



Ministry of Foreign Affairs  
of the Czech Republic



## DEMOGRAPHY MATTERS:

# How population dynamics impacts the economy of the Republic of Moldova?



**An Analytical Report on National Transfer Accounts for the  
Republic of Moldova**

## **Demography matters: How population dynamics impacts the economy of the Republic of Moldova? An Analytical Report on National Transfer Accounts for the Republic of Moldova**

This report has been produced by economic think tank “Expert-Grup” with the advice of Ms. Lili Varga, Research Fellow, Hungarian Demographic Research Institute, under the overall coordination of UNFPA Moldova.

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# ACRONYMS

BoP – Balance of Payments

CDR – Center for Demographic Research

CEE – Central and Eastern Europe

CIS – Commonwealth of Independent States

CIT- Corporate Income Tax

FDI – Foreign Direct Investment

GDP – Gross Domestic Product

HBS – Households Budget Survey

IMF – International Monetary Fund

LCD – Lifecycle Deficit

LFS – Labor Force Survey

MDL – Moldovan leu (national currency in the Republic of Moldova)

NBM – National Bank of Moldova

NBS – National Bureau of Statistics of the Republic of Moldova

NCIM - National Company for Insurance in Medicine

NOSI – National Office for Social Insurance

NTA – National Transfer Accounts

PIT – Personal Income Tax

PPP – Purchasing Power Parity

ROW – Rest of the World

SNA – System of National Accounts

SR – Support Ratio

UN – United Nations

UNFPA – United Nations Population Fund

VAT – Value Added Tax

WWII – World War II

# INTRODUCTION

The National Transfer Accounts (NTA) system is a relatively recent development conceived to improve the understanding of the age dimensions of the modern economies. Conceptually, the NTA stems from numerous researches and contributions that began in 1958 with Paul Samuelson's work on overlapping generations models. More directly, the NTA, as a coherent statistical and accounting system, relies on the methodological contributions and fundamental researches done by Ronald Lee and Andrew Mason (Lee and Mason 2011, UN, 2013).

The key feature of the NTA is the age-disaggregation of the most important economic aggregates and flows that are registered at the macro-level – consumption, labor income, public and private transfers, savings etc. In this regard, it is fully consistent with and complements the Systems of National Accounts. The detailed representation of inter-generational economic flows offers important insights regarding how economic and policy shocks impact people at different stages in their lives.

The entire logic of the NTA stems from a well-known fact of life: people's consumption and earnings vary significantly across ages, with the consumption-earning balance depending on their needs and abilities to satisfy these needs through people's own labor. Surpluses generated by some generations are used to finance the deficits of others, which reveals the most important NTA concept of economic lifecycle. At younger and older ages people are typically less productive and consume more than they produce, resulting in lifecycle deficits. The working-age individuals typically display an opposite pattern: they generate lifecycle surpluses through their more productive work while consuming less. Their surpluses are used, either directly or indirectly (by having other institutions as intermediaries) to finance the consumption gaps of people of other ages. People may also use savings they accumulated earlier in life to fund own consumption at older age, whereas younger persons, on the contrary, may take loans that will be repaid later in their life.

As part of a global NTA network, research teams in more than 50 countries have constructed or are currently constructing national NTA systems<sup>1</sup>. The Republic of Moldova joined the network in 2016, and the UNFPA Moldova provided support to the development of the first ever national NTA estimations in the country. Adopting an inter-generational perspective in the economic and social policy is particularly important in countries undergoing significant demographic changes, such as population aging, migration of working-age population and lowering fertility rates. NTA may provide valuable information for the analysis on the sustainability of the Moldovan economic system, of the inter-generational equity of social protection system and of inter-generational distribution of the fiscal burden. The country faces multiple development challenges with economic and demographic ramifications. Moldova has registered negative population growth since 1999 and an on-going rapid depopulation of the rural communities. The pressures on the public systems, including pensions, education and health, are building up. These challenges are complemented by multiple dysfunctions of the economy, as featured by low employment rate, high shares of informal employment and economic activity, depressed labor market, and intense outmigration of the labor. The ongoing economic and social changes have multiple inter-generational implications, which have to be well assessed and understood. Without such an understanding, the reforms that the Government is undertaking – including pensions system reform, health protection system reform, educational reform – may produce suboptimal or undesired results.

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<sup>1</sup>See details on the NTA project at the project website <http://www.ntaccounts.org/web/nta/show>.

The Purpose of the Report is to present and discuss the most important results from the exercise of building the first Moldovan NTA estimations. It offers a general overview of the most salient features of the Moldovan inter-generational economy. The report has not been conceived to be an analytical or modeling tool per se, as NTA is an accounting database offering analysts and policymakers the data which may be useful for research and decision-making, including through the use of specialized economic-demographic models. Nonetheless, the database itself, the related standard indicators and the accompanying charts also offer valuable insights into the most pressing challenges posed by Moldovan economic and demographic realities.

Building Moldovan NTA estimations has been a data-intensive process closely following the NTA methodology (as defined by UN, 2013). The NTA Moldova team has benefited of data coming from a number of sources that we would like to gratefully acknowledge. Important data have been offered by the National Bureau of Statistics (NBS) and National Office for Social Insurance (NOSI). The Center for the Demographic Research (CDR) of the National Institute for Economic Research offered their estimates for the Moldovan population.

We have chosen 2014 as base year for NTA. The main reason was that when the NTA Moldova project started, the SNA for 2014 was the most comprehensive and up-to-date set of accounts made public by the National Bureau of Statistics (NBS). The Households Budget Survey for the year 2014 served as main source of data for computing age profiles. At our request, the specialists of the National Bureau of Statistics have generated the age profiles for the labor earnings for the same year. The staff of the NOSI provided us the evidence necessary to build the pensions and other in-cash public transfers age profiles for 2014.

The report is structured in seven chapters. The first one discusses the quality of the data available for the NTA. The second briefly introduces those economic, social and policy features that are relevant for the inter-generational flows in Moldova. The third chapter describes the age profiles of the consumption, labor income and the resulting economic lifecycle. The data allowed us to calculate age profiles separately for men and women. However, our gender disaggregation stops at the lifecycle, because gender-disaggregation of public and private transfers is much more involved and less intuitive. The NTA methodology is not yet accomplished in this regard. The fourth chapter highlights the important role that the public transfers and, to a lesser extent, the public asset-based reallocations play in Moldova in channeling resources from ages with surpluses to ages with deficits. Considering the sizable migrant population and the related remittances from the long-term migrants, the fifth chapter discusses the important role that inter-household and intra-household transfers play. It also presents the private asset-based reallocations. A 'special issues' follows drawing on the Moldovan NTA database and addressing the subject if and how can Moldova reap its demographic dividends. The final seventh chapter presents key conclusions and policy implications.



# EXECUTIVE SUMMARY

The Republic of Moldova is going through a demographic transition, with significant long-term implications. Due to a falling fertility rate and intense outmigration, the age distribution of population has turned from a stable pyramid 30 years ago, into a constricted Christmas tree nowadays. A key feature of the Moldovan society is the intense age-specific migration of working age people to other countries, for both seasonal and long-term or even permanent work. These challenges are magnified by economic weaknesses and by a protracted and rather unsuccessful economic transition.

Despite economic hardships, the Government has a relatively high presence in the economy, both as provider of public services and as redistributor of incomes. Payment of the social benefits represent the main item of the public budget expenditures with 35 percent of total. Moldovan Government redistributes high shares of the GDP through the age-related public programs: social protection program costs around 13 percent of the GDP, the education program – 7 percent of the GDP and the health – slightly more than 5 percent of the GDP.

The life-cycle deficit accounts for 36.4 billion MDL and seems quite high compared to the majority of other countries in the NTA project. Only the population aged from 34 to 56 years has lifecycle surplus, meaning that only during these 23 years of life people earn more than consume, which is also a very short period of time compared to other countries in the NTA global project. Significant differences in the life-cycle deficit by gender are worthwhile mentioning. Women accumulate surplus only between 35-54 years old, and is lower compared to the surpluses accumulated by men at all ages. Men accumulate surpluses almost twice longer - between 25-59 years old.

The life-cycle deficit is financed by public and private transfers and public and private asset-based reallocations. For early ages, up to 20 years old, the deficit is financed mainly by private transfers, with a share of 69 percent, while public transfers come second with a share of around 31 percent. At these ages, the consumption of public and private education is a key factor determining the deficit. Compared to all other countries in the NTA project, Moldova spends very large amounts of public and private resources for funding education. The inter-household transfers, coming mainly from family members working permanently or in long-term abroad is a key inflow supporting the younger generations. One key figure to mention, the migrants' remittances represent around one fifth of the Moldovan GDP. Combined with public transfers and income derived from own labor, they are used to pay for the education at the younger ages and for accumulation of savings.

At later ages, after the life-cycle surplus ends, the deficit is financed mainly by public transfers and private asset-based reallocation. Public pensions and dis-savings are the main sources used to finance deficits of the older generations.

The analysis of how Moldova can benefit of demographic dividends has been a special analytical topic in this report. The analysis suggests that Moldova could miss the opportunity to exploit its first demographic dividend, if necessary investments are not made in youth health and education and a better inclusion of young people into labour market. Depending on the level of capitalization of the first demographic dividend, Republic of Moldova may further have a second demographic dividend. This requires two streams of policies: (i) aimed at minimizing the risks of the negative first demographic dividend by unleashing the potential of the young population, and (ii) aimed at maximizing the opportunities of the second demographic dividend by enhancing the business climate and fostering the financial sector.

## 1. NTA data sources and quality discussion

The Moldovan NTA has been developed using official statistical data. However, the quality and reliability of the data is not uniform. The Moldova NTA team identified a number of problems in the population data. Most of these problems stem from intense unobservable outmigration and are due to lack of adjustments of the official demographic statistics to the results of the population censuses (neither that of 2004 nor the most recent one of 2014).

For calculation of the aggregated and per capita age profiles for the Moldovan NTA, we have used the so-called stable population of the country as reported by the NBS. The stable population is composed of persons having domicile in Republic of Moldova, including those temporarily absent. The NBS estimates the stable population using a balance equation which updates previous period's stable population with the number of births, deaths, official immigrants and emigrants during the current period. The indicator is available disaggregated by individual age, sex and residence area.

The NBS also calculates the present population as composed of persons physically present on the country's territory, including those with temporary domicile. The NBS estimates the present population in the inter-census years based on the results of the most recent census updated with data on natural movement and migratory movement. However, there are no recent estimates of the present population disaggregated by individual age. In 2014, a general population and housing census was conducted; however, the data were published only in March 2017.

According to demographic experts from the Center for Demographic Research of the National Institute for Economic Research, until now, the NBS has not accounted properly for the number of permanent emigrants (people whose habitual residence is outside Moldova / people who are outside the country for more than 12 consecutive months), which results in an overestimated stable population (Gagauz et al, 2016). An important problem is the fact that migrants tend to concentrate in the relatively young cohorts – those aged 25-34 years account for 38 percent of labor migrants, whereas those in the 35-44 years – 22 percent - so the distortion is systematically affecting particular ages. Improperly accounting for the number of permanent migrants also may overestimate the NBS' own calculations of the present population. However, significant errors may be found at the more senior ages as well, particularly in the case of the population aged around 70 years. According to NBS official data, as of 1st of January 2015 the stable population of the Republic of Moldova was 3,555,159 persons, whereas the present population equaled 3,384,100 persons. According to the Center for Demographic Research estimates, the present population in 2014 was only 2,868,637 persons. According to the recently-released NBS data, the stable population as of 1st of January 2017 was 3,550,852 people, whereas the corresponding figure for the present population is not yet available. Also, on 31 of March 2017 the key figures from the 2014 census were released, according to which Moldovan population at the time of census was 2,998,235 persons.

Potential flaws related to the population data may propagate in other data. For instance, the Households Budget Surveys (HBS) which are regularly conducted by the NBS are based on a sample corresponding to the stable population, which, as shown above, may significantly deviate, both in terms of size and structure, from the real permanent population of the country. Because the HBS is used as a key source for compiling the National Statistical Accounts, especially for households' final consumption, errors may spread further. The Moldovan NTA project did not have enough resources to estimate the size of potential errors and to implement corrections and adjustments. We have also surprisingly discovered that important data are completely missing. The most striking was to find out that there is no evidence available on the age of users of the public health services. This is a serious flaw undermining the capacity of the Government to implement evidence-based policy, in a sector where the age pattern is particularly important.

Finally, it should be mentioned that throughout the NTA development process, the team had to deal with shortages of data and find alternative ways to accomplish the system. Use of proxies or alternative data

is explained in details in the main part of the text. Here, we would like only to mention that, due to its size, the private asset income has been the most important missing variable. The HBS does not include evidence on the individual- or household-level of the assets and associated income. The declared cost of the owned dwelling has been used to proxy the income from assets. This has potentially significant implications on the shape of the savings, which, on their turn, are determined as age specific residuals after all other variables have been calculated. Due to multiple rounding and imperfect quality of data coming from multiple sources, in some instances savings may have errors built-in, which are especially apparent for the ages 0-2. However, by and large, considering all problems with the data and using other NTA countries as benchmark, we believe that the final result renders a reasonably good story of the key features of the inter-generational economy in the Republic of Moldova.

## 2. Key demographic, economic and policy features of Moldova

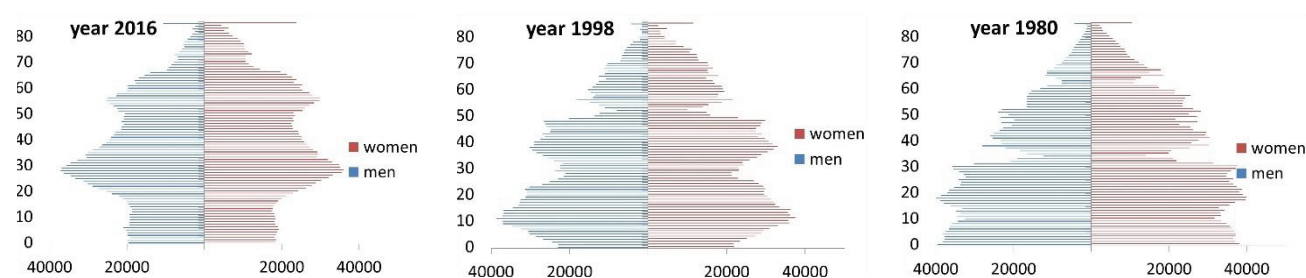
### 2.1. Population

The Republic of Moldova is a small Eastern European country landlocked between Ukraine and Romania and covering an area of 33.8 thousand sq.km. This area includes the breakaway Transnistrian region and the city of Tighina, which seceded following a military conflict in 1992 and since then are not under the control of the Moldovan constitutional authorities and therefore are not covered by official statistics. According to a 2014 regional census, the Transnistrian population is around 500 thousand persons.

As reported by the NBS, on 1st of January 2016, the number of country's stable population amounted to 3553.1 thousand people, while the present population was 3369.1 thousand persons. More than half of the stable population is rural – 2042.0 thousand, while 1511.1 thousand are living in urban areas. However, the definition of the urban area in the Moldovan context encompasses a number of small towns, which socio-economically very much resemble villages.

Due to persisting negative natural growth, the Moldovan population is rapidly decreasing. According to the demographic experts, the country is getting depopulated without any visible evidence of recovery<sup>2</sup>. The stable population contracted by 1 percent in only one decade between 2006 and 2016. The decline gets even more abrupt if one considers the fact that real population in Moldova may be lower than official estimates. The migration has been a key factor behind declining population, seconded by the declining fertility. According to the NBS official data, the total fertility rate reached an all-times low of 1.211 in 2002 and since then has only marginally recovered to 1.301 in 2015.

**Figure 1. Population pyramid in the Republic of Moldova for selected years, thousand people**



*Note: data for 1980 cover the Transnistrian breakaway region and the city of Tighina, which accounted for 14.5 percent of the entire population. Age structure in Transnistrian region and the right-bank Moldova were similar in 1980.*

*Source: authors' calculations based on the NBS Databank on population and demographic processes.*

Population aging is another defining feature of Moldova. According to one of the most recent demographic studies, with a relatively high mortality rate (11.2 permille over the two decades 1996-2016) and a relatively small life expectancy (67.5 year for men and 75.5 years for women), the low birth rate is the main reason behind the population aging<sup>3</sup>. The most recent data for 2016 show an average age of the population of 37.8 years, compared to 35.1 in 2006 and 32.6 in 1996. The population “pyramid” is extremely deformed, resembling more a constricted Christmas tree and thus coming in stark contrast with the stable pyramid three and half decades ago (Figure 1). According to our data, the most severe deteriorations to the age pyramid happened somewhere in the mid-1990s.

<sup>2</sup> Gagauz et al, 2016.

<sup>3</sup> Idem.

Intense outmigration, related to work or family reunification, is another defining phenomenon for the Moldovan demographics. There is little official evidence on the size of the population with permanent residence abroad (long-term or permanent migrants). Assessments conducted by independent Moldovan experts based on indirect evidence (statistical data of host countries) suggest that in the year 2011 around 16 percent of the Moldovan population resided permanently abroad<sup>4</sup>, which amounts to 560-580 thousand people. These estimates are consistent with the most recent 2014 population and housing census.

## 2.2. Economic indicators

Among other peers in the group of transition countries, the Republic of Moldova suffered one of the longest transformational recessions. The 1998 Russian financial crisis resulted in collapsing Moldovan currency and accumulation of budget arrears on wages and social payments. Combined with other shocks, such as droughts and adjustment of energy prices, the Russian crisis triggered a massive emigration of the labor. The migration began with the rural areas where the unreformed agricultural enterprises ceased to provide minimal revenues for subsistence, while alternative employment opportunities were slow to emerge. Emigration from cities and small towns followed shortly after in early 2000s, as the half-hearted enterprises restructuring failed to bring the employed better working conditions and higher salaries. The Moldovan economy recovered its 1993 GDP level only by 2008 (Figure 2). Between 2000 and 2016, the GDP growth rate averaged 4.5 percent yearly, way too slow to achieve income convergence even with the group of CIS countries (Figure 2), let alone the economically more successful countries in the Central and Eastern Europe (CEE).

