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REPORT
National Transfer Accounts in Armenia

Compilation, Data Source Issues, Results for 2019 and Possible Policy Implications

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1. BACKGROUND

The National Transfer Accounts (NTA) holds significant importance for economies worldwide and is continually gaining recognition and understanding. It "provides an accounting of economic flows to and from residents of a country classified by their age. The accounts are comprehensive in that all economic flows that arise as a consequence of the production of goods and services during the year are incorporated into the accounts."[1] The System of National Accounts (SNA) serves as an effective analytical tool for understanding the quantitative relationships among various economic entities. It comprises a set of accounts that collectively offer a comprehensive view of an economy of the country and its activities. These accounts provide a comprehensive and coherent conceptual structure for measuring economic activity of the nation. Sector accounts specifically offer a structured description of economic activities categorized by institutional sectors[2]. The objective of the NTA is to enhance comprehension regarding the impact of population growth and shifting population age distributions on economic growth, gender and generational equity, public finances, and other critical aspects of the macro-economy.[3] When constructing NTA, it becomes feasible to assess how individuals across different age groups generate, consume, and distribute resources, as well as how they save for the future[4].

It is essential to understand how societies manage age and generational challenges for the following reasons:[5]

1. Children and many older persons are vulnerable and usually depend on others to avoid poverty and maintain a decent standard of living. The level of poverty and inequality in different countries is linked to how effectively the material needs of both children and the elderly are being met.
2. The concept of age is shifting. Younger individuals are spending more time in education and entering the labor force later. On the other hand, those in their sixties and seventies are healthier and less likely to experience disabilities. Fixed definitions of childhood or old age paint an inaccurate and incomplete picture of the needs and potential contributions of both the young and the old. Imposing age boundaries leads to the institutionalization of dependency through rigid and misguided age-based policies.
3. Future economic progress will rely significantly on the generational economy. This is due to the crucial role of human capital investment, such as spending on children's health and education. In addition, "it is because responses to population aging can heavily indebt future generations and waste the economic potential of older people. It can also be because responses to population ageing may affect saving, the accumulation of capital and the productivity of the work force."

[1] National Transfer Accounts Manual: Measuring and Analysing the Generational Economy, United Nations, 2013 p. 25. https://www.un-ilibrary.org/content/books/9789210562836c005/read
[2] Statistical Office of the Republic of Serbia 2021. An Analytical Report of the National Transfer Accounts for Serbia, p. 2.
[3] National Transfer accounts: Understanding the Generational Economy. https://www.ntaccounts.org/web/nta/show/
[4] National Transfer accounts: Understanding the Generational Economy. https://www.ntaccounts.org/web/nta/show/
[5] National Transfer Accounts Manual: Measuring and Analysing the Generational Economy, United Nations, 2013 p. 2

4. The sustainability of support systems will be threatened if policies fail to fully address the economic strains resulting from changes in population age structure.
5. Changing consumption patterns and the introduction or discontinuation of public programs can raise concerns about intergenerational equity. This may lead to questions such as the following: "Are the young being overburdened with future support obligations? Are some working age generations short changed when pension structures are changed? Has rapid economic growth in some countries left retirees lagging behind economically?"
6. Gender is an important dimension of the generational economy. The support system for men and women may be very different with potentially adverse implications for women or possibly men. While producing NTA by gender allows to understand consumption and production patterns, full picture of gender aspect for generational accounts requires further analysis, such as National Time Transfer Accounts, as women are much more likely to specialize in home production that is not measured in NTA (or SNA).

As mentioned by the National Transfer Accounts Organization[6], the NTA project offers explanations and a deeper understanding for policymakers in several critical areas, including:

- Public policy on pensions, health care, education, and reproductive health,
- Social institutions, such as the extended family,
- The full economic contribution of women, gender based issues,
- Social, political, and economic implications of population aging.

The development of NTA was built upon a foundation of numerous research efforts dating back to 1958, which studies delved into crucial concepts such as introducing overlapping generation models in economics, significance of intergenerational transfers, the importance of age profiles of labor income and consumption. The initial idea for a broader international project was conceived in 2002, involving collaboration among the United States, Taiwan Province of China, Japan, Indonesia, Brazil, Chile, and France, with researchers from each of these countries or territories contributing to the initiative[7]. Afterwards, emphasizing the importance of NTA for the economy, several countries joined the initiative to develop NTAs.

Armenia started the National Transfer Accounts initiative in 2021, alongside the launch of the development of its Population Strategy. Acknowledging and understanding the demographic challenges it faces, Armenia began developing the Population Strategy in 2021. During this effort, the importance of developing NTA for Armenia was realized and underscored as a crucial element for effective planning and forecasting within the Population Strategy framework as well as effective monitoring and evaluation tool for the assessment of the implementation of the Strategy. The initiative of development of NTA for Armenia was funded by the United National Population Fund in Armenia (UNFPA Armenia), which was implemented in two phases:

[6] National Transfer accounts: Understanding the Generational Economy. https://www.ntaccounts.org/web/nta/show/
[7] National Transfer Accounts Manual: Measuring and Analysing the Generational Economy, United Nations, 2013. https://www.un-ilibrary.org/content/books/9789210562836c005/read

1) **development of the initial National Transfer Accounts framework for Armenia by age distribution**, during which efforts were made to collect the necessary data required and develop the initial version of NTA standard table. Throughout this phase, along with the collection of available data, data issues and gaps were identified, prompting collaborative efforts with colleagues from the Government and Statistical Service of RA to address these gaps in the data. In addition, the initial version of the Standard National Transfer Accounts table, touching upon only the age distribution, was created based on the available collected data;
2) **development of the National Transfer Account framework for Armenia by age and sex distribution**, during which the standard NTA table by age and sex distribution was developed, using improved and enhanced data and with the assistance of international expert.

Currently, National Transfer Accounts of Armenia by age and sex distribution have been developed, comprising of three aggregate standard tables and three per capita tables. Developed National Transfer Accounts of Armenia cover the following:

- Aggregate Table (Total Economy Flows),
- Per Capita Table,
- Tables by Gender,
  - Aggregate Table (Male),
  - Aggregate Table (Female),
  - Per Capita Table (Male),
  - Per Capita Table (Female)

The following report outlines the development of NTA for Armenia, including methodology, data sources, calculations, limitations, and final results. The report follows the structure of national transfer accounts, with separate parts dedicated to separate sections of NTA. In addition to providing background information and a general understanding of the NTA, the report covers the development of NTA for Armenia in the following sections: Lifecycle Account, Public Age Reallocations, and Private Age Reallocations. It also discusses data sources, areas for improvement, and the policy implications of NTA.
The developed NTA for Armenia, offering a comprehensive understanding of economic flows to and from residents of the country, can be of interest to the following beneficiaries:

- **Policymakers**: NTA can serve as a valuable tool to assess the fiscal sustainability of social security, pension, and healthcare systems in light of population aging. This information allows policymakers to make informed decisions regarding necessary reforms and adjustments to these vital systems. It can be of primary interest to the following policymakers:
  - Ministry of Finance of RA,
  - Ministry of Economy of RA,
  - Ministry of Labor and Social Affairs of RA,
  - Ministry of Health of RA,

- Ministry of Education, Science, Culture and Sports of RA

- **Researchers**: Demographers, economists, and social scientists can use NTA for examining economic transfer trends across generations, labor market dynamics, savings patterns, and the economic effects of demographic shifts.
- **Academics:** NTA holds the potential to generate a multitude of hypotheses and uncover new research topics that are highly relevant in academia. Additionally, it can serve as a powerful tool for application in their research endeavors.
- **International Organizations:** Entities such as the United Nations, World Bank, and International Monetary Fund may rely on NTA data and analysis to shape their reports and policy suggestions concerning issues like population aging, economic progress, and social welfare.
- **Other Organizations and Agencies.**

Armenia's NTA is developed by Ameria CJSC with support and funding from UNFPA Armenia. The local team of experts was immensely supported by the international experts (Mikhail B. Denisenko[8] and Eduard Jongstra[9]) who offered guidance, thoroughly reviewed the developed NTA tables, and provided valuable feedback.

Armenia's NTA compilation wound not have been possible without close cooperation with the Ministry of Finance (special thanks to Mr. Avag Avanesyan, Deputy Minister and Ms. Ani Hunanyan, Adviser) and support from the state bodies in providing available details on information requests, namely Armstat, Ministry of Labor and Social affairs, Ministry of Health, Ministry of Internal Affairs, State Revenue Committee, Unified Social Services, Nork technology center and others.

[8] Director, The Institute of Demography of NRU HSE, Head of Department of Demography of HSE (Higher school of Economy)

[9] Regional Adviser on Population and Development. United Nations Population Fund (UNFPA)

2. INTRODUCTION TO ARMENIA'S FIRST NTA

The first NTA for Armenia is based on the data from 2019. Selection of 2019 as base year for the first NTA in Armenia is conditioned on the several reasons. Firstly, a compilation of nationwide economic tables such as NTA, requires detailed information from primary surveys and final SNA indicators. 2019 was the latest available year, when the project started in 2021. Second, such projects require application of a number of models, as usually the information on required details may not be fully available. Models usually can be constructed taking into account "normal" years. Particularly 2020 (Covid-19 and Artsakh war), 2021 (post-covid and post war year), 2022 (changes in Armenian economy as a result of Russia-Ukraine war) are "unusual" years. These events caused substantial disruptions and deviations from normal trends, making these years not representative of the usual economic and social conditions in Armenia. There are other reasons to use latest "normal" years for such projects: (i) first attempt of such large projects requires clear understanding of economic and demographic flows, (ii) such large projects usually are conducted every 3-5 years (there is no need for annual updates considering cost-wise perspective, availability of detailed surveys and usually insignificant changes in consumption and labor income patterns in a short run perspective), indicators and coefficients are used for next years, especially when projecting results for long-run periods. By focusing on and using the 2019 data, the NTA aims to capture a clearer picture, facilitating better analysis and providing feasible estimates for forecasts and projections in medium and long-run.

The National Transfer Accounts framework for Armenia was developed using the best data available at the time. However, due to certain data gaps and limitations, the process necessitated some approximations and assessments. These gaps might have arisen from missing data points, discrepancies in data quality, or challenges in data collection methods. Despite these challenges, the NTA for Armenia represents a robust attempt to understand the economic lifecycle and intergenerational economic flows within the country. As data quality improves and more comprehensive datasets become available, there is potential for significant enhancements in the accuracy of the Armenia NTA. This could involve refining existing estimations, incorporating previously unavailable data points, and improving the overall reliability of the economic analysis provided by the NTA framework for Armenia.

According to the International methodology[10] (NTA Manual), NTA is constructed in a standard table form, which has two main sections: Lifecycle deficit, Reallocation. Each of this sections (and corresponding sub-sections in the tables) have macro control indicators and their distribution by age.

Lifecycle deficit: The Lifecycle deficit section of the table illustrates the consumption and production patterns of population across different ages and sexes, focusing on two key components: Consumption and Labor income. The data for the aggregate macro indicators of this section was sourced from National accounts data, with some additional data used and adjustments made where necessary. The Consumption part of the table, which encompasses public and private spending, shows the allocation of expenditure across age and sex groups for areas like education, health, and other

[10] National Transfer Accounts Manual: Measuring and Analysing the Generational Economy, UN 2013

non-health and education-related expenses, while the Labor income part shows the allocation of income. The age and sex distribution of the Consumption section was determined through detailed calculations based on the functional classification of the State budget. This involved a thorough analysis and breakdown of the budget allocated to education, health and other than education and health examining specific programs to understand their beneficiaries. When such details were lacking, distribution was based on the general population. On the other hand, the age and sex distribution of Labor income relied on the earnings of employed individuals.

Reallocations: The Reallocation section, which refers to the transfer of resources between different age groups within a population to cover lifecycle deficit where needed. It consists of Transfers and Asset-based reallocations, each of which is divided into two parts: public and private reallocations. Public transfers for some categories (education, health, and other in-kind) are aligned with the corresponding sections of public consumption within the Lifecycle deficit. Public transfers for Pensions, in its turn, follow the age and gender distribution of age pensions, while the Other cash component of public transfers uses the age and gender distribution of the general population. On the other hand, the Private transfers section includes Inter-household and Intra-household transfers, which are usually based on data from Household surveys. Asset-based Reallocations refers to the transfer or reallocation of assets, such as property, savings, investments, and inheritances, between different age groups within a population. Public asset-based reallocations by age and sex are based on the age-sex distribution of taxes and duties of the consolidated budget. On the other hand, private asset-based reallocations use the net capital income from mixed income, taking into account the age and gender distribution of employed individuals.

As part of the development of NTA of Armenia, the following key tables have been developed:

- Total economy Standard Table (Total Economy flows),
- Per capita NTA tables,
- Total economy standard NTA gender tables (male and female),
- Per capita NTA gender tables (male and female).

Main steps of NTA development in Armenia: Development of Armenia's NTA tables went through the following phases:

- **Calculation of the aggregate amounts for the total economy (macro controls)**: to calculate the following, SNA data was used, which in most of the cases matched with the variables of NTA. However, in some cases, specific adjustments were made to ensure conceptual alignment with NTA standards. Macro control indicators for the main variables in the first NTA for Armenia are presented in Table 1.

Table 1. Armenia NTA 2019: Aggregate structure and macro control indicators of the standard table for total economy (mln AMD)

Lifecycle Deficit	**2,073,860**
Consumption	**5,536,543**
Public Consumption	822,140
Private Consumption	4,714,404
Less: Labor Income	**3,462,683**
Earnings	2,550,852
Self-employment Labor Income	911,830
Reallocations	**2,073,860**
Transfers	**307,654**
Public Transfers	72,299
Public Transfers, Inflows	1,355,342
Public Transfers, Outflows	1,283,043
Private Transfers	235,355
Private Transfers, Inflows	1,989,322
Private Transfers, Outflows	1,753,966
Inter-household Transfers	235,355
Intra-household Transfers	0
Asset-based Reallocations	**1,766,206**
Public Asset-based Reallocations	-403,573
Private Asset-based Reallocations	2,169,779

Source: Armenia NTA

- **Development of age profiles of each NTA component for single years (0-90)**
- **Development of per capita age profiles, according to the number of population in each single age**
- **Application of the smoothing tool where necessary**: Friedman's SuperSmoother tool in R was employed to smooth the outcomes of the standard NTA tables where necessary. Smoothing was done on per capita indicators.
- **Revision and re-assessment of the aggregate values using smoothed data**: in this stage, smoothed per capita values were multiplied by the population size within each age group to revise and re-assess the aggregate values by age. Furthermore, adjustments were made to harmonize the age profiles with a macro control value derived from the SNA.

The second phase, which implied the development of the general and per capita tables with sex distribution, the sequence of actions differed slightly from the first phase. It involved the following steps:

- **Development of the sex distribution of the total economy age profiles**: the following was developed using the values for age profiles of total economy as well as the official statistical data by sex, which was employed to calculate the proportions of males and females within

the specified age groups. The proportion calculated was then applied to the age profiles of the total economy as a result of which the age-sex profiles of total economy was derived.

- **Calculation of the aggregate amounts (macro controls) of each NTA section by age and sex**: the following was developed by calculating the sum of the values obtained as a result of the age distribution of each section of the gender tables.
- **Revision and re-assessment of the age profiles and aggregate values in all tables after gender tables were constructed and smoothed where necessary.**

Main Data sources: Armenia NTA tables were developed using a combination of official statistical and administrative data sources. For aggregate amounts (macro controls), excluding gender-related tables, data from the System of National Accounts provided by Armstat was used. For age and sex distribution, additional official data sources were employed:

- **Data from Armstat (available or requested additionally):** this includes data from sources like the Household Integrated Living Conditions Survey, data on the number of students at various education levels, healthcare-related data, and more.
- **Data from other official departments of the Government of RA (available or requested):** this encompasses data on labor income requested from the State Revenue Committee, data requested from the Ministry of Finance, and similar sources.

However, the data used during the development of Armenia NTA tables had certain gaps and issues, which can be grouped into the following four categories:

- **absence of necessary data**: during the development of the Armenia NTA tables, several crucial pieces of data were found to be missing or unavailable, for example, the number of children involved in extracurricular education;
- **absence of the age and sex breakdown of the necessary data**: some data lacked age and gender breakdown, which is crucial for constructing NTA tables;
- **absence of the age or sex breakdown of the necessary data**: some data was presented with either age or sex breakdown, yet both are necessary for constructing the respective tables;
- **absence of single-age structure of the data**: some of the data was presented based on age groupings, whereas a breakdown by single ages is required.

The above-mentioned identified data gaps and issues need to be addressed aiming at enhancing and completing the Armenia NTA tables. Besides the general description of the data gaps and issues, each section of the report outlines the requirements for improving the necessary data, which must be collected or enhanced.

3. Armenia NTA 2019 Results

1. The Life cycle account

1.1 Labor income

Labor income is an estimate of the value of the return to labor. Labor income in NTA consists of Earnings (earnings of employees including employees' social contribution) and Self-employment Labor Income.

Macro control indicators for Earnings in Armenia's 2019 NTA is estimated at 2,550.9 bln AMD and for Self-employed income at 911.8bln AMD. As NTA methodology[11] suggests, these indicators are calculated based on SNA indicators plus adjustment for labor income portion of taxes less subsidies on other production.

The need for the adjustment comes due to differences between SNA indicators and NTA indicators. In NTA, primary income consists of labor income, capital income and property income. In SNA, primary income consists of compensation of employees, operating surplus, mixed income, property income and taxes on products and production less subsidies. Therefore, taxes which are separately presented in SNA, should be divided into 3 components in NTA to be attributed correspondingly to labor income, capital income or consumption. Taxes on products go to consumption, while Taxes on other production are allocated between labor and capital income. Labor income and capital income in NTA are adjusted upward valuing labor and capital income before the assessment of taxes less subsidies on production. Table below presents distribution of taxes less subsidies on production for Armenia's 2019 NTA.

Table 2. Distribution of Taxes less subsidies on production from SNA to Labor and Capital income for Armenia's 2019 NTA

		Value, mln AMD	Allocation shares	Calculation of shares for allocation based on SNA values
Taxes less subsidies on other production (from SNA, Armenia 2019)		**93 964**	**100%**	
for labor income	Share, Compensation of employees	39 406	42%	compensation of employees/ (compensation of employees + gross operating surplus, corporations and NPISHs + gross mixed income)
	Share, self-employed labor income	14 086	15%	two thirds of gross mixed income/ (compensation of employees + gross operating surplus, corporations and NPISHs + gross mixed income)

[11] NTA Manual. https://www.ntaccounts.org/web/nta/show/Methodology

for capital income	Capital share, corporations and NPISHs	33 429	36%	gross operating surplus, corporations and NPISHs)/(compensation of employees + gross operating surplus, corporations and NPISHs + gross mixed income
	Capital share, mixed income	7 043	7%	(1/3 gross mixed income)/ (compensation of employees + gross operating surplus, corporations and NPISHs + gross mixed income)

Source: calculated by authors based on Armenia's 2019 SNA data and NTA manual's recommendations

Therefore, Macro control indicators in Armenia's 2019 NTA:

- for Earnings = 2,186,950 mln AMD (Compensation of employees from SNA) + 39,406 mln AMD (corresponding portion of taxes).
- for Self-employed income = 897,744 mln AMD (Two thirds of SNA gross mixed income) + 14,086 mln AMD (corresponding portion of taxes).

Age profiles for labor income indicators are based on data requested from State Revenue Committee of the Republic of Armenia (SRC). SRC provided data by single age groups (14-90) on total salary for employees and total income for self-employed population. The structure of these data is used to distribute macro control indicators by age. It should be noted, that even if this information is quite accurate and detailed, it covers only registered employment and registered income. Ideally, the structure should represent total labor income (including informal or hidden) in the country. Armstat's Integrated Labor Conditions Survey (ILCS) collects data on total income, but it also has limitations on details and sample size. These two sources should be considered carefully to select best source in future NTA compilation. In 2019 NTA, SRC structure of labor income has been used. Both series (salaries of employees and income from self-employed) have been smoothed on per capita values using preferred smoothing method—Friedman's SuperSmoother in R software (as recommended by NTA Manual). Moreover, smoothing was performed separately for men and women.

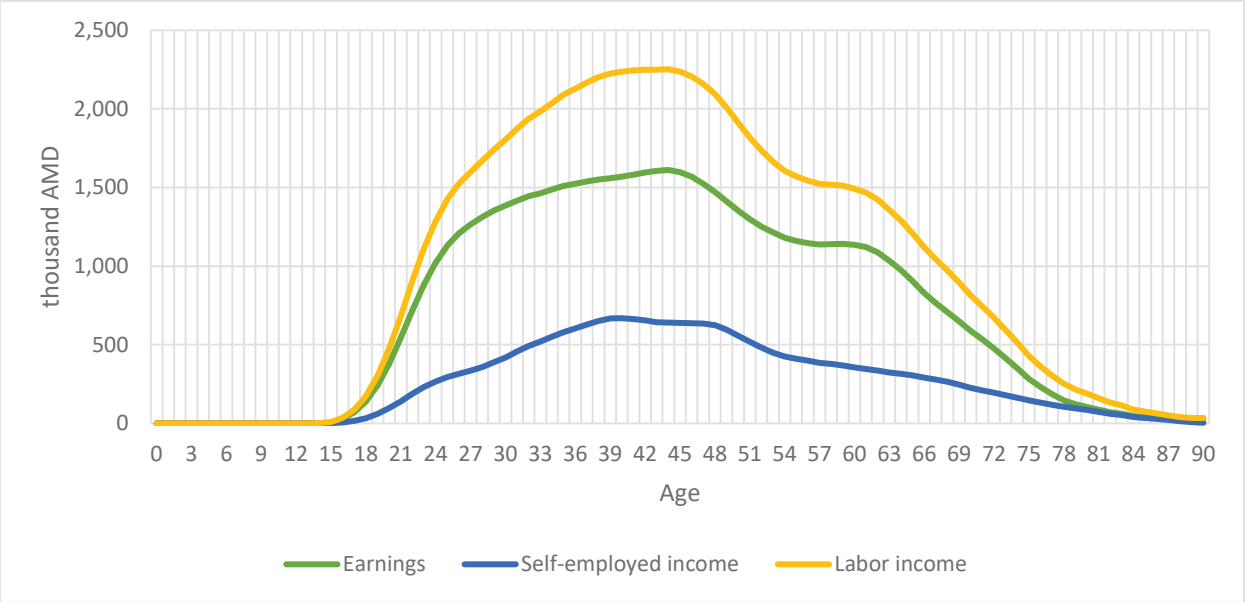
Gender allocation for labor income indicators are based on the same data from SRC, which provided breakdown of salaries and self-employed income by sex. Indicator for each singe age profile is divided between men and women based on their salary (or self-employed income) share in total salary (or self-employed income) for that single age. Macro control indicator for men and women is received as sum of salaries (or self-employed income) for all age groups (14-90).

Data:

According to labor income age distribution, peak of average salary in Armenia is for ages 43-44 (a bit over 1.6 mln AMD per capita), while peak of self-employed income is for ages 39-40 (~670 ths AMD per capita), (Figure 1). Overall labor income (earnings plus self-employed income) peak in Armenia is at 42-44 ages (2.25 mln AMD per capita). Interesting that labor income for ages 48-60 is lower than the observed trend, which corresponds to the population within age 20-30 in the beginning of 1990s,

when the Soviet system collapsed. This population perhaps suffered more of this change as they had received education in Soviet system and had difficulties in professional development in new realities. This is especially noticed for men (Figure 3).

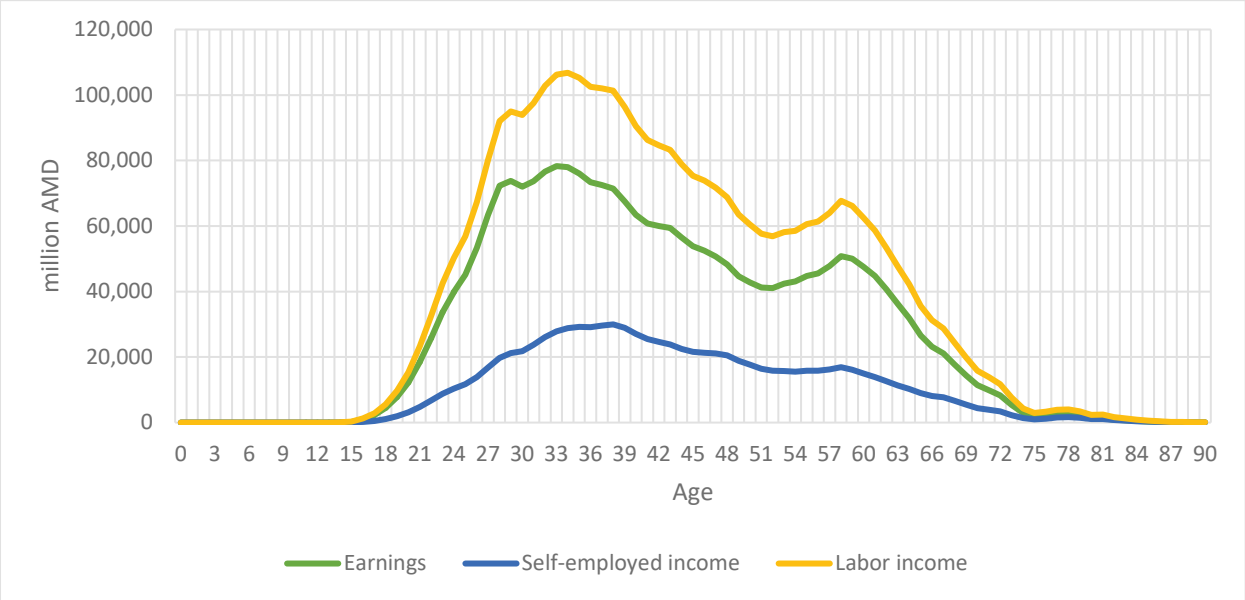
Figure 1. Armenia NTA 2019: Labor income by Age: Per capita values



Source: Armenia NTA 2019

Considering the structure of Armenian population by age, 42-44 age population is not the main group contributing to overall labor income in the economy, even if they have the highest per-capita income. The largest contribution to labor income in total economy comes from 33-35 age population. While average labor income for 43-44 ages is 11.9% higher than for 33-34 ages, the number of 43-44 age population in Armenia in 2019 is by 32% lower than 33-34 age population.

