64 increased from 57% to 69.3% while the unemployment rate declined from 19% to 6.1%. The real average wage increased by 53.9%. At-risk-of-poverty rate declined from 20.5% to 17.3% from 2005 to 2016 (compared to an increase from 16% to 17.3% in the EU). Even during the 2008 crisis the economy in Poland performed quite well and contrary to other EU Member States the economic growth rate remained positive. At the same time, the age composition of the population changed: labour force shrinking as well as population ageing progressed and maintaining a generational balance in the future is increasingly challenged.

The economic, social and demographic changes also have an impact on the generational distribution of income and consumption and as well as an intergenerational balance. The article aims to reflect on the following three research questions:

1) How generational distribution of lifecycle deficit and consumption were affected by economic, social and demographic changes?
2) Is there a convergence of the outcomes of public policies in Poland to a particular type of welfare state in Europe, as measured by labour income, consumption and public transfers?
3) Do the observed changes in consumption, labour income and lifecycle deficit indicate that the economic dependency will be sustained in the future with progressing population ageing?

The article is structured as follows. First, we present the main issues related to generational economy and generational transfers. Then, we present the methodology and data used for the estimation of the age profiles in Poland. This is followed by a short description of major demographic trends in Poland. Then, the changes in the main national accounts aggregates between 2004 and 2016 are analysed, including the impact of demographic and per-capita age profile changes on their overall change. In the following part, we focus on the evolution of the per-capita and aggregate age profiles of consumption, labour income, and the resulting lifecycle deficit. This includes also changes in the distribution of resources between generations through the public transfers. We compare the results for Poland to selected countries in Europe representing different welfare regimes as well as to the EU average. In the conclusions, we present implications from the social policy perspective.

Generational transfers in the literature

Measuring and projecting the balance of intergenerational transfers have drawn particular attention of economists, who subsequently have developed different conceptual and analytical proposals contributing to the generational economy. One of the first approaches to measure the net wealth of current and future generations was presented by (Auerbach et al., 1991), who proposed how to measure the net present value of payments of existing and future generations to the governments. They concluded that, unless policies are altered, the future generations will face a net tax burden that will be by a one-fifth larger compared to the generations born in 1990. (Diamond, 1996, p. 597) underlined that the development of generational accounts has three strands: (i) normative considerations of government activity, (ii) use of generational accounting in a positive theory of human behaviour and (iii) presentation of a generational balance as a both normative criterion and a useful target for a political economy.

An important contribution to the generational economy, along to the three strands of deliberation defined by Diamond, are the National Transfer Accounts — NTA (Lee & Mason, 2011) that provide a comprehensive accounting for not only public, but also private resource reallocation by age.

The NTA approach is based on the assumption that at each stage in their life, generations have different patterns of consumption and labour income that result in the lifecycle deficit. The main focus of the NTA approach is to identify lifecycle deficit (LCD) and sources of its financing. This follows the basic equation that relates to the main national accounts' aggregates. Namely, at each stage of the lifecycle generations show different patterns of consumption and labour income, that result in lifecycle deficit. This can be denoted as:

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

where:
$LCD(x)$ — lifecycle deficit
$C(x)$ — 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 lifecycle deficit, while the right-hand side is comprised of net transfers ($\tau^{+}(x) - \tau^{-}(x)$) and reallocation of resources ($Y^{A}(x) - S(x)$). The NTA method is designed to assess these flows, divided to public and private parts, taking into account cross-sectional age profiles for each of the variables in the equation (1).

The NTA show a more complex picture of government activities in the lens of public transfers paid and received, extended by activities at a household level, and the role of intra-household private transfers in financing consumption of the young and senior generations. This area of research is dynamically developing, both by covering a wide range of countries worldwide and by widening the analytical approach, focusing not only on generational differences, but also, among others, taking into account the gender and the socioeconomic status of households (Lee & Mason, 2019).

An application of the NTA approach in the historical context by comparing the age profiles at different points in time, allows for better understanding of the development of government activities, measured by public transfer flows addressed to different generations, as well as interactions between public policies and cross-generational transfers at a household level. Such studies for European countries were performed for France and Sweden (d'Albis et al., 2015; Lindh et al., 2011). Moreover, the NTA quantify lifecycle deficit, i.e., the part of consumption of two population groups (young and old) that is not financed by labour income. That approach allows comparing the allocation of public and private resources to finance lifecycle deficit over the life course: at the beginning and at the end of the life course.

In Europe, the harmonised National Transfer Accounts for majority of countries were assessed in the EU-funded AGENTA project (Istenič et al., 2016), for year 2010. These

estimates were then applied to identify clusters of countries with regard to the generational focus of public policies (Chłoń-Domińczak et al., 2019). They identified three clusters of countries: (i) European, 14 countries in which the age profiles of public transfers are close to the EU average. This cluster is comprised of both liberal and continental welfare regimes that seem to exhibit similar age patterns for public transfers, including for levels of public consumption (including Poland, Germany and Spain), (ii) Underdeveloped cluster, which is characterised by below-average transfers by age, with five new member states[2] and (iii) Scandinavian, which is characterised by above-average publics transfer and consumption levels by age (including Sweden). This analysis contributed to the literature discussion of the welfare regimes, that was initiated by the seminal book by (Esping-Andersen, 1990).

Data and methodology

In the article, we use the NTA estimates in Poland for years 2004 and 2016. The estimates were made following the common methodology, which is presented in the NTA manual (United Nations Department of Economic and Social Affairs Population Division, 2013). The assessment is based on existing administrative, demographic and survey data, including income and household budget surveys. The estimates for Poland were made using three main types of data sources:

- the survey data (EU-SILC and Household Budget Survey — HBS) to estimate age profiles of private consumption and labour income,
- the public sources, including the data from National Health Fund, to estimate public consumption on health and education statistics to assess the public consumption on education, and finally,
- the national accounts to calculate aggregates aimed at adjusting the survey-data-derived age profiles to match the total flows in the economy.

The main source of data for private consumption was the Household Budget Survey (HBS). The HBS in Poland is conducted annually on a sample of 37.5 thousand households. From 1992 on the survey is based on the monthly rotation — each month the survey covers over 3.1 thousand households. The methodology of the HBS is comparable annually, which ensures comparability of the obtained estimates (Statistics Poland, 2018).