Around 15 percent of the Moldovan GDP is currently generated by the agricultural sector. The industrial sector contributes roughly 18 percent, the market services – with 50 percent and the remaining 17 percent go to the public services. This structure marks significant shifts compared to the more ‘traditional’ one in early transition period, when agriculture and industry combined accounted for more than half of the output (Figure 3). The reduction of the agricultural share in the GDP has been accompanied by a massive shedding of the labor from the sector. Further structural changes are to be expected, including because of the outflow of labor from agricultural sector. Also, we expect that the more pressing budgetary constraints may also lead to rationalization of the employment in the public sector and to further reduce the share of the public sector in the GDP.

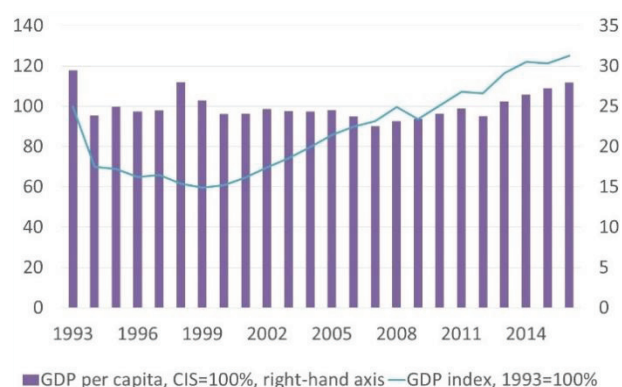
Looking at the GDP by expenditures side, the high final consumption-to-GDP ratio stands out as one of the most striking features of the Moldovan economy. In 2015 the figure was 108 percent, compared to 83 percent in 1995. Thanks to migrants’ remittances, the Moldovan Gross National Product is significantly higher than the Gross Domestic Product, making it possible to sustain a level of consumption by far exceeding the domestically-generated income. The consumption-to-GDP ratio will quite surely decline in near future. However, the reduction is more probably to be gradual than in the form of a hard landing, because the migrants’ transfers will drain slowly, as families reintegrate abroad while the older generations that migrants provide support to gradually pass away.

A brief remark is warranted on how the income is split among production factors, because this has implications for the inter-generational economy and for the economic life-cycle. Roughly 50 percent of the gross value added in 2015 was used to remunerate the employed labor. Around 35 percent went to the owners of the capital, and 13 percent – to the self-employed labor. The latter is an important structural shift compared to mid-1990s, when the capital was gaining around 20 percent of the value added, while the self-employment – around 30 percent.

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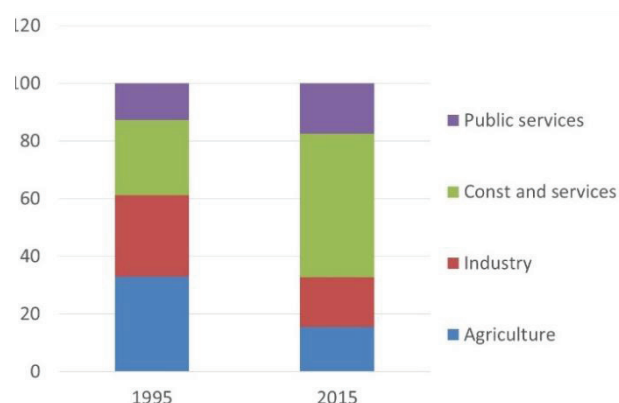
<sup>4</sup>Gagauz et al., 2016.

**Figure 2. Evolution of the Moldovan GDP, 1993=100%**



Source: NBS databank, IMF WEO database and authors' calculations.

**Figure 3. Evolution of the production structure of the Moldovan GDP**



Source: NBS databank and authors' calculations.

### 2.3. Socio-economic trends

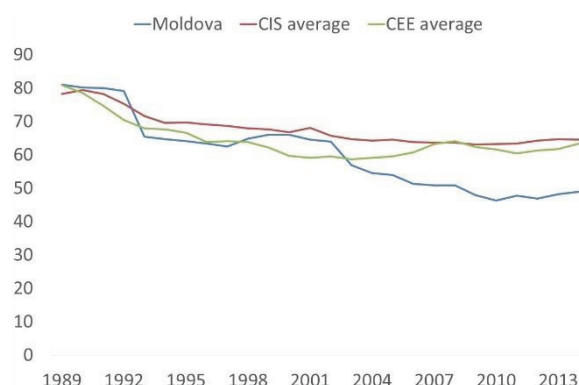
The most recent official data for the fourth quarter 2016 put the number of Moldovan migrant workers at 315.4 thousand persons, roughly 14 percent of the working age population (while the independent assessments are much higher, as previous section shows). Around one third of the migrants are women, a share which has remained pretty stable over the recent decade.

Thanks to geographical proximity, cultural and linguistic affinities with both CIS and European countries, as well as to multiple citizenships and visa-free regime with CIS and Europe, Moldovans can relatively easily access and settle, both formally and informally, in other countries for work purposes.

Migration is probably the key reason behind very low employment rate in Moldova. In 2014, less than half of the population aged 15-59 years was employed – this is a low level not only compared with Moldova own historical track, but also in regional perspective (Figure 4). For the same reason, the unemployment rate in Moldova stands at low levels by historical and regional standards (Figure 5). The labor market indicators display some gender differences. The most recent data for the first quarter 2017 put the men employment rate at 40.2 percent, while the women rate – at 35.5 percent. For the same reporting period, the women unemployment rate was lower than men unemployment rate: 4.5 percent versus 8.0 percent.

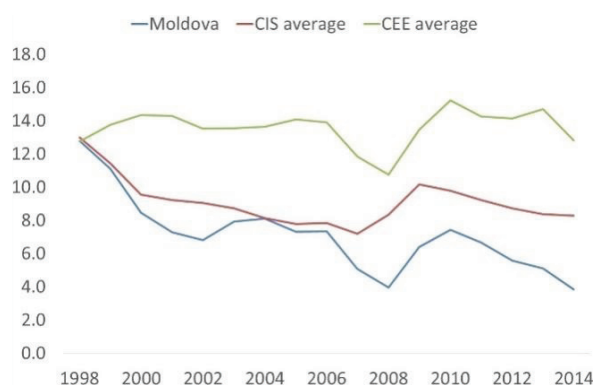
The younger cohorts in Moldova display lower rates of employment. While in case of the population aged 15-24 this is to be explained by educational enrollment, in case of the next group aged 25-34 the low and falling employment is striking, particularly as this is the life period when, according to statistics, most of the Moldovan get married and give birth to their first child. Between 2007 and 2015 the employment rates have been falling for each of the four economically most important age groups of the population between 25 and 64 years (Figure 6).

**Figure 4. Employment rate in Moldova, CIS and CEE countries in the period 1989-2014, % of employed population aged 15-59**



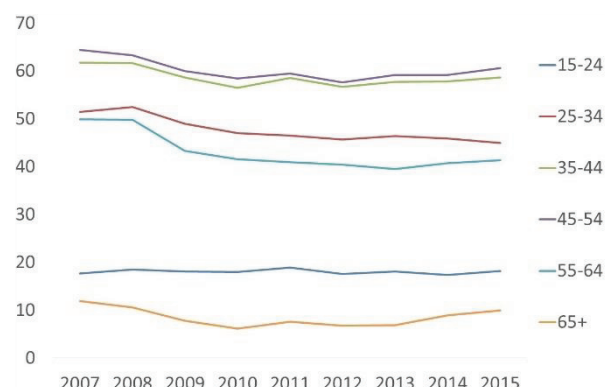
Source: UNICEF TransMonEE database and authors' calculations.

**Figure 5. Unemployment rate in Moldova, CIS and CEE countries in the period 1998-2014, % of economically active population**



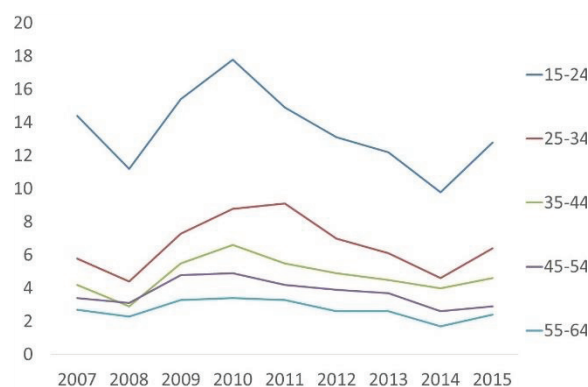
Source: NBS databank and authors' calculations.

**Figure 6. Employment rate by age groups in Moldova, %**



Source: NBS databank.

**Figure 7. Unemployment rate by age groups in Moldova, %**



Source: NBS databank.

Among those willing to work and actively looking for work, the unemployment rate declines with age. The group aged 15-24 years confronts an unemployment risk twice larger than the next group aged 25-34 years (Figure 7). If employed, the chances to be employed informally are much higher for the youngest (25 percent higher chances) and oldest age groups (90 percent higher chances). Quite often this informal 'employment' takes form of non-remunerated work in subsistence-oriented agricultural households. Men are more likely to be employed informally than women: 40 percent of the men are employed informally, whereas for the women the share is 33 percent.

## 2.4. Public finance and public programs

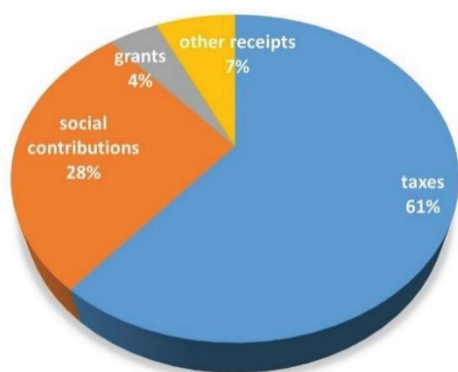
In the period following the 2009-2010 economic crisis, the expenditures of the general government as ratio of GDP stood at 38-39 percent, making the Moldovan Government one of the highest spenders in the group of CIS countries (where spending ratio averages 32 percent). Such a level of the state involvement in the economy is more common for the CEE countries, where the average level of government expenditures represents 41-42 percent of their GDPs.

Providing 61 percent of the total revenue, taxes are the main budgetary source. The VAT and other indirect taxes on goods and services play the key role, by providing more than 80 percent of the tax revenues.

Social contributions (including both compulsory social insurance and medical insurance) account for 28 percent of the public budget revenues. Foreign grants have a relatively high share of 4 percent (Figure 8).

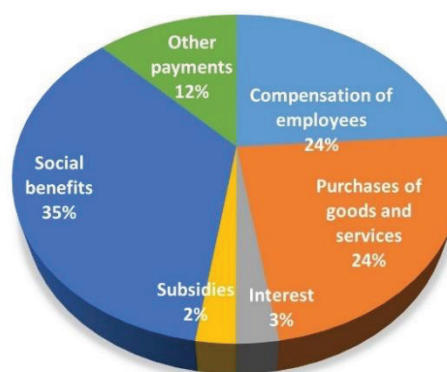
Social benefits represent the main use of the budget, with 35 percent of the total expenditures. The government channels 24 percent of the budgetary expenditures for paying wages in the public sphere and a similar amount for purchasing goods and services (Figure 9). In 2014, the debt service expenditures were relatively low (3 percent), but they will see a growing share in the budgets for the next years, mainly because of the growing public debt.

**Figure 8. Budgetary revenues by main sources, % of total**



Source: Ministry of Finance of the Republic of Moldova, Report on the budgetary execution according to Governmental Finances Statistics for the year 2015.

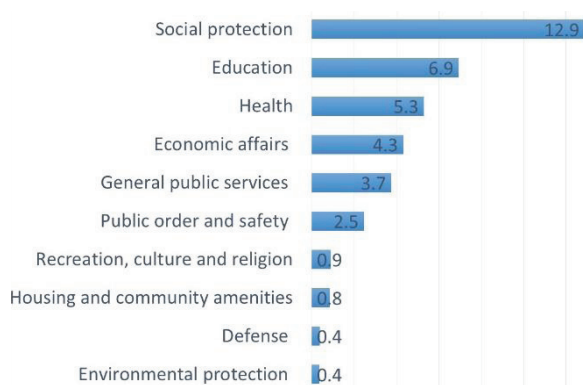
**Figure 9. Budgetary expense by economic classification, % of total**



Source: Ministry of Finance of the Republic of Moldova, Report on the budgetary execution according to Governmental Finances Statistics for the year 2015.

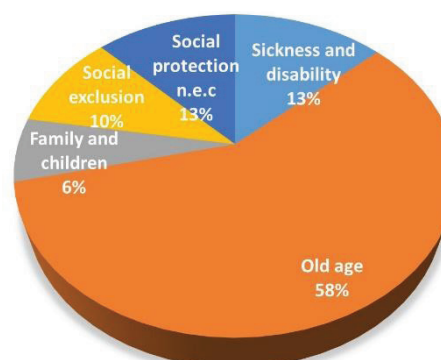
Moldovan Governments redistribute highshares of the GDP to the age-related public programs (Figure 10). Social protection programs cost around 13 percent of the GDP, the education program is 7 percent of the GDP, and health is slightly more than 5 percent of the GDP. In an international comparison, educational program in Moldova is particularly expensive: CIS countries spend on average 5 percent of their GDPs, while CEE countries – around 4.5 percent. In the social protection program, the old-age sub-program attracts more than half of the funds (Figure 11). In the education program the secondary education dominates, with roughly half of the total expenditures. The health program looks more ‘balanced’ as two important programs – hospitals and outpatient services -spend 1/3 of program total funds each.

**Figure 10. Budgetary expense by functional areas, % of GDP**



Source: Ministry of Finance of the Republic of Moldova, Report on the budgetary execution according to Governmental Finances Statistics for the year 2015 and authors' calculations.

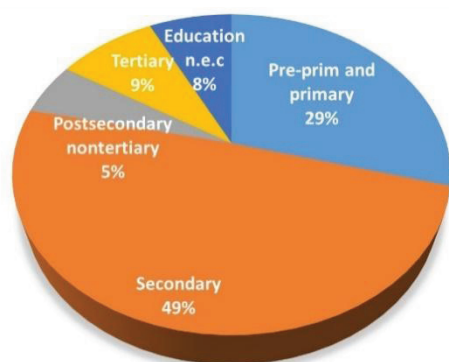
**Figure 11. Expenditures in the social protection program by subprograms, % of program**



Source: Ministry of Finance of the Republic of Moldova, Report on the budgetary execution according to Governmental Finances Statistics for the year 2015 and authors' calculations.

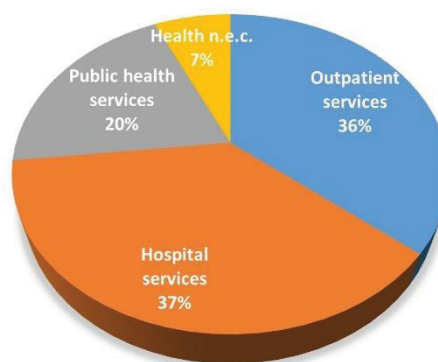


**Figure 12. Expenditures in the education program by sub-programs, % of program**



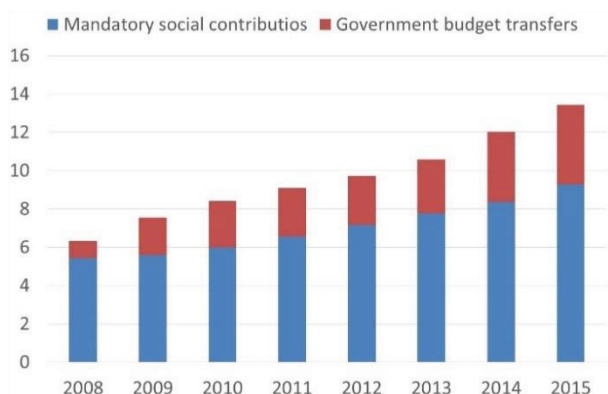
Source: Ministry of Finance of the Republic of Moldova, Report on the budgetary execution according to Governmental Finances Statistics for the year 2015 and authors' calculations.

**Figure 13. Expenditures in the health program by sub-programs, % of program**



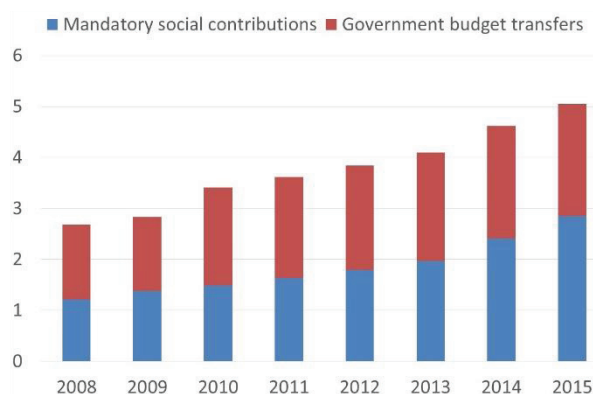
Source: Ministry of Finance of the Republic of Moldova, Report on the budgetary execution according to Governmental Finances Statistics for the year 2015 and authors' calculations.

**Figure 14. Evolution of revenues of the state social insurance budget, billion Moldovan lei**



Source: Ministry of Finance of the Republic of Moldova and authors' calculations.

**Figure 15. Evolution of revenues of the mandatory health insurance budget, billion Moldovan lei**



Source: Ministry of Finance of the Republic of Moldova and authors' calculations.

Health and social protection are funded from distinct budgets: budget of the mandatory medical assistance insurances (managed by the NCIM - National Company for Insurance in Medicine) and the state social insurance budget (managed by the NOSI). The earmarked social mandatory social contributions paid by employers and employees are not enough to fully fund the programs, and the NCIM and NOSI budgets get significant transfers of funds from the central government budget (see Figure 14 and Figure 15).

## 3. Economic life cycle

### 3.1. Labor income

In the Moldovan NTA, labor income has a total amount of 70.3 billion MDL and includes *labor earnings and self-employment labor income*. We used two sources of data to allocate labor income by age: the Labor Force Survey (LFS) and the Household Budget Survey (HBS).

Labor earnings account for 61.1 billion MDL and represent payments to households plus net taxes on production attributed to labor earnings. The figure also includes remuneration of migrant workers who are residents of Moldova net of remuneration of non-resident workers in Moldova reported in the Balance of Payments by National Bank of Moldova (NBM) and as calculated based on the SNA.

LFS data was used to calculate age profiles for *domestic labor compensation* separately by gender and smoothed with SuperSmoother in R. (The same smoothing tool has been applied to all other age patterns in the Moldova NTA, except education). The macro-control from the SNA is significantly higher compared to amount of wages reported in LFS – by 215 percent. Firstly, 25 percent of employees refused to report wages in LFS. For some ages, the rate on non-response is as high as 35-40 percent and this is typical for those ages with wages over average level. Secondly, the wages are apparently underreported in the survey. However, these discrepancies were permanent in the recent decade and we lacked any alternative to estimate the labor compensation age profile.