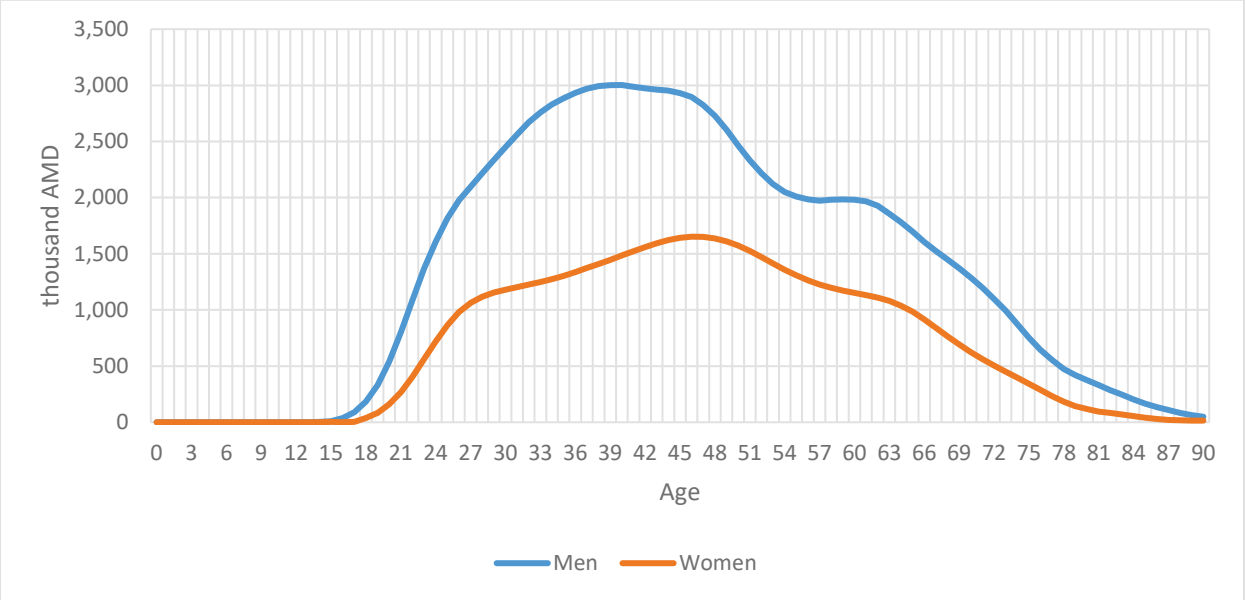
Figure 2. Armenia NTA 2019: Labor income by Age: Total Economy Flows



Source: Armenia NTA 2019

Labor income per capita by age and sex shows different developments. While on average labor income for men is higher than that for women, peak of average labor income for men is in 39-40 age, while it is a bit later (46-47 age) for women. There are many reasons for labor income difference between men and women, such as different participation rates in labor market, different productivity or employment in different economic activity, but also it may be gender inequalities. The contribution of each factor to labor income differences are different in different countries and regions and requires additional research.

Figure 3. Armenia NTA 2019: Labor income by Age and Sex: Per capita values



Source: Armenia NTA 2019

1.2 Consumption

Consumption in NTA is very similar to consumption as defined in SNA and reported in the use of disposable income account. Consumption in NTA consists of 2 components: public and private consumption. Total public consumption in NTA corresponds to the final consumption expenditures of the general government, while Private consumption refers to final consumption of other institutional sectors in SNA.

To estimate private consumption in NTA, taxes less subsidies on products are excluded from the final consumption expenditures for the household and NPISH sectors in SNA. In SNA, taxes on products are entirely allocated in consumption, because they are being paid completely by the consumers. Hence, we adjust consumption from the SNA by taxes less subsidies to get private consumption in NTA.
Public and Private consumptions in NTA are divided into three groups each: education, health and other than education and health. Details on compilation of types of consumption in terms of its components are presented below.

1.2.1 Public consumption

In economic theory, **public consumption** represents the value of goods and services provided to the population using budgetary funds, primarily generated through taxes. Public consumption, in a broad sense, is directed towards both individual and collective societal needs. In fact, services often overlap to such an extent that the distinction between services consumed individually and those consumed collectively becomes blurred. For instance, educational services, while primarily intended for individual student learning, also contribute to societal literacy and economic development as a whole. Similarly, public transportation, provided for general use, may simultaneously serve both individual trips and the collective movement of large groups of people. However, to be precise in our estimates, we consider educational and health services provided by Government as individual consumption, while other services than health and education as collective consumption (this last component includes public services such as infrastructure, public defense and security, cultural and recreational activities, etc.). As mentioned, NTA divides public consumption into three components: education consumption, health consumption and other public consumption.

Macro control indicator for Total Public consumption in Armenia's NTA is equivalent to final consumption expenditure of general government for GDP by expenditure (SNA, Armenia 2019) which is estimated at 822.1 billion AMD. According to the details provided by Armstat, 141.4 billion AMD is directed to Education, 137.5 billion AMD to Health and remaining 543.2 billion AMD to the consumption other than education and health.

Age profiles of public consumption on education and public consumption on health are based on detailed allocation of public expenditure by separate programs and sub-programs of consolidated general government budget expenditure by functional classification (for Education and Health). Share of each program and/or sub-program is calculated in total expenditure (for Education and Health separately), then expenditure of each program or sub-program was allocated to age profiles based on age breakdown of program beneficiaries (where available) or according to population structure in dedicated beneficiary age group or in total population. Thus, for example, expenditure under the programs of Basic general education (comprised 28.15% of total Education expenditure in 2019) were allocated to main beneficiaries of the program (children from grades 5-9, or aged 10 to 16 years) using official statistics on the number of students involved in public schools by separate age profiles. In case if structure of actual beneficiaries by age was not available, total population structure was used to construct age profiles. Thus, for example, *Provision of medicine to prisoners in detention centers*, the expenditures are distributed on population in 14-80 age using total Armenian population structure as more accurate data were not available.

Tables 3 and 4 present overall logic and summary of age profile distribution for public consumption on Education and Health. More details on distribution by sub-programs are presented in Annex 1.

Table 3. Armenia NTA 2019: Public consumption on Education by age groups: Total Economy Flows

Consolidated budget: Education expenditure	Share in total expenditures	Proportion of costs on each age in total expenditure, percentage points			
		0-5	6-17	18-23	24-90
Preschool education (lower kindergarten, ages: 2-3, upper kindergarten: ages 3-6)	**12.69%**	11.98%	0.71%	0.00%	0.00%
General elementary education (grades 1-4)	**19.40%**	0.00%	19.40%	0.00%	0.00%
Basic general education (grades 5-9)	**28.15%**	0.00%	28.14%	0.01%	0.00%
Secondary general education (grades 10-12)	**10.28%**	0.00%	9.74%	0.54%	0.00%
Primary vocational and secondary vocational education	**6.21%**	0.00%	4.47%	1.40%	0.34%
Higher education	**6.61%**	0.00%	0.17%	5.44%	1.01%
Extracurricular education	**7.45%**	0.00%	7.39%	0.06%	0.00%
Additional education	**0.64%**	0.00%	0.00%	0.04%	0.60%
Support services to education	**7.85%**	0.79%	6.35%	0.50%	0.22%
Education, n.e.c.	**0.72%**	0.06%	0.11%	0.05%	0.50%
Proportion of total expenditures for age group		**12.83%**	**76.47%**	**8.03%**	**2.67%**

Source: Armenia NTA 2019

Table 4. Armenia NTA 2019: Public consumption on Health by age groups: Total Economy Flows

Consolidated Budget: Health, expenditure	Share in total expenditures on health	Proportion of costs on each age in total expenditure, percentage points			
		0	1-17	18-63	64-90
Medical products, devices and equipment	3.78%	0.04%	0.70%	2.56%	0.49%
Outpatient services	34.50%	4.47%	3.94%	21.33%	4.76%
Hospital services	53.38%	1.20%	11.75%	25.28%	15.14%
Public health services	3.54%	0.04%	0.80%	2.24%	0.47%
Healthcare, n.e.c.	4.80%	0.06%	1.08%	3.03%	0.63%
Proportion of total expenditures for age group		**5.82%**	**18.26%**	**54.43%**	**21.49%**

Source: Armenia NTA 2019

It should be noted that better data sources on breakdown of beneficiaries of public health and education programs may add accuracy to age relocation of these data. Particularly, the following data sources can be improved later:

- **Additional education**, which refers mainly to the training of government employees. It can probably be distributed by the age of government employees participated in the trainings.
- **Extracurricular education**, in case of which the expenditures are distributed on people aged 6-21. It would be more accurate to distribute the expenditures by the age structure (number) of children involved in the mentioned processes,

- **More detailed age structure for health expenditure and especially for general medical services at policlinics.** For all health programs and sub-programs, exact structure of beneficiaries by separate age would improve age relocation accuracy. Currently, breakdown of patients, diseases or beneficiaries are available by large age groups only (for example 0-14, 15-49, 50+), so age allocation by separate ages within available age groups was done using total population structure. No information is available to distribute general medical services program by age and sex, so currently it is done proportionally to population structure.
- **Distinguishing health expenditure on newborns (0 age) is necessary**. Current data sources do not allow distinguishing expenditure on newborns from other children and its expenditure had been estimated using models from other countries.
- **More details on age and sex structure for distribution of Other public expenditure (at least for large components) may help to be more accurate**.

The age distribution of the third component of Public consumption (other than education and health) was done proportionally for per capita indicators, as these expenditures mostly cover collective expenditure.

Gender allocation for public consumption components are based on the same data sources, which have breakdown by sex. Indicator for each singe age profile is divided between men and women. Macro control indicator for men and women is received as sum of age profiles (0-90).

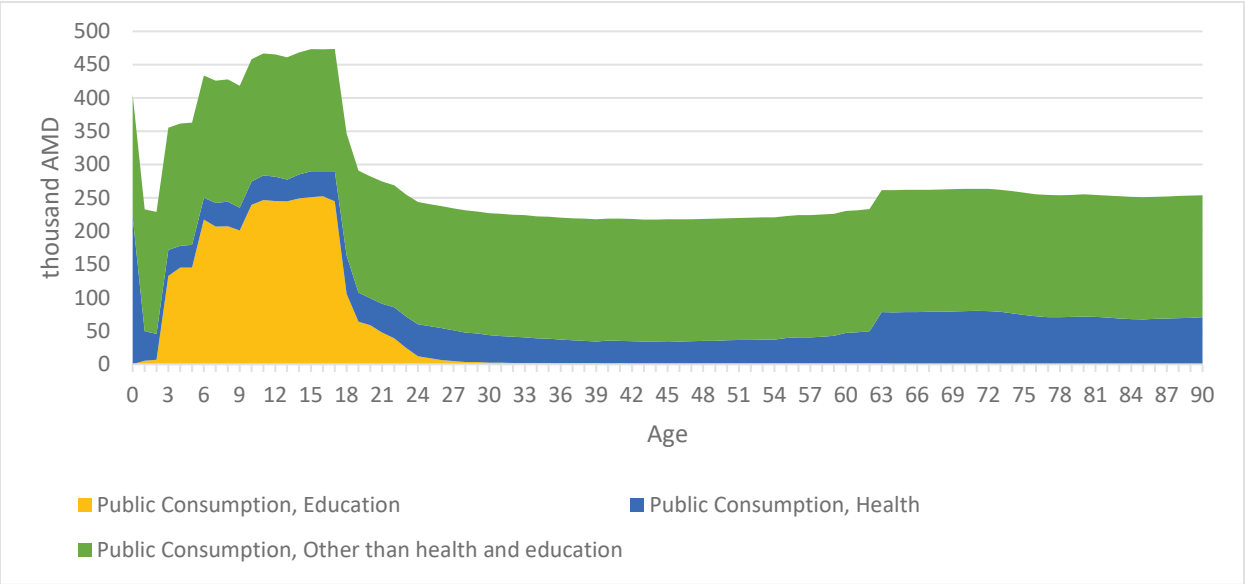
Data:

Overall, according to Armenia NTA data, General government spends more on younger age population largely due to expenditure on education. General education is financed by public means in Armenia. The expenditure on education is the highest for ages 11-16 at around 250ths AMD per capita, while at primary school (6-10) average expenditure per capita was at around 200 ths AMD. Government expenditure on education go down significantly after age 16. It is visible that public education expenditure is almost equal for ages 10 to 16, which perhaps is not logical. It is expected that more expenditure is needed for high school classes than middle classes (for example more equipment, more laboratories, better trained teachers), but it is not the case in Armenia. Another issue noticed from NTA is that there is almost no expenditure on professional development after school.

Public expenditure on health are distributed more evenly compared to the expenditure on education. Two peaks are visible: Expenditure on newborns, expenditure on population 16-18 age (due to medical checks for boys in pre-military age). Another change is visible starting from 63 (retirement age) as most of healthcare services are free for pensioners.

Other public consumption, which largely represents collective public services are distributed evenly by all ages and between gender.

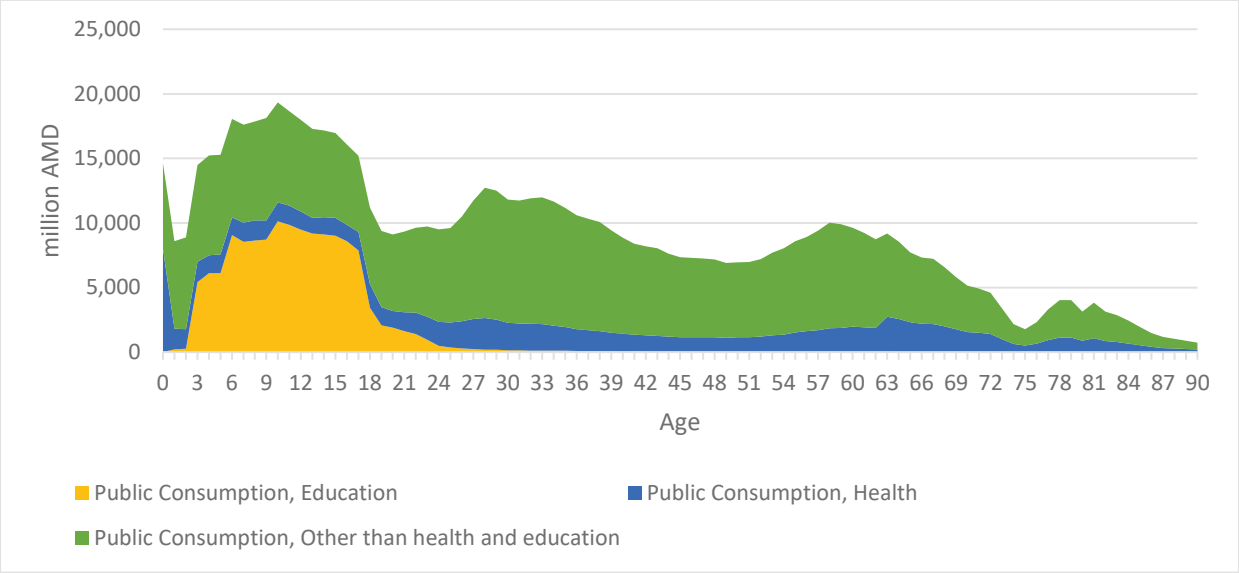
Figure 4. Armenia NTA 2019: Public Consumption by Age: Per capita values



Source: Armenia NTA 2019

Considering the structure of Armenia's population in 2019, government spent the largest amount on population with age 10, where per capita expenditure was not the highest, but number of population in that age was higher than at 16-18 ages. Another peaks, which are explained by the number of population are at ages 28 and 58.

Figure 5. Armenia NTA 2019: Public Consumption by Age: Total Economy Flows

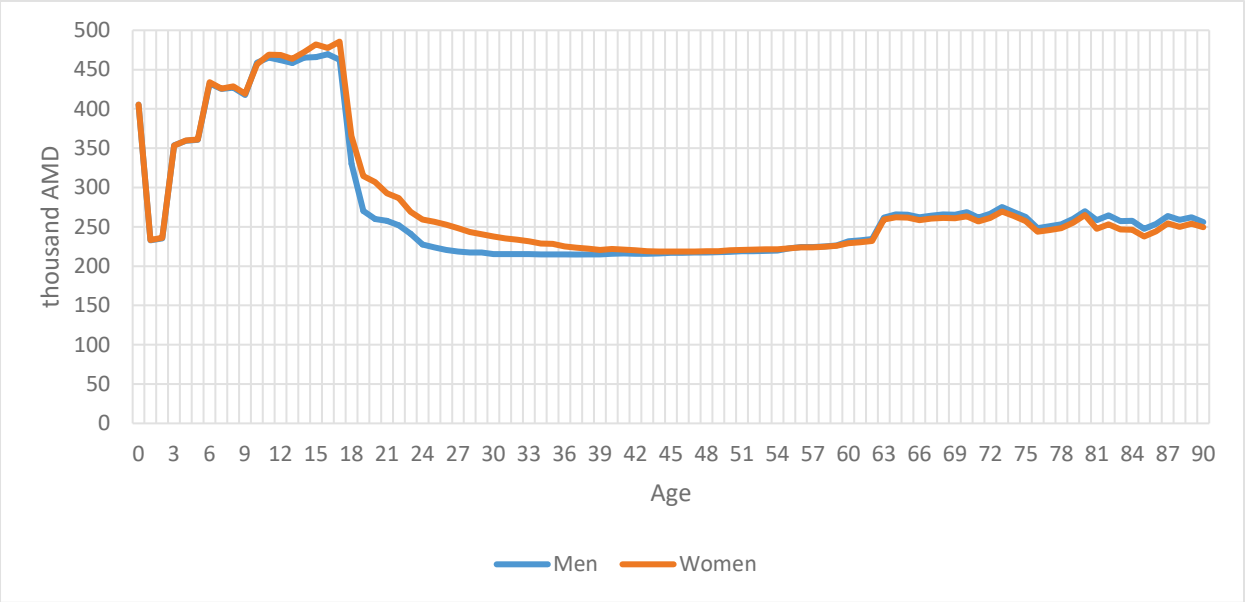


Source: Armenia NTA 2019

Public expenditure by gender per capita is very similar. The only visible difference between men and women are for ages 16-38 ages. While more expenditure on women for ages 16-22 are explained by higher expenditure on education, for 23-38 the difference can be explained by higher expenditure on health (childbirth related costs for fertile age women). Of course, the differences may have been more visible, in case if more detailed information on expenditure other than education and health were

available by sex. But it should be also mentioned that this breakdown of data sources is very rare also in other countries.

Figure 6. Armenia NTA 2019: Public Consumption by Age and Sex: Per capita values



Source: Armenia NTA 2019

1.2.2 Private consumption

Public consumption of population is another important component of total consumption. Moreover, usually in many countries the size of private consumption is higher compared to the Public consumption. Private consumption expenditure is significantly higher in Armenia: it is striking 85% of total consumption in Armenia 2019 NTA, with a total amount of 4,714 billion AMD. Like Public consumption, Private consumption in NTA is also presented by 3 main components: private consumption on education, private consumption on health and other private consumption.

Macro control indicator for Total Private consumption is based on SNA's final consumption expenditure of households and Non-profit institutions serving households (NPISH) with adjustment of taxes and subsidies on products. Particularly for Armenia's 2019 NTA:

Private Consumption (4,714 bln AMD) = Final consumption expenditure of households and NPISH from Armenia's 2019 national accounts (5,459.7 bln AMD) – Taxes on products (765.8 bln AMD) + Subsidies on products (20.4 bln AMD).

SNA indicators for Armenia for 2019 do not provide breakdown of private consumption expenditure by required components for NTA. Macro control indicator for private consumption on health for Armenia (616 bln AMD) is taken from the estimate provided in Health National Accounts[12] compiled by the National Health Institute under the Ministry of Health of the Republic of Armenia. The macro

[12] https://nih.am/assets/pdf/atvk/af1c36a476d2ad4a41609a5fde974319.pdf

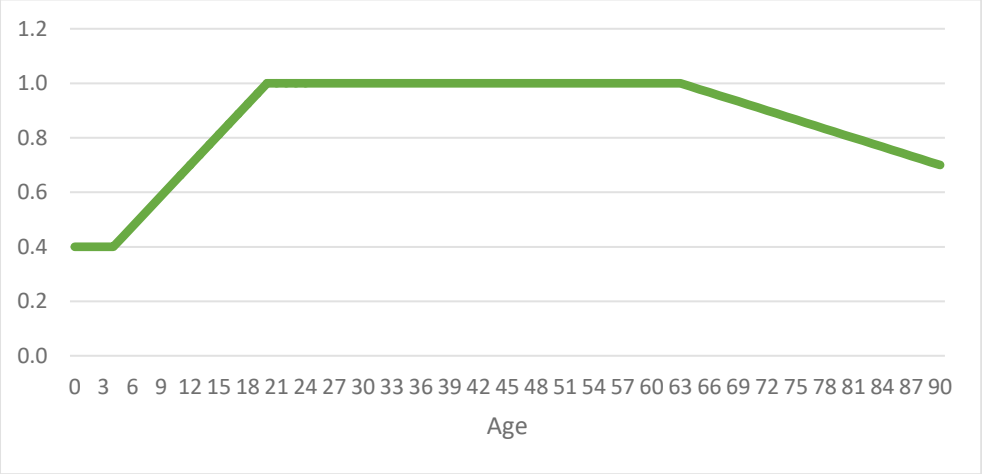
control indicator for private consumption on education is estimated using the relation between the shares of private consumption on education and private consumption on health from Armstat's consumer basket calculation for CPI (average indicator for 2018-2020 was used). Macro control indicator for private consumption other than education and health is estimated as residual:

Total Private Consumption – Private consumption on education – Private consumption on health.

This calculation could have been more accurate and straightforward if Armstat provides breakdown of private final consumption expenditure by COICOP[13] (where health and education are presented separately).

Age profiles of private consumption on health and education have been constructed using Armstat's ILCS database. Particularly, ILCS collects data on health and education expenditure for each member of household in the survey, which allows receiving the structure of households' expenditure by age and sex. Main costs of private education are child day care private kindergartens, tuitions and other required fees, activities of the parent councils, uniforms and other clothing, books and other educational materials, food, transportation, etc. The structure of expenditure has been used to distribute macro control indicators by age, then using population structure per capita values have been calculated. Both series (private consumption on health and education) have been smoothed on per capita values (men and women separately) using preferred smoothing method—Friedman's SuperSmoother in R software. After smoothing of series on per capita values, total economy values were adjusted to the smoothed series.
An age consumption comparison model has been used to allocate macro control indicator for Private consumption other than health and education by age. Such models are used also by many other countries in NTA compilation if there are no better data sources on total private consumption expenditure breakdown by age.