The age profiles of the consumption components have been estimated by use of different analytical methods. The private education consumption profile has been obtained using the regression method, following the recommendations from the NTA manual (UN, 2013, p. 98). It is calculated from age 0 until age 54 (we also include expenditure on lifelong learning). The education expenditure for each household member is allocated according to the obtained regression coefficients. The private health consumption for all ages is assessed by use of an iterative approach — an alternative to a regression method (UN, 2013, p. 100). Other private consumption by age is calculated according

[2] Bulgaria, Estonia, Latvia, Romania, and Slovenia.

to a piecewise linear profile, with weights for private consumption ranging from 0.4 for children aged 4 and younger and increasing linearly to 1 for adults aged 20 and over. Public education consumption profiles are calculated for each year. They are based on the data on education expenditures for each level of education, coming from the state budget and local government budgets' reports, which are combined with information on enrolment at different stages of education by age from Eurostat. Public health consumption is assessed on the data from the National Health Fund. Other public consumption obtained from national accounts (i.e., defence, police, justice) is distributed equally over the population according to the NTA methodology. The labour income of workers and self-employed are estimated using the EU-SILC data on individual income.

The obtained profiles are smoothed across ages using the Friedman (1984) method, in line with the approach proposed in the NTA manual. Public consumption on education is an exception, as remaining unsmoothed allows for capturing differences resulting from different expenditure at different educational stages. At the end of the estimation procedure, all age profiles are adjusted using the relevant aggregate from national accounts.

In the analysis we use:

(i) the per-capita age profiles, which reflect the average levels of labour income, consumption, lifecycle deficit and transfers for representatives of each age cohort.
(ii) the aggregate age profiles, which take into account the population age structure to investigate, how demographic changes affect the aggregate distribution of the analysed flows.

Age profiles are estimated in nominal currency values (nominal profiles) as well as in relative terms, using the labour income of prime-aged cohorts in the age groups 30–49 as normalisation factor (normalised profiles). The normalisation method follows the NTA manual. The normalisation allows comparisons of the age profiles between countries as well as in time. As shown in the Table 1, between 2004 and 2016 the real income used for normalisation increased by 38.4% in per-capita terms and 49.7% in aggregate terms, which are below the real GDP growth between 2004 and 2016 (56.1%).

Table 1. Average labour income (30–49) in real value for 2016

	2004	**2008**	**2012**	**2016**	**Index 2016/2004**
per-capita (in PLN)	35 726	43 426	42 433	49 458	138.4
aggregate (in million PLN)	4 769	5 700	5 827	7 140	149.7

Source: Own calculations.

The normalised data also allows international comparisons. For the comparison purpose we use the normalised NTA age profiles developed within AGENTA project (Istenič et al., 2016) to identify relative differences stemming from different socio-economic developments and the welfare regime characteristics. The following countries are used for comparisons: Germany (continental regime and European cluster),

Spain (Mediterranean regime and European cluster) and Sweden (socio-democratic Scandinavian regime and Scandinavian cluster). The reference year for the EU estimates is 2010, so the 2016 age profiles in Poland are compared to the ones observed 6 years before in other EU countries. The comparison of the normalised values still allows to provide valid comparisons. While comparing national normalised data it is important to keep in mind the nominal differences between countries. The average labour incomes of those aged 30–49 vary significantly between countries, which is shown in Table 2.

Table 2. Average labour income of people aged 30–49 in EUR in Poland and selected countries

Country	Average nominal income in EUR
Poland (2016)	11 337
Germany (2010)	32 979
Spain (2010)	24 255
Sweden (2010)	40 525

Source: Own calculations for Poland, for other countries (Istenič et al., 2016).

As one can see, the ratio of labour income used for the normalisation between the country with the highest nominal income (Sweden) and the lowest one (Poland) exceeds 3.5. This also has implications for comparisons. Namely, the share of labour income needed to finance consumption needs in Sweden is much lower compared to Poland. This also means that the Swedish population can devote higher share of the income to savings, which in turn affects the ability to finance consumption of the senior generations from asset-based reallocations.

Results

Demographic developments in Poland between 2004 and 2016

The evolution of the population in Poland between 2004 and 2016 is an important factor shaping the aggregate consumption, labour income and lifecycle deficit by age, contributing to the changing need for the inter-generational allocations. The Polish population is characterised by two large baby-boom generations, one composing by cohorts born after World War II and the second by cohorts born in the end of 1970s and the beginning of the 1980s. Since 1989, fertility remains below replacement, approaching in 1998 the low fertility levels (TFR below 1.5). As a result, the size of the youngest generations (below age 20) is gradually declining while the two baby-boom generations progressing in age with time impose changes in the age structure of the population.

Between 2004 and 2016, the number of people below the age of 20 declined by 1.7 million and the population above age 65 increased by 1.3 million. The population in working age (20–64 years) was increasing to reach its peak in 2011 and started to decline afterwards (Figure 1, Table 3). Consequently, the young dependency ratio declined

from 39 to 31 people below 20 years per 100 people aged 20–64 years while the old-age dependency ratio increased from 21 to 26 people older than 65 per 100 people aged 20–64 years.

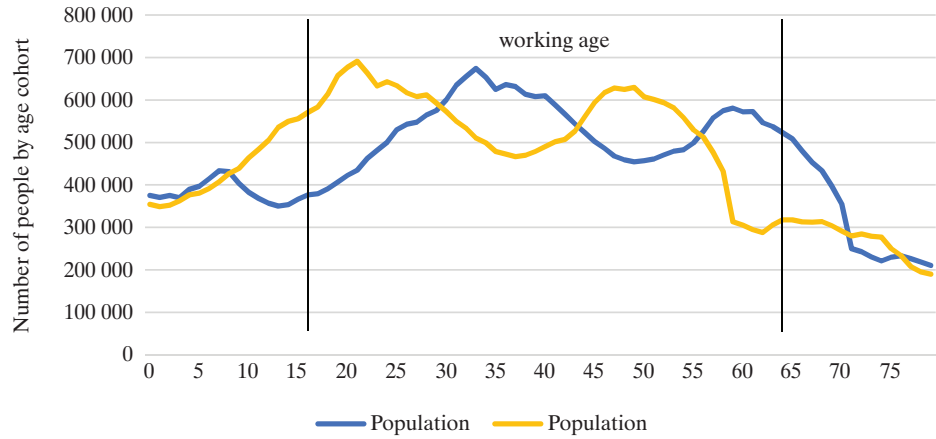

Figure 1. Age profile of the population in Poland, 2004 and 2016

Note: people aged 80 and over are not shown for the clarity of the picture

Source: EUROSTAT [extracted on 15.12.2019].