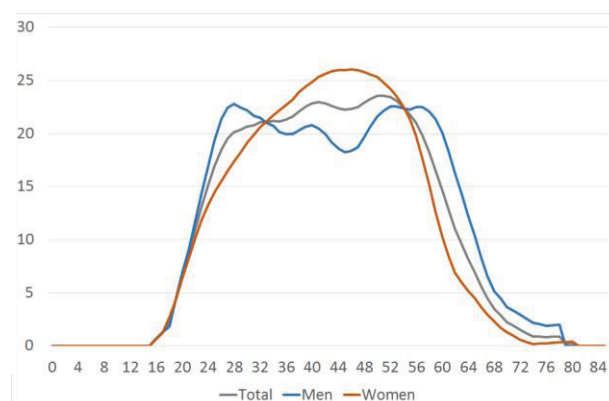
There is an uneven pattern of the domestic labor earnings determined by significant differences in the per capita age profiles by gender (Figure 16). Thus, for male population there is a clear decrease in domestic labor compensation from the age of 29 to the age of 45, with an increase registered afterwards. This shape is explained by intense migration of men in the age group of 30-45 reflected in the national statistics that determine a decrease in the number of employees in this cohort. As for women, the pattern is in line with the intuition: with a slower increase, due to maternity leave and child-care periods and a decrease that starts before the retirement age. In fact, due to higher migration of men and consequently lower participation on domestic labor market in for middle-age cohorts, per capital domestic labor compensation for women exceeds the level earned by men between the age of 33 to 54 years old.

*The compensation of Moldova workers from abroad* partly explains the pattern of the domestic labor earnings. Net compensations of workers abroad represent a significant part of labor earnings in Moldova – 22.9 percent, accounting for 14.0 billion MDL. We used the HBS to construct the age patterns and then smoothed the resulting age profiles. Workers receiving labor compensation were considered as household members, who were reported as being working abroad. While in the BoP, the remuneration of migrant workers who are residents of Moldova uses short-term migration for data aggregation, the HBS data does not allow for proper identification of short-term migration and related remittances. Therefore, we used the assumption that an individual still reported as household members transferring money to the household is considered to be a Moldovan worker abroad receiving labor compensation.

In the HBS dataset, only men between 17 to 61 years old complied with these criteria, while women receive work compensation from abroad from 18 to 70 years old. With no separate data for remittances sent by each migrant worker abroad in HBS, we distributed equally remittances received by the household among the individuals reported as working abroad. This distribution may cause gender bias, although it is still in line with the general intuition (Figure 17). Thus, the pattern for men reflects the age distribution of the population that left for work abroad. The pattern for women also reflects the maternity leave and child-care periods with lower values in labor compensation for women aged up to 34 years.

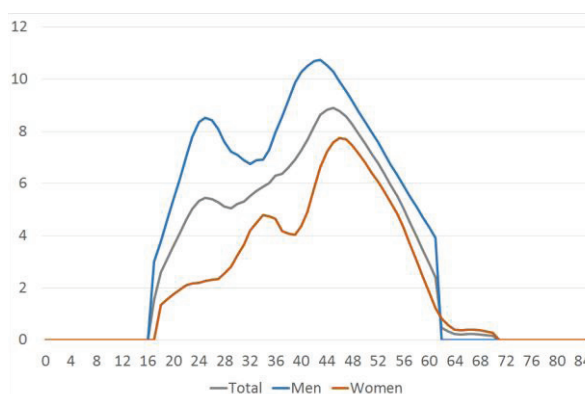
The remittances seem to be strongly underreported in the HBS. Thus, the sum of remittances received by households with short-term migrants is more than twice times lower than the workers' compensation macro-control from the balance of payments. Actually, the number of migrant workers also seems to be underreported, that is reflected on the overall amount of remittances, including compensation of Moldovan employees from abroad.

**Figure 16. Per capita age distribution of domestic labor earning by gender, thousand MDL**



Source: Authors' calculations.

**Figure 17. Per capita age distribution of labor compensation of Moldovan workers abroad by gender, thousand MDL**



Source: Authors' calculations.

At the same time, remittances-related data in Moldova pose some challenges, related to the extent of labor migration and the shares of labor compensation and personal transfers coming from abroad. Although in the BoP offers the information regarding the labor compensation of Moldovan workers abroad (as coming from migrants working abroad for periods less than 12 months and being treated as Moldovan residents) and transfers from abroad (from non-resident long-term workers), it might be still difficult to differentiate between the two of them. While labor compensation accounts for 14 billion MDL, personal transfers from abroad account for 12 billion MDL. Given the scarce information for their accurate delimitation, we consider that part of compensation of Moldovan workers abroad may be currently reflected in the transfers from abroad. If this is the case, the labor income may be somewhat higher and, consequently, the life-cycle deficit may be lower. However, we do not have sufficient data for an accurate estimation of the share of labor compensation of workers abroad in total personal transfers from abroad. This issue needs further investigation and a proper reflection in the NTA methodology. We believe that NTA's treatment of the migrant remittances should be further developed, considering the fact that migration affects a significant number of countries, not only Moldova.

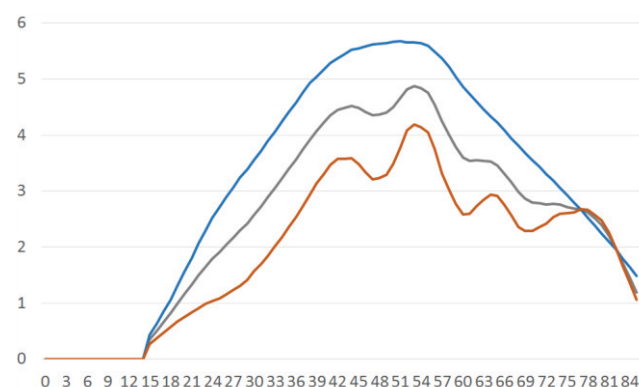
The *self-employment income* equals 9.3 billion MDL and it is calculated as two thirds of the mixed income accruing to households as per SNA income formation account plus net taxes on production attributed to self-employment earnings. The per capita age profile was calculated based in the HBS data and then smoothed. In case of self-employment income, the data from HBS is slightly higher than the macro-control form the SNA - by 15%. The HBS offers data per household on the incomes from self-employment and individual data on main and secondary source of income. The self-employment income comes from agricultural and non-agricultural activities. Therefore, the following assumption were applied in the distribution of the household-level self-employment income by household members:

- The income from individual agricultural activities was divided equally between members over 15 years reporting the self-employment in the own household, income from entrepreneurship and income from handcraft activities as main and secondary sources of income;
- The income from individual non-agricultural activities was divided equally between members over 15 years reporting the income from entrepreneurship and income from handcraft activities as main and secondary source of income.

The age pattern of the self-employment income is somewhat erratic (Figure 18). While the age distribution of self-employment for men is quite in line with the intuition, the age distribution for women is more irregular. Some of the fluctuations have an explanation, while other are a consequence of low number of observation in the sample that might distort the distribution. For instance, the decrease in incomes for those women aged 44 - 52 years is in line with lower number of self-employed women as there is higher migration at this age, and also there is a higher number of official women employees. On the other hand, the decrease in incomes for the ages 68-70 is related to poorer quality of data that is reflected in most of the variables for these ages.

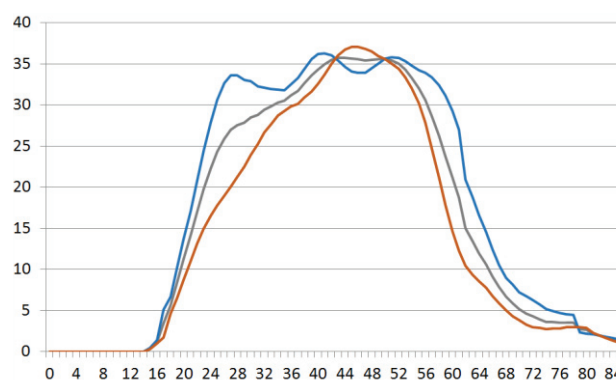
The overall per capita age distribution differs significantly by gender (Figure 19), given the particularities of Moldovan labor market and social policies as different median ages for migration of women and men. Wages are still lower for women. Also, maternity leave and child care allowances (three years paid + three years unpaid) are mainly taken by women.

**Figure 18. Per capita age distribution of self-employment labor income by gender, thousand MDL**



Source: Authors' calculations.

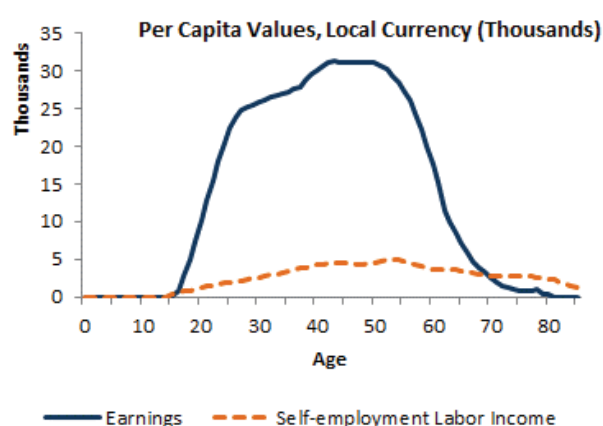
**Figure 19. Per capita age distribution of labor income by gender, thousand MDL**



Source: Authors' calculations.

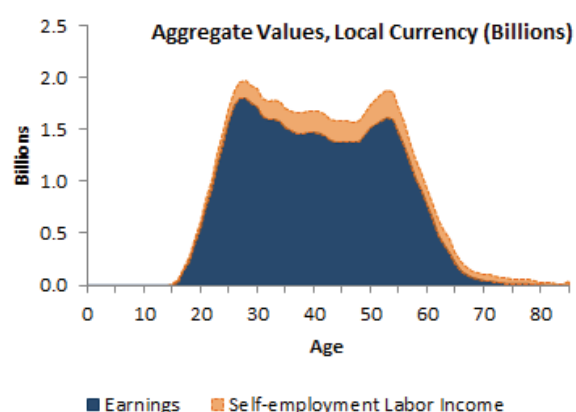
Thus, in the overall distribution, the per capita earnings reach their maximum at the age of 43 (Figure 20), due to relatively higher domestic wages for this age and more intense migration and consequently higher compensation of Moldovan employees abroad. At the same time, the aggregated age profile reflects the structure of population by age used for the calculations (Figure 21).

Figure 20. Per capita labor income, thousand MDL



Source: Authors' calculations.

Figure 21. Aggregated labor income, billion MDL



Source: Authors' calculations.

### 3.2. Public consumption

Public consumption in Moldova in the year 2014 was 20.4 billion MDL. The part of public consumption with clear age patterns such as education and health represents 64.3 percent and the rest supports general services like state institutions, police, defense, etc.

**Public education** represents the largest part of the public consumption accounting for 35.3 percent of public consumption. The share is relatively large and, indeed, a GDP share, Moldova spends relatively more than other countries for funding the public education system. In 2014, the share of Governmental expenditures on education in GDP was as high as 7.5 percent, while the average in EU was 4.95 percent and in OECD countries – 5.3 percent. This also results in relatively higher public consumption at the ages specific for school enrolment as compared with other countries for which NTA data are available.

The age profiles for public education were calculated in three steps, separately for men and women:

- Unit cost for each level of education were calculated by dividing public expenditures on education to number of students enrolled in public institutions at each level of education. The available data allowed for disaggregation by the following levels of education: pre-primary, general (gymnasium, lyceum, special schools, evening schools), vocational (technical schools), post-secondary education (“colegii”), higher education (university, MA and PhD) and post-university studies for medical students (separate financing is allocated to students in their 3-to-7 years internships after the graduation of the Medical University as part of “Rezidentiat” and “Secundariat” programs).
- Enrolment rates for each age were calculated. For a number of ages, the students might be enrolled in different level of education. For instance, at the age of 7 they might be enrolled in the last year of pre-primary education or the first year of general education. Those aged 17 years might be enrolled in general, vocational, post-secondary or tertiary education). Separate enrolment rates were calculated for these ages.
- Consumption of public expenditures per person was calculated by multiplying the unit cost with the enrolment rate. For the ages with simultaneous enrollment in several levels of education, the consumption of public education per capita for students of same ages enrolled in different levels of education was summed over.

The age profiles for public education consumption were not smoothed. There are several particular features visible on the pattern of age distribution of public expenditures on education (Figure 22) that have an explanation from the NTA perspective:

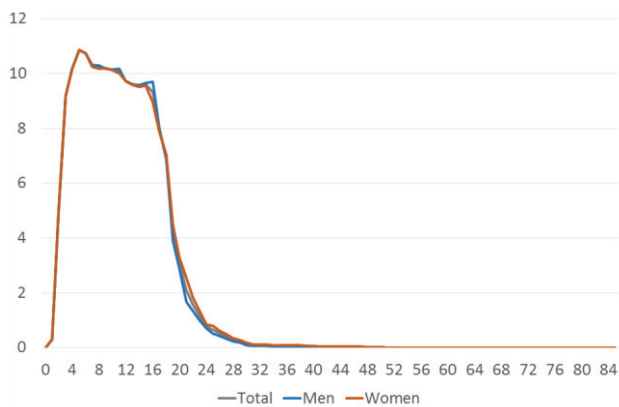
- In Moldova, the pre-primary education is guaranteed from the age of three years old (this coincides with ending of the partially paid parental leave period), but at the same time child-care facilities exist for kids aged starting 1 year old. In the governmental financial statistics, child-care facilities costs are considered educational expenditures as well. Therefore, the public consumption of education rises significantly at the age of three and decreases starting with the age of seven when children go to school and per capita expenditures are lower.
- Decreasing per capita education consumption at the age of 12 is partly a consequence of decreasing enrolment rate at this age (the average for the graduation of primary school). There might be an intuitive rather than a fact-based explanation for this decline in enrollment. This is related to Moldovan working migrants taking their families abroad for reunification. Our assumption is that some of the parents may be waiting for their children to graduate the primary school before taking children abroad.
- The per capita consumption of public education decreases rapidly after the age of 16 as the enrolment rates also decrease significantly. In fact, the enrolment rates start to fall at the age 16 already, but it is not reflected in the per capita consumption due to higher enrolment of students of age of 16, especially men, in one of the most expensive level of education – vocational education.

*Public consumption of health services* accounts for 5.9 billion MDL and represents 29 percent of total public consumption. For the allocation of public consumption of health services, we used the HBS and created separate profiles for men and women that were subsequently smoothed with SuperSmoother in R. The most appropriate variable that could be used is the probability of benefitting from the health-care services in the current month. We assumed that everybody gets services of the same value and we admit that this assumption might have caused a bias towards health expenditures for early ages. However, no other data in HBS could provide better estimates for public consumption of health, and administrative data on health age profile are not available either. The calculated public consumption profile that is proportional to the probability to receive health-care services was adjusted to the macro-control from the SNA. The data should be interpreted with precaution as there might be a bias due to the assumption that everybody receives health-care services of the same value.

One might derive two important facts from the pattern of per capita age distribution (Figure 23).

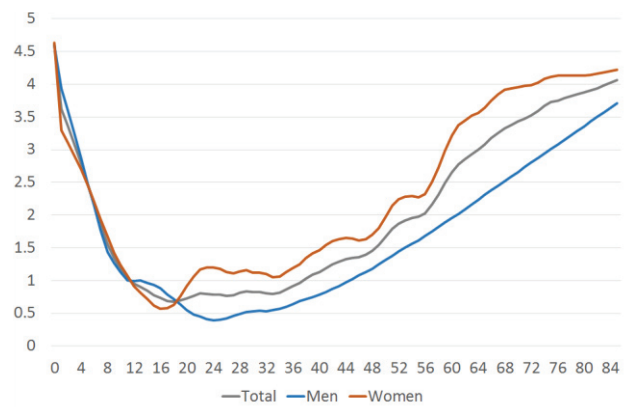
- There is a clear age pattern of the public health expenditures, with highest per capita levels characteristic for the first years of life. For the age 0, we used unsmoothed values in the series, as we admit higher public consumption at this age after the birth and also due to mandatory monthly check-ups until the age of 1. Also, family doctors have a high share of children as visiting patients due to multiple mandatory check-ups and medical certificates needed for kindergarten and schools.
- There are significant gender differences in the distribution of the public health expenditures related to maternity and birth from the of 19 to 33 years old. Further, at all other ages per capita expenditures are higher for women, probably determined more by their discipline in going to a doctor rather than by their poorer health status.

**Figure 22. Per capita age distribution of public consumption on education by gender, thousand MDL**



Source: Authors' calculations.

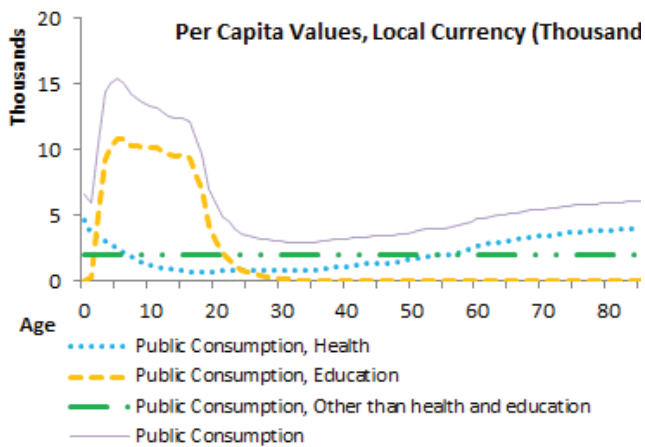
**Figure 23. Per capita age distribution of public consumption on health by gender, thousand MDL**



Source: Authors' calculations.

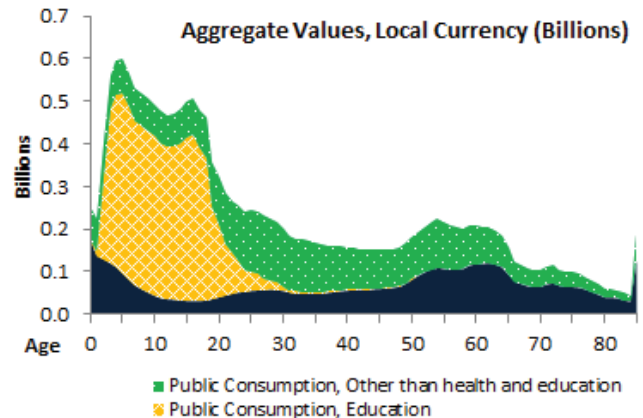
Other public consumption was allocated according to the NTA methodology equally over the entire population. The overall age distribution of public consumption is primarily driven by high educational expenditures of those up to 21 years old (Figure 24 and Figure 25). In the mid ages (people from 21 to 56 years old), other public consumption is the most important and after 56 years old the consumption of health-care services is dominant.