Figure 7. Consumption comparison model by age



Source: materials from the 14th Global Meeting of the NTA Network, Paris, February 14-17, 2023

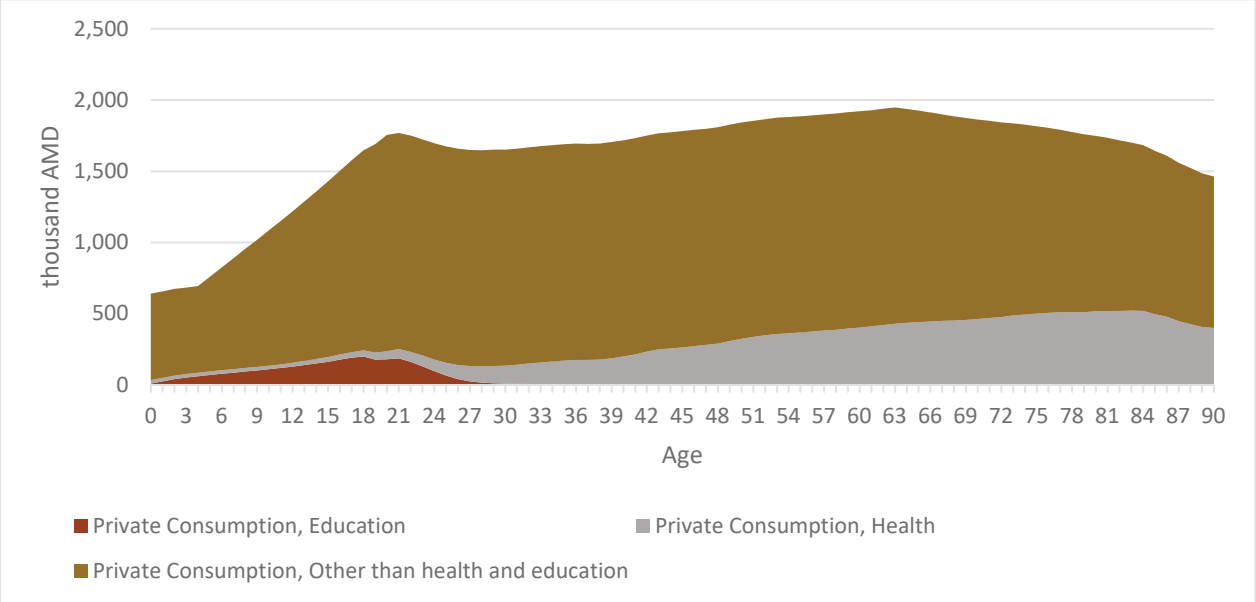
[13] The Classification of Individual Consumption According to Purpose (COICOP) is the international classification of household expenditure.

The principle of the model is that a person reaches maximum consumption levels at the age of 20. A high level of consumption is maintained until the age of retirement. From birth to the age of 20, a person gradually increases their consumption each year, and after the age of 63, consumption declines. Therefore, through calculations, the model assumes that the consumption of individuals aged 20-63 is taken as absolute consumption, and consumptions for each age are calculated as a proportion of the absolute value. Thus, for example, a person's consumption at birth is 40% of the consumption of a person aged 20-63. Subsequently, consumption increases gradually to the absolute value until the age of 20. The same process, but in reverse, occurs after the age of 63. Consumption gradually declines, reaching about 70% of absolute consumption at the end of life.

Gender allocation for private consumption indicators are based on the same data sources described above. Private expenditure on health and education from ILCS provide data by sex also. It should be noted also that an application of simplified consumption comparison model by age (due to absence of data source on age-sex breakdown of private expenditure other than health and education) assumes equal consumption for men and women within each age. This approach can be improved only if private consumption other than health and education is available by age and sex. Currently, Armstat's ILCS provides details for private consumption on education and health by age and sex, but the other private consumption is not available by age-sex.

Data:
According to the Armenia's 2019 NTA overall private expenditure by per capita indicators has two peaks by age: one is at age 20 (when highest per capita private expenditure on education meets the maximum consumption level for other private consumption) and another one is at age 63 (or around 60-65), when increasing private expenditure on health correspond with still the maximum consumption level of other private consumption.

Figure 8. Armenia NTA 2019: Private Consumption by Age: Per capita values

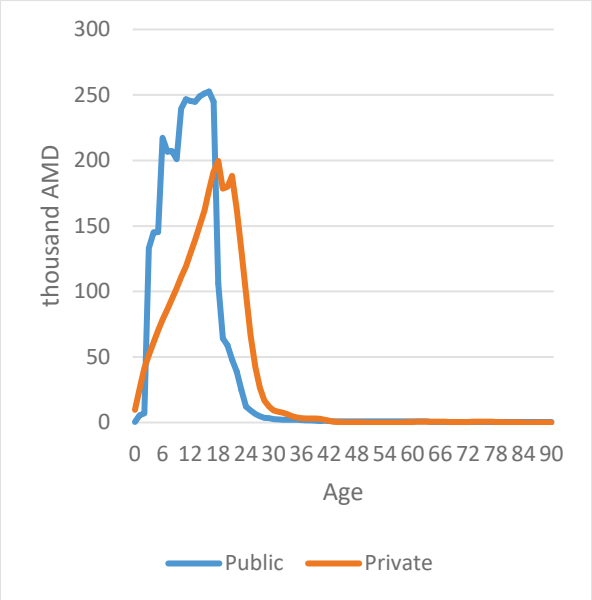


Source: Armenia NTA 2019

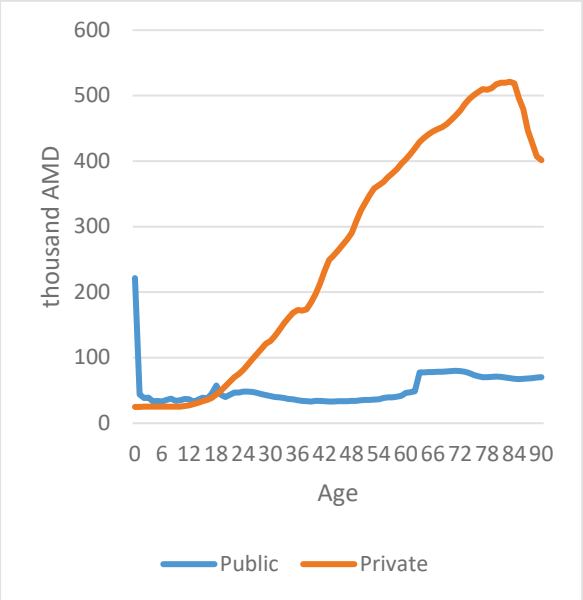
Private expenditure on education in Armenia are peaked for 17-21 ages, while public expenditure are peaked for 10-17 ages. So, general education is largely financed by the government, while, university education by private expenditure. Unlike education, where public and private expenditure are more or less comparable, private expenditure on health are significantly higher compared to public expenditure on health. Public expenditure on health are significant for children as they are higher than private expenditure for ages 0-18, but later ages public expenditure on health become less and less compared to private expenditure. Introduction of well-designed mandatory health insurance may help increasing efficiency of both public and private expenditure on health.

Figures 9. Armenia NTA 2019: Per capita expenditure: Private vs Public

a. Education



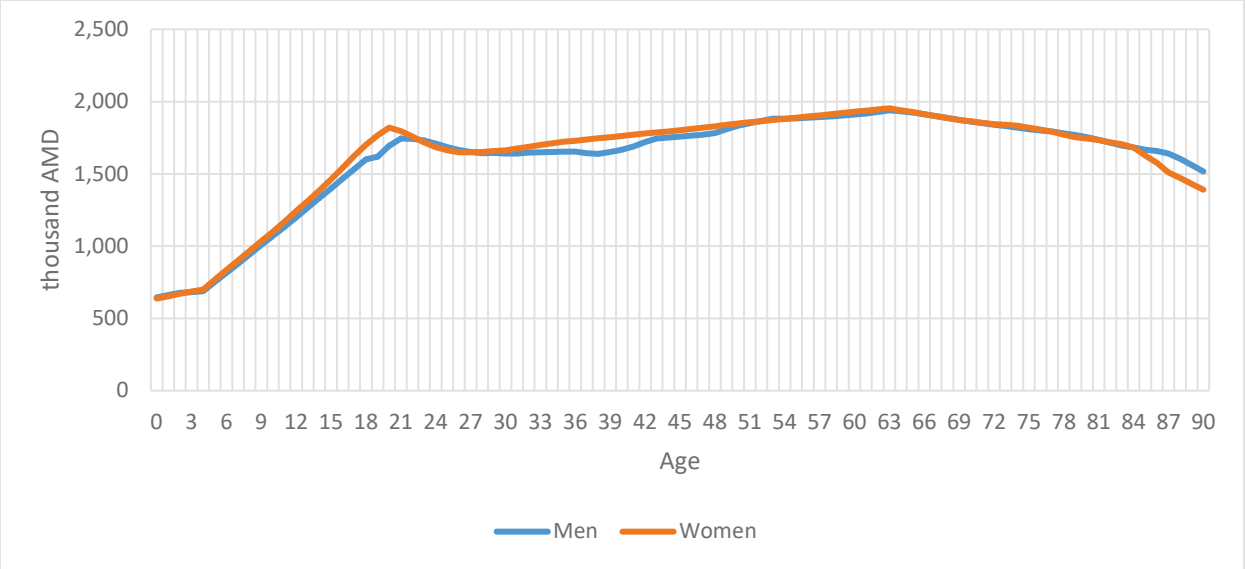
b. Health



Source: Armenia NTA 2019

Total private expenditure by gender and age have similar trends. One of the reasons for similar distribution by age is the treatment of other public expenditure, which was distributed equally to men and women as no source is available here.

Figure 10. Armenia NTA 2019: Private Consumption by Age and Sex: Per capita values

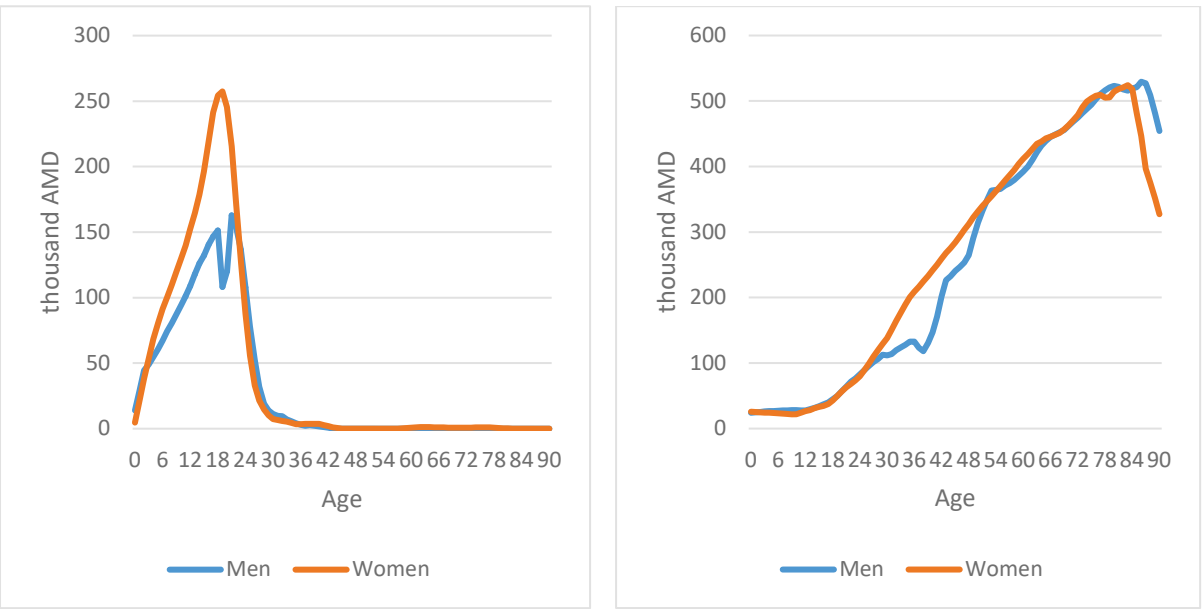


Source: Armenia NTA 2019

The differences by gender are visible for public expenditure for ages 16-22 (largely explained by higher participation of girls in high school education and also by military service for boys, while girls continue their study) and for ages 30-48 (largely explained by higher expenditure on health for women due to childbirth mainly). Another difference is noticed for population over 80, which perhaps can be explained with the fact than men have more healthcare issues at that age than women (due to higher risks in non-communicable diseases).

Figures 11. Armenia NTA 2019: Per capita Private expenditure by sex:

a. Education **b. Health**



Source: Armenia NTA 2019

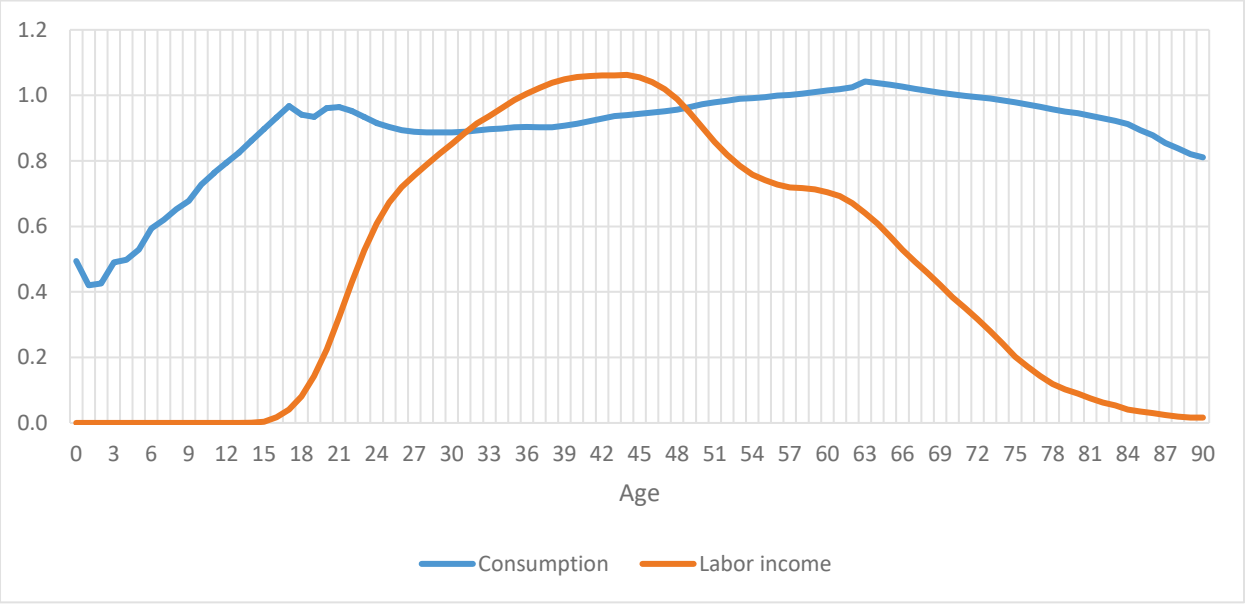
1.3 Life-cycle deficit

The fundamental indicator of NTA is **life-cycle balance by age**. Economic life cycle is a fundamental feature of all societies. The economic life cycle refers to patterns of consumption and earnings across age that lead to a mismatch between material needs and the ability to satisfy those needs through own labor. As it is stated in NTA manual, in all contemporary societies, we experience a long period at the beginning and the end of our lives when we consume more than we produce through our labor. In the middle comes a period during which more is produced than is consumed. Many behavioral and non-behavioral factors influence how consumption and labor income vary with age. Average labor income at each age depends on hours worked, labor force participation, unemployment, and wages and the many cultural, political, social and economic factors that influence each of these elements of labor income (Lee and Ogawa, 2011). In similar fashion, average consumption at each age is influenced by historical events, preferences, prices, including interest rates, political systems and many other forces (Tung, 2011).

Life cycle deficit in NTA = Consumption - Labor income.

For those ages where Consumption is larger than Labor income, life cycle deficit is registered, which has to be covered by reallocations, such as Transfers (public and private) or Asset-based reallocations. As it can be seen from the Figure below, all ages except 32-48 range have life cycle deficit: consumption is higher than their labor income. Per capita values in the Figure 12 are presented as relative to an average labor income for 30-49 ages, which is used by all countries that compile NTA for country comparison reasons.

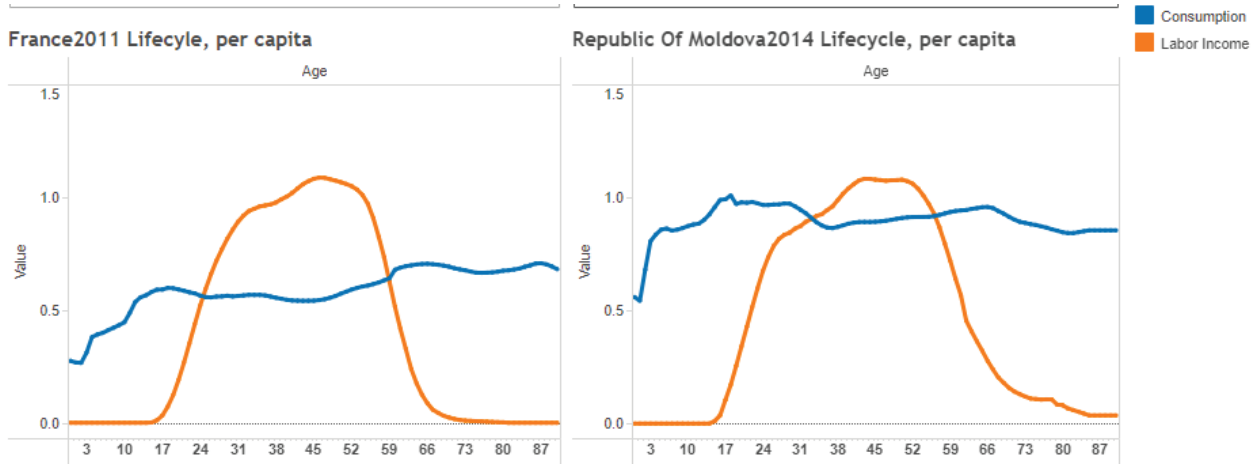
Figure 12. Armenia NTA 2019: Life cycle balance by Age: Per capita values*



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019

Particularly, Moldova 2014 indicators show consumption pattern nearly similar to Armenia (largest part of single age groups have consumption at nearly 1.0 value), while consumption value is largely at 0.5 value with France 2011 indicators. This difference is perhaps explained by differences in productivity: Armenia and Moldova have much lower labor productivity compared to developed economy, in this case France. As result, there are more single ages in France with lifecycle positive balance (23 to 59), while for Moldova only population in 33 to 56 ages have positive life cycle balance (Figure 13).

Figure 13. NTAs in other countries: Life cycle balance

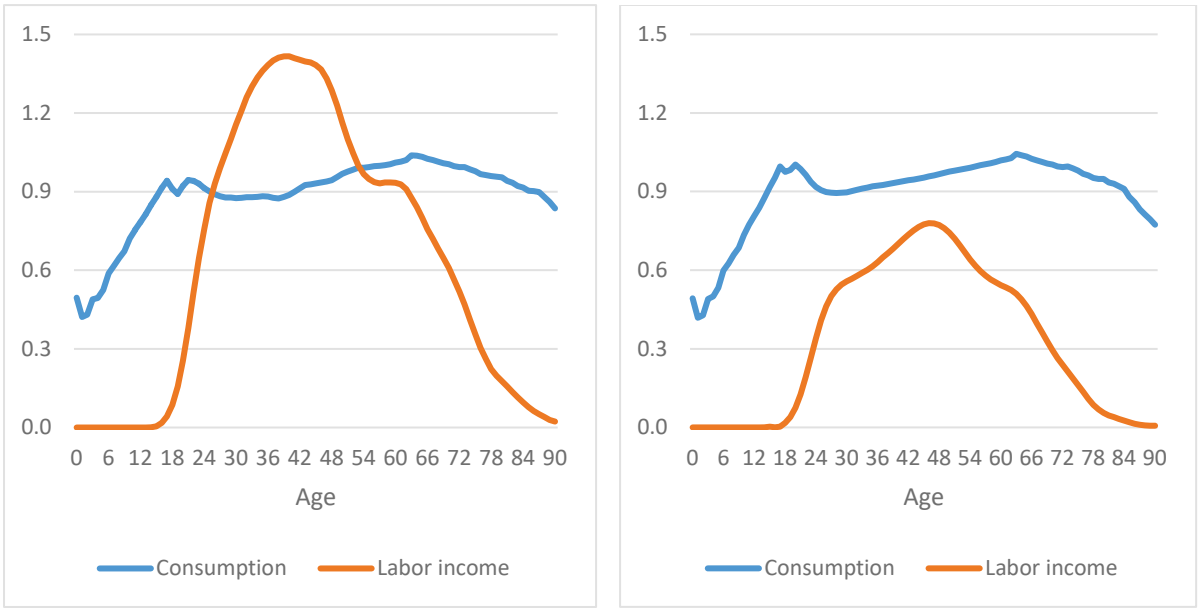


Source: https://ntaccounts.org/web/nta/show/NTA%20data%20visualization

The life cycle balance patterns are significantly different for men and women in Armenia. While Consumption patterns are more or less similar, labor income patterns are very different. As result, men in 26-52 ages produce more than they consume, while no single age for women produces more than they consume. It should be noted here, that while men have larger participation in labor market, women usually do much more unpaid work. NTA (as SNA) takes into account only economic production (particularly most of the services rendered within households are not taken into account). There is another version of accounts – National Time Transfer Accounts (NTTA) which takes into account time spend on activities which are usually not paid therefore are not visible for NTA or SNA, such as child care of elderly care, etc.). While only few countries have managed to have full NTTA, their result show larger participation of women than men, with larger number of women's singe age groups with positive life cycle balance.

Figures 14. Armenia NTA 2019: Life cycle balance by Sex: Per capita values*

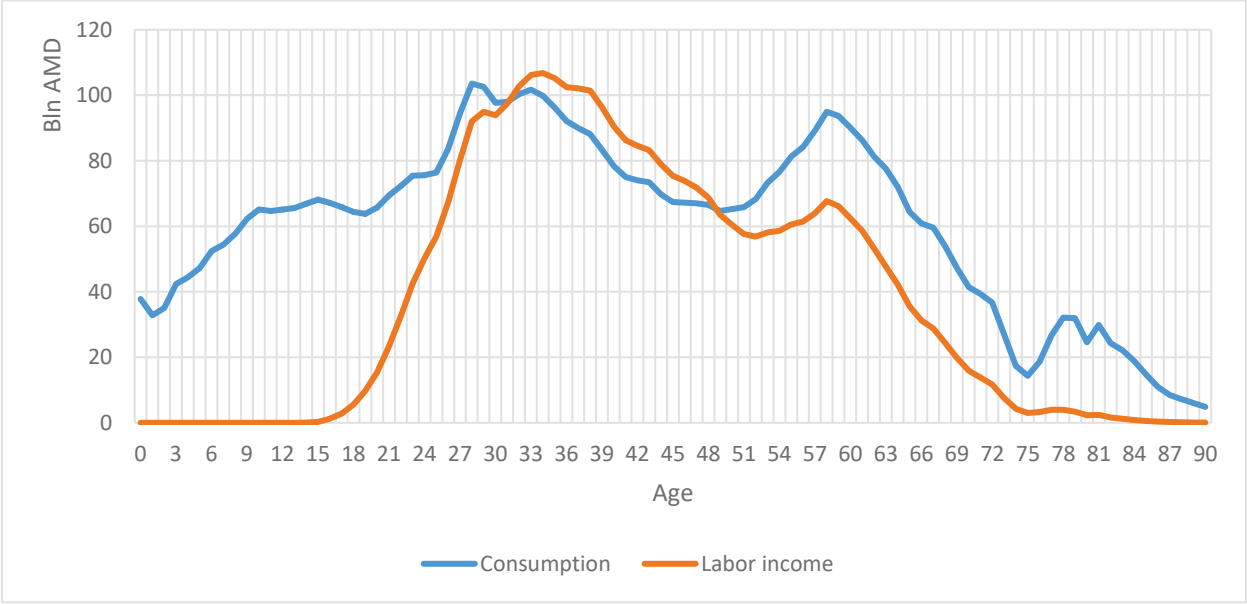
a. Men **b. Women**



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019

For the total economy in 2019 overall life cycle deficit was around 2.07 trillion AMD. The population with positive life cycle balance (32-48 age) produce by 146 bln AMD more than they consume, so overall deficit for ages with life cycle deficit is 2.22 trillion AMD.

Figure 15. Armenia NTA 2019: Life cycle balance by Age: Total Economy flows



Source: Armenia NTA 2019

The largest part of this total deficit (47.3%) belongs to children (0-18 age), while 24.9% - to elderly population (64+). Even if consumption patterns remain the same, only changes in demographic structure of population (particularly, aging) will change the shares in deficit. Understanding the

influence of demographic changes on life cycle is important also to plan corresponding public revenues and expenditure.

2. Public age reallocations

As described in previous chapter, the population under 33 and over 48 in Armenia have negative life cycle balance, which means their consumption is larger than their labor income. This deficit is financed by age reallocations. The economic mechanisms used for age reallocations fall into two broad categories: transfers and asset-based reallocations. A defining feature of transfers is that they involve no explicit quid pro quo or exchange. Resources flow from one party to another either voluntarily, in the case of most private transfers, or not, in the case of public transfers. Asset-based reallocations realize inter-age flows through inter-temporal exchange. An asset such as gold, for example, can be acquired using labor income when young. It can be sold later, thereby generating an inflow that can be used to fund old-age consumption. More generally, asset-based reallocations involve two kinds of flows, asset income and savings[14].

This chapter presents compilation of Public age reallocations for Armenia's NTA.

2.1 Public transfers

In NTA, Public transfers present two main functions: mediation of transfers to program beneficiaries from taxpayers which is summarized under Public transfer Inflows and 2) implementation of the payments to the government from residents and the rest of the world, which is summarized under Public Transfer Outflows.[15] Public transfers appear to be the transfers between "public and the private sector, or transfers between the public sector and the rest of the world." At the aggregate level, total net public transfers of the given economy are calculated as the difference between the transfers received (inflows) and paid (outflows) by individuals to and from the government, respectively.