Table 3. The size of the broad age groups and demographic dependency ratios

	2004	**2016**
Number of people in age groups		
0–19	9 357 711	7 693 130
20–64	23 797 851	24 436 457
65+	5 018 273	6 303 405
Demographic dependency (per 100 people aged 20–64)		
Young DR (0–19)	39	↓31
Old-Age DR (65+)	21	↑26
Total DR	60	↑57

Source: EUROSTAT [extracted on 15.12.2019].

Change of the main NTA aggregates

As highlighted in the introduction, Poland experienced the remarkable economic growth after the EU accession in 2004. This also translated into the significant growth of the real aggregate consumption and the even faster growth of the real aggregate labour income. As a result, the real aggregate lifecycle deficit grew by around a fifth (Table 4).

Table 4. Real value of main NTA aggregates in 2004 and 2016 and their change

	Million PLN*		2004 = 100
	2004	**2016**	**2016**
Lifecycle Deficit	**49 682**	**60 186**	**121.1**
Consumption	**208 240**	**301 798**	**144.9**
Public Consumption	53 683	83 068	154.7
Public Consumption, Education	13 159	19 275	146.5
Public Consumption, Health	11 150	19 560	175.4
Public Consumption, Other	29 374	44 233	150.6
Private Consumption	154 557	218 730	141.5
Private Consumption, Education	2 112	2 140	101.3
Private Consumption, Health	6 476	12 208	188.5
Private Consumption, Other	145 968	204 381	140.0
Public Transfers, Inflows	100 499	155 169	154.4
Public Transfers, Outflows	101 787	158 648	155.9
Labour Income	**158 559**	**241 612**	**152.4**

* Measured according to real PLN of 2016

Source: Own calculations.

The increases in aggregate consumption and lifecycle deficit were not equally distributed across generations, defined according to the NTA limits of the economically active age for Poland, that is young, active and senior generations. The generations divided according as the ages at which the LCD turns to negative, that is the ages when labour income exceeds the consumption. These limits in Poland in 2016 were estimated as 27 years and 57 years. To demonstrate these changes the ratios of main NTA aggregates for people aged 57 and more (senior generations) to people below 27 (young generations) are derived (Figure 2).

Comparing the ratios of lifecycle deficit (LCD), consumption and public transfers attributed to young generations and senior generations shows a clear change in the generational pattern. There is a steady shift towards higher consumption and also lifecycle deficit of senior generations in relation to young ones. By the same token, the share of public transfers received by senior generations also increased.

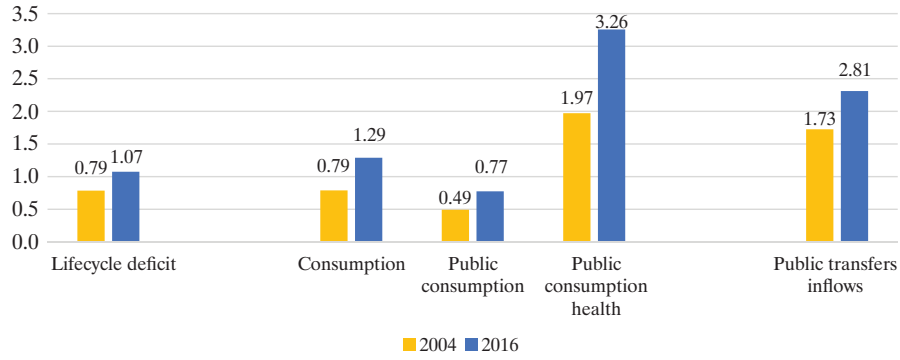

Figure 2. Ratios of the aggregate consumption and the aggregate lifecycle deficit of senior generations (57 and over) compared to young generations (below 27) in 2004 and 2016

Source: Own calculations.

In 2016 the aggregate LCD of the senior generations was higher than the young generations (by 7 points), while in earlier years the young generations had the higher aggregate lifecycle deficit (the LCD of the senior generations was 21 points smaller). The generational change in the aggregate consumption was even more pronounced. In 2016, the senior generations consumed 30 points more than the young generations, while in 2004 the aggregate consumption of younger generations was higher, as the senior generations consumed 21 points less than young generations. There is also a significant generational shift in public consumption and public transfers. The public consumption on health of the senior generations increased from almost 2 times to more than 3 times of the young generations between 2004 and 2016. In 2016 the senior generations received 2.3 times more public transfers than the young generations, compared to 1.73 times more in 2004.

These results clearly confirm that with population ageing the aggregate consumption and lifecycle deficit of the senior generations increases relative to the young generations, along with the increase of public transfers that are to a large extent used to finance consumption of this part of the population.

Impacts of the age structure and per-capita age profiles on the NTA aggregates

In order to identify the impact of changes in the age structure and the per-capita age profiles on the dynamics of the NTA aggregates, the observed growth of the NTA aggregates is decomposed into: (i) the change of the population age structure, (ii) the impact the per-capita age profile and (iii) the impact of the per-capita normalised age profile, that is deducting the impact of the wage growth of people aged 30–49 (Table 5)[3].

[3] According to the NTA manual (UN 2013), the normalisation used for the age profiles is labour income of people in age group 30–49.

Due to the change in the age composition only, lifecycle deficit would increase by 5.2%, while the total aggregate consumption and labour income would decline by 1.7% and 3.5% respectively. Interestingly, only education consumption would increase, following the increase of the number of children in the school age resulting from the temporary increase in births in 2004–2009. The public transfers (both inflows and outflows) would also decline.

Table 5. Indices of changes in the NTA aggregates between 2004 and 2016 and their decomposition to demography and per-capita age profile impacts (according to real PLN of 2016)

	Total change (2004 = 100)	The isolated effect of change in		
		population age structure	per-capita age profile	per-capita age profile normalised
		(i)	(ii)	(iii)
Lifecycle Deficit	**121.1**	**105.2**	**115.2**	**76.9**
Consumption	**144.9**	**98.3**	**147.5**	**98.5**
Public Consumption	154.7	102.9	150.5	100.5
Public Consumption, Education	*146.5*	*128.4*	*114.1*	*76.2*
Public Consumption, Health	*175.4*	*89.4*	*196.2*	*131.1*
Public Consumption, Other	*150.6*	*97.7*	*154.2*	*102.9*
Private Consumption	141.5	96.5	146.6	97.9
Private Consumption, Education	*101.3*	*124.4*	*81.4*	*54.4*
Private Consumption, Health	*188.5*	*89.9*	*209.7*	*140.1*
Private Consumption, Other	*140.0*	*96.6*	*144.9*	*96.8*
Public Transfers, Inflows	154.4	92.9	166.3	111.0
Public Transfers, Outflows	155.9	94.9	164.2	109.7
Labour Income	**152.4**	**96.6**	**157.8**	**105.4**

Note: The multiplication of (i) and (ii) provides with the total change.