**Figure 24. Per capita age distribution of public consumption, thousand MDL**



Source: Authors' calculations.

**Figure 25. Aggregated age distribution of public consumption, billion MDL**



Source: Authors' calculations.

### 3.3. Private consumption

The households' private consumption plays an important role in the Moldovan economy. With a total amount of 86.4 billion Moldovan lei, the private consumption represents 81 percent of the total consumption in the NTA and roughly 77 percent of the country's GDP. The private consumption includes 1.6 billion MDL spent for education private consumption (1.4 percent of the GDP), 4.1 billion – health private consumption (3.7 percent) and 80.7 billion – other goods and services private consumption (71.9 percent).

Some remarks are necessary regarding the macro-control variables. The education consumption comes directly from the SNA (resource-use table). There is a difference with the HBS macro-variable estimate (which is only 0.5 billion MDL), but we cannot correct this due to missing information regarding additional costs incurred by households with education, such as uniforms, sport shoes, schoolbags etc. In case of the health, we have as macro-control the total private expenditures for health services and health-related goods, including medicines and medical equipment, as calculated based on the HBS. The SNA macro-variable refers to the final consumption of the output of the economic activity N called “Health care and social assistance”. Using directly the SNA macro-variable would result in both inclusion and exclusion errors. On the one hand, the SNA macro-variable includes the veterinary services and the social assistance services. On the other hand, the SNA macro-variable excludes the consumption of medicines and medical equipment (such as wheelchairs, hearing aids, glasses, etc.). The macro-variable for consumption of other goods and services is a residual, calculated as the SNA macro-variable of total consumption in households and not-for-profit institutions serving households after deduction of education and (HBS-adjusted) health expenditures.

The age profiles of the private consumption components are quite in line with the intuition (Figure 28 and Figure 29).

*Per capita education private consumption* reaches its maximum for the persons in their early 20s, which is explained by the large private expenditures for university tuition. The tuition fees are paid by students that were not able to successfully pass admission exams and to be enrolled within the number of scholarships paid by the public budget. The tuition fees range from 3000 MDL per year in case of pedagogical universities up to 20000 MDL per year in case of medical universities. In 2016, more than 10 thousand of those 17.6 thousand people graduating public universities paid for their university education. Also, the pattern differs slightly by gender and can be explained by higher enrolment in extra-curricular activities of girls in primary education and higher enrolment rates of women in universities (Figure 26). We have computed the private education age profile based on the HBS, using an approach similar to the age profiles of the public education consumption.

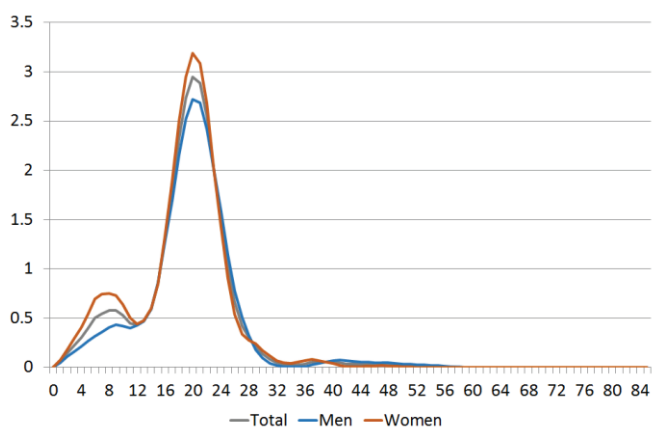
- We started by calculating education level-specific ‘unit costs’ for the subpopulation of households with only one enrolled member.
- The level-specific ‘unit costs’ were then used to normalize, adjust and allocate private education expenditures in the rest of the households.

This method has been used because the regression method recommended by the NTA manual gave too many statistically insignificant or negative coefficients. Also, despite the fact that the NTA methodology does not recommend smoothing in case of educational expenditures, we have applied the R-based smoothing tool, because for some ages there were too few observations in the HBS.

*The health age profile* begins with relatively high per capita expenditures in early life (around 1300 MDL for ages 0-1), it then reaches a minimum of 400 for the ages 14-15 and then grows almost linearly until 2000 MDL until the age of 63 years. It then declines slowly. As in the case of public consumption for health, there is an increase of private consumption of health for women in the reproductive age that persists further in life (Figure 27). Again, the HBS served as source of computing the age profile. One of the modules of the HBS collects data on the health status and health expenditures for each member of the household, including expenditures for formal and informal medical consultations and diagnostics, stationary treatment, dental treatment services, medicines, as well as cost of hospitalization services for the last 12 months. The age profile has been smoothed.

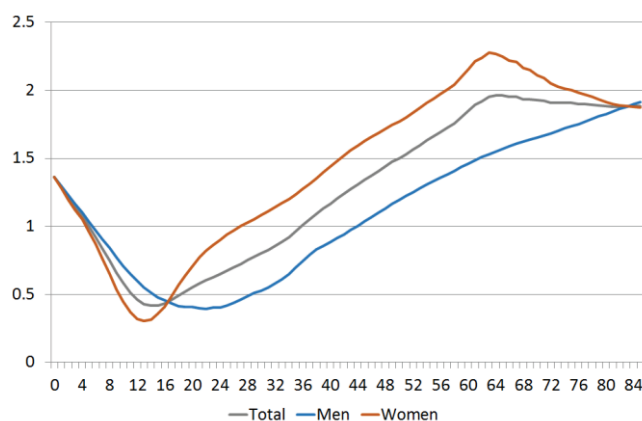


**Figure 26. Per capita age distribution of private consumption of education by gender, thousand MDL**



Source: Authors' calculations.

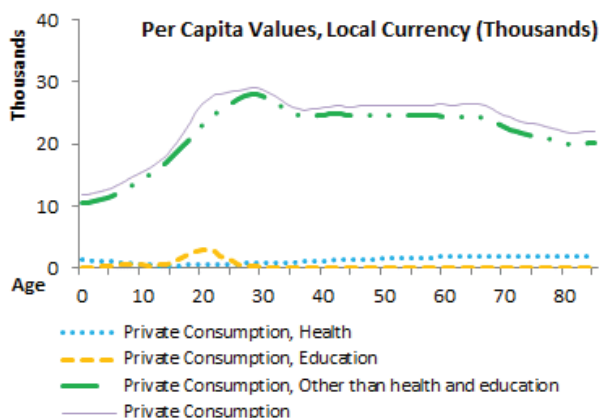
**Figure 27. Per capita age distribution of private consumption of health by gender, thousand MDL**



Source: Authors' calculations.

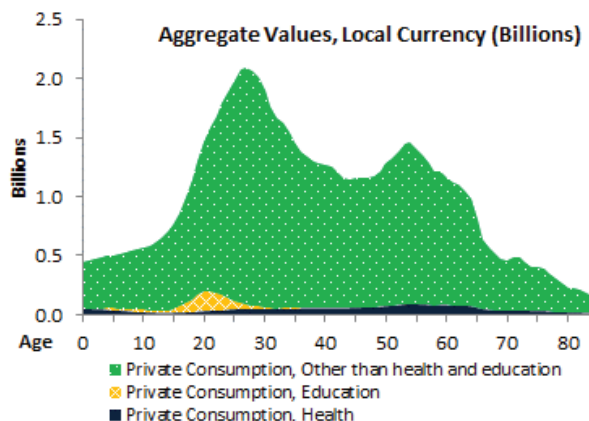
*The age profile for the private consumption of other goods and services* has been calculated using the 0-4-20 adjustment scale recommended by the NTA manual. Its per capita evolution is shown in Figure 28, which reflects a maximum per capital level reached by those in their late 20s – early 30s, a plateau for the cohort aged 36 - 67 years and a slow decline after. As expected, the aggregate private consumption age profiles displayed in the Figure 29 is very much resounding with the age structure of the population.

**Figure 28. Age profile of the private consumption and its components, per capita, thousand MDL**



Source: NTA Moldova

**Figure 29. Age profile of the private consumption and its components, aggregate values, billion MDL**



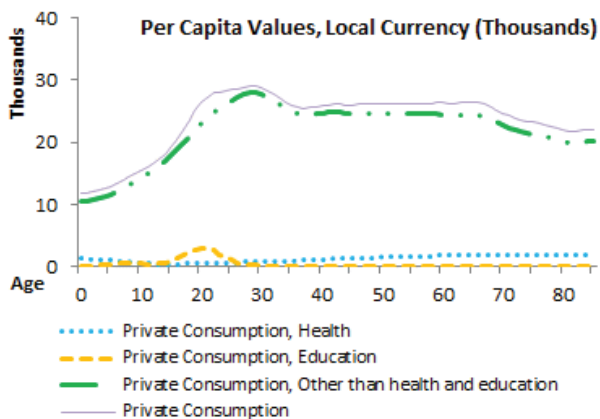
Source: NTA Moldova

### 3.4. Life-cycle deficit

The life-cycle deficit accounts for 36.4 billion MDL. What is particularly striking, is the fact that only the population between 34 - 56 years old have lifecycle surplus, meaning that only during 23 years in their life people earn more than they consume (Figure 30 and Figure 31). This is a much shorter period of surplus than in many countries. Also, the surplus created at these ages seems very low compared to magnitude of active live surpluses in other countries. The highest surplus is at the age 43, only of 6.299 thou MDL (0.191 USD at PPP normalized) per capita. This is determined by higher surplus for men at these ages that reach over 7 thou MDL between 40 -42 years old, while for female population the highest surplus is registered later in life, at 44-47 years old and reaches a maximum of 6.6 thou. MDL. At the same time, the highest deficit is at the age of 16 years, which is associated with high consumption of education services. While lifecycle deficit decreases significantly after this age for men, it has a later (starting at 18 years old)

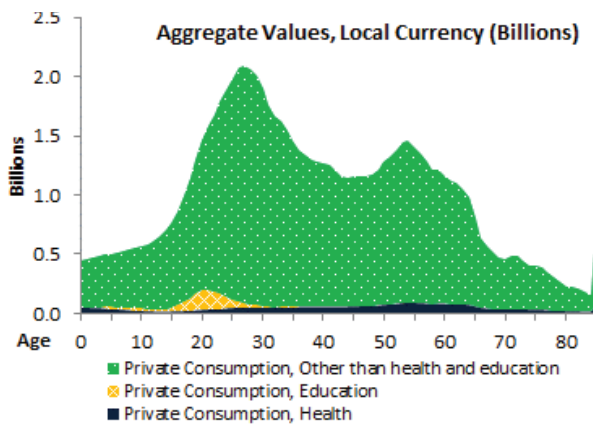
and slower decline for women, due to their higher enrolment in education and later entrance on the labor market associated with both enrolment and fertility period. Also, the aggregated life-cycle deficit, accumulated after the age of 56 is higher than the life-cycle surplus, indicating over the relatively long period of life during which people consume more than produce.

**Figure 30. Per capita age profile of consumption and labor income, thousand MDL**



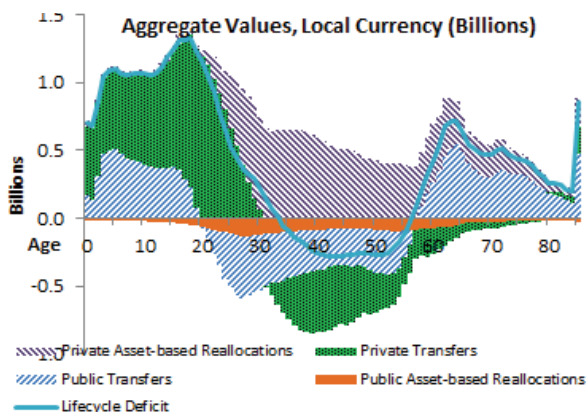
Source: NTA Moldova.

**Figure 31. Aggregated age profile of consumption and labor income, billion MDL**



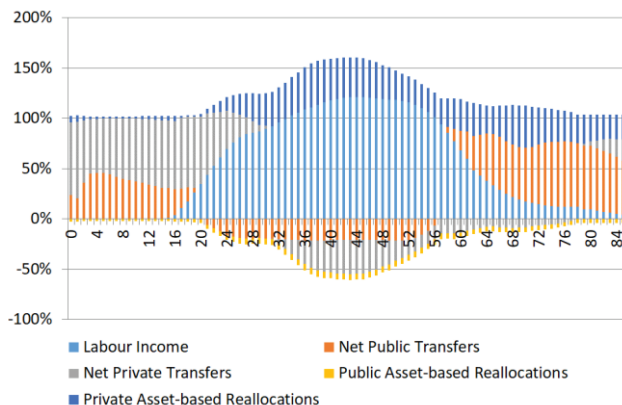
Source: NTA Moldova.

**Figure 32. Per capita age profile of life-cycle deficit, thousand MDL**



Source: NTA Moldova

**Figure 33. Aggregated age profile of life-cycle deficit, billion MDL**

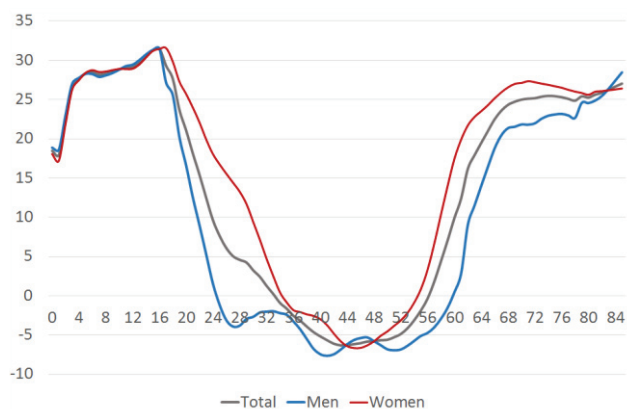


Source: NTA Moldova

Significant differences in the life-cycle deficit by gender are worthwhile mentioning (Figure 32 and Figure 33). Women accumulate surplus only between 35-54 years old, which is much shorter compared to the surplus accumulated by men at all ages. Men accumulate surplus over an almost twice longer period of time - between 25-59 years old and the surplus is much higher. Only between the ages of 44 to 48 years the surplus accumulated by women is marginally higher compared to the surplus accumulated by men.

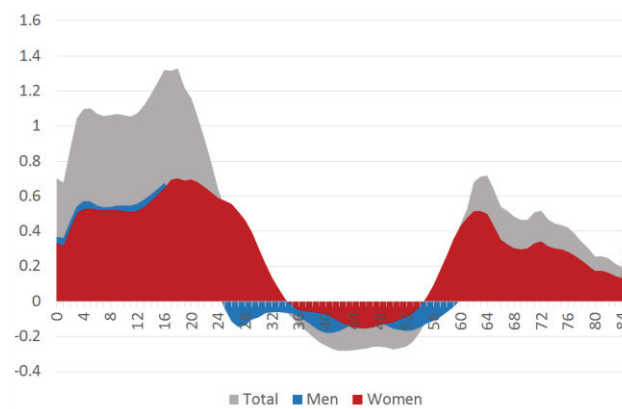
The life-cycle deficit is financed by public and private transfers and public and private asset-based reallocations, as analyzed further on in the Chapter 4 and Chapter 5. For the early ages, up to 20 years, the deficit is financed mainly by private transfers (68percent) and public transfers (31 percent). While a part of population aged from 22 to 32 years (when population starts accumulating surplus) is already on the labor market, there are still significant shortages financed by private transfers and asset-based reallocations. At later ages, after the life-cycle surplus ends, the deficit is financed mainly by public transfers and private asset-based reallocation (Figure 34 and Figure 35).

**Figure 34. Financing of life-cycle deficit by source, billion MDL**



Source: NTA Moldova

**Figure 35. Financing of consumption, percent of total deficit**



Source: NTA Moldova

## 4. Public age reallocations

Public reallocations consist of public transfers and public asset-based reallocations. Public transfers represent flows intermediated by the government and include taxes, social and health contributions as outflows and social benefits and public consumption as inflows.

### 4.1. Public transfers inflows

Public transfers inflows represent 37.8 billion MDL and consist of both in-kind and in-cash transfers. The in-kind transfer inflows follow the same age profile as public consumption in education, health, and other public consumption, as described in the previous chapter. Cash transfers are transfers in money form provided by the government, these could be divided in pensions, health-related transfers and other social protection benefits.

In case of education, in Moldova there are only in-kind transfers and the per capita age profile coincides with the profile of public consumption of education (Figure 24 and Figure 25).

In case of health transfer inflows, besides the significant in-kind transfers, we also considered the in-cash transfers to the population. They account for 397.2 million MDL (6.3 percent of total health transfer inflows) and include:

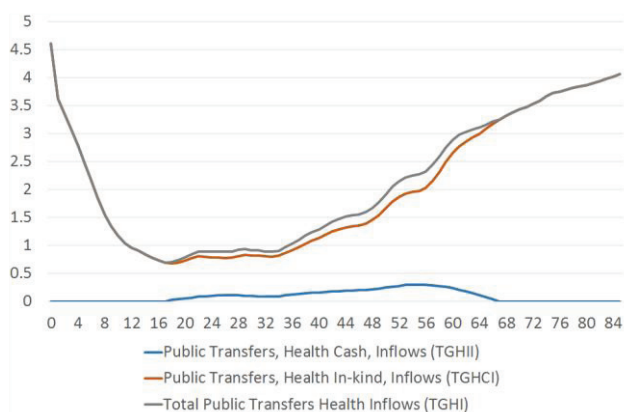
- Health-related transfers from State Social Insurance Budget in form of: 1) benefits for temporary work incapacity, 2) benefits for temporary work incapacity caused by work accident or professional sickness, 3) health recovery through balneal-therapeutic and rehabilitation treatment expenditures for insured persons, 4) compensation of expenditures for balneal-therapeutic treatment of veterans and
- Health-related transfers from the Republican and Local Funds for Social Protection of Population (mainly for purchase of personal medical devices and equipment, such as glasses, wheelchairs etc.).