Macro control indicators for the Public Transfers is estimated to be 72.3 bln AMD (2019), which is a difference between Public Transfers Inflows (1,355.3 bln AMD) and Public Transfer Outflows (1,283.0 bln AMD).

Public Transfer Inflows are calculated as the sum of the Public Transfer inflows categories, which include both in-kind and in-cash transfers received by individuals. Public transfers inflows in-kind are equivalent to the overall public expenditure, adjusted to remove taxes but including subsidies. In other words, macro control indicators for public transfers are closely related to macro control indicators in Public consumption. These transfers include Public transfer inflows for education, health and other in-kind and are explained by respective categories in public consumption (public consumption on

[14] National Transfer Accounts Manual: Measuring and Analysing the Generational Economy, UN 2013
[15] National Transfer Accounts: Understanding the Generational Economy. Aggregate Values and the Structure of Public Flows. https://ntaccounts.org/web/nta/show/Methodology/3.%20Public%20Reallocations#H-qc2sls

education, health and other than health and education). Public transfers in-cash which implies monetary transfers received from government, "consist of social benefits other than social transfers in-kind and other current transfers received by private sector (pension, unemployment benefits, child allowances, miscellaneous current transfers from general government in the form of assistance and grant, except those recorded as investment grant)."[16] They include Public Transfers inflows Pensions and Other cash. Macro indicator for Total Pension Inflows should be based on actual age-specific pensions paid only. In case of Armenia, "working pensions" were available only, as the Ministry of Finance provides detailed budget expenditure where "working pensions" are not detailed further. Significant part in "working pensions" is age specific pensions, but it includes also other types of pensions. Public Transfers Other cash, in its turn, incorporates Government sector's Total current transfers payable to ROW minus Total current Transfers receivable from ROW (the source of the data used for this category is the Balance of Payment), while Public Transfers Other cash Inflows includes Total current transfers payable by the Government sector minus Pensions paid.

Public Transfer Outflows include taxes, social contributions and other revenues paid by the private sector to the government. They appear to be the sum of all categories of Public Transfer Outflows. Public Transfer Outflows for education, health, pensions and other in-kind are equal to the public transfer inflows of the respective categories, as their difference should be zero. The "Public Transfer, Other cash Outflows", however, are calculated as the difference of "net Public Transfers Other cash" and "Public Transfers, Other cash Inflows". Net Public Transfers, Other cash outflows in its turn, were calculated as net transfers of the Government Sector in the Balance of Payments for Armenia.

The age and gender profiles of Public Transfer Inflows and Outflows are calculated based on transfer components. As Public Transfer Inflows in-kind are equal to the Public consumption of the appropriate sections (education, health, other than education and health), the age and gender profiles for this category use the age and gender profile patterns of the mentioned sections. Inflow for Pensions, in their turn, use the age and gender structure of number of privileged pensioners based on data provided by Unified Social Service. Unfortunately, single age-sex breakdown of size of age-specific pensions was not possible to obtain at this stage, which would have increased significantly the quality of distribution of pensions by age and gender. Instead, average pension by sex was used in calculations. The results of this allocation were then smoothed using per capita indicators. On the other hand, the age distribution of Public Transfers Inflows Other cash uses the age structure of total population, while the gender distribution for each age is calculated proportionally based on share of male-female in each age.

Public Transfers Outflows of all the respective categories use the proxy calculation of breakdown of taxpayers by age, the results of which were further smoothed. A proxy calculation of age and gender distribution was applied, as there was no data on the age and gender distribution of taxpayers for the different types of taxes, following the guidelines specified by the NTA methodology for such cases. The NTA methodology specifies which age profiles to use for various taxes when survey data or administrative data on those taxes is unavailable. For example, taxes on income and payrolls can be

[16] Statistical Office of the Republic of Serbia 2021. An Analytical Report of the National Transfer Accounts for Serbia, p.21.

assumed to have the same age pattern as labor income; taxes on assets can be assumed to have the same age pattern as private asset income; taxes on consumption such as value added taxes (VAT) or sales taxes can be assumed to have the same age pattern as total private consumption or components of private consumption that depend on the details of the tax systems, e.g., treatment of consumption and education.

The table below presents the alternative proxy calculation suggested by the NTA methodology alongside the proxy calculation implemented for the Armenia NTA for the specified tax categories. Please note that the highlighted boxes indicate methodologies other than those recommended by the NTA (general or alternative) methodology due to the absence of required data.

Table 5. Methodology for the calculation of tax distribution by age and gender for NTA

Revenues	**Distribution proxy suggested by the NTA methodology**	**Distribution proxy used for Armenia NTA**
Value added tax	Consumption	Total consumption pattern by age and gender was used
Profit tax	Asset income	In the absence of age and gender breakdowns for both profit tax and asset income, the distribution for this category was based on the age of the head of household, considering that property is typically attributed to the household head. Another assumption here is that asset ownership is similar to property ownership, which is not necessarily true.
Income tax	Labor income	In the absence of breakdown of income tax by age and gender, the breakdown of labor income by age and gender distribution was applied
Excise tax	Depends on products where excise tax is applied- for example, Tobacco/Alcohol by consumption, etc.	In this case, the consumption structure of alcohol and tobacco in Armenia, derived from various sources, was used. However, certain approximations were made and a specific model was applied, as the data were provided for age groups rather than individual ages
Turnover tax	Consumption	Total consumption pattern by age and gender was used
Property tax	Asset income	In the absence of age and gender breakdowns for property tax and asset income, the distribution for this category was based on the age of the head of household, considering that property is typically attributed to the household head.
Land tax	Asset income	In the absence of age and gender breakdowns for land tax and asset income, the distribution for this category was based on the age of the head of household, considering that property is typically attributed to the household head.
Customs duty	Consumption	Total consumption pattern by age and gender was used
Payments for utilization of natural resources and environment protection	Asset income	In the absence of age and gender breakdowns for payments for utilization of natural resources and environment protection and asset income, the distribution for this category was based on the age of the head of household, considering that property is typically attributed to the household head. Given the nature of the tax associated with the utilization of natural resources and environmental protection, it may be appropriate to allocate taxes paid by mining companies based on the age and gender distribution of the company owners.

Other tax incomes	Consumption	Total consumption pattern by age and gender was used
Duties	Consumption	Total consumption pattern by age and gender was used
Social payments	Labor income	In the absence of breakdown of social payments by age and gender, the breakdown of labor income by age and gender distribution was applied
Official transfers	Consumption	Total consumption pattern by age and gender was used
Other incomes	Consumption	Total consumption pattern by age and gender was used

Source: Armenia NTA

According to the NTA methodology, in cases when age distribution of taxpayers is unavailable, for example, for Value Added Tax (VAT), it suggests relying on the consumption structure considering the fact that VAT is paid by all individuals based on their consumption. This principle extends to turnover tax, customs duty, other tax incomes, duties, official transfers, and other incomes, where the total consumption breakdown is recommended due to their alignment with consumption patterns. In situations where age structure data for income tax and social payments are not available, it is recommended to rely on the breakdown of labor income, given the strong interconnection between these categories and labor income. If age structure data for Profit, Property, Land taxes, and Payments for utilization of natural resources and environment protection are unavailable, the NTA methodology recommends using Asset income as an alternative. However, in the case of Armenia NTA, when alternative suggestions from the NTA methodology were applied for other categories, the distribution for Profit, Property, Land taxes, and Payments for utilization of natural resources and environment protection relied on the age of the head of the household as the data for the age and gender distribution of the mentioned taxes and payments was not available. This alternative proxy method was chosen based on the typical association of property ownership with the household head.

Further, the total distribution of taxes by age was calculated by summing all the mentioned taxes for each age group, utilizing the shares of the given taxes in the total consolidated budget. The tax distribution by aged was done considering only the adult population (people aged 18 and above). Overall, two approaches exist for calculating the age distribution of taxes:

- According to the first approach, taxes are allocated across both children (aged 0-18) and adults, considering that children, like adults, have consumption and may possess assets from which tax obligations could arise.
- According to the second approach, taxes are assigned only to the adult population (individuals aged 18 and above). This is because while children may have assets resulting from transfers by their parents, these assets are formally attributed to the head of the household.

Data needs and gaps: during the development of the given section of NTA, a range of data requirements and identified gaps were emphasized. The current analysis highlights a crucial need for more comprehensive and precise data regarding taxpayers, including detailed breakdowns by age, gender, and specific tax types. This detailed data and information is essential for a thorough understanding of tax distribution dynamics within the population. By obtaining such detailed data,

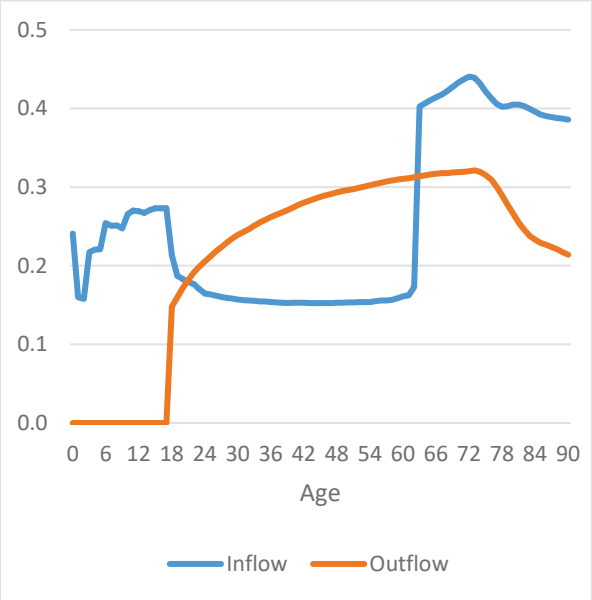
significant improvements can be achieved in the accuracy and depth of the NTA framework, allowing for more nuanced policy assessments and targeted interventions.

Data Presentation:

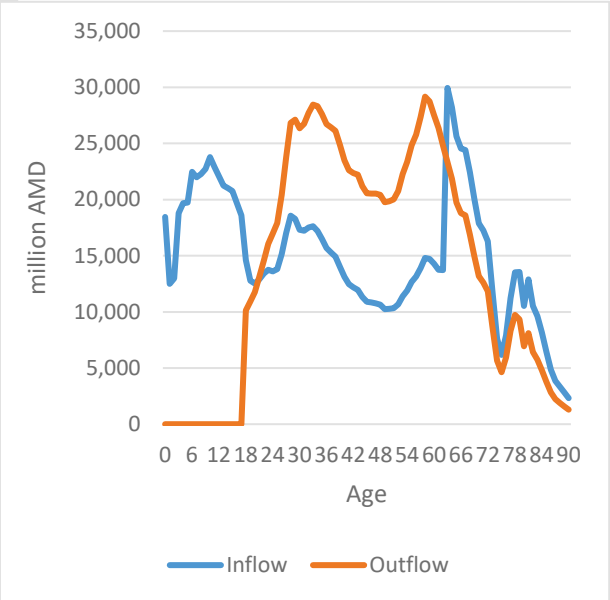
According to the Armenia's 2019 NTA Public transfers inflow (transfers received by population) is higher than Public transfers outflow (transfers paid to government by population, like taxes) for the population under 20 and over 63. Population with age between 20-63 largely finances transfers to other age groups through the government.

Figure 16. Armenia NTA 2019: Public Transfers

a. Per capita values*



b. Total Economy flows

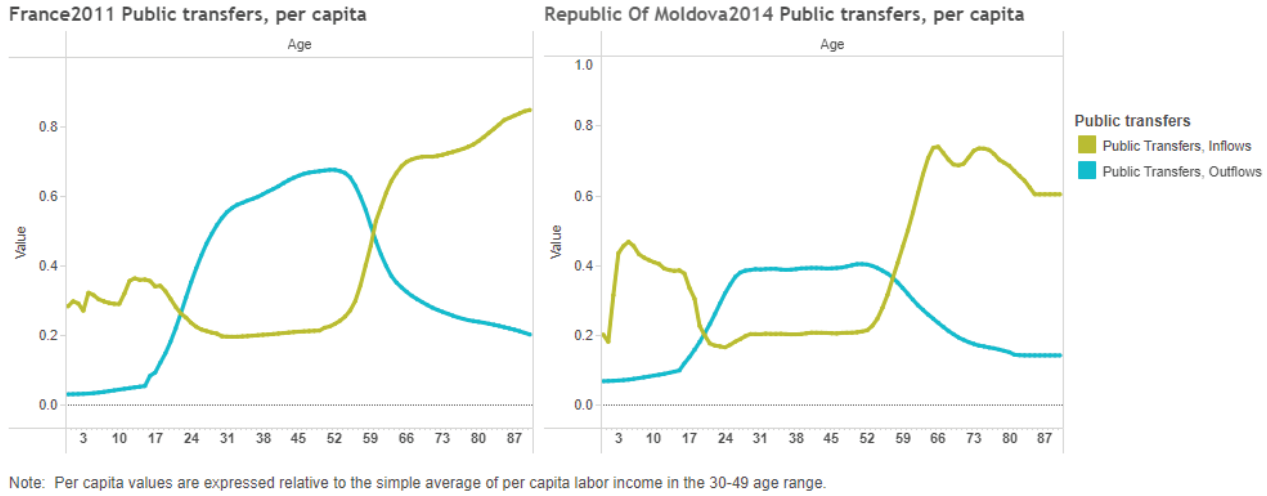


** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*

Source: Armenia NTA 2019

Comparing Armenia's per capita public transfers to other countries, we see that both inflows (transfers provided by the government) and outflows (transfers paid to the government) are lower in Armenia with comparative indicators. Public transfers inflows to children (mainly education transfers) are at 0.3-0.4 level of 30-49 age labor income in observed countries, while it is lower than 0.3 level in Armenia. The difference in transfer inflows to older population and especially in transfer outflows (payments to the government such as taxes) is much larger.

Figure 17. NTAs in other countries: Public Transfers

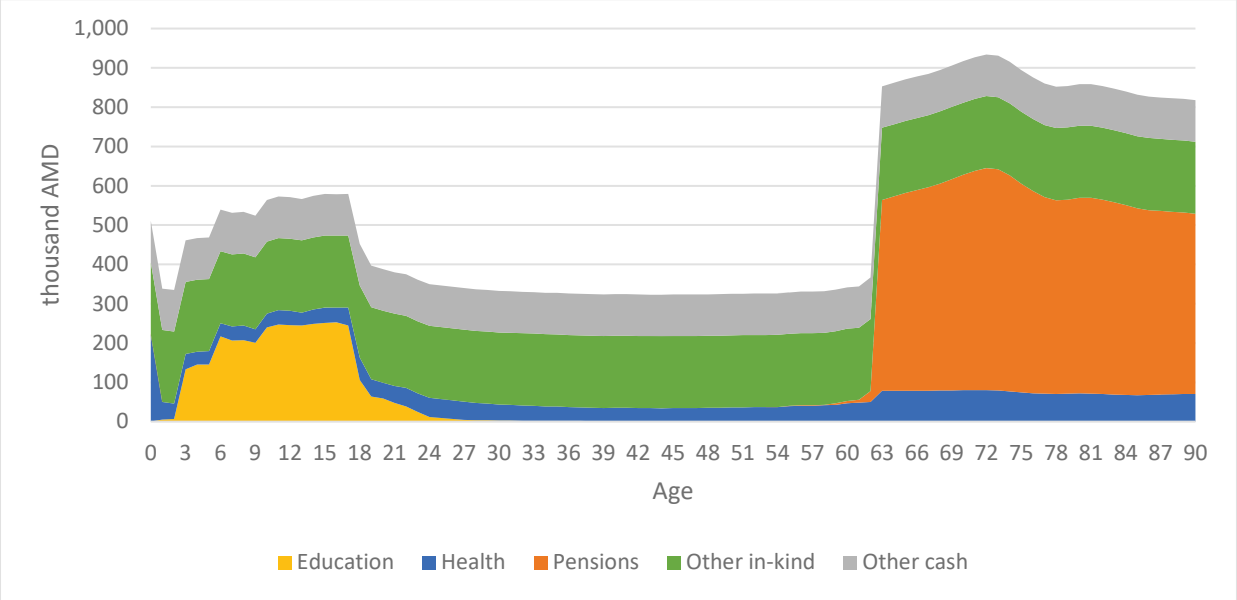


Note: Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range.

Source: https://ntaccounts.org/web/nta/show/NTA%20data%20visualization

The structure of Public transfers inflow (transfers received by population from the government) is different for different age groups: Education related transfers are the most significant for children, especially those in school age, while Pensions are the most important transfers for old age groups.

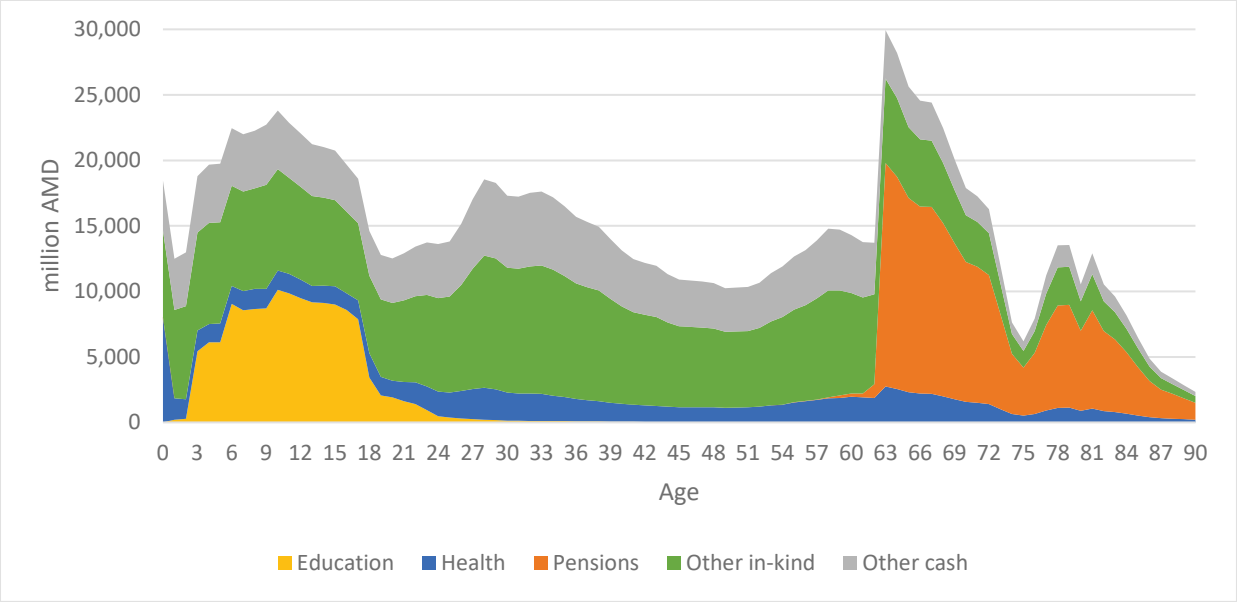
Figure 18. Armenia NTA 2019: Public Transfers Inflows by components and by Age: Per capita values



Source: Armenia NTA 2019

While per capita values show larger Public transfers for an older group of population, total economy flows, which takes into account the number of population in each age group, show two almost similar peaks for the largest total public transfers: age group 8-10 and age group 64-66.

Figure 19. Armenia NTA 2019: Public Transfers Inflows by components and by Age: Total Economy Flows

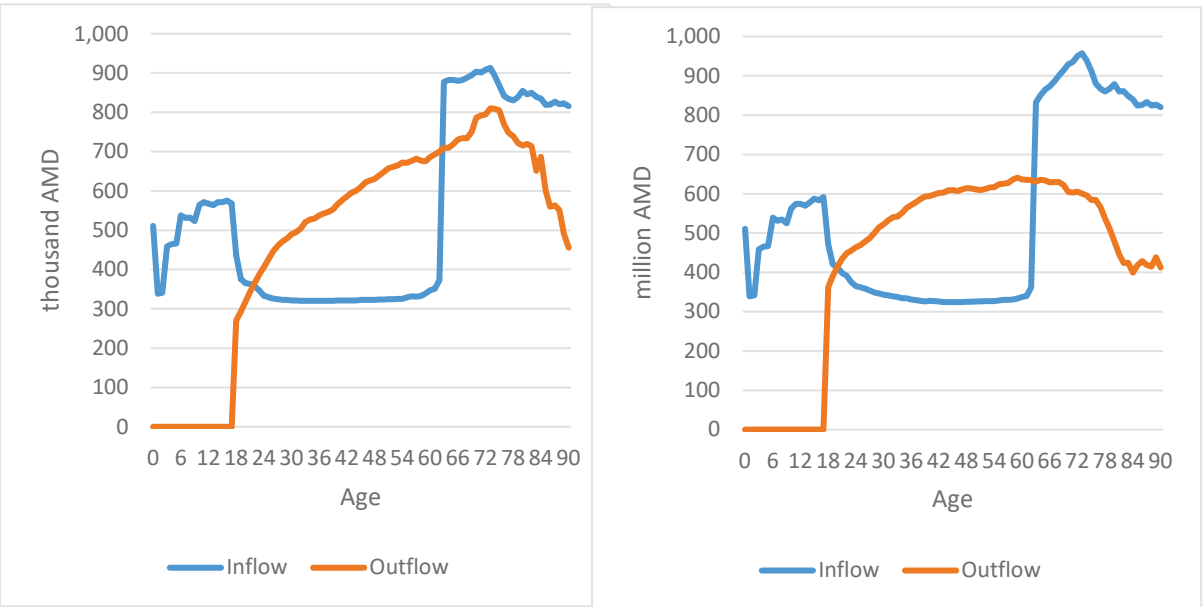


Source: Armenia NTA 2019

Observing Public transfers by sex, larger net inflow of public transfers is noticed for women, mainly due to larger outflow (payments to government) by men. This is mainly explained by higher taxes paid by men vs women, which for older ages is conditioned by larger number of men with assets and therefore larger taxes/payments to government.

Figure 20. Armenia NTA 2019: Public Transfers by Sex (per capita values)

a. Men **b. Women**



Source: Armenia NTA 2019

2.2 Public asset-based reallocations

Public asset-based reallocations "summarize the inflows to and outflows from age groups that are a consequence of public asset transactions. Asset-based reallocations consist of two distinct flows – public asset income (or loss) and public saving."[17] They appear to be calculated as the difference of public asset income and public saving. In its turn, Public asset income consists of capital income and property income. Typically public capital income is zero or very small[18]. Public property income is defined as property income inflows less property income outflows. Property income inflows include interest income and dividends and royalties earned from natural resources. Property income outflows consist primarily of interest payments on public debt.

Macro control indicators for Public Asset-Based Reallocations is estimated to be -403.6 bln AMD, which is calculated as the following:

Public Asset-Based Reallocations (-403.6 bln. AMD) = Public asset Income (-49.6) - Public Saving (354.0)
Public Asset Income is defined to be "the sum of public capital income (that is equal to the public net operating surplus) and public property income." Asset income, in its turn, appears to be the "net inflow for the taxpayers if positive and a net outflow if negative"[19] . In case of Armenia, Public asset income is negative due to interest paid on public debt. The macro control indicator for this category was derived from the Institutional sector accounts in the SNA:

Public Capital income (net) = Gross operating surplus of General Government sector (from SNA) – Consumption of fixed capital of General Government sector (from SNA)
Public Property income (net) = Property income Inflows (SNA, Allocation of primary income account, GG sector) - Property income Outflows (SNA, Allocation of primary income account, GG sector)
Public Asset Income= Capital income (1,000) + Property income (-50,563)

Public Saving appears to be "equivalent to the net public saving from the SNA." It is assumed that "if positive, public saving generates an outflow from taxpayers while public dissaving or the accumulation of the public debt generate an inflow to taxpayers."[20] The data for macro control indicator of this category is sourced from SNA: for which the use of disposable income account, GG sector was considered.