Source: Own calculations.

The decomposition shows that the per-capita age profiles in real terms (the column (ii) in Table 5) had a larger impact on the growth of the analysed aggregate values compared to the age structure changes. In particular, the development of per-capita age profiles led to the remarkable increases of consumption and labour income while it resulted in a smaller increase of lifecycle deficit. The largest increases caused by the evolution of per-capita age profiles are due to the changes in health consumption, both public and private, which doubled. At the same time, the public consumption on education did

not grow substantially, showing that overall growth of the economy and wages did not translate to public investments in human capital development. The private consumption on education declined, which may indicate the policy changes — namely children in primary and lower secondary schools were equipped with textbooks by schools and parents do not need to buy them anymore. It is also worth noting that the growth of public transfers (both inflows and outflows) was higher than the growth of labour income. This indicates a fiscal expansion, which leads also to higher public transfers. These issues are discussed later in the article.

The impact of per-capita age profiles is even more visible when changes of the NTA aggregates are investigated using normalised values (the column (iii) in Table 5). The normalised age profiles allow to estimate the effect of the change in the age profile, rather than its shape combined with the growth of wages. Using normalised age profiles, we find that the lifecycle deficit declines, following the small drop in the aggregate consumption and the rise of labour income. Even when excluding the impact of the wage growth, the high increase of consumption on health, both public and private, is revealed respectively by 31 and 40 p.p. and the drop of consumption on education, both public and private, respectively by 24 and 46 p.p. The public transfer inflows and outflows increased faster than wages.

The evolution of the normalised NTA age profiles in Poland compared to selected EU countries

In this section, our focus is on the evolution of the per-capita and the aggregate age profiles of consumption, public transfers, labour income, and lifecycle deficit in Poland. We analyse the evolution of the age profiles for Poland between 2004 and 2016, referring to normalised values of per-capita and aggregate age profiles. We also compare the 2016 per-capita age profiles in Poland to those in selected EU countries representing different welfare regimes (Germany, Spain, Sweden). The age profiles are designed for the broad age groups: 0–19 years (young generations), 20–64 years (working-age generations), 65 years and older (senior generations). Contrary to the previous section, here we use traditional borders of the economically active age to derive some comparable age-specific and cross-country indicators.

Consumption

The evolution of the per-capita consumption age profiles in Poland between 2004 and 2016, similarly to most of developed countries, shows consumption increases for older age groups, but also in case of young age groups, particularly in the ages related to participation in public education. Last but not least, it also increased for the people in the prime-aged group (30–49), which is presented in Figure 3 (the left panel).

Looking at the aggregate consumption, we see the visible shift of consumption peeks related to the two baby-boom generations (Figure 3, the right panel). In 2016, the aggregate consumption of young people declined (below 30), but also those between

ages 43 and 57, following the population decline in these groups. The age shift of the baby boom generations translated into increased consumption of people between ages 33 and 44, as well as 57–72 years.

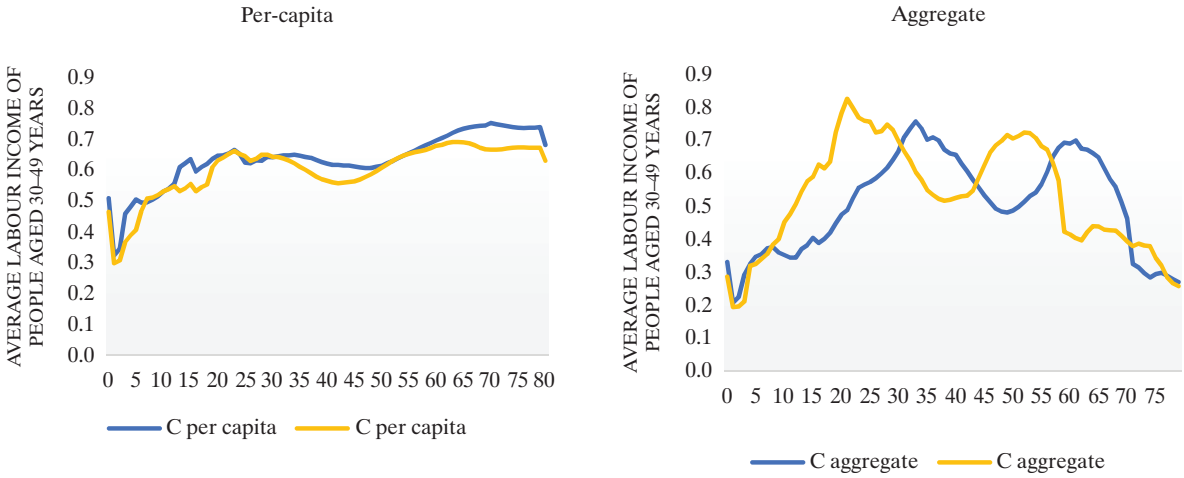

Figure 3. Normalised age profiles of consumption in Poland, 2004 and 2016

Source: Own calculations.

The normalised per-capita consumption by the three broad age groups in Poland slightly differs from the other EU countries (Table 6). Consumption of the young generations is below the EU average, but higher compared to normalised levels in Germany or Sweden. This difference is explained by higher nominal labour income of people in ages 30–49 in the latter two countries. Consumption of the senior generations (65 and more) in Poland in 2016 is relatively higher compared to the EU average, but similar to the one observed in Germany.

Table 6. Normalised per-capita consumption by the broad age groups, Poland vs. selected EU countries

Age group	Poland		EU 25	DE	ES	SE	Poland (EU 25 average 2010 = 100)	
	2004	2016	2010				2004	2016
all	49.87	51.32	52.66	48.74	52.87	46.16	94.7	97.4
0–19	9.65	10.56	11.17	9.35	11.34	9.51	86.4	94.6
20–64	28.63	28.98	29.89	27.46	30.22	26.14	95.8	96.9
65+	11.59	11.78	11.61	11.93	11.31	10.51	99.9	101.5
0–19/65+	*0.83*	*0.90*	*0.96*	*0.78*	*1.00*	*0.90*	*86.5*	*93.2*

Relative to average labour income of people aged 30–49 years

Source: Own calculations.

The ratio of per-capita consumption between young and old generations in Poland in 2016 is lower compared to the EU average, that means that young people consume (relatively) less. However, there are differences to countries representing different welfare regimes. While the generational ratio in Poland is similar to the one in Sweden, it is higher than in Germany (which is related to lower consumption of young generations in Germany). On the other hand, in Spain the generational ratio is higher, as the young generations consume relatively more than in other analysed countries.