The available data from HBS allowed under several assumptions to generate the age distribution only of benefits for temporary work incapacity. As these three benefits account for 78 percent of total in-cash health transfers we used them to construct the general age profile of the in-cash transfers for health that was adjusted to the macro-control.

Benefits for temporary work incapacity account for 309.9 million MDL. To estimate their age distribution, we have used the HBS data to count the average number of days spent by a person on sick leave during a year. As there is no other HBS variable that would directly indicate the number of days we made two assumptions: (i) employees who reported they were hospitalized were attributed the number of days of hospitalization as number of sick leave days; (ii) employed mothers with children under 7 years old were allocated five days of sick leave in case their children benefited of health-care services in the current month. The age of seven was selected because, according to the law, in 2014 parents could benefit of paid sick leave in case of sickness of their children up to this age. While both parents can opt for sick leave in case of child sickness, in Moldova it is still more common for mothers to stay on sick leave with children rather than for fathers. While the amount of paid sick leave varies with wage and employment period, we do not have sufficient information to take it into consideration and assumed equal pay. The series was smoothed with SuperSmoother in R.

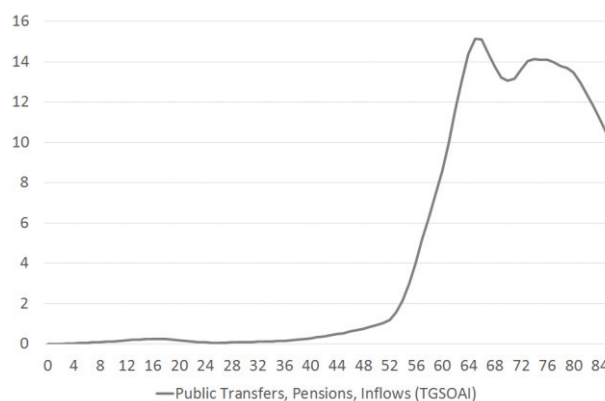
Based on the applied assumptions, there is a higher per capita in-cash transfers for women with younger children and an expected increase of cash transfers for all population before the retirement age. Therefore, the overall public health transfer inflows start to increase after the age of 33 and decline at the retirement age (Figure 36).

**Figure 36. Per capita age profile for public health transfers inflows, thousand MDL**



Source: NTA Moldova

**Figura 37. Profilul de vârstă per capita pentru influxuri de transferuri pentru pensii, mii lei**



Source: NTA Moldova

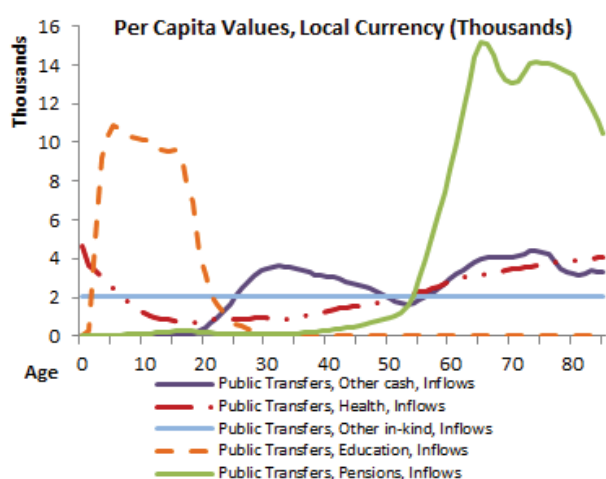
The most important part of public transfer inflows is represented by pensions. They account for 9.4 billion MDL and represent 24.8 percent of total public transfer inflows. In Moldova of the year 2014, the retirement age for women was 57 and for men 62, with multiple exceptions though. The recent reform of the pension system involves gradual increase of the retirement age starting with 2017 by 6 months yearly. Therefore, within the next couple of years the NTA results will not change dramatically due to the change in the retirement age. We used administrative data from the National Office for Social Insurance (NOSI) on pensions and additional support for pensioners to construct the age profile (Figure 37). A feature of the pensioners-related data raises questions regarding the overall quality of demographic data in Moldova. The number of people who, according to NOSI receive pensions, is smaller than the number of NBS reported population at the respective age. This is a striking divergence, because the entire population is entitled to receive at least a minimal social pension and would be reflected in the NOSI registers. While the average deviations are not very significant (up to 10%), the deviation for the ages of 69-70 (born in 1945-1946 after the WW2) is very high (30 / 40 percent). The ‘saddle’ corresponding to these ages in Figure 37 cannot be explained by migration or other factors and represent an issue that should be further examined. As this gap becomes more prominent in 2007 it might be linked to some data revisions after the 2004 census.

As for the other cash transfers that represent 7.6 billion MDL, we followed the NTA manual methodology and used the HBS data to allocate them to the household head. The following transfers available and included in HBS were accounted as other cash transfers: benefits for children, compensations and other social allocations. Most of other in-cash transfer target families with children and (28 to 40 years old) and pensionaries (after 60 years old).

However, in case of Moldovan social protection system, it would be also interesting to have a more nuanced approach of other public transfer cash inflows, namely based on the direct beneficiary of the transfer. This approach would look at the direct impact on the social protection system as there would not be some benefits if there are no beneficiaries (i.e. there would not be child-care benefits currently attributed to the household head if there are no children). While for the moment, additional data would be necessary to follow this approach, it might provide more accurate estimates for the burden on the social protection system. Therefore, it might be reasonable to conduct this alternative scenario for further improvement of Moldovan NTA and also for further reflection on the NTA methodology.

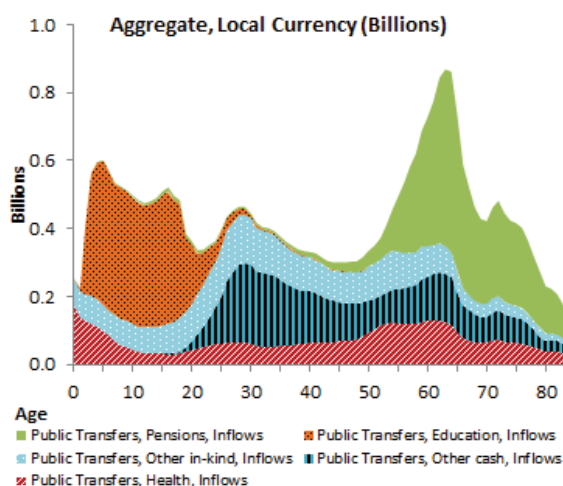
The total public transfers inflow is on increase until the age of 6 years, when the cost of public education per person reaches an inflexion point. It continued decreasing, with the lowest level attained for 24 years old (5.4 thou MDL per capita). After that age, the pattern changes, with the inflow increasing up until the age of 66 years when the highest per capita public transfers inflow of 24.4 thousand MDL is registered (Figure 38 and Figure 39).

**Figure 38. Per capita age profile of public transfers, inflows, thousand MDL**



Source: NTA Moldova

**Figure 39. Aggregated age profile of public transfers, inflows, thousand MDL**



Source: NTA Moldova

## 4.2. Public transfers outflows

Public transfer outflows are taxes paid to the government, including the mandatory social and health contributions (even though the latter are not treated as taxes in the Moldovan Tax Code). Public transfer outflows were allocated by the similar components of public transfer inflows. Depending on the source of financing, separate calculations were made to create the age profiles of public transfer outflows. As a first step the age profile of taxes, current grants and other income used for the financing of the education, health, pensions and other outflows was calculated. In this regard, we calculated the age profile for taxes, grants and incomes as described below:

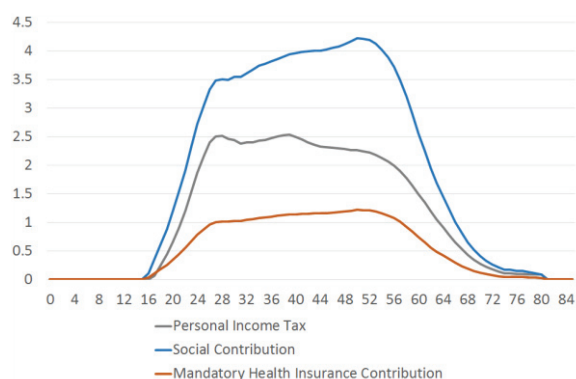
- **Mandatory social insurance contributions.** In Moldova, the social contribution represents 29 percent of gross wage (6 percent paid by employee + 23 percent paid by employer). We used the data from LFS and calculated the employee's contribution based on the net wage received by the employee. The age profile of the part paid by employer is proportional to the part paid by the employee. We smoothed the series with SuperSmoother in R and adjusted the age profiles to the macro-control of 8.4 billion MDL as reflected in the Governmental budgetary reports.
- **Mandatory health insurance contribution.** In 2014, the mandatory health insurance contribution was paid equally by the employee and employer on a rate of 4 percent of the gross wage each. We used the data from LFS and calculated the employee's contribution based on the net wage received by the employee. We smoothed the series with SuperSmoother in R and adjusted the age profiles to the macro-control of 2.4 billion MDL that we took from the public finance database.
- **Personal income tax (PIT)** was calculated based on LFS data. For employees, a formula was applied in order to calculate the personal income tax, given the net wage reported. In Moldova, there is a progressive taxation system, with personal exemption and additional exemption for family members who do not work. As we do not know how many persons are reported for the additional exemption and the exemption is very low we excluded these from the calculations. The generated

age profile was adjusted to the macro-control of 2.4 billion MDL taken from public finance data. • Profilul de vârstă pentru TVAa fost alocat proporțional consumului privat, altul decât educație și sănătate, și ajustat la macro-controlul de 12,6 miliarde lei preluat din datele finanțelor publice.

- **VAT** age profile was allocated proportional to private consumption, other than health and education and adjusted to the macro-control of 12.6 billion MDL from public finance data.
- **Excises** age profile was calculated using the HBS data. This budgetary revenue has a total of 3.6 billion MDL and has a relatively wide fiscal base, including fuel, jewelry, furs, alcoholic beverages, tobacco and many others. However, we have had only the HBS evidence on the consumption of alcoholic beverages and tobacco. We have redistributed the household consumption of alcoholic beverages and tobacco on those aged 16 years and above, using an equivalence scale 16-20 similar to the standard NTA scale for 0-4-20 years.
- **Custom duties** have a total of 1.4 billion MDL and we have computed the age profile using the data regarding individual consumption of goods (services excluded), that have been estimated using the same 0-4-20 equivalence scale applied to the household consumption of goods.
- **Property tax** has a relatively small macro-total of 346 million MDL. The age profile has been constructed using the HBS data on the cost of house as declared by the HBS respondents. The property tax has been assigned to the household heads based on the assumption that they are owners of the house.
- **Corporate income tax (CIT)** was allocated across age using the age profile of property tax adjusted to the macro-control of 2.4 billion MDL from public finance data.
- **Current grants.** We considered them to be allocated equally for all population and divided the 1.6 billion MDL amount of current (as opposed to capital) foreign grants to the number of population, so that every citizen is entitled to 0.45 thousand MDL.
- **Other revenues.** Other revenues of the public budget were also considered to be allocated equally across entire population and we divided the macro-control of 2.3 billion MDL amount to the number of population, so that every citizen is entitled to 0.6 thousand MDL. Other revenues include fines, penalties, fees paid for the use of public services and others.

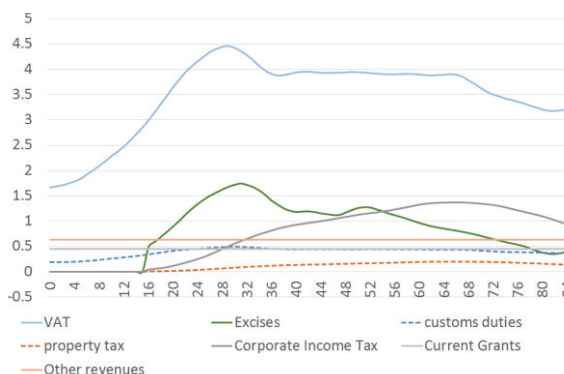
Social insurance and health insurance contributions were used solely for the purpose of calculation of public transfer outflow for pensions and health. Only employed people contribute and, therefore, the contribution starts at 15 years old. While the personal income tax and social and health contribution are calculated using the same LFS data, the age distribution of social contributions displays a slightly different pattern compared to income tax paid by individuals. This is explained by the progressive taxation system and a larger number of employees with a lower average wage at older ages compared to the younger employees (Figure 40). The age profile of PIT, VAT, custom duties, excises, property tax, CIT, current grants and other income was used to construct the general profile for the contributions to the public transfer outflows. Considering their sizes, the major contributions for the general profile are given by the VAT, excises and personal income tax (Figure 41).

**Figure 40. Per capita age profile PIT, social and health contributions, thousand MDL**



Source: NTA Moldova

**Figure 41. Per capita age profile for general purpose taxes, current grants and other revenues, thousand MDL**



Source: NTA Moldova

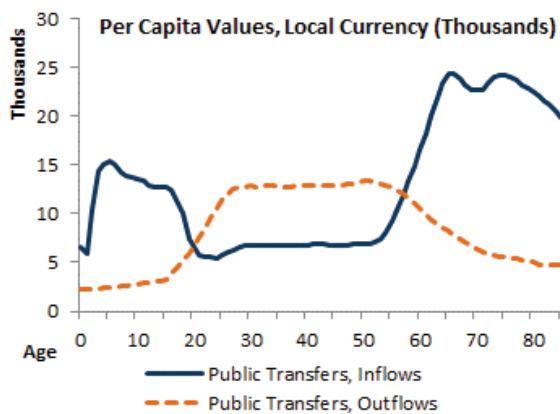
Based on the age distribution of social contributions, general purpose taxes, grants and other revenues, the age profile for the public outflows were created as revealed in Figure 42 and Figure 43.

- Public transfer outflows for education are financed entirely from general purpose budget and are equal to the public inflows of 7.2 billion MDL.
- Public transfer outflows for health were financed in proportion of 338.3 percent by mandatory health insurance contributions and the rest by transfers from state budget and payments from Social Insurance Budget. The part financed from the medical insurance budget administered by the National Company for Medical Insurance (NCMI) corresponds to the in-cash health transfer inflows. At the same time, the NCMI budget also comprises transfers from the state budget due to the persisting deficit. Therefore, we constructed the age profile by summing up the age profile of the mandatory health insurance contribution with age profile of general purpose taxes, current grants and other revenues for the amount financed from the state budget.
- Transfer outflows for pensions were financed in proportion of 89.2 percent by social contributions and the rest by transfers from the state budget (i.e. general tax profiles, current grants and other income) and therefore follow closely the age distribution of social contributions. They represent the highest public outflows of 9.4 billion MDL. We constructed the age profile by summing up the age profile of the social insurance contribution with age profile of general purpose taxes, current grants and other revenues for the amount financed from the state budget.
- Other in-kind and in-cash transfer outflows are financed from the general budget and therefore follow the age profile of general purpose taxes, current grants and other income.

Thus, the most important public transfer outflows are generated by the working age population of 28 to 55 years old explained by the relatively high consumption levels of those younger and the relatively high social contributions paid at later ages.

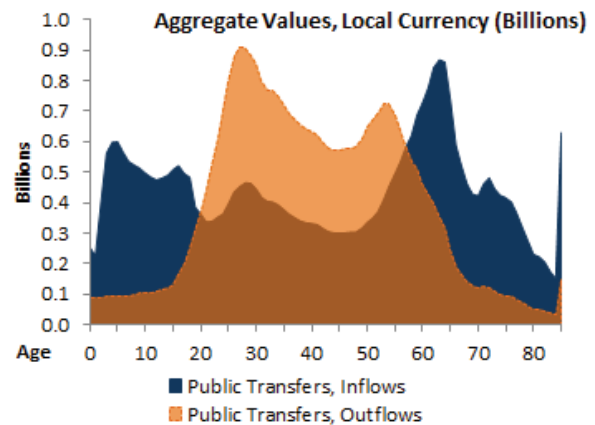


**Figure 42. Per capita age profile of public transfers, inflow and outflow, thousand MDL**



Source: NTA Moldova

**Figure 43. Aggregated age profile of public transfers, outflow, billion MDL**

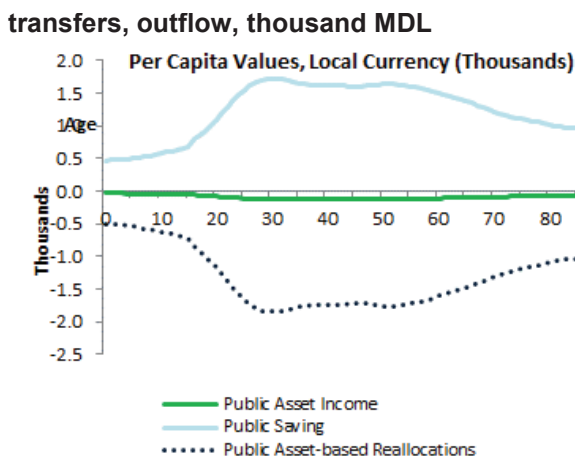


Source: NTA Moldova

### 4.3 Public asset-based reallocations

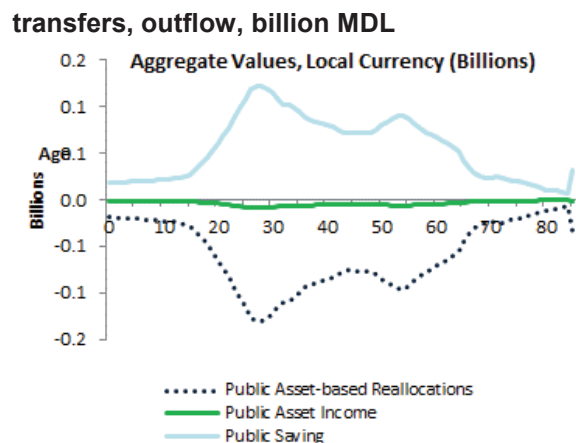
Public asset income represents net capital income transfers to the Government from other institutions, including rest of the world (ROW) and accounts for a negative macro-total of -337.6 million MDL. Public savings as reported by the SNA equaled 4.7 billion MDL. According to the NTA methodology, the age profiles of public asset income and public savings are equal to the pattern of general taxes. They show an increase for the first 30 years of life, followed by a more stable period until the age of 53 and a decrease afterwards (Figure 44 and Figure 45).