Public savings (net) = Gross Public savings (SNA, Use of disposable income account, GG sector) – Consumption of fixed capital of General Government sector (SNA)

The age and gender profiles of Public Asset-based Reallocations were calculated using the methodology applied for Public Transfers Outflows applying calculated shares of tax revenue

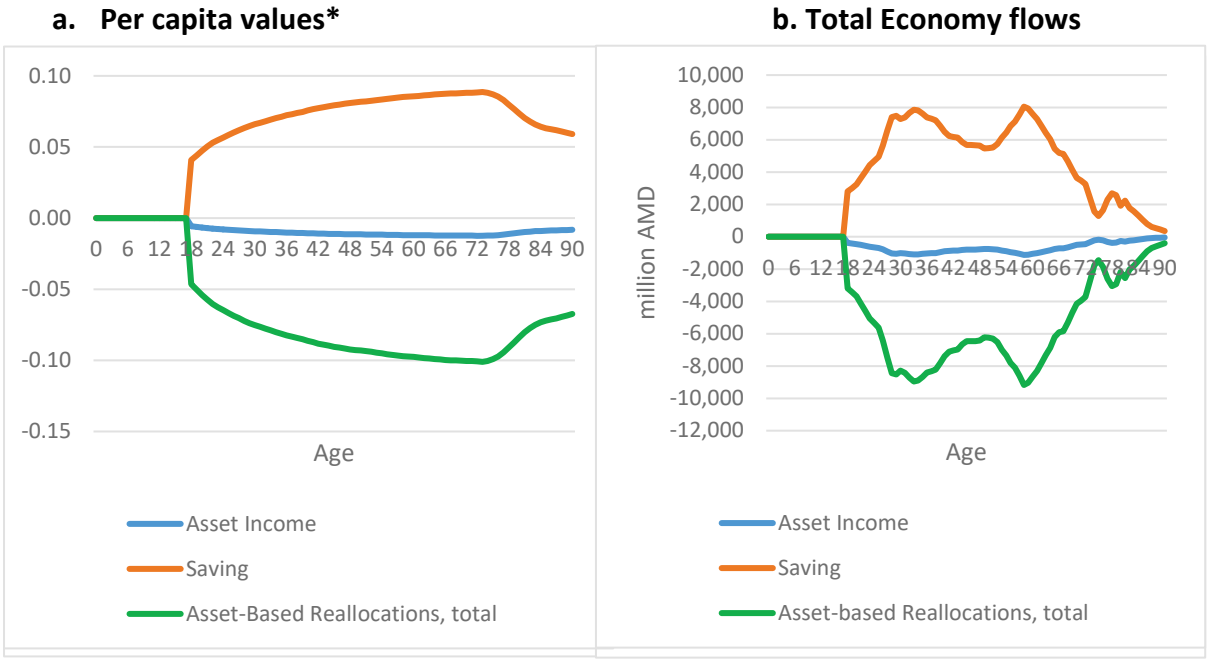
[17] National Transfer Accounts: Understanding the Generational Economy. 3.2 Public Asset-Based Reallocations. Introduction. https://ntaccounts.org/web/nta/show/Methodology/3.2%20Public%20Asset-Based%20Reallocations
[18] National Transfer Accounts Manual: Measuring and Analysing the Generational Economy, UN 2013
[19] Statistical Office of the Republic of Serbia 2021. An Analytical Report of the National Transfer Accounts for Serbia, p. 26.
[20] Statistical Office of the Republic of Serbia 2021. An Analytical Report of the National Transfer Accounts for Serbia, p. 26.

distribution by age following the methodology applied for Public Transfers Outflow (see details in Public transfers chapter).

Data Presentation:

As described above, age-gender allocation of Public asset-based NTA indicators is based on proxy distribution of taxpayers by age-gender, therefore this distribution is similar to those for Public Transfer Outflows. As Public Asset Income is negative (49.6 bln AMD) in Armenia in 2019 and Savings is positive (354 bln AMD), total Public Asset-based reallocations (Asset income - Savings) are negative. Middle age/working population bears negative balance for Public asset-based reallocations.

Figure 21. Armenia NTA 2019: Public Asset-based Reallocation



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*

Source: Armenia NTA 2019

3. Private age reallocations

This chapter presents compilation of Private age reallocations for Armenia's NTA.

3.1 Private transfers

Private transfers are defined to include "flows between different households (including flows between households and the rest of the world (ROW)) and among members of the same household." They are composed of the Inter-household and Intra-household transfers. Private Transfers appear to be calculated as the sum of Inter-household and Intra-household transfers.

Macro control indicator for the net Private transfers is estimated at 235.4 bln AMD, which is actually equal to net Inter-household private transfers (as net Inter-household transfers are equal to 0). Macro indicator for the net Inter-household private transfers is equal to the corresponding indicator from the Balance of Payments Statistics in Armenia ("Secondary Income: Personal transfers (Current transfers between resident and nonresident households) ").

The following equations are in place for Private Transfers in NTA:

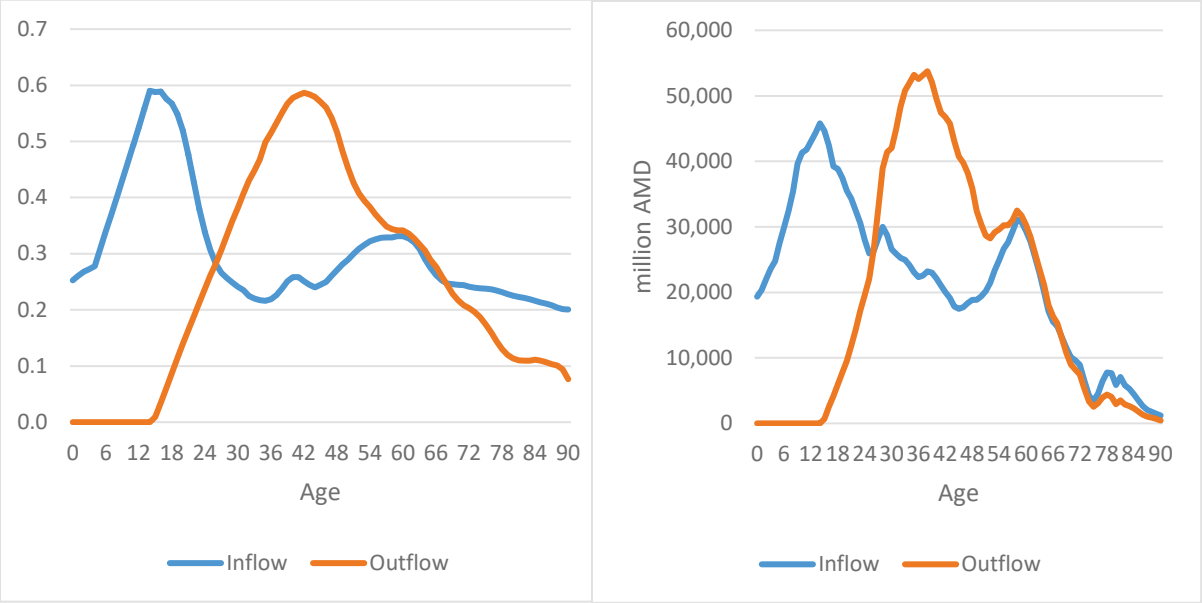
Net Private transfers = Net Inter-Household transfers + Net Intra-household transfers or
= Private Transfers, inflow – Private Transfers, outflow

Private transfers, inflow = Inter-Household transfers, inflow + Intra-Household transfers, inflow
Private transfers, outflow = Inter-Household transfers, outflow + Intra-Household transfers, outflow
Net Inter-Household transfers = Inter-Household transfers, inflow - Inter-Household transfers, outflow
Net Intra-Household transfers = Intra-Household transfers, inflow - Intra-Household transfers, outflow

Age and sex profiles for private transfers are constructed on Inter-household and Intra-household inflow and outflow levels, which are discussed in detail below within their corresponding sub-chapters. Overall, as shown in Figure 22, the largest receivers of private transfers (private transfers inflow) are teenagers, while population of 40-45 age are the largest payers of private transfers (private transfers outflows). Overall, the population within 26-66 ages are paying more than they receive as private transfers.

Figure 22. Armenia NTA 2019: Private Transfers

a. Per capita values* **b. Total Economy flows**

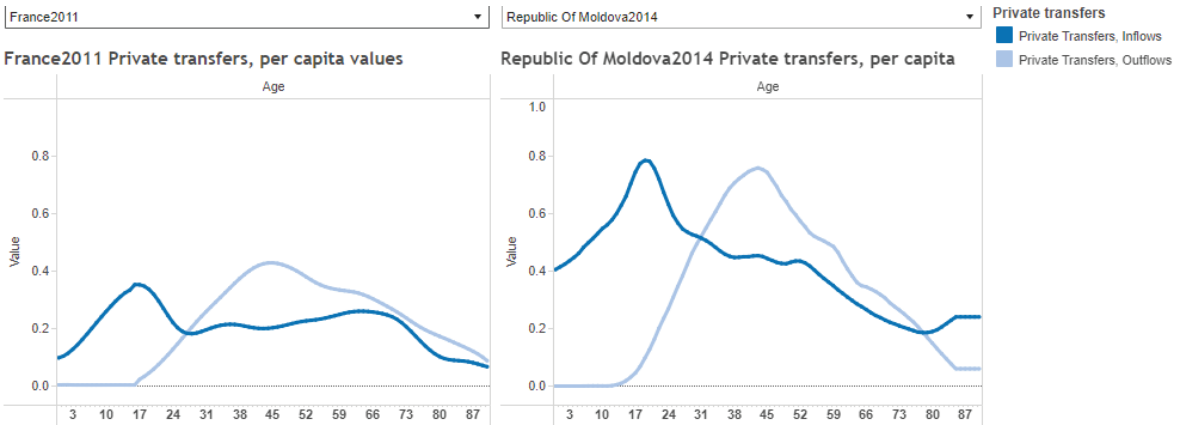


** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*

Source: Armenia NTA 2019

Private transfer trends in Armenia (compared to other countries, particularly to France as a country with advanced economy and to Moldova as a country with similar development background and development level), are more like a country with similar development level. The comparable size of private transfers is higher in Armenia and Moldova against France (0.6-0.8 vs 0.3-0.4 relative to average labor income in the 30-49 age range), which means private transfers are more important for the economy. Another difference with France is that older population are receivers of net private transfers in Armenia and Moldova, while they are payers in France, which means public transfers are not enough for their consumption in these countries and part of the private transfers go to this age groups. Overall, consumption in older age groups is largely supported with private transfers in Armenia, while in France they receive more public transfers.

Figure 23. NTAs in other countries: Private Transfers



Source: https://ntaccounts.org/web/nta/show/NTA%20data%20visualization

3.1.1 Inter-household transfers

Inter-household transfers "consist of direct transfers between households, transfers mediated by NPISHs, and transfers to and from ROW." These transfers include alimony payments, gifts, from/to abroad and all other transfers that flow from one household to another. Inter-household transfers are calculated as the difference between Inter-household transfers Inflows and Outflows.

Macro control indicators for Inter-household transfers in Armenia for 2019 is estimated at 235.4 bln AMD, which is the difference between Inter-household transfers Inflows (354.0 bln AMD) and Inter-household transfers Outflows (118.7 bln AMD).

It is mentioned that "the difference between inflows and outflows of private inter-household transfers must equal net private transfers from the rest of the world as reported in the SNA." In a closed economy they would sum to zero, but in an open economy private inter-household transfer inflows plus net private transfers to ROW will equal inter-household private transfer outflows. Inflows and/or outflows must be adjusted to insure that consistency with estimates of net flows to ROW."

Inter-household transfers, inflows appear to be "current economic transfers received by resident households and ROW."[21] They are calculated as the sum of the Household remittances received from the ROW and estimated inter-household transfers received from other households within Armenia. The source of macro control indicator for the household remittances is the Balance of Payment compiled by the Central Bank of Armenia (CBA), while the data source for the estimation of inter-household transfers within Armenia is Armstat's ILCS database, where household's transfers from other households in Armenia and outside of Armenia are available.

Inter-household transfers, outflows are considered to be "donations and gifts given to households, to NPISHs and to the ROW. They are calculated as the sum of the household remittances paid to the ROW and estimated inter-household transfers to other households within Armenia. The sources of the estimation of macro control indicators are the same as for the inflows, namely the Balance of Payment by the CBA and ILCS database by Armstat.

Data for Macro control indicators of Inter-household transfers with ROW are based on the indicators from the Balance of Payment statistics in Armenia for 2019. Particularly, inflows are equal to Credit of "Personal transfers (Current transfers between resident and nonresident households)" ($682.1 mln converted to AMD with average annual exchange rate), while outflows are equal to Debit of "Personal transfers (Current transfers between resident and nonresident households)" ($192.2 mln converted to AMD with average annual exchange rate).

Data for Macro control indicators of Inter-household transfers within Armenia are based on corresponding questions in Armstat's ILCS database, adjusted upward to the level of macroeconomic

[21] National Transfer Accounts: Understanding the generational economy. 4.1 Private Transfers. Inter-household Transfers. https://ntaccounts.org/web/nta/show/Methodology/4.1%20Private%20Transfers#H-z3lz5f

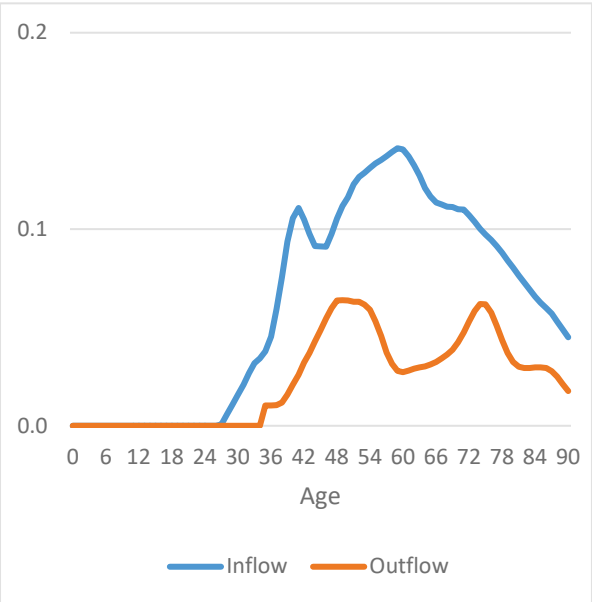
indicators, using the difference between the total economy consumption in SNA and total consumption covered by the ILCS.

Age and gender distribution of Inter-household transfers are done based on the principles suggested by the NTA manual. Particularly, for age distribution "Inter-household transfers are assigned to the household head"[22]. Armstat's ILCS database provides data on household's heads such as age and sex, which were used for the breakdown data on the paid and received transfer from Armenia or abroad. For the macro control indicator, a distribution of households headed by men and women was used (only those received transfer from Armenia or abroad) sourced from the Armstat ILCS database. The age and gender distribution of this category followed the breakdown of household heads by both age and gender for those households that received transfers from Armenia or abroad. As many other indicators in NTA, data on inter-household transfers by age and sex were smoothed at the per capita level.

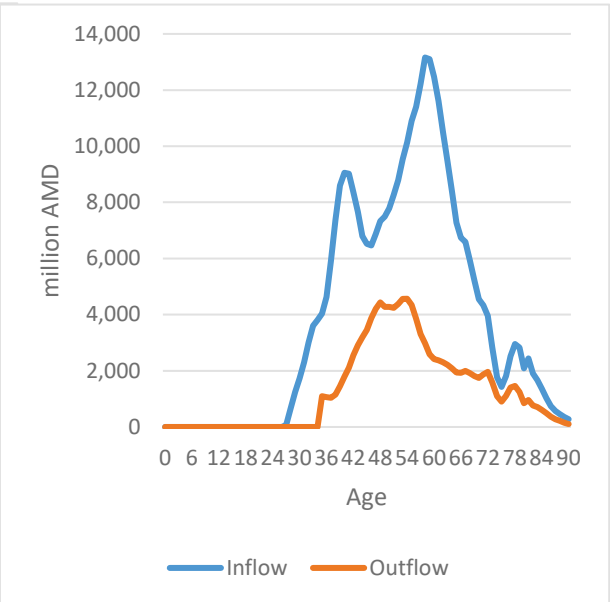
Data for Inter-household transfers in Armenia show that inflow of Inter-household transfers is higher than the outflow for all age groups that receive transfers. According to the Armstat's ILCS 2019, heads of households starting from age 27 receive transfers (inflow), while households pay transfers to others starting with heads of households starting from 35.

Figure 24. Armenia NTA 2019: Inter-household Transfers

a. Per capita values*



b. Total Economy flows



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019

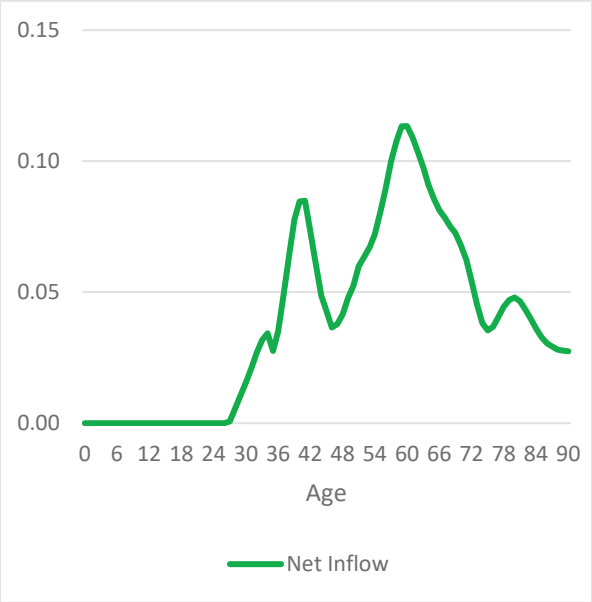
As transfer inflows from the ROW is much higher than transfers within Armenia, all ages have positive net inter-household transfers in Armenia. As net inter-household transfers within Armenia are equal

[22] National Transfer Accounts: Understanding the generational economy. 4.1 Private Transfers. Inter-household Transfers. https://ntaccounts.org/web/nta/show/Methodology/4.1%20Private%20Transfers#H-z3lz5f

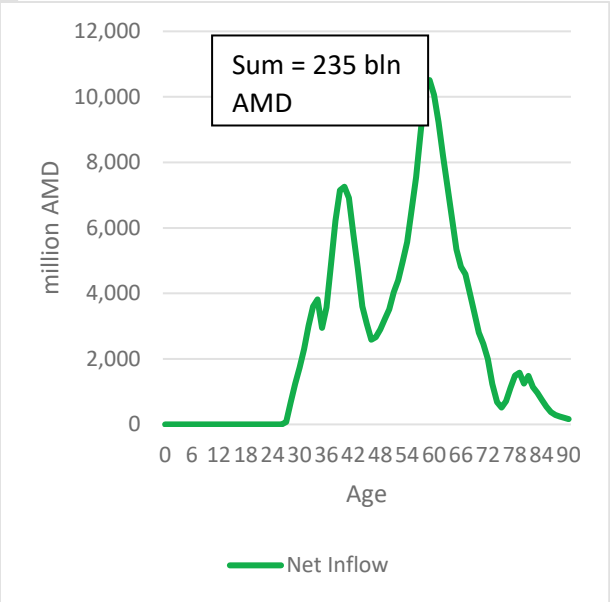
to zero, net Inter-household transfers for the economy is equal to net remittances inflow from the ROW, which was 235 bln AMD in 2019.

Figure 25. Armenia NTA 2019: Net Inter-Household Transfers

a. Per capita values*



b. Total Economy flows

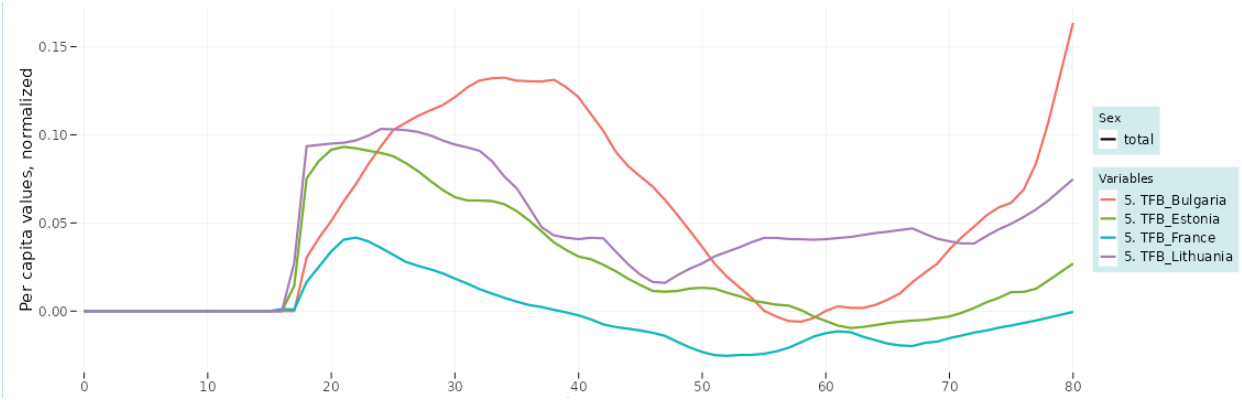


Source: Armenia NTA 2019

Comparing Armenia's net inter-household transfers' age reallocation to other countries reveals two main peculiarities. First one is that Armenian net inter-household transfers have two peaks, while most of the European countries (see Figure 26 for several examples) do not have such picture. Having two peaks in transfer size for Armenia is explained by large availability of multigenerational households in Armenia compared to advanced European economies. While in most European countries head of household is mostly the person with higher financial support, in Armenia, when several families may live toghether in the same household, head of the household can be the senior member of household (for example the parent of the person with the highest financial income). Figure 26 shows that perhaps Lithuania (which had similar background with Armenia) has small peak at higher age also, but it is already too small compared to Armenia.

Second peculiarity for Armenia (and also for other developing countries) is the relative size of inter-household transfers. The households with heads within age 57-63 receive net inter-household transfers at over 10% (0.10) of average labor income, while for example in France, the ages with the largest net inter-household transfers receive less than 4%.

Figure 26. NTAs in other countries: Inter-household Transfers



Source: https://dataexplorer.wittgensteincentre.org/nta/, European NTA 2010

3.1.2 Intra-household transfers

In contrast to Inter-household transfers, intra-household transfers include flows among the members of the same household. As NTA describes consumption and production patterns at singe age level, there is a need to estimate transfers within households to cover personal consumption. Such estimates are not needed in any macroeconomic accounts, like SNA or Balance of payments, so official statistics does not cover such details. NTA manual proposes a model to be used to estimate breakdown and the structure of intra-household transfers between the members of households. Many countries also use indirect calculation of intra-household transfers "as the balancing item between private consumption and disposable income (labor income plus net private transfers plus public cash transfer inflows less taxes paid)." In such cases, household members with a deficit (disposable income less than current private consumption) receive transfers from household members with a surplus (disposable income greater than current private consumption).

The aggregate value (or macro control indicator) of intra-household transfers equals to zero, as intra-household transfer inflows equal intra-household transfer outflows at the household level.

Our methodology for estimation of intra-household transfers by age and sex (as well as to receive macro control indicators) in Armenia suggests using data from 2 Armstat's ILCS databases, namely database by households and database by household members. This is a complex model based on household consumption and income indicators. Here the indicators are calculated as follows:

- ***Consumption*** of a household was considered either its **total income**, or **expenditure level**, depending on which indicator is higher. Both total income and expenditure levels are available in the Household Survey of ArmStat. To found out consumption of every member of a household, by age consumption model, mentioned before, was used.
- ***Income*** of a household is divided by the members through coefficients, which are 1 for working members, zero for not working members, and 0.22 for pensioners, which is calculated by dividing average pension of Armenia in 2019 and average wages for the same year.

Based on these indicators, ***Inflow*** of a household member is estimated as the difference between his consumption and income (if the income isn't enough to cover consumption). If the member has enough income to cover his/her needs, then it is considered, that he/she doesn't need any inflows, so the inflow indicator for him/her is equal to 0. One of the assumptions for this model is that if the household members earn more than they consume, money saved by them flows to the head of household to cover his/her needs, to transfer to those who needs or to save.

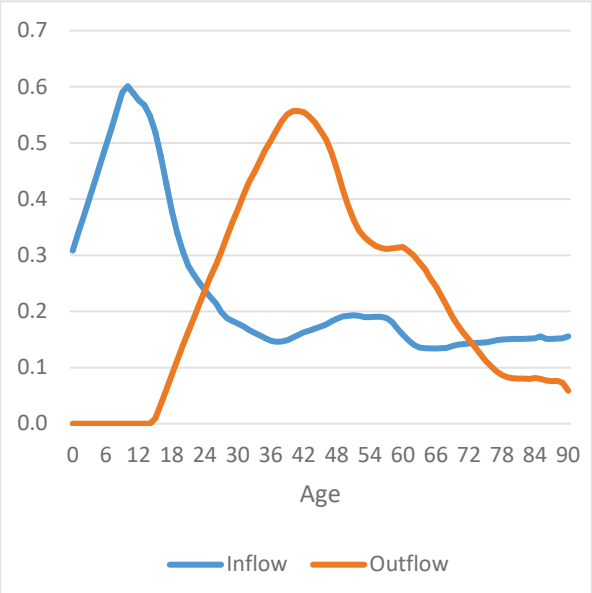
Outflow of a member is a difference between his income and consumption, if it is positive. If it is negative, then the member has not enough income to cover his consumption, and needs additional inflows. In this case, outflows are estimated as 0.

After assessing those main indicators, sum of weighted inflows and consumption by using weights of every household (from HH Survey) was calculated. Aggregate values for Inflows and Outflows for the economy is calculated as share in total private consumption, using share of inflows and consumption from the Armstat's ILCS (34.6% of the consumption inside the households is distributed by the members).