Public consumption

As discussed earlier, the public consumption increased more than the total consumption. Additionally, the public consumption is more likely to face intergenerational shifts. Therefore, we take a closer look at this part of the total consumption. As depicted in Figure 4 (the upper panel), the public consumption per-capita age profiles in Poland increased for all generations. The increases were visible particularly for the young people (up to age 23), which is due to increased public spending on education. The public consumption increased for people in prime age, which reflects the increase in public consumption other than education and health. Another visible development is the increase of per-capita public consumption for those aged 65 and over in subsequent estimates, related to the higher public consumption on health (Figure 4, the lower panel).

The evolution of per-capita profiles for broad age groups is presented in Table 7. Between 2004 and 2016 the total public consumption increased for all age groups. The growth of the public consumption of the young generations was higher than the one of the senior generations. As a result, the ratio of the public consumption of the young generations relative to the senior generations increased.

However, when we compare these values to the EU average, we clearly see that despite this increase, the public consumption for all age groups remains below this benchmark. The largest gap is for the senior generations, while the public consumption of young generations is the closest to the EU average. The total per-capita normalised public consumption in Poland is similar to the one observed in Germany, but lower compared to Spain and Sweden. It is also worth noting that the generational ratio of public consumption in Poland is more favourable for the young generations, compared to the values observed in the EU 25 as well as all selected countries.

The gap between the public consumption in Poland and the EU average is larger for health consumption. Regarding the working-age generations it is only slightly above two thirds of the EU average and even less when we compare to Sweden or Germany. The comparison is better for the young generations, as between 2004 and 2016, the ratio of the values for Poland to the EU average in 2010 increased by 15.2 p.p. Also, the senior generations noted the increase of public consumption by 19.8 p.p. As a result, the generational ratio of the public consumption on health, similarly to the total public consumption, is more favourable towards the young generations in Poland compared to the European average, Germany and Spain, but smaller than in Sweden. Between

2004 and 2016, following the increase of the public consumption on health of the senior generations, the generational ratio in per-capita consumption shifted towards the older generations.

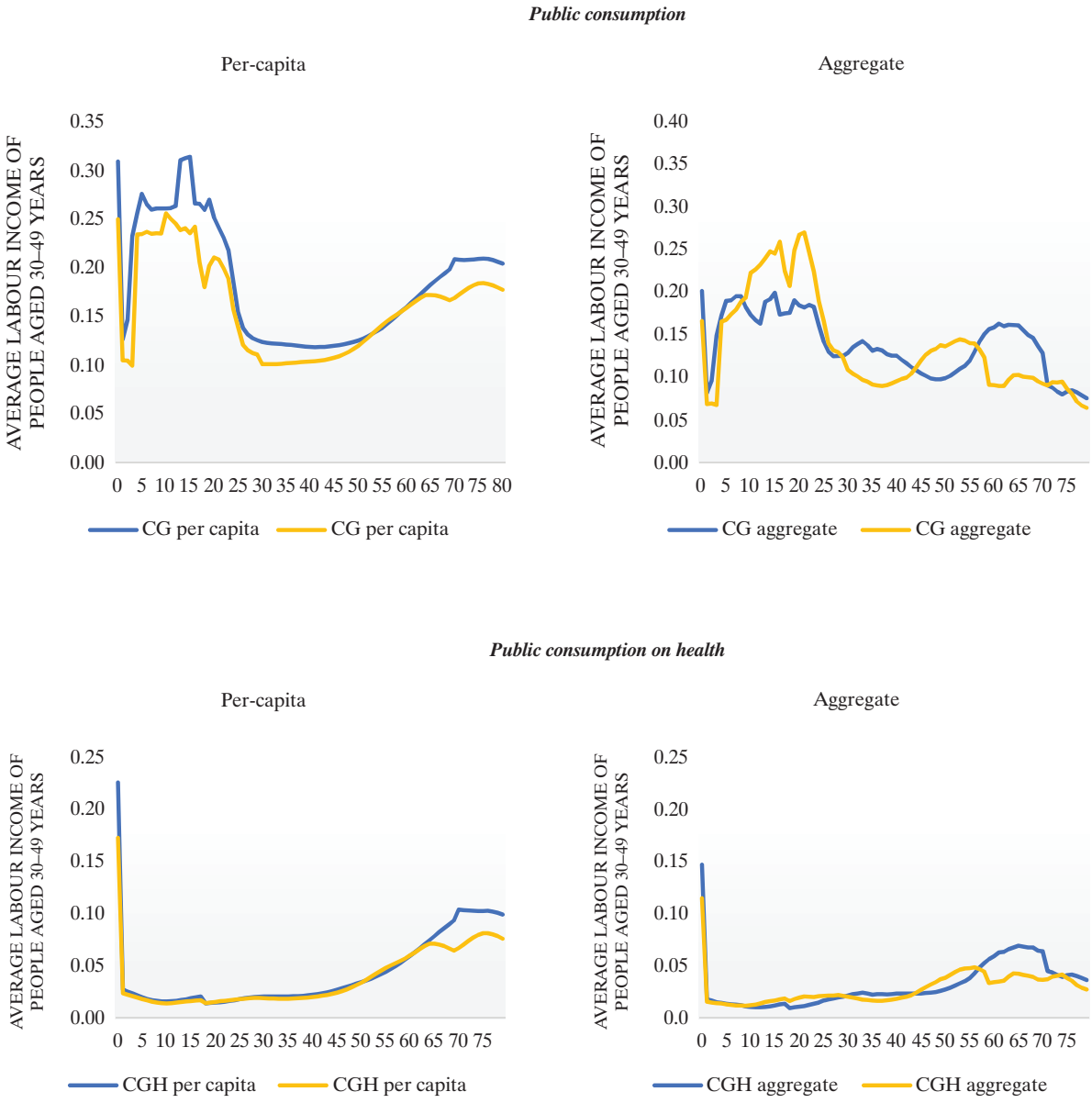

Figure 4. Normalised age profiles of public consumption in Poland, 2004 and 2016

Source: Own calculations.