**Figure 44. Per capita age profile of public transfers, outflow, thousand MDL**



Source: NTA Moldova

**Figure 45. Aggregated age profile of public transfers, outflow, billion MDL**



Source: NTA Moldova

## 5. Private age reallocations

Private transfers are composed of inter-household flows between households or between households and the rest of the world and intra-household transfers, flows between members living in the same household. On the aggregate, the private transfers in Moldova NTA are twice larger than the public transfers. As shown in the Chapter 3, their importance is crucial in funding the lifecycle deficit of those aged below 30 and are slightly less important for older generations (Figure 46).

### 5.1. Inter-household transfers

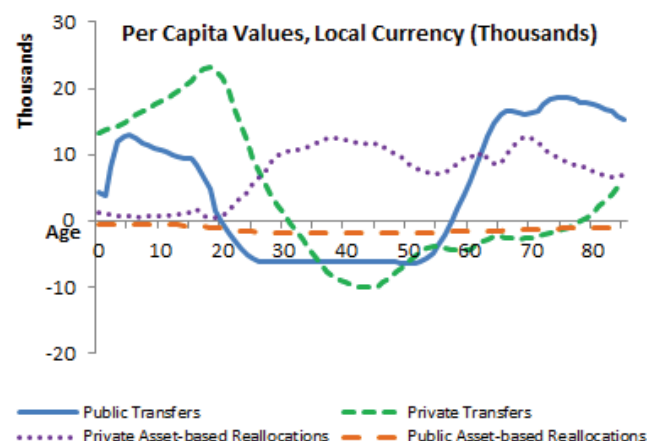
Inter-household transfers play a particularly important role in the inter-generational economy in the Republic of Moldova. There are many possible forms that such transfers can take, including remittances from family members working abroad in long-term (more than 12 months), gifts, alimonies, support to students not leaving permanently in the household, etc.

For the Moldovan NTA we have estimated some outflows, based on the data coming from the HBS, with a total value of approximately 1.2 billion MDL. Among other destinations, the outflow reflects the fact that many households in Moldova provide in-kind or material support to their relatives abroad, especially on the occasion of traditional religious holidays highly respected by Moldovan families, such as Easter or Christmas.

However, for the inter-household inflows we only had the data to estimate age profiles of the transfers made by the Moldovan migrants working permanently abroad. We had almost no detail regarding gifts, alimonies and other inflows. The migrants' transfers are dominant though, as the SNA for 2014 reflects a domestic inflow of almost 13 billion MDL as personal transfers.

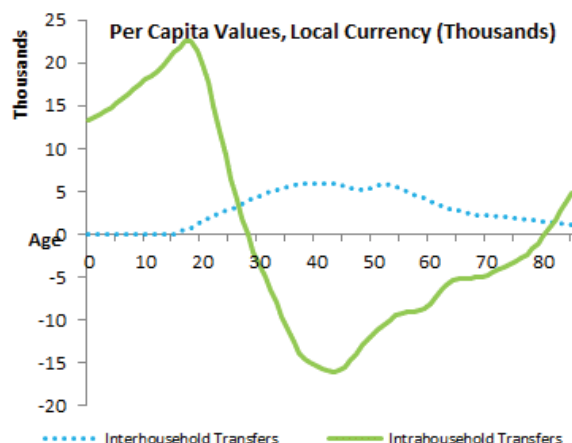
In the HBS the remittances are declared at the household level. We have estimated the transfers from ROW as the residual remaining after deducting the migrant workers labor compensation from the declared total remittances. According to the NTA methodology, the inter-household inflows are imputed as household heads' revenues. The age pattern has been smoothed. As displayed in the Figure 47, the per capita inter-household inflows follow a rather steady growth from the age of 16 up until the segment of persons aged 35 to 55 when the highest levels of interhousehold transfers is reached and then the profile slowly declines.

**Figure 46. Age profile of public and private transfers and asset-based reallocations, per capita**



Source: NTA Moldova

**Figure 47. Age profile of the private inter-household and intra-household transfers, per capita**



Source: NTA Moldova

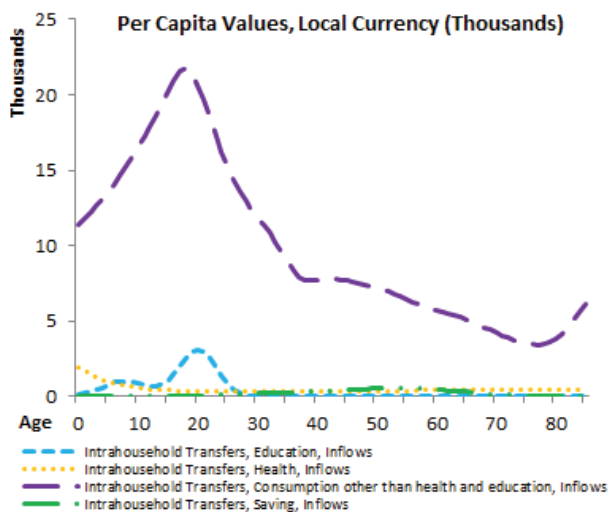
## 5.2. Intra-household transfers

As inferred from the Figure 47, in case of Moldova, the intra-household transfers represent a very important way of redistributing resources among generations. The intra-household transfers have been allocated following the NTA methodology.

- Firstly, individual level income and expenditures have been used to estimate the surplus/deficits for each household member.
- Then, following the NTA algorithm, a part of the income has been rechanneled from household members with surplus to those with deficit. As shown in the Figure 47, the intra-household transfers are positive for the younger generations, which is line with our expectations. However, inflows to the older generations are smaller.

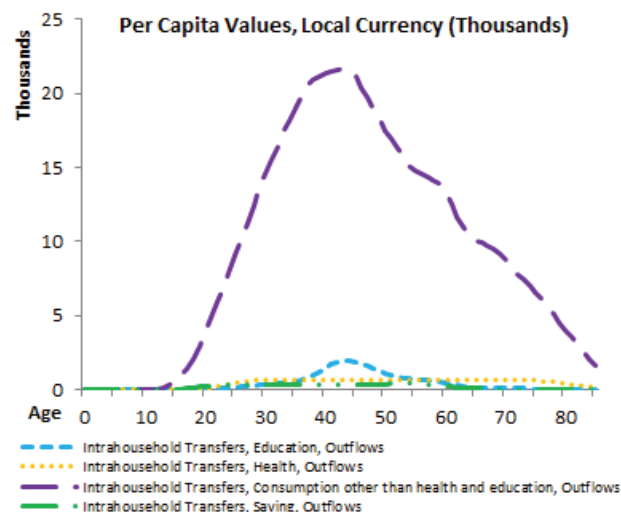
Again, in line with the expectation, the intra-household inflows and outflows related to consumption of other goods and services dominate the picture. In both per capita and aggregate terms, those in the segment of 15-24 years are the main recipients (Figure 48), while the individuals around 40 years are the main source of funds (Figure 49). Education-related transfers are also important, with the same recipient and sending ages as above. The deficit of funds at early ages is explained by the high private costs incurred by households for education, especially related to entrance in primary school, but more so related to university tuition costs. The intra-household health and savings transfers do not display sharp elbows as in case of transfers for education and for other goods and services.

**Figure 48. Age profile of intra-household inflows by use, per capita, thousand MDL**



Source: NTA Moldova

**Figure 49. Age profile of intra-household outflows by destination, per capita, thousand MDL**



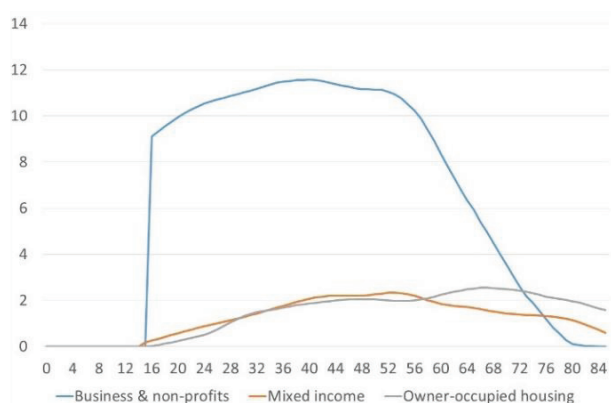
Source: NTA Moldova

## 5.3. Private capital income

The private capital income includes three key components: capital income from businesses and non-profit organizations (33.6 billion MDL), mixed income attributable to capital (4.6 billion MDL) and imputed income from owner-occupied housing (5.5 billion MDL). The age profile of the owned dwelling price was used to generate the profile of the capital income from businesses and non-profit organizations. We admit that this is a gross approximation, however, we did not have better options, considering the scarcity of information regarding asset-related and entrepreneurship-related income in the Moldovan HBS.

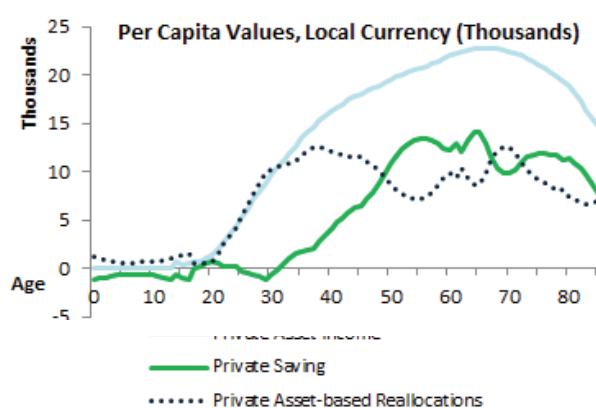
The age profile of the mixed income attributable to capital is identical with the age profile of the mixed income attributed to labor. The age profile of the imputed income from owner-occupied housing has been determined based on the HBS 2014 evidence: in the questionnaire, the respondents were asked to answer how much they would pay to rent the housing if they would not own it. The flows have been attributed to household heads which are defined in the survey. The Figure 50 displays the per capita age patterns of the capital incomes.

**Figure 50. Age profile of the private capital income, per capita, thousand MDL**



Source: NTA Moldova

**Figure 51. Age profile of the private asset-based reallocations, per capita, thousand MDL**



Source: NTA Moldova

## 5.4. Private property income

The private sector net property income against the ROW is negative, around -2.1 billion MDL, a figure which comes from the SNA. It is composed of payments of interests, royalties, rents and dividends. The negative figure is obvious considering the high private debt that Moldovan private sectors owns to the rest of the world, and the high volume of FDI in the Moldovan economy, which results in payment of dividends to the residents abroad. The age profile has been calculated using the HBS 2014 evidence on the income gained from property.

## 5.5. Private savings

Private savings are calculated as residual in the Moldova NTA, after all other age profiles have been defined and estimated. As shown in the Figure 51, the private savings for the early ages are not strictly equal to zero, as the NTA methodology requires. However, considering the scarcity of data and the difficulty to make good corrections while multiple variables are missing simultaneously, we believe that private savings that we obtained still serve as a good reflection of the social and economic realities of Moldova. The savings appear for the first time at ages 17 and remain positive until the age of 24. The positive savings at younger ages are fully explained by the important amounts of intra-household transfers funded by long-term migrants' transfers, as well as by the relatively early entrance of Moldovan youth in the cohort of economically active population. An important part of the economically active youth is nonetheless employed in other countries as temporary or seasonal workers, with Russian construction sector attracting the biggest number of low-skilled young workers. At 25 savings turn negative again and remain so until 32-33, which to some extent correlates with the more 'costly' part of life, when most of the persons have their children born and the children are in their early childhood. This is usually accompanied by higher volumes of expenditures for children food, clothes, early education and health protection. For women, this part of life also may involve staying home with the children and thus receiving smaller or nil income from labor. The savings reach a plateau for the ages of 55-65 and then start gradually descending.

## 6. Special issue: analysis on the Moldova's demographic dividends

As revealed in chapter 3 of this report, Moldova registers a striking life-cycle deficit, being larger and longer compared to most countries in the region. This is due both to economic factors (e.g. outmigration, low participation rate of the working age population, low productivity and wages) and demographic factors (e.g. population aging). Taking into account that Moldova passes through an ongoing demographic transition (chapter 2), due to declining fertility rate and population aging, the current life-cycle deficit could either precede or follow the demographic dividends. In the first case, the deficit would gradually moderate over time, easing the pressures on the economy and system of public finances, and could even generate opportunities for economic growth. In the second case, the life-cycle deficit would pose increasing constraints on the economy and state budget, especially on the social assistance and insurance programs, with the potential to undermine the economic growth. Hence, the government has to understand the peculiarities and implications of the demographic transition for the economy, by taking full advantage of demographic dividends in a timely manner.

### 6.1 About the first and second demographic dividend

In order to understand better the implications of the life-cycle deficit and demographic changes, it is necessary to estimate the demographic dividend of the country. The dividend measures the effect of changes in the population age structure on per capita income growth. In this chapter, we will estimate two demographic dividends:

- i. First demographic dividend* analyses the growth rates of effective number of producers (the population that participates on the labor market and earns labor income) and effective number of consumers (the population that consumes private and public goods and services, mainly education and health). It can generate positive impact on economic growth during the demographic transition in which the fertility rate falls, leading to fewer dependent children and, hence, higher ratio between producers and consumers. As a result, the country generates more resources that could be invested for economic and social purposes. Other things being equal, under such circumstances, the income per capita will grow faster (Mason and Lee, 2007). The tricky part about this form of demographic dividend is that it is temporary and, if not explored through proper public policies, can turn into a negative demographic dividend, with persistent negative impact on the economic growth. It can happen in the moment when the cohorts of population born during periods of declining fertility rates enter the labor force, while cohorts from working ages start entering the pension ages. It leads to declining ratio between producers and consumers, as the rate of growth of people generating income slows down or even turns negative, being exceeded by the growth rate of the number of consumers. Hence, unless the government manages to increase the employment rate before the first demographic dividend fades away, the demographic change transforms gradually from economic opportunity into economic burden, with pressures on the economic growth and public finances.
- ii. Second demographic dividend.* The population aging does not necessarily imply negative effects on the economy. If accompanied by increasing savings and capital accumulation, it can generate a strong wealth effect on the economy. Thus, in order to smooth their consumption after entering the pension age, the population starts investing in assets (e.g. personal savings, housing, funded pensions). It forms an important pool of resources that can be channeled into productive investments and economic growth. Hence, in order to get this dividend materialized, there have to be proper conditions for savings and investments (e.g. stability, predictability, property rights protection, rule of law) and a financial sector that is robust and credible enough in order to attract the savings from the population and efficient in order to facilitate a smooth financial intermediation (channeling the population's savings into investments).

## 6.2 Methodology

We started the estimation of the first demographic dividend by computing the support ratio, which is the indicator describing the relation between the people who are supporting the economy by generating incomes and the consumption needs of the population. It is the best proxy indicator for the demographic dividend, as a raising support ratio suggests an increase in the share of population that is generating income that is used to support the consumption and economic growth.

So, the support ratio (SR) represents the ratio between effective producers and consumers. There are several variations of the SR, depending on the way how we compute the effective producers and effective consumers:

- 1. Demographic support ratio.** The most straightforward way is to assume that the number of producers equals the number of people aged 20-64, assuming that all age groups are equally productive and have the same consumption needs. In this setting, the number of consumers equals the total number of the population.

$$P1(t) = \sum_{a=20}^{64} N(a,t) \quad C1(t) = \sum_{a=0}^{\varphi} N(a,t)$$

where:

- $N(a,t)$  - the number of people in age group  $a$  at time  $t$
- $\varphi$  - maximum length of life
- $P1$  - number of producers
- $C1$  - number of consumers.

The demographic support ratio will be computed as follows:

$$SR1(t) = \frac{P1(t)}{C1(t)}$$

- 2. NTA support ratio.** The second approach is to compute the SR based on the effective number of producers and consumers estimated based on NTA age profiles of consumption and labor income:

$$P2(t) = \sum_{a=0}^{\varphi} \gamma(a) N(a,t)$$

$$C2(t) = \sum_{a=0}^{\varphi} \delta(a) N(a,t)$$

where:

- $\gamma(a)$  - age specific time-invariant vector of labour income per capita estimated within the NTA database for 2014
- $\delta(a)$  - age specific time-invariant vector of consumption per capita estimated within the NTA database for 2014
- $N(a,t)$  - the number of people in age group  $a$  at time  $t$
- $\varphi$  - maximum length of life
- $P1$  - effective number of producers
- $C1$  - effective number of consumers.

The NTA support ratio will be computed as follows:

$$SR2(t) = \frac{P2(t)}{C2(t)}$$

Having estimated the support ratio, we proceed to the estimation of the first demographic dividend. It is equal to the annual growth rate of the effective number of producers minus effective number of consumers. We chose the second approach for estimation of the effective numbers of producers and consumers because it reflects the age specific patterns of consumption and labor income. Thus, if the growth rate of effective producers is higher than the growth rate of the effective number of consumers, the first demographic dividend is positive and leads to higher income per capita and economic growth (and vice-versa).

If for calculation of the first demographic dividend we focused on the consumption and production components of the life-cycle deficit, the second demographic dividend is analyzed based on the financing sources of the LCD (reallocations). We focused on four key components of reallocations: public and private transfers, and public and private asset-based reallocations.

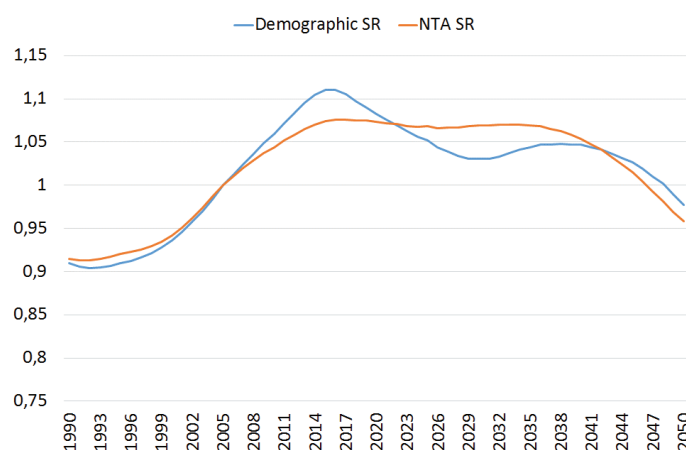
In order to estimate both demographic dividends, the NTA values were aggregated into five-year age groups, converted in per capita terms and normalized using the arithmetic average labor income for 30-49 age groups. In order to obtain the projected NTA values until 2050, the per capita values estimated for 2014 within the NTA database were extrapolated using the demographic projections for the World Bank. In that case, we assumed that labor income and consumption patterns specific to the five-year age groups remain constant over time.