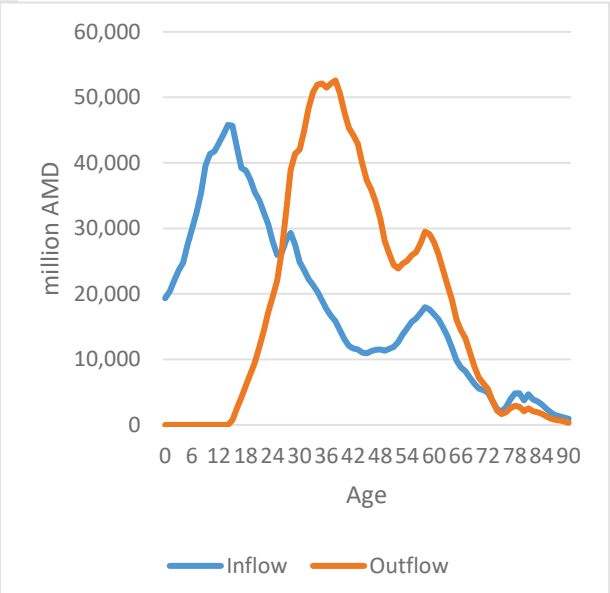
While this methodology provides us with the macro control indicators and age distribution for intra-household transfer inflows and outflows (Figure 27), final balancing of NTA indicators by each age and sex is still needed, as there are different discrepancies by separate ages.

Figure 27. Armenia NTA 2019: Intra-household Transfers (initial without final balancing of NTA)

a. Per capita values*



b. Total Economy flows

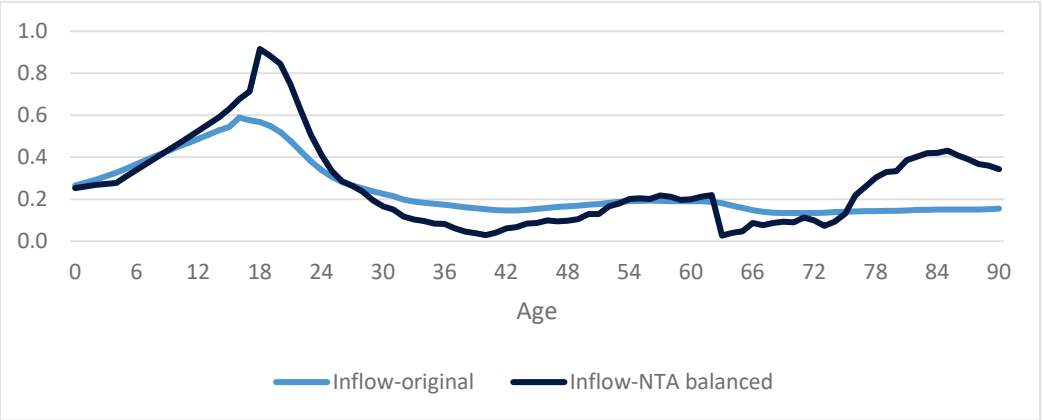


** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019 (working files)

Considering that these discrepancies are largely covered within intra-household transfers also in most of the other countries compiling NTA (as mentioned intra-household transfers are the most difficult

to estimate as there is no direct data source, so it is assumed that it may use the least accurate data sources to distribute data by age compared to other indicators in NTA tables), we have revised the structure of intra-household transfer inflows by age to ensure final balancing of NTA by age. The comparison between original and NTA-balanced Inter-household transfer inflows by age with per capita indicators is presented in Figure 28.

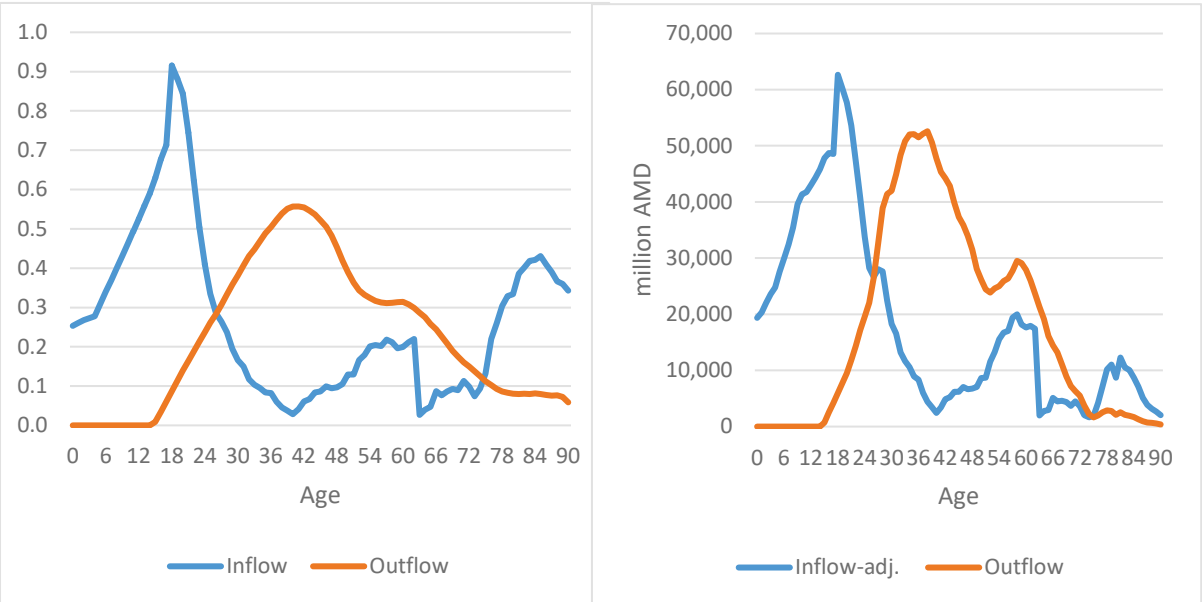
Figure 28. Armenia NTA 2019: Intra-household Transfers (initial without final balancing of NTA)
Per capita values*



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*; *Source: Armenia NTA 2019 (working files)*

It should be mentioned that after intra-household inflows adjustment (for NTA balancing), there are minor changes in the ages of net receivers and net payers of intra-household transfers: the age group 25-72 (as net payers- negative net inflow) in original data changed to 27-74 age group in adjusted data (Figures 29 and 30).

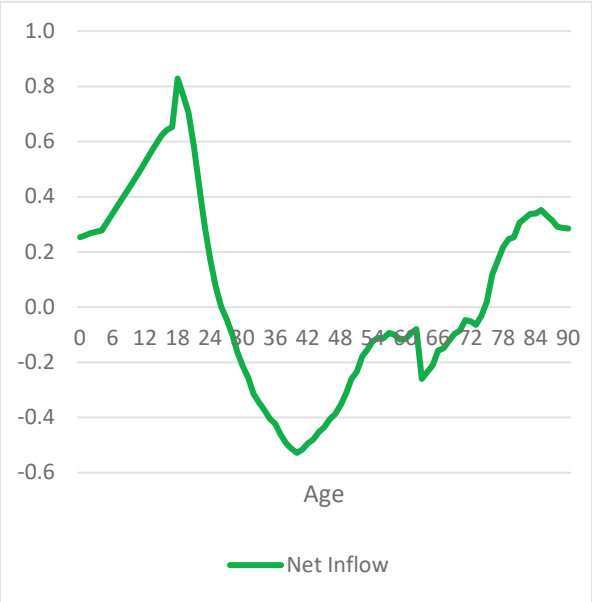
Figure 29. Armenia NTA 2019: Intra-household Transfers (Inflows adjusted-final NTA balanced)
a. Per capita values* **b. Total Economy flows**



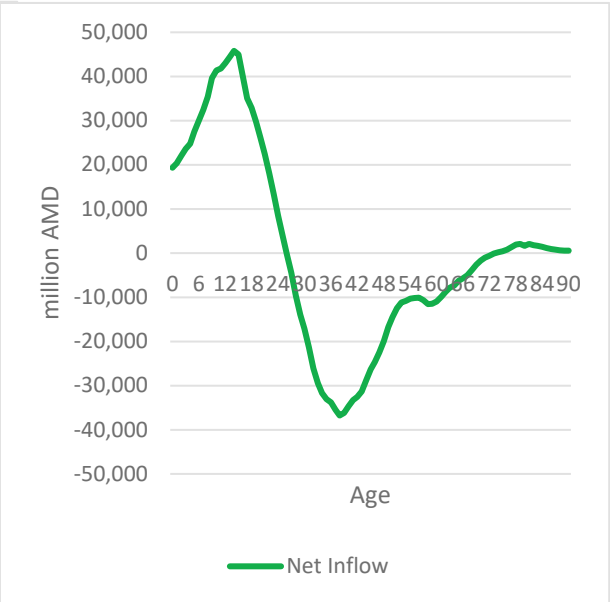
** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019

Figure 30. Armenia NTA 2019: Net Intra-household Transfers

b. Per capita values*



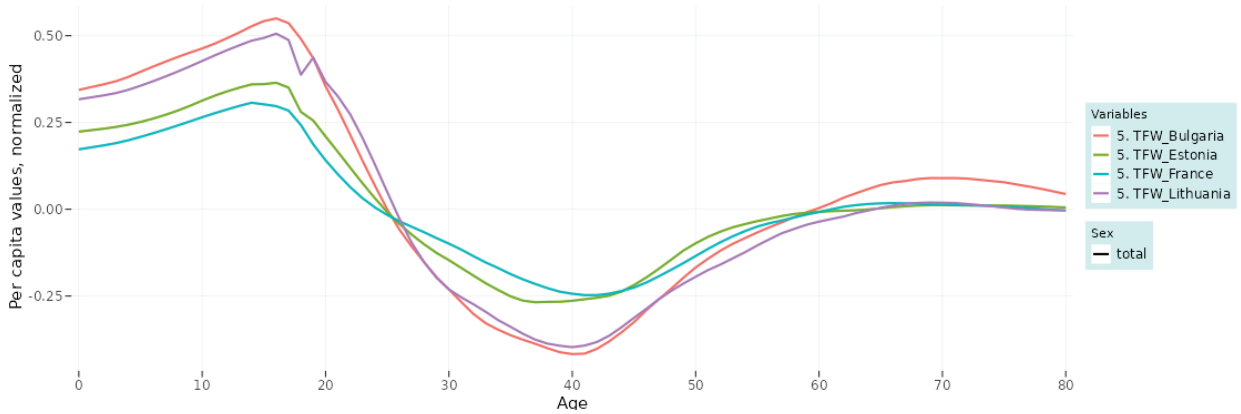
b. Total Economy flows



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019

Comparing net inflow of intra-household transfers in Armenia with the European countries (Figure 31) reveals that the size (importance) of intra-household transfers is much larger in Armenia compared to European countries. The level of development of economy seems to reduce intra-household transfers. Particularly intra-household transfers in France are relatively less than in Bulgaria and much less than in Armenia. This is another evidence that private transfers (inter-household and especially intra-household) are more important for the Armenia's population considering lower productivity as well as lower relative size of targeted public transfers.

Figure 31. NTAs in other countries: Intra-household Transfers, Net

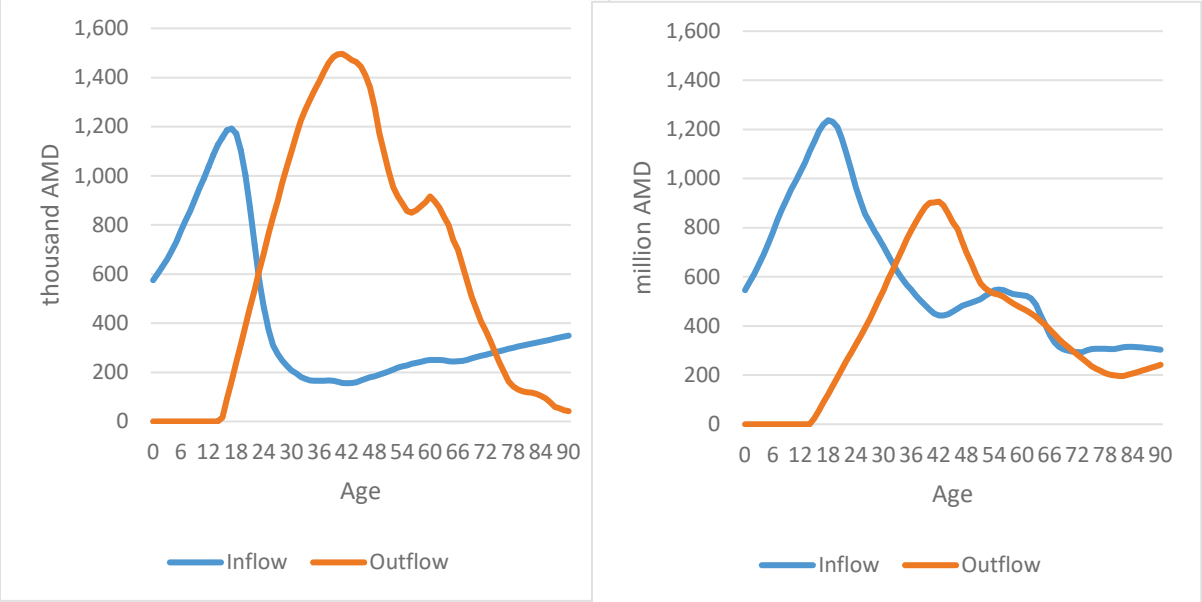


Source: https://dataexplorer.wittgensteincentre.org/nta/, *European NTA 2010*

Comparing intra-household transfers by sex, as expected, men in total have a negative net inflow at 353.2 mln AMD, while women have positive net inflow of that amount, meaning that men pay more than receive within their household. Considering per capita indicators, men within 23-74 age are net payers in their households on average (negative net inflow), while women of 33-53 and 65-71 ages (50 years vs 28 years) are net payers within their households.

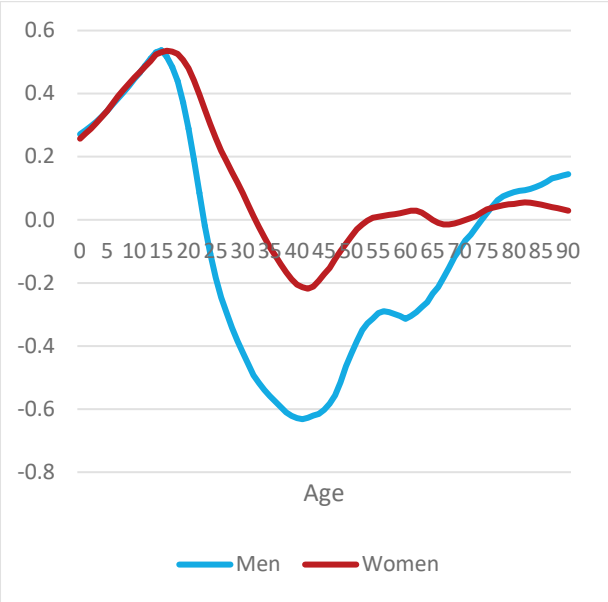
Figure 32. Armenia NTA 2019: Private Intra-household Transfers by Sex (per capita values)

a. Men **b. Women**



Source: Armenia NTA 2019

Figure 33. Armenia NTA 2019: Private Net Intra-household Transfers by Sex (per capita values)

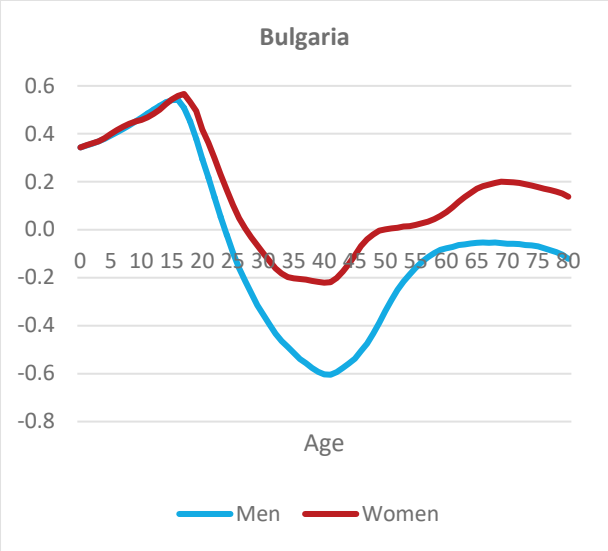


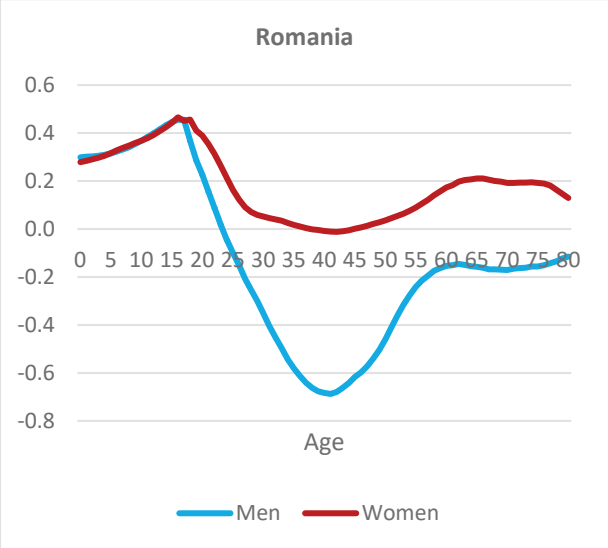
Source: Armenia NTA 2019

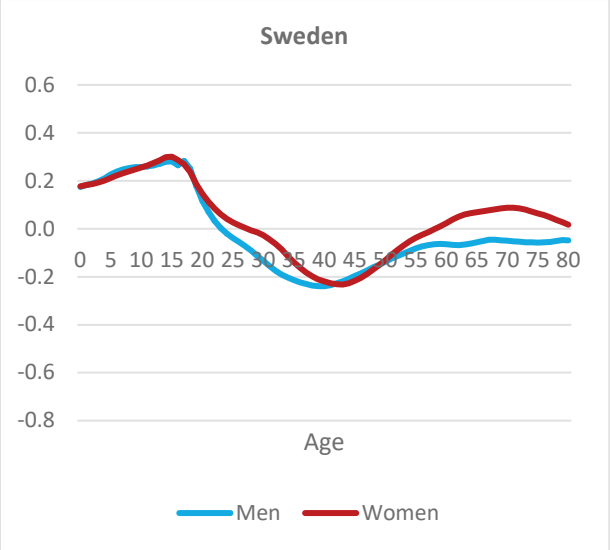
Comparing net intra-household transfers by sex with European countries, we see Armenia is more like Bulgaria (in 2010) – large net transfers and similar patterns for men and women. Interesting that

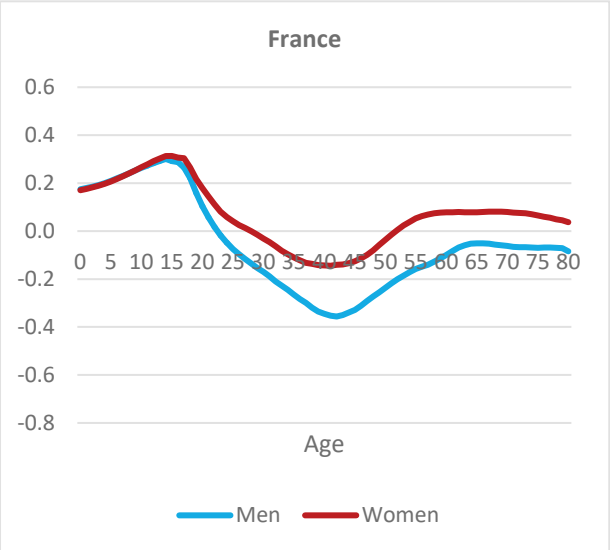
gender difference is very low in Sweden, compared to other countries and especially to Romania, where difference is even higher than in Armenia.

Figure 34. NTAs in other countries: Intra-household Transfers, Net (by sex)









Source: https://dataexplorer.wittgensteincentre.org/nta/, European NTA 2010

3.2 Private asset-based reallocations

Assets play a crucial role in redistributing economic resources across different age groups. Asset-based reallocations help address a fundamental aspect of the life cycle: the disparity between individual labor income and desired consumption levels. Private asset-based reallocations are comprised of two components: private asset income and private saving. Private asset-based reallocations appear to be the difference of private asset income and private saving.

Macro control indicator of the Private asset-based reallocations is estimated at 2,169.8 bln AMD, which represents the difference between Private Asset Income (1,629.1 bln AMD) and the Private Saving (-540.7 bln AMD). Private saving is based on the SNA data, calculated as the difference of total savings and general government sector savings. Macro control indicators on private savings for male and female is received as residual to provide balancing between life cycle deficit and age reallocations.

Private Asset Income is characterized as income that "consists of capital income plus net property income for households, corporations, and non-profit institutions serving households (NPISHs), all sectors distinguished in national income accounts."

Private Asset Income = Private Capital Income, business & non-profits +
Private Capital Income, owner-occupied housing +
Private Property Income.

Private Capital Income of businesses and non-profit organizations is estimated based on the SNA indicators, as net operating surplus of private sector less capital income of households (owner-occupied housing) plus share in other taxes on production less other subsidies on production:

Private Capital Income, business & non-profits = Gross operating surplus, total economy -
gross operating surplus, government sector +
*Capital share of mixed income (1/3) * share of gross operating surplus of businesses +*
*Capital share of taxes less subsidies * share of gross operating surplus of businesses –*
Consumption of fixed capital, corporations and NPISH

Private capital income on owner-occupied housing is a capital income of households also estimated based on SNA indicator. For 2019 this indicator is estimated at 452.6 mln AMD. Private property income (-187.9 mln AMD) is the property income for total economy in sectorial accounts of SNA (-238.4 mln AMD) less property income of government sector (-50.6 mln AMD).

Age and sex profiles of macro indicators for private asset-based reallocations was modeled using proxy calculations due to the lack of detailed data. Different proxy calculations were employed to determine the age and gender distribution of the respective components in this section, upon which subsequent analyses were based. The table below outlines the calculation of the macro control indicators and the proxy calculations used to calculate age and gender distribution of each sector of this category. Additionally, it identifies the specific data needs and gaps encountered during the process.

Table 6. Proxy calculations used for age and gender distribution of Private asset-based reallocations

Category	Calculation of macro control indicators	Proxy calculation used for age distribution	Data needs and gaps for further improvement
Private Capital Income, business & non-profits	1.1. Calculation of the **Net capital income, corporations and NPISH**, which equals the sum of the below-mentioned indicators: 1.1.1. gross operating surplus of all domestic sectors except Government institutional sector, 1.1.2. capital income from owner occupied dwellings, which is calculated using the data on the owner occupied dwellings value added- consumption of fixed capital derived from the SNA, 1.1.3. capital income related calculated share of taxes less subsidies on other production. 1.2. **Calculation of capital share of mixed income** (43% of total taxes less subsidies on other production according to calculation for 2019 data).	1.1 For the calculation of **Net capital income of corporations and NPISH**, instead of age profiles for dividend, interest and rent receivers (as proposed by NTA manual) the age allocation of vehicle owners in Armenia received from Police was used. 1.2 For the calculation of **capital share of mixed income** the household self-employment income age breakdown received from State Revenue Committee was used.	• Age and sex profiles for dividend, interest and rent receivers, • Breakdown by age and sex of owners of businesses.
Private Capital Income, owner-occupied housing	The estimation of this component is based on SNA using data on the Net capital income of owner occupied dwellings from household sector. It is equal to gross value added of owner-occupied dwellings less estimated consumption of fixed capital.	Instead of household imputed rent age breakdown by head of household, the age structure of heads of households from ILCS Armenia was used.	• Age and sex profiles of owner occupied dwellings from household sector, • Payed property tax on dwellings and houses by age and gender.
Private Property Income	The calculation of this component is based on Sectorial accounts of SNA on property income, estimated as Total consolidated - Government sector.	As no age and sex breakdown of property income was available the age structure of vehicle owners in Armenia was used.	• Dividends, interest income and rent received from the private property by age and gender, • Interest expense of the household including mortgage interest

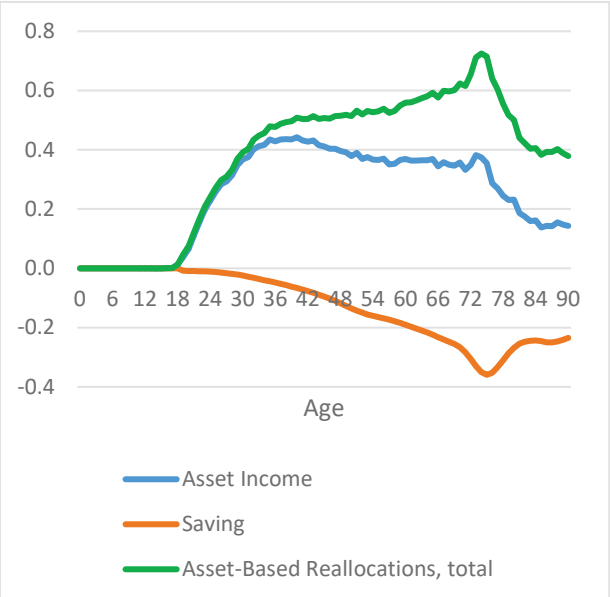
			by the age and gender of household head, • Owners of private property by sex and type.
Private Saving	It is calculated as the difference of total savings and General government sector savings based on SNA data.	Many countries estimate age-specific savings as difference between disposable income and consumption. We have allocated savings by the structure of head of households for total economy, which is also mentioned by NTA Manual. Gender tables, anyway, use private savings as residual.	