Table 7. Normalised per-capita public consumption by the broad age groups, Poland vs. selected EU countries

Age group	Poland		EU 25	DE	ES	SE	Poland (EU 25 average 2010 = 100)	
	2004	2016	2010				2004	2016
Public consumption (CG) per-capita								
all	12.96	14.86	16.84	14.65	16.71	19.44	77.0	88.2
0–19	4.27	5.18	5.67	4.56	5.59	5.55	75.3	91.3
20–64	5.87	6.45	7.40	6.47	7.39	9.13	79.4	87.1
65+	2.82	3.24	3.77	3.61	3.73	4.76	74.7	85.8
0–19/65+	*1.51*	*1.60*	*1.50*	*1.26*	*1.50*	*1.17*	*100.7*	*106.4*
Public consumption on health (CGH) per-capita								
all	3.0	3.5	4.5	4.8	4.8	5.0	67.3	78.0
0–19	3.05	3.54	4.53	4.79	4.81	4.96	81.1	96.3
20–64	0.49	0.58	0.60	0.66	0.61	0.77	66.9	68.3
65+	1.39	1.41	2.07	2.25	2.19	2.28	63.2	83.0
0–19/65+	*0.41*	*0.37*	*0.32*	*0.35*	*0.30*	*0.40*	*128.4*	*115.9*

Relative to average labour income of people aged 30–49

Source: Own calculations.

Public transfers inflows

Apart from the public consumption, individuals also receive public cash transfers, mainly in the form of pensions as well as other cash benefits that finance consumption, particularly of the senior generations. When we account for all public transfers, there is a significant shift towards the senior generation, which is indicated by the generational ratio. While the evolution of the public transfers for the young generations is mainly explained by the developments of public consumption for education and care, the changes for the working-age and senior generations are also driven by public policy regulations related to cash transfers. Increased public transfer inflows towards the working-age people in 2016 (between ages 26 and 45) is explained by the introduction of the new universal family 500+ benefit for families with at least two children below age 18, from April 2016. In the case of the senior generations, there is an observable downward shift of public transfer inflows between ages 50 and 69, which indicates delayed take up of pension benefits. This can be contributed to the increases in legal and effective retirement age (Chłoń-Domińczak, 2019).

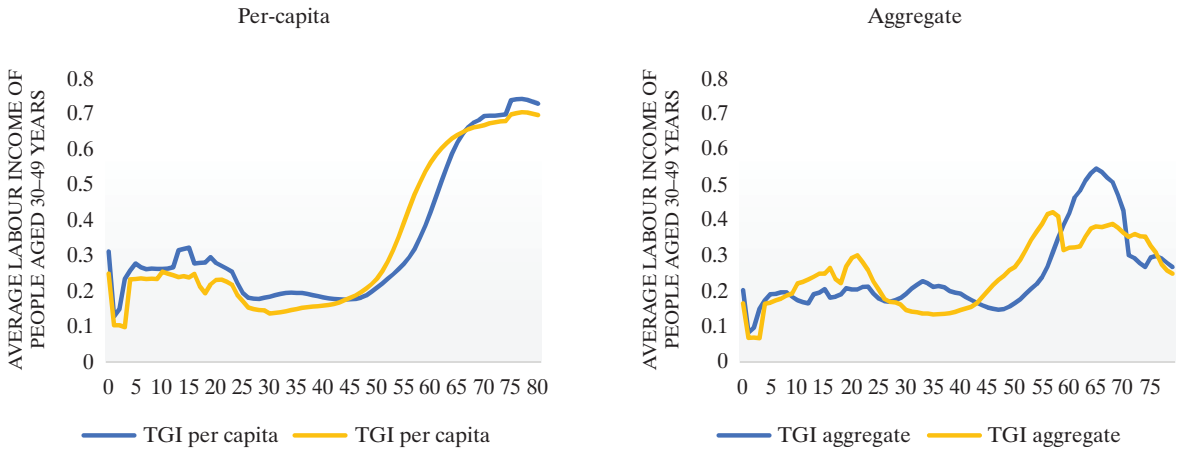

Figure 5. Normalised age profiles of public transfer inflows in Poland, 2004 and 2016

Source: Own calculations.

Changes of the aggregate age profile of public transfer inflows in the analysed period show that with ageing of the post-war baby boom generations the peak of these inflows shifted from age 57 in 2004 to age 65.

Summarised per-capita public transfer inflows for all age groups in Poland in both analysed years are between 27- and 28-times average labour income of people aged 30–49 (Table 8). The per-capita public transfers received by the young generations are around half of those received by the senior generations. In 2016, this ratio in Poland (0.47) was below the EU average (0.52), but similar to the ratio in Germany and Sweden. The total public transfer inflows for all age groups are below the EU average, with the gap smallest for the senior generations and largest for the working-age generations. The distribution of public transfer inflows by generations in Poland is similar to the one observed in Germany, while in Spain and Sweden the public transfer inflows are relatively higher.

Table 8. Normalised per-capita public transfer inflows by the broad age groups, Poland vs. selected EU countries

Age group	Poland		EU 25	DE	ES	SE	Poland (EU 25 average 2010 = 100)	
	2004	2016	2010				2004	2016
all	27.12	27.78	31.18	27.53	29.65	32.18	87.0	89.1
0–19	4.31	5.30	6.01	4.86	5.77	5.89	71.7	88.2
20–64	11.95	11.28	13.55	11.80	12.95	14.04	88.2	83.3
65+	10.86	11.19	11.62	10.87	10.94	12.25	93.5	96.3
0–19/65+	*0.40*	*0.47*	*0.52*	*0.45*	*0.53*	*0.48*	76.7	91.6

Relative to average labour income of people aged 30–49 years

Source: Own calculations.

Concluding the consumption assessment, the analysis of the NTA age profiles clearly shows that while the total consumption in Poland gradually converges to the European average (relative to labour income of those aged 30 to 49), the public consumption and public transfers remain below the EU average. This shows that the welfare state in Poland is still less developed compared to the representatives of the European countries: Germany, Spain and Sweden, and it is significantly distant in particular from the most generous Scandinavian model. The evolution of per-capita age profiles indicates that there is a shift towards a higher share of consumption of the senior generations, particularly between 2004 and 2012, while this trend slightly reversed in 2016. Furthermore, the consumption gap between Poland and the EU average declines regarding both the total and public consumption.

Labour income

The normalised per-capita age profiles of labour income show that between 2004 and 2016, there was an increase of the labour income of people aged 40 year or over, relative to the average income of people in age group 30–49. This indicates extending working lives and later retirement due to the increased retirement age and limitation of early retirement routes in Poland (Figure 6, the left panel), which was also reflected in later take up of pensions, as discussed in the previous section. As a result, there is a visible increase of earnings of those in the working age, but also for people aged 65 and over. There are also changes of the aggregate labour income age profile — from the bimodal shape with two humps: lower for those in age group around 30 and larger for people in mid-40s to the curve with one maximum for generations in their mid-30s. This illustrates the impact of the changing age structure, in particular shifting the post-war baby boom cohorts from working generations to senior generations (Figure 6, right).