### 6.3 Estimation results: support ratio

The evolution of the support ratio confirm that Moldova is passing through an important demographic transition, which will last at least until 2050. It consists of declining fertility rate and population aging, accompanied by migration of working age population.

Both demographic and NTA support ratios reveal an increase in the share of producers in total consumers from the first years of independence of Moldova until 2016. This is due to the decline in fertility rate and, as a result, the decline in dependent children. As official statistical data suggest, starting with 2017, the ratio deteriorates as the post-World War II (WWII) baby boomers enter the pension age and, hence, a massive cohort of population turns from effective producers into net consumers. According to our projections, the ratio will stabilize and even improve during 2030-2040, after the cohort of WWII baby boomers' pensioners is replaced by smaller cohorts, while the baby boomers of mid-1980s remain in working age. However, after 2040, when these cohorts reach the pension age, the support ratio starts to deteriorate again. As the cohort of baby-boomers of mid-1980s is bigger than the cohort of baby-boomers after the WWII, the decline in support ratio that time will be steeper than the decline of 2017-2030.

**Figura 52. Două tipuri de rată de dependență (față de anul 2000)**



Sursa: Estimările autorilor

The difference in demographic and NTA support ratios cannot remain unnoticed. In fact, these gaps reveal a series of economic issues and suggest policy implications for mitigating the negative impact of deterioration of SR. The steeper growth of demographic SR compared to that of the NTA SR during 2005-2016 is explained by the low labor participation rate of the working age population. As a result, the growth in the share of working age population in total population was not accompanied by a similar growth in the share of people that generate income and provide the necessary resources for covering the consumption of the entire population. This is a structural problem of the Moldovan economy, revealing limited economic and employment opportunities and strong incentives for the working age population to migrate.

As a result, we can conclude that Moldova did not manage to explore in full the opportunities generated by the raising demographic SR until 2016. Particularly, the country did not generate enough economic opportunities for the cohorts of baby boomers of 1980s that could increase the ratio of producers and generate more resources to be invested for social and economic purposes - a window of demographic opportunity that could be missed soon, given the fact that starting from 2017 the SR started to deteriorate. At the same time, the projected decline in the NTA SR during 2017-2030 is much smoother compared to that of the demographic SR. It is due to the fact that the demographic aging is accompanied by moving of cohorts of baby-boomers of 1980s into upper ages with higher labor income. Hence, supporting the productivity and, thus, income growth, of the population, both young and upper-ages, is instrumental for mitigating the burden generated by demographic aging.

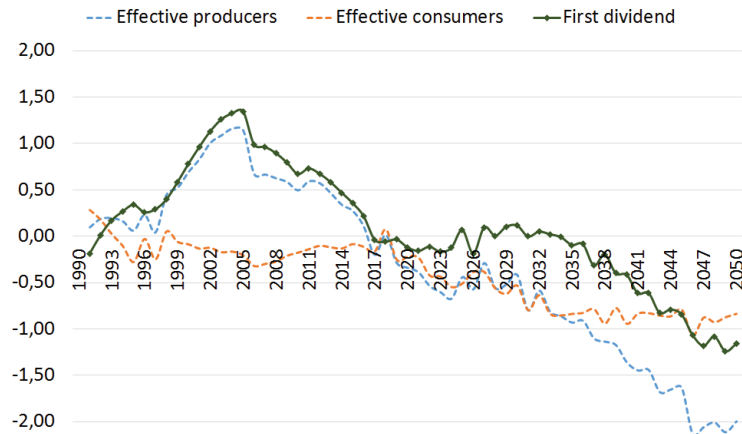
## 6.4 Estimation results: first and second demographic dividends

The estimations about the historical and projected support ratio brought a negative and a positive news at the same time:

- The negative news is that Moldova could lose the opportunity to explore the first positive demographic dividend: 2017 marks the period when the demographic dividend turns negative, meaning that the demographic transition net implications for the economic growth are rather negative. During 1992-2005, Moldova enjoyed a positive and growing demographic dividend, as the number of effective producers (people who generate value added, income and economic growth) grew faster than the number of effective consumers (people who consume public and private goods and services on the account of resources generated by effective producers). During 2006-2017 the demographic dividend declined due to declining growth rate of effective producers, but remained positive as the growth rate of effective consumers remained lower (even negative). Starting from 2017, at least, until 2050 (horizon for our projections), the growth rate of effective producers will be negative and, in most part of this period will be outpaced by the growth rate of effective consumers. As a result, without proper policies that would boost productivity and incomes of the working age population, especially of young people, the first demographic dividend during the next decades is expected to be negative, implying costs for the economy and pressures on the system of public finances due to rising consumption needs amid tightening income base.



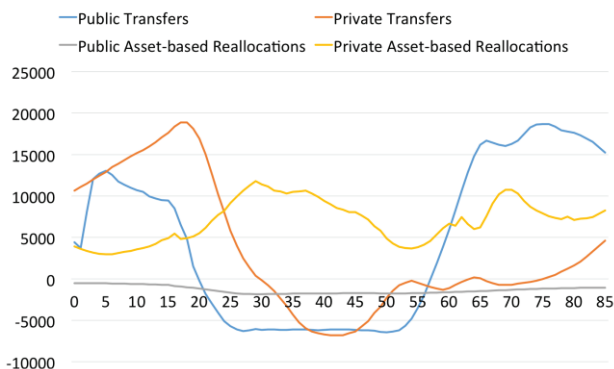
**Figure 53. Growth rate of effective producers (%), effective consumers (%) and the difference between both rates (p.p.) (first demographic dividend)**



Source: NTA Moldova

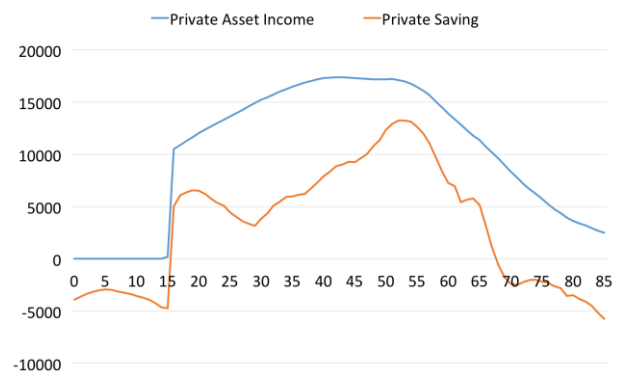
- **The positive news** suggested by the SR dynamics is that Moldova has a chance to explore the remaining benefits of the first demographic dividend that will offer the opportunity to explore the second demographic dividend as well. There are at least two important signs revealing the potential for the second demographic dividend:
  - i. The prolonged period (20 years) of growing gap between the NTA and demographic SRs during 2022-2042. It suggests that in the next years Moldova will witness a growth in age profiles of effective producers, which in long run may reach higher productivity and wages. Hence, the repercussion of the decline in demographic SR will be mitigated by the increase in income per effective producer.
  - ii. People from higher age groups tend to smooth their life-cycle deficit by means of private asset-based reallocations, mainly private capital income and private savings. As shown by figures 54 and 55, right before reaching the pension age, this is the main source of financing the LCD. It points to the fact that the approaching pension age creates incentives for the population to save more in order to smooth consumption during the pension period. This incentive is especially strong in Moldova given the weak public pension system, consisting of low pensions (the average pension covers only two thirds of the living subsistence level) and low confidence in the sustainability of the pensions' system. Hence, the patterns of financing the LCD show that the population aging, before turning into a net cost for the economy, can lead to higher inflows of savings that can be used for economic and social projects (e.g. investments in infrastructure, social assistance, transfers into the education and health systems).

**Figure 54. Distribution of reallocations by ages, 2014, MDL per capita**



Source: NTA Moldova

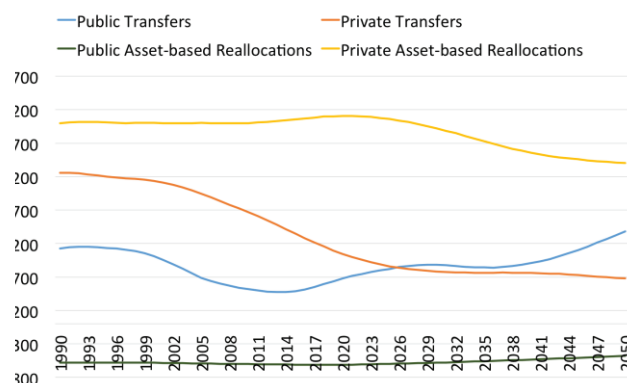
**Figure 55. Distribution of main types of private asset-based reallocations, 2014, MDL per capita**



Source: NTA Moldova

The Figure 56 reveals the potential for a strong positive second demographic dividend for Moldova. Thus, the private asset-based reallocations (primarily, capital income and savings), represent, traditionally, the main financing source for the life-cycle deficit. Although the public transfers started growing in 2015 and this upward trend will persist throughout the forecasted time span due to growing number of pensioners and pension liabilities, there still will be the possibility for Moldova to explore the second demographic dividend. Given the fact that the gap between the private asset-based reallocations and public transfers is forecasted to shrink continuously throughout the projected time span, it is important that the government does not lose the momentum in exploring the benefits of the second demographic dividend.

**Figure 56. Projected main types of reallocations, MDL/capita (scaled by the average labour income of the age groups 30-49)**



Source: NTA Moldova

## 6.5 Policy implications

Demographic transition and population aging can bring both risks and opportunities for economic growth. In this regard, taking stock of demographic dividends is instrumental.

The analysis of demographic and NTA SRs suggest that, without proper policies, Moldova is going to miss the demographic window of opportunity provided by the raising share of working age population and income earners. In 2017, the growth in support ratio turned negative, due to the decline in the number of effective producers, with a faster rate than the decline in the number of effective consumers. It involves costs for the economic growth because of declining ratio between the people that generate value added and revenues for the economy and consumers of public and private goods and services. If this phenomenon is not mitigated, the imbalances of the Moldovan economy will continue to grow (primarily, the current account deficit and budgetary deficit), depriving the country from human and productive capital and undermining the long-term development. At the same time, in case the right policies are implemented that would explore the first dividend, the costs of demographic transition will turn into benefits, which will be amplified by the exploration of the second dividend expected for the upcoming years.

## 7. Conclusions and implications

Moldova fares a high life-cycle deficit compared to other NTA countries. Only the population aged from 34 to 56 years has lifecycle surplus. This means that only during 23 years of life people earn more than they consume. A number of significant gender differences in the life-cycle deficit are worthwhile mentioning. Women accumulate surplus only between 35-54 years old, and is lower compared to the surpluses accumulated by men at all ages. Men accumulate surpluses almost twice longer - between 25-59 years old.

For early ages, up to 20 years old, the lifecycle deficit is financed mainly by private transfers (69 percent) and public transfers (31 percent). For these younger cohorts, the high levels of consumption of public and private education are key in determining the deficit. Compared to the majority other countries in the NTA project, Moldova spends a very large proportion of the public and private resources for funding education. The inter-household transfers are the key inter-generational inflow supporting the younger generations. At later ages in life, after the life-cycle surplus ends, the deficit is financed mainly by public transfers and private asset-based reallocation. Public pensions and dis-savings are the main sources used to finance deficits of the older generations.

The state has a relatively high presence in the Moldovan economy, both as provider of public services and as redistributor of incomes. Significant shares of the GDP are redistributed as part of the age-related public programs: the social protection program costs around 13 percent of the GDP, the education program, which is 7 percent of the GDP and the health program, which is slightly more than 5 percent of the GDP. All these figures are quite high in an international comparison.

The report has not been conceived to be an analytical one, therefore it would be an overstretch to advance far-reaching policy conclusions on how to redress potential imbalances in the Moldova inter-generational economy. Nonetheless, at least some broad conclusions may be warranted.

Particularly, taking into account the demographic transition and the estimations about the first and second demographic dividends, the policies should focus on two key priorities: (i) minimizing the risks and maximizing the benefits of the first dividend, and (ii) maximizing the opportunities of the second dividend. While the first type of policies should aim at unleashing the potential of young people through the realization of their rights and dignity, the second type of policies go beyond human capital by addressing aspects related to financial sector development, governance and business climate. Both streams complement each other and form the necessary policy mix for harnessing the demographic dividend.

Key policies aimed at minimizing the risks and maximizing the benefits of the first dividend:

- ***Unleashing the potential of young population.*** The Government should create the necessary conditions to implement effectively the human-rights based approach to public policies and budgeting. This is especially related to facilitating the access of children and youth from vulnerable groups to education and health services, as well as to social inclusion programs. The population, especially children and youth, by no means should be left apart by public policies. Therefore, the Government has to undertake full commitment to ensure that its policies and budgeting will be based on the principle of no one left behind. It should be complemented by the next intervention:
- ***Expanding the access of youth, especially from vulnerable groups, to economic opportunities.*** It implies two streams of policies: (i) stimulating the youth employment, and (ii) stimulating youth entrepreneurship. The first stream should consist of strengthening incentives to employers to invest in the training/retraining of the young labor force, institutionalize a zero-tolerance policy to any forms of discrimination at the workplace (principle of equal pay for equal work), coupled with strengthening the Labor Inspection for a better enforcement, reforming the educational system to make it better aligned to the needs of the private sector, as well as addressing the information asymmetry between youth and the private sector on the labor market.

The second stream of policies should consist of programs to support start ups initiated by youth, especially by those from vulnerable groups. It could imply financial investment matching grants, subsidies for consultancy services and informational support.

- ***Fulfilling the rights and participation of youth, especially of women and adolescent girls.*** The policies should aim at improvements in maternal, newborn and child health, universal access to contraception, prevention and treatment of HIV and STIs and elimination of gender-based violence, in accordance to the Sustainable Development Goals assumed in 2015 by the Government of Moldova. A special attention should be devoted to stimulation of voluntary family planning, allowing women and couples to decide on timing, number and spacing of their children.
- ***Increasing investments in health and education of children and young people.*** These investments should be based entirely on the human rights approach, implying zero tolerance to any forms of discrimination or exclusion, especially against girls/women. The declining fertility rate should free up more such investments per young people, which will alleviate in the long-term the costs of the negative first demographic dividend and will stimulate productivity and economic growth. As soon as these young people enter the labor market, these investments will generate sustainable returns, allowing the country to benefit of the second demographic dividend.

Key policies aimed at maximizing the opportunities of the second dividend:

- ***Extending the productive periods of effective producers.*** This can be achieved by lifting the pension age (it should be done carefully and in line with the raising life expectancy of pensioners) and creating favorable employment conditions for higher-age employees, as well as incentivizing the employees to remain on the labor market after reaching the pension age.
- ***Raising labor productivity, especially for upper-age population.*** This will provide a sustainable fundament for wage growth of the aging population. In that regard, it is instrumental to ensure a liberalized, friendly and predictable investment climate in order to ensure a strong private sector and demand for labor force, flexible labor market in order to allow the labor force to transit easier to higher productive sectors, and an education system that can both train and retrain the labor force according to the needs of the economy.
- ***Building a resilient financial sector.*** A stronger financial sector is necessary to ensure an efficient intermediation, by absorbing the savings and channeling them for development purposes. It implies strengthening of the banking sector, as well as of financial non-banking institutions (e.g. insurance companies, pension funds) and the capital market.
- ***Developing the market for T-bills and T-bonds.*** The access of the population and other institutions to these financial instruments should be expanded, as currently, the primary market is dominated by banks and the secondary market is almost absent. It should be done by granting a preferential fiscal treatment for incomes generated by T-bills and T-bonds, breaking the monopoly of banks on the primary market of these financial instruments and active promotion of this instruments among the population as convenient option for placing their savings.
- ***Developing the second and third pillars of the pensions' system.*** The potential growth in savings represents a historic opportunity for development of the multi-pillar pension system. Specifically, the mandatory (pillar 2) and non-mandatory (pillar 3) pension funds could absorb part of these savings and re-invest in low risk long-term financial instruments (T-bonds, time deposits), which would be transformed into private and public capital investments. At the same time, as shown by recent analysis (Expert-Grup, 2015), this will foster the pensions' system in Moldova, which is currently very weak and unsustainable, being solely based on the redistributive pension system based on intergenerational solidarity).

Last, but not least, more attention should be allocated to strengthening the national statistical system, in order to make it more suitable for NTA estimations. Particularly:

- Order needs to be brought into the official population data. The results of the 2014 population and housing census have to be used in order to update the NBS estimates of the stable population. In particular, the NBS should switch from “domicile” to “usual residence” when updating the stable population.
- The NBS should regularly conduct migrants-targeting surveys, in order to have clear understanding of the trends and structural shifts accompanying the migration.
- The samples of the Households Budget Survey, Labor Force Survey and other surveys have to be adequately updated to reflect the demographic reality.
- These updates should translate into the key macroeconomic figures estimated as part of the National System of Accounts.
- The health-sector informational system has to be further developed. Currently, the system does not offer age-disaggregated information regarding the services provided, which is a significant shortcoming, considering the strong age profile of the health services consumption.

# Moldova NTA 2014: Country Profile



Country Tables  
Version 1.0  
Moldova  
2014

Total population (thousands)	3,556	Per capita income (current USD)	2,2
Population growth rate (%)	-0.06	Per capita income (PPP, USD)	5,0
Percentage under 25	35	Rate of growth (%), real per capita inc., past 25 yr	10
Percentage 60 and older	16	Child dependency ratio	
Total fertility rate	1.28	Old age dependency ratio	
Life expectancy at birth	71	Exchange rate (local currency unit per USD)	14.