Source: Armenia NTA

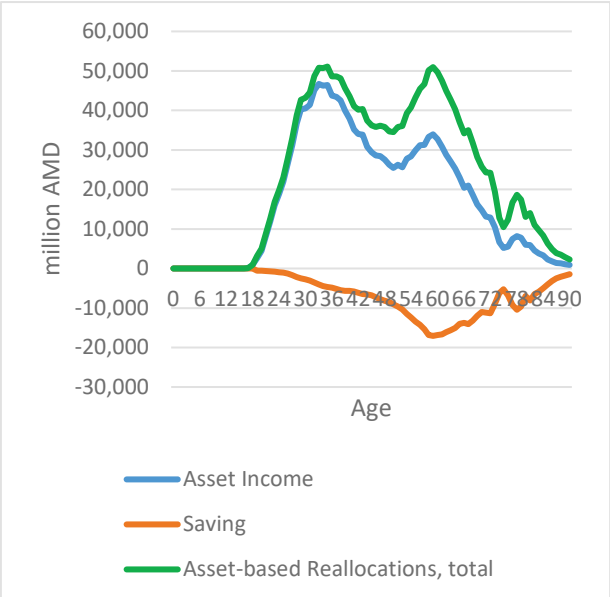
Data presentation of private asset-based reallocations shows that asset income increases from age 18 to age 35 and then remains at nearly same level (with decreasing trend) to around age 75, after which it decreases again. Allocation of private savings by the structure of head of household compensates slow decrease in asset income from 35 to 75.

Figure 35. Armenia NTA 2019: Private Asset-based Reallocation

a. Per capita values*



b. Total Economy flows



** Per capita values are expressed relative to the simple average of per capita labor income in the 30-49 age range*
Source: Armenia NTA 2019

4. NTA Policy Implications

Global Applications of National Transfer Accounts:

NTA offer a detailed insight into how resources are distributed across different age groups within the population, can be marked an essential tool for public policy planning and implementation. The importance of NTA in public policy implications becomes even more evident when dealing with changes in population structure and demographic challenges. Using the methodology of National Transfer Accounts in policy planning can provide governments with better insights to foster economic growth and address the social protection needs of a rapidly aging population[23]. NTA can be effectively utilized in the following areas of public policy:

- **Demographic policy**: NTA appears to be a methodology of intergenerational economics that offers a strong way to calculate the economic effects of changes in demographics. Using NTA "it is possible to calculate the extent and magnitude of the demographic dividend in its different expressions, as well as the expenditures associated with aging, based on the economic life cycle and the economic support ratio, providing key background information and projections, both for preparing for the economic challenges arising from aging, and for harnessing the dividend in different social sectors (labor, education, health, pensions, etc.) and among different economic agents."[24] Numerous studies and academic efforts have been devoted to exploring the interplay between key demographic concepts and NTA. Significant research has been conducted to analyze the demographic dividend across diverse countries and regions through the lens of NTA[25] [26] [27] [28] [29]. Demographic dividend can be defined as "the economic growth potential presented by a change in the age structure of the population with an increasing number of people in the workforce relative to the number of dependents."[30] For a range of countries undergoing their first demographic dividend phase, NTA can provide

[23] UNFPA Asia and the Pacific 2021. *Using National Transfer Accounts for Policy Advancement across Asia-Pacific*. https://asiapacific.unfpa.org/en/news/using-national-transfer-accounts-policy-advancement-across-asia-pacific
[24] United Nations, *About National Transfer Accounts (NTA)* https://www.cepal.org/en/subtopics/national-transfer-accounts-nta/about-national-transfer-accounts-nta
[25] Amporfu, E, Sakyi, D., Frimpong, P.B. 2014. *Demographic Dividend of Ghana: The National Transfer Accounts Approach*. https://shorturl.at/jnpLO
[26] Olaniyan,O., Olasehinde, N., Odufuwa, O., Awodumi, O. 2021. The nature and extent of demographic dividend in West Africa: National transfer account approach. *The Journal of the Economics of Ageing*. Volume 20. https://www.sciencedirect.com/science/article/abs/pii/S2212828X21000426
[27] Oosthuizen, M. 2022. The Economic Lifecycle and Africa's Demographic Dividend: Evidence from national transfer accounts. *The Routledge Handbook of African Demography*. 1st Edition.
[28] Olasehinde, N., Olaniyan, O., Soyibo, A., Lawanson, A., Dauda, S., Odufuwa, O., Awodumi, O., Olalude, T., Adonri, O., Dasogot, A. 2024. Demographic Dividend in Nigeria: Evidence from Country and Sub-Country Application of National Transfer Accounts (NTA) Approach. *HPTRP Research Working Paper*. Number 2024-1. Health Policy Training and Research Programme, University of Ibadan, Nigeria. https://www.researchgate.net/profile/Noah-Olasehinde/publication/379807533_HPTRP_Research_Working_Paper_Series_2024-1/links/661b19d943f8df018dfe31f7/HPTRP-Research-Working-Paper-Series-2024-1.pdf
[29] Khondker, B. H., Rahman, M. M. 2018. Some Estimates of First Demographic Dividend in Bangladesh: An Application of the Bangladesh National Transfer Account. *Structural Change and Dynamics of Labor Markets in Bangladesh.*
[30] Economic and Social Commission for Asia and the Pacific (ESCAP). The demographic dividend: An economic development opportunity. https://www.population-trends-asiapacific.org/demographic-dividend

insights into accelerating, prolonging, and directing this dividend towards significant development goals. In contrast, countries that have completed their first dividend can use NTA to gain insights on how economic benefits can be sustained and how governments and families can effectively prepare for an aging population[31].

- **Economic Policy**: NTA offers comprehensive insights into the earning, consumption, saving, and resource transfer patterns of various age groups. This information helps policymakers better understand the economic behaviors and needs of various segments of the population. According to a recent academic study exploring the impact of demographic challenges on South Korea's economy using NTA measurements[32], low fertility and low mortality affect the economy in different ways regarding direction, magnitude, timing, and impact across age groups. Meanwhile, "the only effect of an aging population that is the same in all circumstances is the effect on the public pension system: low fertility and mortality will increase pressure on the public pension system of South Korea."
- **Social Policy**: NTA plays a crucial role in guiding the development and improvement of social security and pension systems in light of an aging population. It assists policymakers in predicting future demands, evaluating the financial sustainability of current systems, and implementing necessary adjustments to ensure adequacy and fairness. Different academic and research projects have focused on social policy aspects through the use of NTA[33].
- **Fiscal Policy**: NTA can serve as a crucial instrument for ensuring fiscal sustainability in light of demographic changes. Demographic changes have a significant impact on the fiscal sustainability as "when the population structure changes with an increasing proportion of older persons and a decreasing birth rate, it is anticipated that the future will see a decline in taxpayers, primarily from the working-age group. Meanwhile, the number of beneficiaries of public services and social welfare, such as pensions and healthcare is expected to rise. This trend may lead to risks and long-term fiscal challenges for the country."[34] NTA data plays a vital role in guiding long-term fiscal planning by forecasting shifts in government spending resulting from demographic changes. This helps ensure the sustainability of policies without imposing excessive burdens on future generations. By analyzing intergenerational transfers and evaluating the effects of demographic shifts, NTA empowers policymakers to optimize social security systems, make well-informed investment choices, and ensure that fiscal policies align with evolving social needs while maintaining economic stability. Given the importance of NTA for the fiscal policy, a number of research and academic work has been

[31] Lee, R. D., Mason, A. National Transfer Accounts and demographic dividends. National Transfer Accounts: Understanding the Generational Economy. Bulletin. Number 9, p. 1. Westley, S. B. (ed). https://ntaccounts.org/doc/repository/NTA%20Bulletin%209.pdf

[32] Kim, H. K., Lee, S. H. 2021. The effects of population aging on South Korea's economy: The National Transfer Accounts approach. *The Journal of the Economics of Ageing*. Volume 20. https://www.sciencedirect.com/science/article/abs/pii/S2212828X21000335

[33] Narayana, M. R. 2023. Improving economic security for older persons by public pension schemes: evidence from National Transfer Accounts for India. Journal of Social and Economic Development. https://link.springer.com/article/10.1007/s40847-022-00219-8

[34] Wassana, I.E. 2023. Generational Economy and Population Ageing: National Transfer Accounts and Fiscal Policy. UNFPA. https://www.unescap.org/sites/default/d8files/event-documents/Wassana_Generational%20Economy%20and%20Pop%20Ageing_NTA.pdf

devoted to examining the interplay between fiscal policy and NTA across diverse countries and regions[35][36].

- **Education policy**: National Transfer Accounts can be extremely useful for designing and implementing education policies, as they provide detailed information on education expenditures. This perspective allows for a better understanding of government spending on education across different age groups, identifying any gaps, which is crucial for human capital development. Research dedicated to examining educational shifts in the context of demographic changes, using NTA results for the Philippines[37], for example, highlights that "between 2007 and 2040 the schooling age population of the Philippines is projected to continue to increase in size and the age structure to shift toward higher proportion in the age group that attend the tertiary school level". Simulations for two hypothetical scenarios revealed that "the two changes, shift in education financing mix toward higher private share and change in school-age population age structure from 2007 to 2040, would among others result to reduced share of education resources and higher per capita private education cost for the bottom income tercile group". Another academic study[38] evaluated "the sustainability of the public transfer systems in 24 EU countries using a new cohort-specific indicator, the Human Capital Investment Gap (HKIG)." The mentioned indicator "measures for a certain cohort the difference between the public benefits in old age and the public contributions of the child generation."
- **Health Policy**: Similar to its application in education policy, NTA can also serve as an analytical tool for health policy, helping to address the challenges faced by the healthcare system in the country due to demographic changes and shifts. For example, the paper on analysis focused on understanding how much elderly individuals in India consume compared to their income, using the National Transfer Accounts (NTA) methodology[39] mentions that "the rise in the older population tends to increase the demand for comprehensive care disproportionately. Under these circumstances, social security is an area that needs to be broadened and strengthened to meet the fastest growing aged population, and demand for healthcare resources." It should be noted that this question has also been addressed in other academic and research endeavors[40][41].

[35] Lowhachai , S., Lee, S. H., Tawichsri, T. 2016. Population Aging and Fiscal Sustainability in Thailand: The National Transfer Accounts (NTA) Approach.
[36] Correa, C. H. 2023. National Transfer Accounts: the fiscal balance of the Brazilian generational economy. Cadernos de Finanças Públicas, 2023, Vol 23, Issue 1.
[37] Salas, J.M. Ian S.; Abrigo, Michael Ralph M.; Racelis, Rachel H. 2012. Implications of Philippine Trends in Education Financing and Projected Change in School-age Population on Education Expenditures by Income Group: Using National Transfer Accounts Results. *PIDS Discussion Paper Series*, No. 2012-34. https://www.econstor.eu/bitstream/10419/126896/1/pidsdps1234.pdf
[38] Hammer, B., Prskawetz,A., Gál, R.A., Vargha, L., Istenič, T. 2018. Human Capital Investment and the Sustainability of Public Transfer Systems Across Europe: An Evaluation based on National Transfer Accounts. Journal of Population Ageing. Volume 12. https://link.springer.com/article/10.1007/s12062-018-9224-8
[39] Bhaumik, D., Ladusingh, L. 2021. Consumption over Income of the Elderly in India: An Analysis based on National Transfer Accounts Methodology. *Demography India*. Vol. 50, No. 1, p. 124. https://iasp.ac.in/uploads/journal/50_1009.pdf
[40] Bruil, A., Barb, F. 2015. The National Transfer Accounts for the Netherlands. Discussion Paper. Statistics Netherlands. https://download.cbs.nl/pdf/2015-the-national-transfer-accounts-for-the-netherlands.pdf
[41] Vaittinen, R., Vanne, R. 2010. National Transfer Accounts for Finland in 2004. https://www.ntaccounts.org/doc/repository/VV2010.pdf

It should be noted that public policy can influence dividends, fiscal sustainability, and inequality through various channels[42]:

- Labor patterns
    - Utilizing female, youth, and elderly labor force
    - Increasing productivity (via effective education, health investment and training)
    - Improving the school to work transition
    - Improving the work to retirement transition
        - Raise or eliminate mandatory retirement policies
        - Address low productivity of older workers through continuing education programs and employment practices
    - Encouraging saving and investment to create employment
- Consumption patterns
    - Achieving efficiency of spending on education and health including long-term care
    - As health improves, spending on young elderly for health and retirement could be reduced
    - Avoiding excess reliance on transfers to support consumption.

NTA, serving as both a conceptual framework and a practical tool, enables the following[43]:

- Estimate the size of lifecycle deficit for each age, understand the sources which cover the deficit and forecast their availability in the future,
- Define the impact of demographic changes (age-sex) on the economic growth,
- Determine the consequences of population's age structure changes on human capital formation (health and education),
- Determine the importance of private transfers in the well-being of individual generations,
- Assess the consequences of changes in the tax burden.

Application of National Transfer Accounts in Armenia:

Highlighting its importance for the effective public policy planning and implementation, National Transfer Accounts project have been initiated in Armenia along the development of the Population Strategy, as implementation of the given Strategy and any other strategy requires effective and consistent monitoring and evaluation of strategic measures and initiatives, which are essential for implementing a strategy.

The Population Strategy of Armenia envisions achieving a "balanced and sustainable population structure that is aimed at the long-term human capital development and the quality of life improvement." This strategy outlines four key strategic objectives within its results framework:

1. Strategic Goal 1- Creating an environment that promotes family well-being, where every newborn contributes to the development of human capital;

[42] Wassana, I.E. 2023. Generational Economy and Population Ageing: National Transfer Accounts and Fiscal Policy. UNFPA. https://www.unescap.org/sites/default/d8files/event-documents/Wassana_Generational%20Economy%20and%20Pop%20Ageing_NTA.pdf

[43] Денисенко, М.Б. Национальные трансфертные счета: происхождение, назначение, результаты.

2. Strategic Goal 2- Reducing death risk factors and promoting healthy environment to diminish lifelong human capital deterioration and loss;
3. Strategic Goal 3- Ensuring active, healthy and dignified ageing by the senior citizens' involvement in the state's socio-economic life and the increase of their potential;
4. Strategic Goal 4- Reducing motives leading to emigration, and improving competitiveness in the formation, retention, and attraction of high skilled human capital.

The systematic approach of the Population Strategy involves breaking down each strategic goal into specific goals that target unique concepts related to that strategic goal. These specific goals are further divided into programs that categorize the specific measures to be implemented (Table 7). This structured approach is designed to effectively tackle the demographic challenges faced by Armenia.

Table 7. Structure of the results framework of the Population Strategy of Armenia

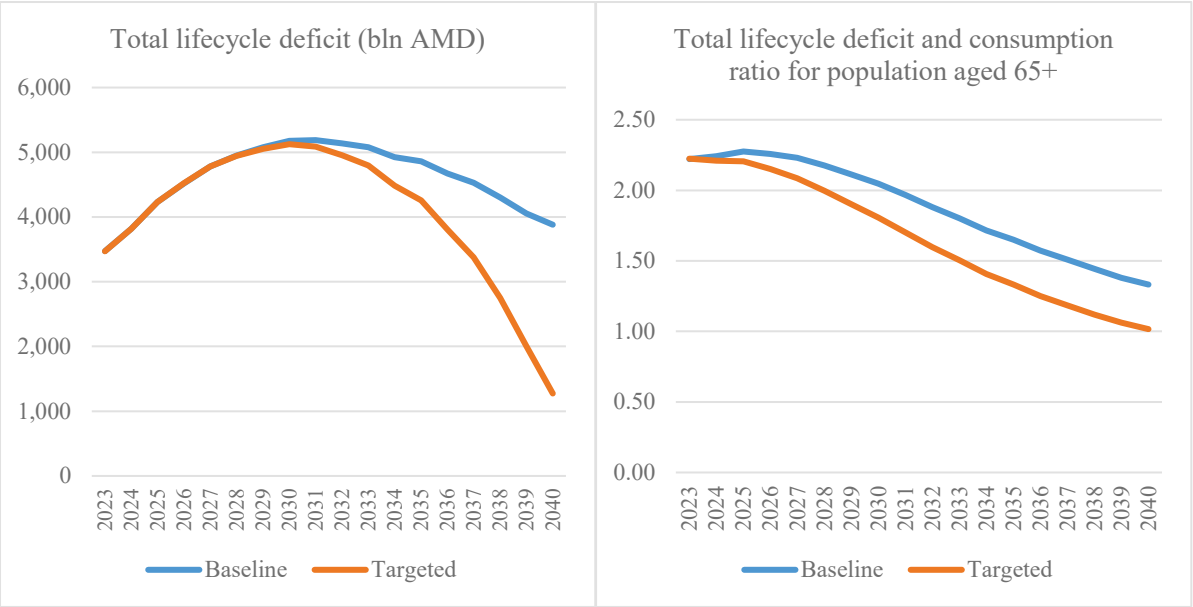
Vision
Strategic Goal
Specific Goal
Programs
Measures

At each strategic level, specific baseline and targeted monitoring and evaluation indicators have been defined. These indicators will serve as a reference point and benchmark during the monitoring and evaluation process, guiding the assessment of Strategy progress and outcomes. Two such indicators are designed to be calculated based on Armenia NTA:

- Total lifecycle deficit (bln AMD),
- Total lifecycle deficit and consumption ratio for population aged 65+.

The indicators mentioned above have both baseline and targeted values that were developed within the context of a results framework.

Figures 36. Baseline and targeted indicators calculated based on Armenia NTA

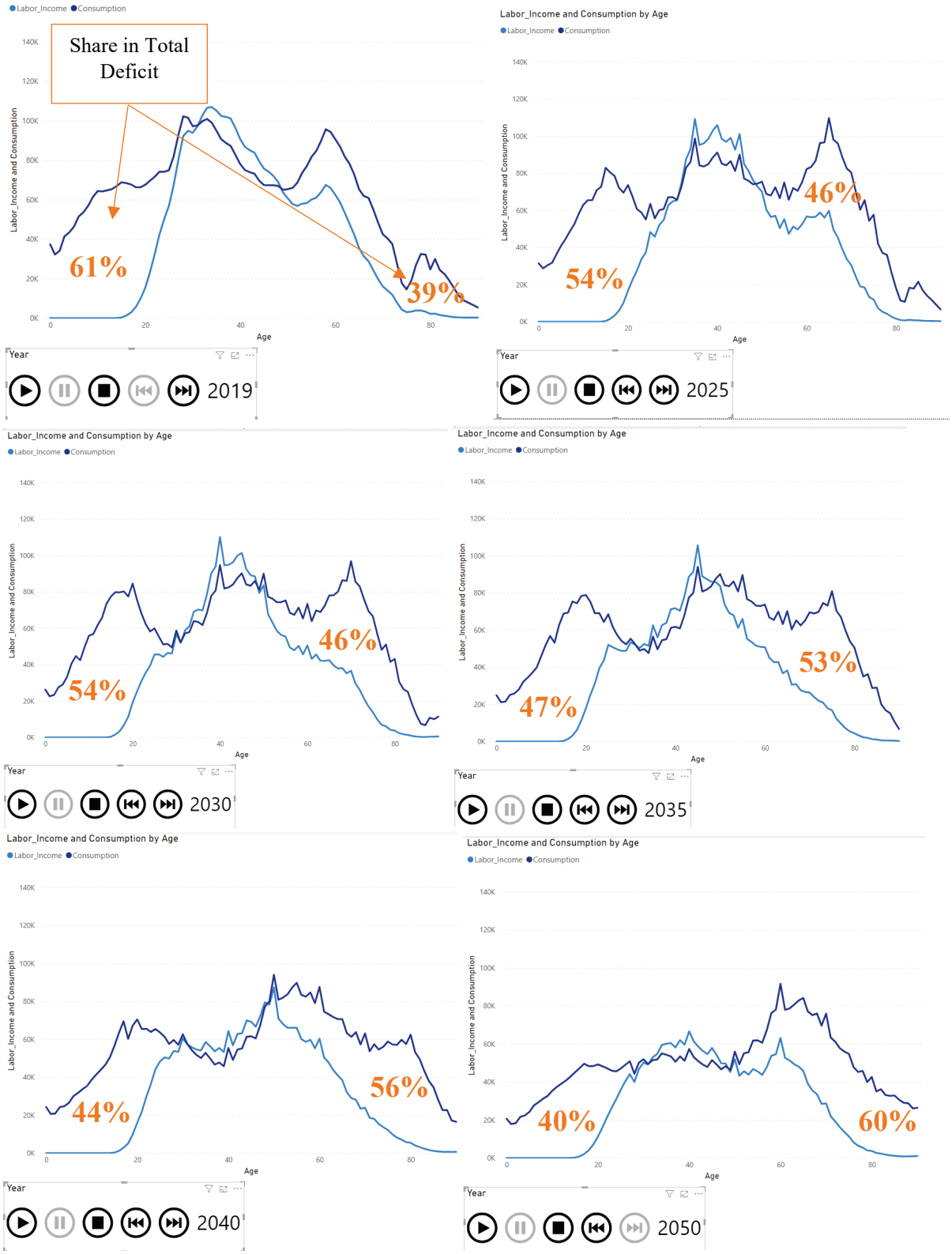


Source: Population Strategy of Armenia, Results Framework

The baseline and targeted indicators were created using population projections up to 2050. These projections were conducted within the framework of Population Strategy of Armenia and were based on three scenarios: low, medium, and high. The baseline indicators were developed according to the medium scenario projection, whereas the targeted indicators were based on the high scenario projection.

Using population projections, forecasts were generated for NTA Armenia, focusing on labor income and consumption patterns. These projections were based on the assumption that no changes in population behavior will occur and the intergenerational transfer patterns will remain unchanged. Based on the given forecasts, it is possible to note that the change in the population structure (aging) leads to a decrease in labor income. Additionally, it is noticeable that the Deficit is decreasing for young generation (0-31) and increasing for the older generation (49-90), which means that transfers to the older generation will be made at the expense of children, i.e., the costs of developing human resources. It the share of total deficit for younger population was 61% vs 39% for the older population in 2019, it decreases to 40% for younger population and 60% for older population in 2050. This suggests that the country will allocate a greater share of resources to the older population, particularly towards healthcare, while reducing resources allocated to the younger population, especially in areas like health and education. This shift could have a negative impact on human capital development.

Figures 37. NTA Armenia, projection using population forecast



Source: Armenia NTA

While the projections maintain stable behavioral and intergenerational transfer patterns, demographic shifts and the implementation of the Population Strategy will inevitably lead to changes in these areas as well. This implies that with more comprehensive data and resolution of existing data

gaps and issues, it would be feasible to implement more detailed projections for each sector of NTA (e.g., public and private consumption of education, health, etc.), providing a more comprehensive understanding of the general economic flows within the country.

Overall, NTA is one of the most comprehensive tools that allows for observing the added value created in the economy, consumption, and public expenditures according to the individual ages of the population. Specifically, the integration of NTA with population forecasts provides a picture of planned incomes and expenditures in the economy. However, the use and integration of NTA would not be restricted solely to Population Strategy. Once NTA is developed, it can be incorporated into all stages of public policies and strategies. This integration would enhance the efficiency of implementation and the outcomes of policies and strategies, leading to improved resource allocation within the country.

5. Conclusions and Recommendations

While **SNA** serves as an effective analytical tool for understanding the quantitative relationships among various economic entities, **NTA** provides an accounting of economic flows to and from residents of a country classified by their age.

NTA aim to improve our understanding of the economic consequences of demographic changes by introducing demographic information into the SNA. NTA shows how individuals across different age groups and by gender generate, consume, and distribute resources, as well as how they save for the future.

Fundamental demographic challenges (ageing, migration, lower fertility, etc) on global, regional and national levels affect socio-economic development. Understanding and using NTA in policy planning can better inform governments to promote economic growth and respond to the social protection needs of a rapidly ageing population.

NTA allows to establish a process for monitoring impacts of demographic change on key economic indicators, in different public development policies, such as:

- Education policy: Education expenditure monitoring and planning,
- Healthcare policy: Health expenditure monitoring and planning,
- Pension system: Addressing population aging,
- Social security and Social protection system monitoring and planning,
- Public revenues: Impact of demographic shifts on fiscal policy.

The results of Armenia's first NTA have been already used within the development of Demographic Strategy 2024-2040. NTA indicators provide monitoring and evaluation tools for the implementation of the strategy.

Armenia's first NTA provides not only standard tables with age reallocation, but also provide the breakdown of the indicators by gender, which assures that different public policies will not only benefit from generational breakdown data, but also with their gender breakdown.