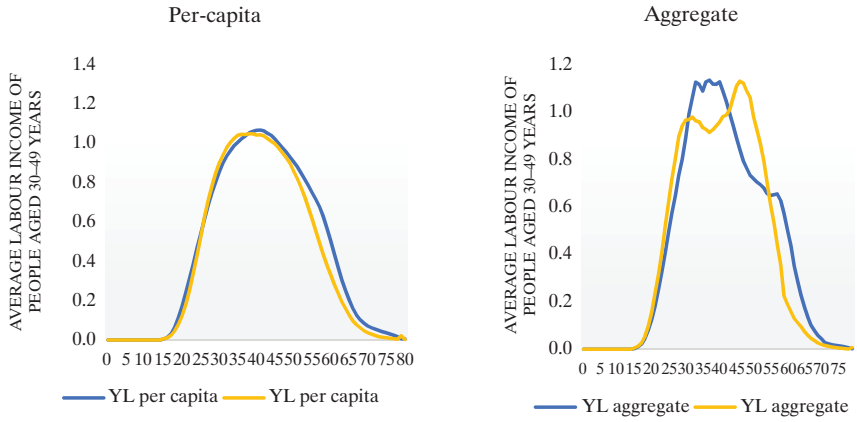

Figure 6. Normalised age profiles of labour income in Poland, 2004 and 1016

Source: Own calculations.

The observed shifts in the per-capita profiles make them more similar to the EU average of 2010, as our reference point (Table 9). However, labour income of those in working age in 2016 still remains below the EU average and much below the values observed in Sweden in 2010. It is also worth noting that labour income of the youngest group (0–19) in Poland also remains below the EU average, which can be explained by the organisation of the educational system in Poland, with the lower share of dual education system, compared particularly to Germany or Sweden. As a result, the young people in Poland enter the labour market once they complete their education, usually after they turn 18 or above. The most important change in the age profile can be noted in labour income of people aged 65 and over. While in 2004 their income was much below the EU average of 2010, in 2016 it exceeded this benchmark. There is also a convergence of labour income of those aged 20–64 towards the EU average, however, it remains below the values observed in Sweden, Spain and Germany.

Table 9. Normalised per-capita labour income by the broad age groups, Poland vs. selected EU countries

Age group	Poland		EU 25	DE	ES	SE	Poland (EU 25 average 2010 = 100)	
	2004	2016	2010				2004	2016
Total	33.1	35.7	37.0	37.3	37.8	40.8	89.6	96.6
0–19	0.2	0.2	0.3	0.4	0.2	0.4	54.8	75.4
20–64	32.4	34.4	35.7	36.2	36.7	38.9	90.7	96.5
65+	0.6	1.1	1.0	0.8	0.9	1.5	58.1	108.1

Relative to average labour income of people aged 30–49 years

Source: Own calculations.

Lifecycle deficit

Between 2004 and 2016, the normalised per-capita age profile of lifecycle deficit (LCD) did not change much (Figure 7), with notable exception of people between ages 47 and 67, in which there is some decline in the lifecycle deficit as well as increase of the lifecycle surplus, caused by the extended working lives and postpone retirement. As a result, the total number of years with the LCD surplus (that is labour income exceeding the total consumption increased from 26 years (from age 24 to 57) in 2004 to 30 years (from age 27 to 57) in 2016. The evolution of the aggregate profiles shows that the declining number of people aged 0–19 led to the smaller aggregate LCD for the young generations in parallel to the higher aggregate LCD for the senior generations, which size increased.

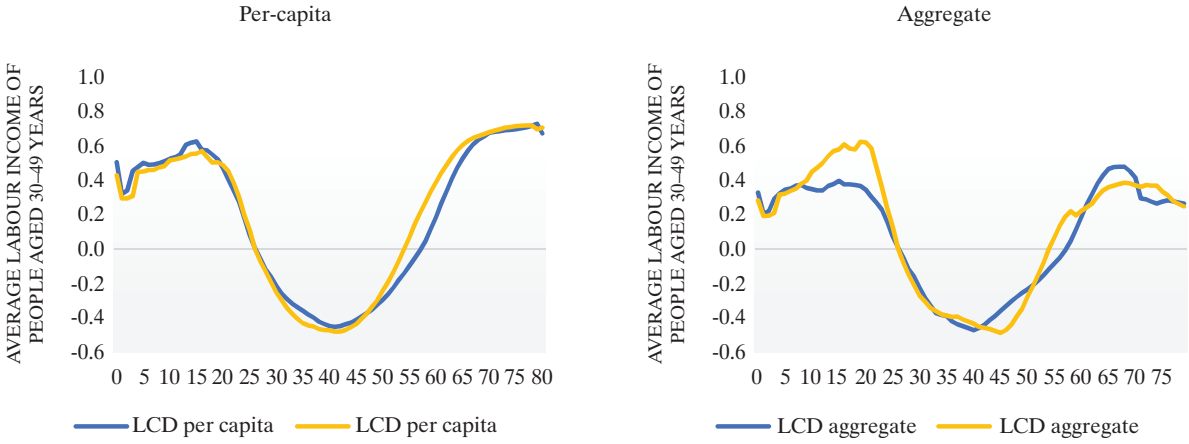

Figure 7. Normalised age profiles of lifecycle deficit in Poland, 2004 and 1016

Source: Own calculations.

Table 10 shows the normalised per-capita lifecycle deficit (LCD) in Poland for the broad age groups to the EU average, Germany, Spain and Sweden. The values from 2016 for Poland are similar to the EU average, after the increase of lifecycle surplus for the generations 20–64 observed in 2016. The LCD of the young generations relative to wages, is smaller in Sweden and Germany while for the working-age generations lifecycle surplus is larger in these two countries. Furthermore, the normalised LCD of the senior generations is lower in Sweden. The boundaries of the LDC economically active age in Poland are becoming similar to the EU average due the increase of the upper limit in 2016. However, the upper limit is still below the one observed in Germany, Spain or Sweden.