## National Transfer Accounts summary, per capita values

Moldova lei	All ages	0-19	20-64	65+
Lifecycle Deficit	10,246	27,262	2,416	24,747
Consumption	30,017	28,430	30,604	29,613
Less: Labor Income	19,771	1,167	28,188	4,866
Transfers	4,550	23,977	-3,859	17,594
Public Transfers	1,239	8,881	-3,675	17,002
Private Transfers	3,311	15,097	-185	593
Asset-based Reallocations	5,696	3,285	6,275	7,153
Asset Income	11,596	2,571	15,321	6,735
Less: Saving	5,900	-714	9,046	-418

## Support Ratios

1950-2050	
1950	#N/A
1960	53.0
1970	51.2
1980	55.1
1990	55.8
2000	57.6
2010	64.5
2020	67.8
2030	68.9
2040	68.7
2050	62.8

## National Transfer Accounts summary, aggregate values

1000 Moldova lei	All ages	0-19	20-64	65+
Lifecycle Deficit	36,439	21,675	5,795	8,969
Consumption	106,753	22,603	73,417	10,732
Less: Labor Income	70,314	928	67,622	1,764
Transfers	16,181	19,063	-9,258	6,376
Public Transfers	4,407	7,061	-8,815	6,161
Private Transfers	11,774	12,003	-443	215
Asset-based Reallocations	20,258	2,612	15,054	2,592
Asset Income	41,240	2,044	36,756	2,441
Less: Saving	20,983	-568	21,702	-152

## Fiscal Support Ratios

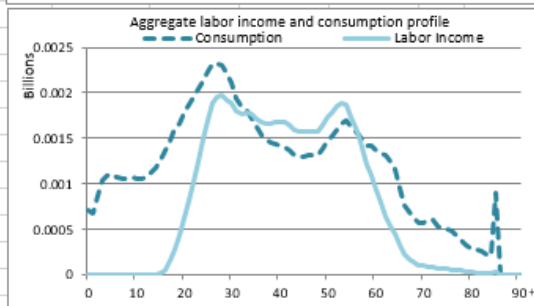
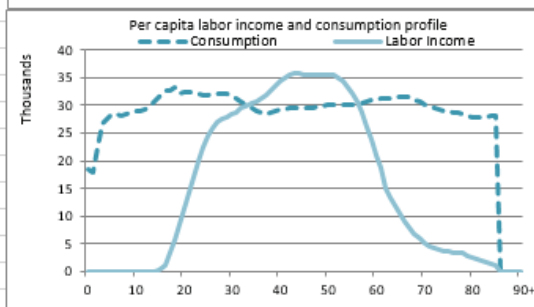
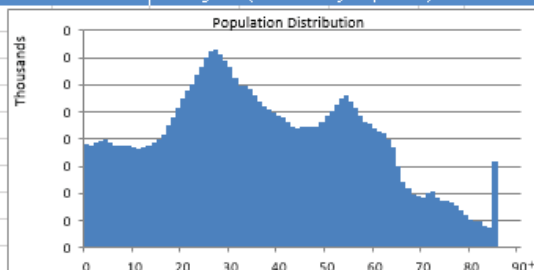
1950-2050	
1950	#N/A
1960	76.7
1970	72.8
1980	79.2
1990	78.1
2000	80.6
2010	90.9
2020	89.7
2030	86.9
2040	84.7
2050	73.4

## Flows as a percent of consumption at each age range

	All ages	0-19	20-64	65+
Labor Income	65.9	4.1	92.1	16.4
Private Transfers	11.0	53.1	-0.6	2.0
Public Transfers	4.1	31.2	-12.0	57.4
Asset-based Reallocations	19.0	11.6	20.5	24.2

For more information: Ronald Lee and Andrew Mason, lead authors and editors, 2011.  
*Population aging and the generational economy: A global perspective.* Cheltenham, UK: Edward Elgar.

[www.ntaccounts.org](http://www.ntaccounts.org)



## Appendix: Results of sensitivity analysis

### Limitations of the sensitivity analysis

This appendix includes some basic results of the analysis of the NTA Moldova sensitivity to an alternative set of demographic data. Such an alternative dataset, available for the NTA basic year (2014) has been offered us by the Center for Demographic Research. At first glance, it would therefore seem that checking the sensitivity of the NTA results should be something very straightforward. This is not the case, however, for two key reasons.

- First, the dataset of the Center for Demographic Research refers to the present population, whereas the official data we used refer to stable population.
- Second, the entire System of the National Accounts, from which we derived the NTA macro-control variables, is based on the official demographic data. For instance, the total private consumption, the labor income and the self-employed income directly build on the size and structure of the official population. An alternative set of demographic data, would require adjusting the macro-control variables accordingly, a task which is well beyond our resources.

Therefore, the results of the sensitivity analysis should be taken with these caveats in mind. We see the role of this analysis more in underlying the fundamental role of high quality of the input data rather than to present allegedly 'more realistic' alternative assessments of the Moldova NTA system.

### Key differences between official and alternative demographic datasets

The current population data in Moldova is based on the 1989 census of population with some adjustments in the structure of population after the 2004 census of population applied in 2007. The recently published data from the 2014 census of population report an estimated population of 2998.2 thousand in 2014, or 15.6% lower than the current population used by national statistics. Nevertheless, the latest census data are still to be processed as the proper disaggregation by main criteria, including age is available only for the population covered by the census (2,804,801 people, including 209,030 non-resident persons). At the same time, post-census survey conducted by NBS indicate that only 91 percent of the population of the country and 59 percent of capital's population was covered by the census<sup>5</sup>. The methodology to be applied for the population not covered by the census is still to be developed.

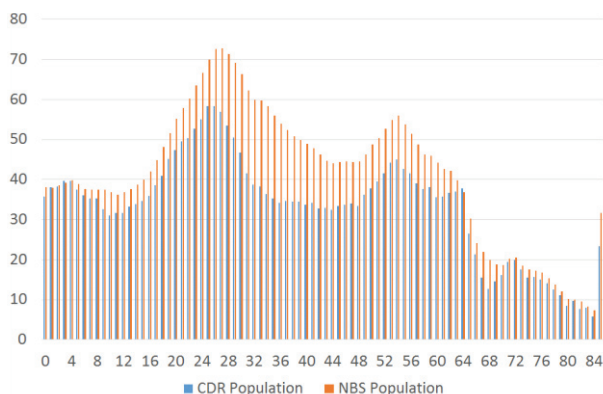
The NBS official statistics come in stark contrast with the alternative estimates of the Center for Demographic Research (CDR). The differences refer to both size and structure of the population. The population estimated by CDR in 2014 - 2868.6 thousand persons - is close to the 2014 population and housing census data. The largest difference in the number of population is for the working age population where the difference might reach up to 38% (maximum gap registered for the age of 34) (Figure 57). As a result, the structure of the population also differs, with lower share of the population of 20-64 years old in the CDG dataset (Figure 58).

The difference in share of working age population in Moldova (15-57 for women and 15-62 for men) between the two datasets is about 4 percentage points that might change the overall income and consumption distribution of the population and consequently influence the lifecycle deficit. Nevertheless, the most important gaps are registered in the cohort of 30-39 years that might strongly influence the private intra-household transfers, as this is a typical age for having children enrolled in primary to secondary education.

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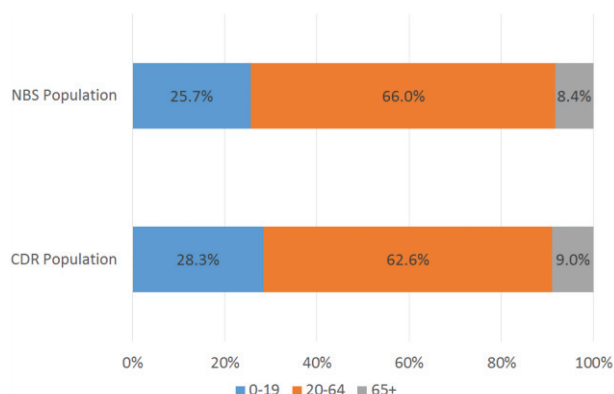
<sup>5</sup>Main results of Population Census 2014 published by NBS <http://www.statistica.md/newsview.php?l=ro&idc=168&id=5583&parent=0>

**Figure 57. Distribution of population by age, thousand people**



Source: NBS, CDR

**Figure 58. Structure of population by age groups, %**



Source: NBS, CDR

Population above 65 years old estimated by the CDR gets closer to the official estimates, with the notice that the doubtful distribution of the population aged 69-71 mentioned in Chapter 4 is smoother.

Additionally, the share of population that registers lifecycle surplus based on the official NBS data (i.e. 33 to 55 years old) also differs that is very important in the context of NTA analysis. While in the NBS data the share of the population is 32.4%, in the CDR data it is only 29.1%. This might have serious implications on the overall analysis with the possibility of shortening the period of lifecycle surplus or decrease in its level. However, these assumptions may be verified only by using alternative data sources for all other data used in constructing the NTA (i.e. System of National Accounts, Household Budget Survey, Labour Force Survey), which are not available.

### NTA with official demographic data versus NTA with alternative data

The use of the alternative dataset has significant implications for the per capita figures of the NTA. As we do not change the macro-totals, it has no implications on the aggregate values, though. Also, because nothing changes in the underlying structure of the HBS and LFS, the breadth of the lifecycle – where it starts and where it ends - does not change either.

The set of figures from Figure 59 to Figure 64 reveals two key differences between the NTA based on the official NBS data as compared with the CDR data. Firstly, the NTA based on the official data displays smoother shapes as compared to the alternative NTA. This is particularly the case of the persons around 70 years, featuring significant spikes in the figures below. This is due to significant structural differences in the population of these specific ages, as revealed in the previous section.

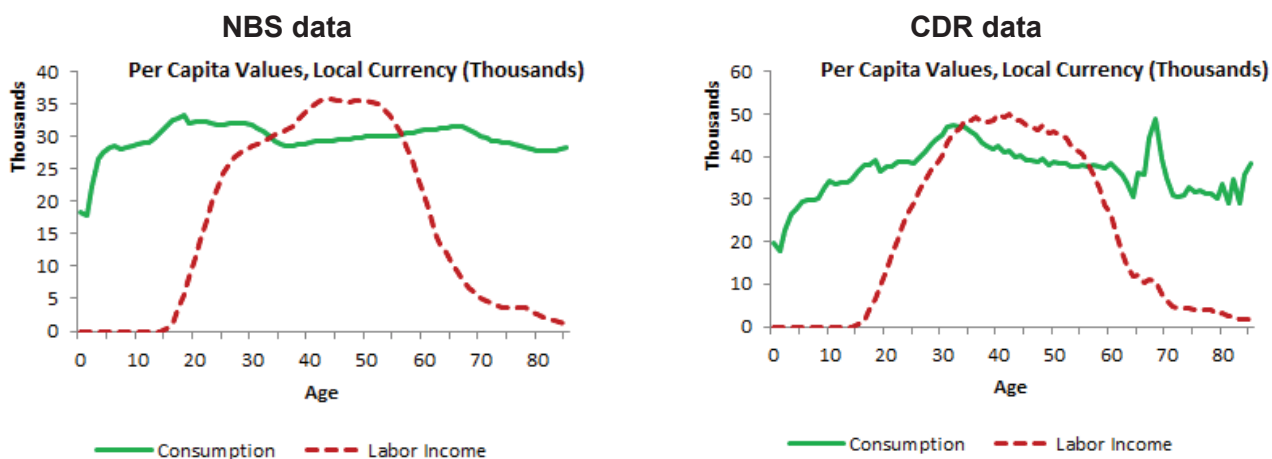
Secondly, in the alternative NTA the per capita values rise or fall compared to the official NTA depending on whether the number of people in the given age segment is either below or above the official estimates.

In particular, as inferred from the Figure 59, the alternative NTA reflects a much steeper growth of the per capita consumption for the segment from 0 to 33 and a more sinuous shape for the ages above 60. The differences are less striking in case of the income derived from labor and self-employment. However, the sharper form of the labor earnings in case of the alternative NTA is easily discernable (Figure 60). Similar changes are visible for public and private transfers. Again, all these differences are entirely attributable to structural differences in the two population datasets.

However, as emphasized above, this high sensitivity of the NTA to demographic data is meant to underline the importance of data quality rather than to make inferences about which of the two alternative NTA is better.



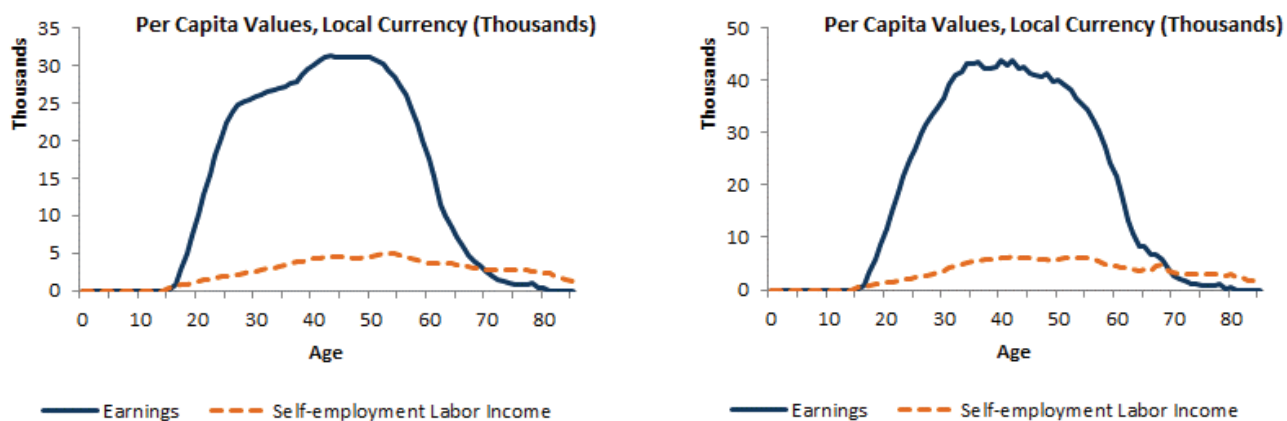
Figure 59. Sensitivity of consumption and labor income to demographic datasets



Source: NTA Moldova

Source: NTA Moldova

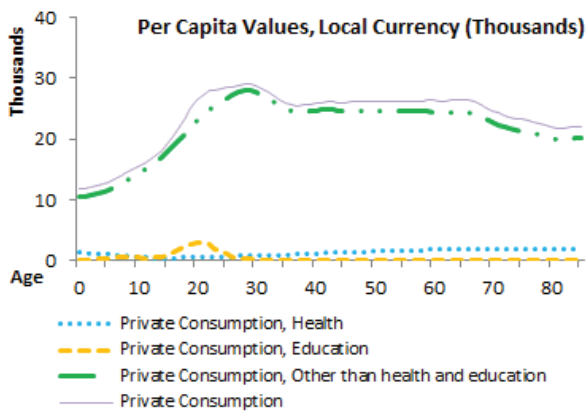
Figure 60. Sensitivity of income from labor and self-employment to demographic datasets



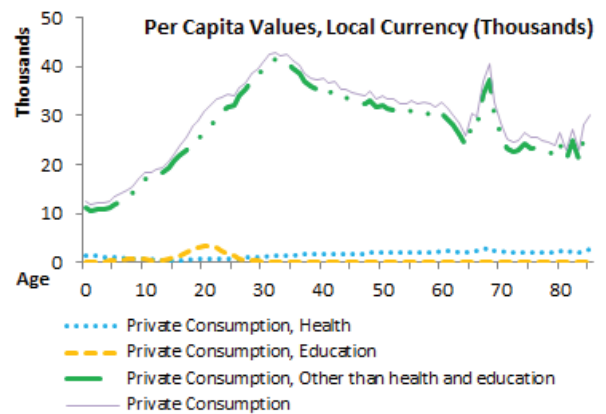
Source: NTA Moldova

Source: NTA Moldova

Figure 61. Sensitivity of private consumption to demographic datasets

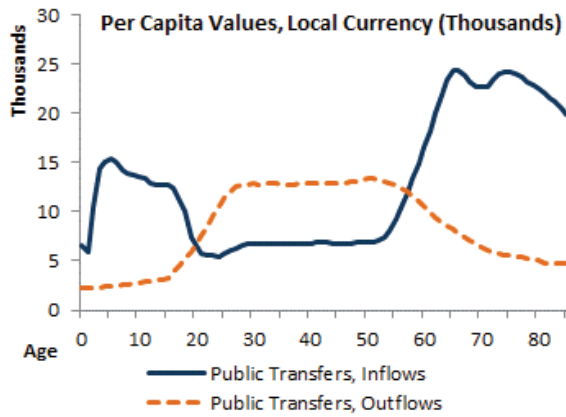


Source: NTA Moldova

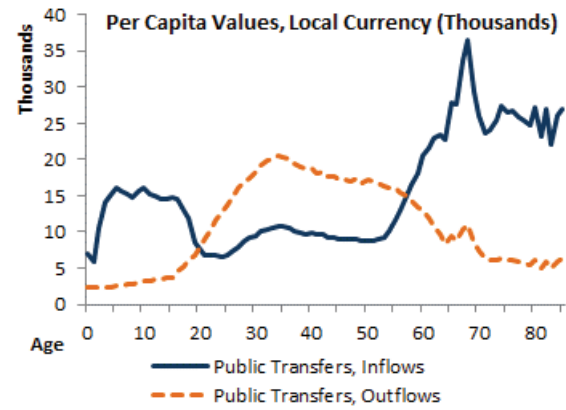


Source: NTA Moldova

Figure 62. Sensitivity of public transfers to demographic datasets

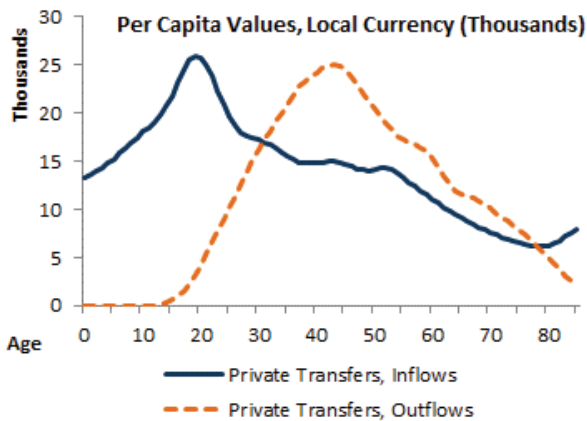


Source: NTA Moldova

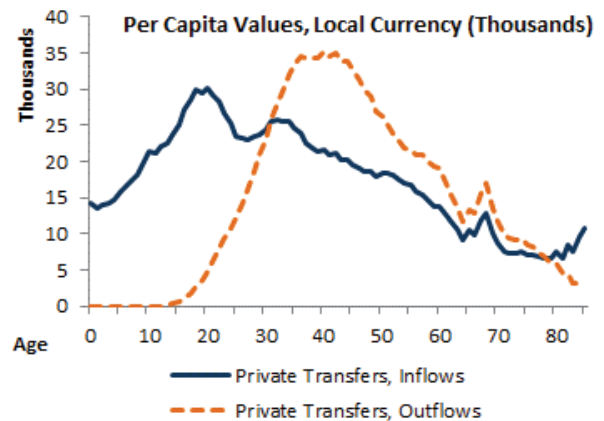


Source: NTA Moldova

Figure 63. Sensitivity of private transfers to demographic datasets



Source: NTA Moldova



Source: NTA Moldova

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