Table 10. Normalised per-capita lifecycle deficit by the broad age groups, Poland vs. selected EU countries

Age group	Poland		EU 25	DE	ES	SE	Poland (EU 25 average 2010 = 100)	
	2004	2016	2010				2004	2016
Lifecycle deficit								
all	16.77	15.61	15.71	11.41	15.04	5.35	106.8	99.3
0–19	9.49	10.34	10.87	9.00	11.11	9.10	87.3	95.1
20–64	–3.74	–5.44	–5.78	–8.70	–6.43	–12.72	64.6	94.2
65+	11.02	10.71	10.62	11.11	10.37	8.96	103.8	100.9
Economic active age (boundaries of the negative LCD)								
Low	27	27	27	27	27	27		
High	53	57	57	59	59	63		
Economic dependency rate								
young	0.35	0.34	0.34	0.28	0.34	0.25	102.7	100.8
old age	0.44	0.35	0.34	0.33	0.31	0.22	130.8	105.0
Total	0.78	0.69	0.67	0.61	0.65	0.47	116.7	102.9

Relative to average labour income of people aged 30–49

Source: Own calculations.

Changes in the aggregate lifecycle deficit implied also some shifts in the economic dependency rate, which is defined as a ratio of aggregate lifecycle deficit of generations below and above the economically active age to the aggregate labour income (as proposed by Loichinger et al., 2017). The total economic dependency rate in Poland in 2016 was lower than in earlier years, which results from both the declining young economic dependency and the declining old-age dependency. The decline in the economic old-age dependency rate is the joint outcome of the increase of the economic activity age and the increase of labour income of people aged 50 years and over, that can be attributed to the rising retirement age. Despite these improvements, the economic dependency in Poland remains still above the 2010 level in Spain, Germany and particularly in Sweden and close (but above) EU the average.

Conclusions

The application of the National Transfer Accounts approach to analyse changes of the generational distribution of labour income, consumption (including the public and lifecycle deficit (LCD) in time provides a useful framework to assess the shifts in the generational balance under the remarkable changes in both economic and social developments as well the population age structure in Poland after 2004. The estimated per-capita age profiles of the NTA components and their aggregates, considered also for the broad age groups reflecting the young, working-age and senior generations respectively, allow for in-depth insights into evolving generational distributions, including responses to the research questions that were formulated in the introduction.

With regards to the first research question, we see that the generational distribution of lifecycle deficit and consumption were affected by economic, social and demographic changes. The dynamic economic growth led to the increase of major aggregates of national accounts, most notably consumption and labour income. The decomposition of the national accounts aggregates revealed that the total changes in the aggregate consumption, labour income, but also the lifecycle deficit derived from the NTA approach between 2004 and 2016 were affected mainly by the wage growth and shifts in per-capita age profiles. The population change itself would lead to a decline of both consumption and labour income would decline in real terms, the former more than the latter. The changing age structure would also lead to the increase of the total aggregate lifecycle deficit. The potential demographic impact was reversed by growing wages and evolving age profiles of labour income and consumption.

We have also shown that intergenerational transfers evolved with the changes in the public policies as well societal preferences and behaviours that shape private consumption and intra-household transfers. The growth of public cash transfer inflows was faster than the public consumption, which indicates the increasing relative generosity of the social policies associated with cash transfer payments. This means that with the economic growth, there is an increased capacity of the welfare state to provide public transfers, particularly to the population groups that require support — the young and senior generations.

The changes in the generational distribution of lifecycle deficit are under impact of shifts in the population age structure, as the per-capita LCD of younger generations slightly increased, while for the senior generations it declined. This means that the demographic developments affected mainly the age structure of the LCD and not its size, which is mitigated by the changes of the per-capita age profiles.

With regards to the second research question on the convergence of the outcomes of public policies in Poland to a particular type of welfare state in Europe, we observe that the slow reduction of the observe differences to EU average, Germany and Spain, while the distinction compared to Sweden remains. This confirms the conclusions of (Chłoń-Domińczak et al., 2019) who show distinct public transfers in the Scandinavian countries (including Sweden), compared to the largest group of countries, that includes Germany, Spain and Poland.

The age distribution of total consumption in Poland becomes similar to the EU-25 average, but also quite similar to Spain, particularly in the case of young generation. There is also a gradual reduction of the gap in public consumption between the EU average and Poland for all generations. The total public consumption, particularly of the young and senior generations, became closer to the EU average, and similar to the ones observed particularly in Spain, but still lower compared to those in Sweden. The consumption part that increased the most in the analysed period is the aggregate health consumption. The increase of per-capita consumption, particularly at older ages, led to a total increase by 30 p.p. in the case of public consumption and 40 p.p. in the case of private consumption on health. This is similar to the developments observed in other counties, such as the US or Sweden. With the technical progress and population ageing, the per-capita public consumption on health rises mainly for the pre-natal and post-natal health services as well as for those aged 65 and over. With population ageing progressing, it can be expected that this trend is most likely to continue. While the gap in the public consumption in health declined, particularly for the young and senior generations, it is still below the levels in the European countries. This indicates that in the future there might be a further pressure to increase per-capita public health consumption of the senior generations.

Another convergence that we observe is the extension of the boundaries of the economically active age. While the lower age limit remained similar to the other countries in Europe compared here, the upper age limit increased. However, it remains still below the EU average, Spain and Germany and, in particular, Sweden (63 years).

Finally, with regards to the third research question related sustainable evolution of the economic dependency in the future with progressing population ageing, our findings indicate that there were some developments that can support the stability of the economic dependency of the non-active population. We have shown that the growth of the aggregate lifecycle deficit caused by the population ageing in Poland was significantly mitigated by the evolution of the per-capita age profiles, including higher growth of labour income and relatively lower growth of consumption. If the direction of these developments were maintained in the future, Poland would be able to slow down the growth of the aggregate lifecycle deficit, despite the progress in population ageing. This ‘opportunity window’

is conditioned on labour income growth being faster than consumption increase. The policy regulations implemented until 2016, particularly related to increasing effective retirement age, were conducive to such developments. Unfortunately, the 2017 regulation on a withdrawal from the higher retirement age can lead to a slower growth of labour income, and in turn impact the faster increase of the aggregate lifecycle deficit in the future.

Our findings indicate that the important role in mitigating the growth of the aggregate lifecycle deficit is played by the labour income at all ages, including the fast transition of young people to economic activity, but most importantly postponed transition to inactivity at older ages. Therefore, it is important to pursue policies that increase per-capita labour income, through investment in human capital and productivity. One of the important conclusions that can be drawn from our analysis is that with the increased consumption on health, the expenditure on public (and private) education declines, which may have an impact on the development of human capital in the future.

This is potential risk for implementing policies aiming at raising labour income at all ages, particularly of those in age groups 50 and over. The increased per-capita labour income, combined with slower growth of the consumption, can contribute to sustaining the generational balance in the future, despite advances in population ageing.

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