The results of the NTA 2019 for Armenia show:

- Total Labor income covers only 62.5% of Total Consumption in the economy, the rest of the Lifecycle Deficit is covered by Reallocations (31.9% by Asset based reallocations and 5.6% by Transfers)
- Population within 31-49 age groups have positive Lifecycle balance (labor income exceeds consumption), while other age groups (0-30 and 50-90) cover their lifecycle deficit with transfers and asset based reallocations. Ages 0-21 and 74-90 rely mostly on transfers.
- While Lifecycle balance for men is positive for 26-52 ages, there is no single age group of women that has positive Lifecycle balance. Men have larger participation in labor market, while women do more unpaid work.
- Changes in demographic structure (particularly, aging) will change the shares in deficit in near future. While currently, 61% of reallocations go to children and 39% to elderly population, if no policy changes occur, by 2050 the ratio will change to 40%-60%, which means less investment in human development and larger investment in "maintenance".
- Average labor income for men is higher vs women: peak of average labor income for men is in 39-40 age (~3 mln per capita), for women - for 46-47 age (~1.8 mln per capita).
- The comparison with other countries show that public transfers in Armenia are much lower compared to private transfers. While public education expenditure is comparable with private education expenditure, public health expenditure is significantly lower that private. The difference is getting larger with increase in age of population.
- Well-designed mandatory health insurance may help increasing efficiency of both public and private expenditure on health.
- The education expenditure on girls at 14-20 age is comparably higher vs boys, due to lower participation of boys at high school level and 2-year military service. Introduction of educational programs during military service may improve the picture.

Recommendations on NTA future works

Compilation of NTA periodically is essential for its effective use in policy development and monitoring and evaluation of current and future public policies. NTA should be constructed at least every 3-5 year. NTA allows data driven Forecasts and Projections: as NTA provides unique opportunity for age and gender breakdown of macroeconomic indicators, it can show the impact of different policies on the population and economic indicators of the country. NTA indicators should be used in most of the socio-economic policies, especially on demographic policy, education and healthcare, labor policy and fiscal policy. NTA may provide gender based evidence of the impact of policies.

While Armenia's first NTA provides huge support for data driven policy making, improvement in data sources for an NTA is another important aspect. Data source improvement is one of the main issues in all countries which started compiling NTAs, as it requires a lot of details by singe age and gender. Differences among male and female population in NTA show the need of larger studies to understand their real support to the economy. While NTA relies on macroeconomic indicators, it cannot take into account the support provided largely by women in for of unpaid work, such as caretaking (children and elderly) and others. National Time Transfer Accounts (NTTA) are further development of NTA to consider also time-use aspects, which is especially important for policies considering indicators that have gender differences (for instance labor related policies).

Annexes

1. Summary of data sources (table)

Table 1. Lifecycle Deficit

Lifecycle Deficit	*Methodology and source for 2019 macro control data*	*Age distribution*	*Sex distribution*
Consumption	**Consumption less Labor Income**		
Public Consumption	SNA, GDP by expenditure		
Public Consumption, Education	An estimate of Education public expenditure from SNA *Male-Female (as sum of age distribution)*	Details below	Done (male-female distribution based on same data from Armstat used for age distribution)
Public Consumption, Health	An estimate of Health public expenditure from SNA *Male-Female (as sum of age distribution)*	Details below Data smoothed on per capita level for ages 63+.	Done (male-female distribution based on same data for age distribution (data from Armstat and Ministry of Health)).
Public Consumption, Other than health and education	Public consumption less estimates on public expenditure on education and health *Male-Female: based on share of males-females in population*	by total population structure	Overall data for each age are divided proportionally based on share of male-female in each age.
Private Consumption	SNA, GDP by expenditure		
Private Consumption, Education	An estimate for private consumption on education (average for several data sources: CPI weights (2018-2020), SUT estimate *Male-Female: shares of education expenditure from ILSC (for 2019: 45.3%-54.7%)*	Based on ILCS private consumption on education data (data received from Armstat-ILCS database) (details below) Data smoothed on per capita level.	Based on ILCS private consumption on education data (for males and females)
Private Consumption, Health	An estimate from Health National Accounts (https://nih.am/) *Male-Female: shares of healthcare expenditure from ILSC (for 2019: 41.7%-58.3%)*	Based on ILCS private consumption on healthcare data (data received from Armstat ILCS database) (details below). Data smoothed on per capita level.	Based on ILCS private consumption on healthcare data (for males and females)
Private Consumption, Other than health and education	Private consumption less estimates on private expenditure on education and health	Model distribution proposed by NTA international experts (per capita	Overall data for each age are divided proportionally based on

	Male-Female: based on share of males-females in population	consumption is done using 0.4 coefficient for 0-4 years, 1 coefficient for 20+ years and 0.4 to 1 coefficients for 5-19 years)	share of male-female in each age.
Less: Labor Income	**As sum of Earnings and Self-employment Labor Income**		
Earnings	Compensation of employees (from SNA) plus Adjustment for labor income portion of taxes less subsidies on other production (Share allocated to compensation of employees = compensation of employees/ (compensation of employees + gross operating surplus, corporations and NPISHs + gross mixed income)) *Male-Female shares: Based on data from SRC*	Based on data provided by State Revenue Committee (SRC) on salary for employees by single age groups (14-90) Data smoothed on per capita level (age 14+)	Based on data provided by SRC on salary for employees by sex-age singe groups (14-90 ages))
Self-employment Labor Income	As recommended by NTA, two-third of SNA gross mixed income adjusted by labor share in taxes less subsidies on other production (Share allocated to self-employed labor income = two thirds of gross mixed income/ (compensation of employees + gross operating surplus, corporations and NPISHs + gross mixed income)) *Male-Female shares: Based on data from SRC*	Based on data provided by SRC on turnover for self-employed by single age groups (14-90)) Data smoothed on per capita level (age 14+)	Based on data provided by SRC on turnover for self-employed by sex-age singe groups (14-90 ages))

Table 2. Reallocations

Reallocations	*Methodology and source for 2019 macro control data*	*Age distribution*	*Sex distribution*
Transfers			
Public Transfers	Inflow minus Outflow Simplified method is used as in many countries (with inflows are equal to outflows for most of public transfers).	Inflow minus Outflow	Inflow minus Outflow
Public Transfers, Inflows	As sum of all public transfers inflows, mentioned below	As sum of the components. Issues of each component are below.	As sum of the components. Issues of each component are below.
Public Transfers, Outflows	As sum of all public transfers outflows, mentioned below	As sum of the components. Issues of each component are below.	As sum of the components. Issues of each component are below.
Public Transfers, Education	Inflow minus Outflow =0	Inflow minus Outflow	Inflow minus Outflow
Public Transfers, Education, Inflows	SNA data (Equals to public consumption on education)	Same as in Public consumption on education	Same as in Public consumption on education
Public Transfers, Education, Outflows	Equals to Inflow	Proxy calculation of breakdown of Tax payers by age is used (details in Table 5 and below) The structure of taxpayers by components smoothed on per capita level (age 18+)	The proxy structure of taxpayers by age-sex. We need breakdown of Tax payers by gender (for improved accuracy).
Public Transfers, Health	Inflow minus Outflow =0	Inflow minus Outflow	Inflow minus Outflow
Public Transfers, Health, Inflows	SNA data (Equals to public consumption on health)	same as in Public consumption on health	same as in Public consumption on health
Public Transfers, Health, Outflows	Equals to Inflow	Same structure as described under Public Transfers, Education, Outflows	Same structure as described under Public Transfers, Education, Outflows
Public Transfers, Pensions	Inflow minus Outflow =0	Inflow minus Outflow	Inflow minus Outflow
Public Transfers, Pensions, Inflows	Minfin: Pensions paid (only age-specific pensions should be included, but we have	Done (based on age structure *(according to Unified social service –*	Done (based on age-sex structure *(according to Unified social service –*

	working pensions only (which includes other types also), where significant part is age pensions but may include also other types) *Male-Female: breakdown by number of pensioners (according to Unified social service – age + privileged)*	*age + privileged pensioners)* Data smoothed on per capita level (age 55+)	*age + privileged pensioners)*
Public Transfers, Pensions, Outflows	Equals to Inflow	Same structure as described under Public Transfers, Education, Outflows	Same structure as described under Public Transfers, Education, Outflows
Public Transfers, Other in-kind	Inflow minus Outflow =0	Inflow minus Outflow	Inflow minus Outflow
Public Transfers, Other in-kind, Inflows	SNA data (Equals to Public Consumption, Other than health and education)	by total population structure	Overall data for each age are divided proportionally based on share of male-female in each age.
Public Transfers, Other in-kind, Outflows	Equals to Inflow	Same structure as described under Public Transfers, Education, Outflows	Same structure as described under Public Transfers, Education, Outflows
Public Transfers, Other cash	From BOP: Government sector's Total current transfers payable to ROW minus Total Current Transfers receivable from ROW *Male-Female: based on share of males-females in population*	Inflow-Outflow	Inflow-Outflow
Public Transfers, Other cash, Inflows	Total current transfers payable by the Government sector minus Pensions paid *Male-Female: based on share of males-females in population*	by total population structure	using share of each gender in total population for each age
Public Transfers, Other cash, Outflows	*As residual*	Same structure as described under Public Transfers, Education, Outflows	Same structure as described under Public Transfers, Education, Outflows

Private Transfers			
Private Transfers, Inflows	This implies the sum of all private transfers inflows, namely, *inter-household* and *intra-household* private transfers inflows.	As sum of the components. Details of each component are below.	As sum of the components. Details of each component are below.
Private Transfers, Outflows	This implies the sum of all private transfers outflows, namely, *inter-household* and *intra-household* private transfers outflows.	As sum of the components. Issues of each component are below.	As sum of the components. Issues of each component are below.
Inter-household Transfers	BOP: Remittances (Inflow minus Outflow) *NTA says: "The macro controls available for inter-household transfers are usually very limited, however, and the magnitudes of inflows and outflows are based primarily on survey estimates rather than SNA data."*	Inflow –Outflow by age	Inflow – Outflow by age/sex
Inter-household Transfers, Inflows	1) BOP Household remittances received + 2) Estimated Inter-household transfers within Armenia (based on Armstat ILCS) *Male-Female breakdown (76.9%-23.1%): based on share of households with male-female head (only households who received transfers from other households) from Armstat ILCS database*	According to the age of the head of the household who received transfer from Armenia or abroad (Armstat ILCS, trin_00 part of questionnaire) . Source data smoothed on per capita level .	According to the age of the head of the household who received transfer from Armenia or abroad (Armstat ILCS, trin_00 part of questionnaire)
Inter-household Transfers, Outflows	1) BOP Household remittances paid + 2) Estimated Inter-household transfers within Armenia (based on Armstat ILCS) *Male-Female breakdown (83.2%-16.8%): based on share of households with male-female head (only households who sent transfers to other households) from Armstat ILCS database*	According to the age of the head of the household who sent transfer to Armenia or abroad (Armstat ILCS, trout_00 part of questionnaire). Data from ILCS were smoothed to cover all ages. Source data smoothed on per capita level .	According to the age of the head of the household who sent transfers to Armenia or abroad (Armstat ILCS, trout_00 part of questionnaire). Data from ILCS were smoothed to cover all ages by gender.

Intra-household Transfers	Intra-household transfers for the economy = 0, as Inflows are equal to Outflows. *NTA says: "Intra-household transfers are not part of national accounts and are not observed in large-scale household surveys. Instead of asking people about intra-household transfers directly, we **use a model with simple rules** about how resources are shared within the household."*	Inflow –Outflow by age	Inflow – Outflow by age/sex
Intra-household Transfers, Inflows	A sum of total intra-household transfer inflows based on model calculation using Armstat's ILCS database adjusted upward considering the coefficient of difference between ILCS's total consumption and Total private consumption of households in SNA.	A model uses the following data from Armstat's ILCS database: HH level data (Total private consumption, total income), were distributed by members using Personal level data (age, sex, head of household, employment status, proxy of pension size to average salary). If a member's consumption is larger than income, the member receives inflow of that amount, if not inflow is 0. All surplus is either transferred to other members to cover deficit, or transferred to head of household for saving. Source data smoothed on per capita level. At a later stage, Inflows by age were adjusted to provide NTA balance by ages.	The model allows allocation by age and sex.
Intra-household Transfers, Outflows	Same as inflows, but for outflows.		

Table 3. Asset Based Reallocations

Asset-based Reallocations	*Methodology and source for 2019 macro control data*	*Age distribution*	*Sex Distribution*
Public Asset-based Reallocations	Income minus Savings	Income minus Savings	Income minus Savings
Public Asset Income	Capital income calculation + SNA, Allocation of primary income, GG sector *Male-Female: using total share of male-female in population*	Using Calculated shares of Tax revenue distribution by age Source data smoothed on per capita level.	Similar estimation of tax shares by age-sex. Need breakdown of Tax payers by age-gender for improved accuracy.
Public Saving	SNA, Use of disposable income account, GG sector *Male-Female: using total share of male-female in population*	Using Calculated shares of Tax revenue distribution by age Source data smoothed on per capita level.	Similar estimation of tax shares by age-sex. Need breakdown of Tax payers by age-gender for improved accuracy.
Private Asset-based Reallocations	Income minus Savings		
Private Asset Income	As sum of 3 components below		
Private Capital Income, business & non-profits	Calculation based on SNA **1.** Net capital income, corporations and NPISH (SNA: **1a.** gross operating surplus of all domestic sectors except Government institutional sector - **1b**. capital income from owner occupied dwellings (SNA: owner occupied dwellings value added- consumption of fixed capital) + **1c**. capital income related calculated share of taxes less subsidies on other production) + **2.** calculated capital share of mixed income (43% of total taxes less subsidies on other	Current model details (need to change when better data sources are available): -for Net capital income of corporations and NPISH, instead of age profiles for dividend, interest and rent receivers (as proposed by NTA manual) we have used age allocation of vehicle owners in Armenia received from Police -for capital share of mixed income we have used (as proposed by NTA manual) household self-employment income age breakdown received from State Revenue Committee.	Same method as described for age breakdown is applied for gender. Need indicators to proxy breakdown by age and sex of owners of businesses for improved accuracy.

	production according to calculation for 2019 data)		
Private Capital Income, owner-occupied housing	Estimated based on SNA (Net capital income of owner occupied dwellings from household sector). Is equal to gross value added of owner occupied dwellings – estimated consumption of fixed capital	There are no data on age profiles according to NTA Manual recommendation (Household imputed rent), so currently model data based on proxy indicators are used. Current model details: Instead of household imputed rent age breakdown by head of household, we have used the age structure of heads of households from ILCS Armenia. Source data smoothed on per capita level.	The age-sex structure of head of household from Armstat's ILCS database.
Private Property Income	Calculated based on Sectorial accounts of SNA on property income (Total consolidated - Government sector)	*According to NTA manual:* ***Property income inflows*** *are allocated using the pattern of dividends, interest income and rent. For* ***Property income outflows****: two kinds of private property income are distinguished. Consumer credit outflows are allocated by age using interest expense of the household including mortgage interest. Other property income outflows are allocated by age using dividends, interest income and rent.* Unfortunately, these proposed age profiles are not available currently for Armenia. ILCS has questions on rent and income from stocks, etc, but data are very few and cannot be used for all ages. We have used a proxy, such as age allocation of vehicle owners in Armenia (need better source to improve accuracy). Source data smoothed on per capita level.	Same proxy used for age-sex allocation.
Private Saving	SNA (total savings-General Government sector savings)	A proxy based on structure of head of households (smoothed) by age.	Age-sex data were adjusted to provide balance of NTA

The table below outlines the details and methodological adjustments concerning data sources.

Table 4. Detailed Methodology and Questions by different components

Public Consumption	
Public Consumption-Education	
Methodological adjustments	Representation of Public Expenditures on Education distributed according to the age of population is based on the functional classification of education expenditures of state budget with following sections: • **Preschool education (ages 2-3 in nursery, ages 3-6 in kindergarten)**, in case of which the expenditures are distributed on 1-6 aged people, • **Elementary general education (1-4 grades)**, in case of which the expenditures are distributed on people aged 6-21 (there are separate cases of adults enrolled in primary classes/grades), • **Basic general education (5-9 grades)**, in case of which the expenditures are distributed on people aged 6-21 people (there are some specific cases outside the main pattern), • **Secondary general education (10-12 grades)**, in case of which the expenditures are distributed on people aged 6-21, • **Primary vocational and secondary vocational education**, in case of which expenditures are distributed on people aged 14-39, • **Higher education**, in case of which the expenditures are distributed on people aged 16-48 (including bachelor's and master's degrees as well as postgraduate education), • **Extracurricular education**, in case of which the expenditures are distributed on people aged 6-21. **It would be more accurate to distribute the expenditures by the number of children involved in the mentioned processes, if not, then by the number of school-age children, as it is done in the attached document,** • **Additional education**, which refers mainly to the training of government employees. It can probably be distributed by the age of government employees, but because of absence of the data it is dispensed by the number of population, on people aged 21-63, • Support services to education, for which are considered the expenditures for 48 different educational programs. As the educational programs are very diverse, within the project educational expenditures by both programs and state budget operational classification groups and subgroups are considered. It should be noted that the state budget expenditures in the field of education and their names/definitions differ somewhat according to programs and operational classification, so we have used the definition that gives a better idea of which age group they relate to. Further, the shares of expenditures for the separate program under the additional education are calculated, which afterwards are distributed on the people of a certain age they relate to. The shares of expenses for individual ages have been then added to obtain a more accurate distribution of additional costs to education. In cases, when no specific age

	was possible to determine, expenditures are dispensed according to age structure of total population. Several expenses are presented below, namely: • *Activities aimed at improving the seismic safety of schools implemented with the support of the Asian Development Bank*, in case of which the expenses are distributed on people aged 1-20, according to children of general education age, who are the main beneficiary; • *Within the framework of the "Education Improvement Program" implemented with the support of the World Bank, capital investments in senior, secondary and basic schools and organizations in the field of education*, in case of which expenses are distributed on people aged 1-20, according to children of general education age, who are the main beneficiary; • *Improvement of building conditions of primary and secondary vocational educational institutions*, in case of which the expenses are distributed on people aged 14-39, according to young people of primary and secondary vocational education age; • *Implementation of STEM education and robotics development in schools*, in case of which the expenses are distributed on people aged 1-20 according to children of general education age, who are the main beneficiary; • *Pedagogical-psychological support services*, in case of which the expenses are distributed on people aged 1-39, according to children of general education and young people of primary and secondary vocational education age; • *Academic exchange and mobility services*, in case of which the expenses are distributed on people aged 16-46, according to the age of people involved in the first (Bachelor's degree) and second (Master's degree) levels of higher education, as well as those involved in postgraduate education (PhD); • *Implementation of the subject "National song and dance" in public educational institutions*; in case of which the expenses are distributed on children aged 10-12, according to the age of children included in the grades in which curriculum the subject is included; • **Education, n.e.c**., it should probably include public administration and similar expenses. In the document, it is distributed according to total population.
Sources	Existing data on population used in the document is presented in "Social Situation of RA in 2020" report of Armstat, available at https://armstat.am/en/?nid=82&id=2414
Public Consumption - Health	
Methodological Adjustments	Public Expenditures on Public Health are distributed according to the main beneficiaries of provided goods (medicine etc.) and services for which both public health programs and functional classification of the state budget is considered. In some cases, the public cost profile does not reflect the exact age group of beneficiaries, so the distribution is done conditionally based on the study of other government or relevant documents. Public Expenditures on Public Health cover the following sections: • **Medical products, devices and equipment**, in case of which the expenditures are distributed on the people considered as the main beneficiary group as a result of the

	examination of sub-projects. More details presented in the attached document, some of the sub-projects are presented below: • *Provision of medicines to outpatient - polyclinic, hospital medical care recipients and individuals included in special groups*, in case of which the expenditures are distributed on total population in the absence of more accurate data. It follows the logic that total population benefits from these services, but, however, it would be better to have more accurate data on the main beneficiaries; • *Provision of medicines to the state protection service*, in case of which the expenditures are distributed on people **aged 20-63** in the absence of more accurate data; • *Provision of medicine to prisoners in detention centers*, in case of which the expenditures are distributed on people **aged 14-80** in the absence of more accurate data; • *Medical devices and equipment*, which, according to the functional classifications, refers to the current repair and maintenance services for equipment of military hospitals and medical points, so in this case the expenditures are distributed on people **aged 18-63**. It should be considered that people aged 18-20 have higher share in this beneficiary group as it is the age of mandatory military service, so a certain ratio can be applied in the mentioned beneficiary group (for example, 60% for 18-20 age group and 40% for those 21-63) to achieve more accuracy later in case of absence of necessary data; • **Outpatient services**, in case of which the expenditures are distributed on the people considered as the main beneficiary group as a result of examination of sub-projects. More details presented in the document, some of them are presented below: • *General medical services*, in case of which the expenses are distributed on total population; • *Specialized medical services*, in case of which the expenses are distributed taking into account the number of patients for certain diseases according to age groups. However, Armstat presents the number of patients using different age group structures for different diseases, which is further divided into single-age structure in the attached document according to population structure. In case of sports medical and anti-doping control services, in the absence of any data, the expenses are distributed on total population. However, it would be more accurate to have some official data on professional sports players according to which the expenses can be distributed; • *Dental services*, in case of which 2 groups-adults **(18-80)** and children **(0-17)** are considered. Since there is a specification only for adults, namely, beneficiaries included in socially disadvantaged and special groups, it is necessary to have at least the structure of the mentioned groups to reach more accuracy in the future; • *Paramedical services*, in case of which the expenses are distributed on total population; • **Hospital services**, in case of which expenses are distributed according to the following sections:

	• *General hospital services*, in case of which the expenses are distributed according to the main beneficiary groups of the given service, for example: • Implementation of emergency medical care according to the list of diseases and conditions approved by the Minister of Health of RA, in case of which the expenditures are dispensed on total population; • Medical care services for socially disadvantaged and special groups, in case of which the expenses are distributed according to total population. However, for more precision it would be better to have the structure of population of the given groups; • Medical assistance services to military personnel, as well as rescue workers and their family members, in case of which the expenditures are dispensed according to total population in the absence of the necessary data; • Medical assistance and maintenance services for employees of state institutions and organizations: it would be more accurate to calculate the expenses using the number of employees in the absence of which the expenses a4re distributed according to total population aged 20-63; • Medical care services for servicemen outside the Republic of Armenia, the expenses of which are distributed on people **aged 18-63**. It should be considered that people aged 18-20 have higher share in this beneficiary group as it is the age of mandatory military service, so a certain ratio can be applied in the mentioned beneficiary group (for example, 60% for 18-20 age group and 40% for those 21-63) to achieve more accuracy later in case of absence of necessary data; • *Specialized hospital services*, in case of which the expenditures are dispensed according to the number of patients for certain diseases according to age groups. However, Armstat presents the number of patients using different age group structures, which is further divided into single-age structure according to the population structure. In case of sports medical and anti-doping control services, in the absence of any data, the expenses are distributed on total people; • *Maternal and child medical services*, in case of which the expenses are shared among the given groups of individuals, in particular: • Obstetric medical care services, in case of which the expenditures are dispensed among people **aged 15-49 (fertility age)**; • Medical care services for gynecological diseases, in case of which the expenditures are distributed according to total population; • Provision of (hospital) medical care for children (children aged 0-7 and 7-18 included in socially disadvantaged and special groups) (examination, diagnosis, treatment), which, in case of absence of the structures of population of the given groups is distributed on children **aged 0-17**; • Medical care services using assisted reproductive technologies for infertile couples, in case of which expenses are distributed on people **aged 20-42** according to the age of the woman specified in the government decision; • **Public health services,** which is calculated according to total population;

	• **Healthcare (n.e.c.),** which is distributed according to total population. However, in case of any significant expenses, included in this section addressing a special beneficiary group, should be considered in the future to secure higher accuracy.
Sources	Existing data on population used in the document is presented in "Social Situation of RA in 2020" report of Armstat, available at https://armstat.am/en/?nid=82&id=2414
Public Consumption, other than health and education	
Methodological adjustments	Public consumption, other than health and education is distributed according to the total number of population by age and sex.
Sources	Armstat, Demographic database https://armstat.am/en/?nid=209
Private Consumption	
Private Consumption-Education	
Methodological adjustments	Private consumption related to education is based on the ILCS data provided by Armstat. It consists of the sum of the total weighted amount spent by the household on the education of the given member of the household, which should be distributed by the age and sex of the given member. It includes the following: • Tuition and other required fees, • Activities of the parent council, • Uniform and other clothing, • Books, • Other educational materials, • Food, transportation and/or accommodation, • Other expenses.
Source	ILCS data, Armstat.
Private Consumption-Health	
Methodological adjustments	Private consumption related to health is distributed based on the ILCS data provided by Armstat (Spending on outpatient services for last 30 days and spendings on hospitals for last 12 months). Overall macro control indicator is distributed by age and sex using shares of each age (sex) spendings in total spendings based on Armstat ILCS data (total weighted amount that the given member of the household spent for outpatient services (recalculated for 12 months from monthly data) and hospital services (last 12 months)).
Source	ILCS data, Armstat.
Private consumption, other than health and education	
Methodological adjustments	Private consumption, other than health and education is distributed according to age and sex structure based on the total number of population by age and sex.
Source	Armstat, Demographic database https://armstat.am/en/?nid=209
Reallocations	
Transfers	
Public Transfers	
Methodological adjustments	**Public Transfers- Inflows** • *Public transfers, inflows* consist of the following kinds of public transfer inflows: *education, health, pensions, other in-kind* and *other cash,*

	• *Public transfers for education* uses data and patterns of Public consumption on education, distributed by the same pattern of age and sex, • *Public transfers for health* uses the data and patterns of Public consumption on health, distributed by the same pattern of age and sex, • *Public transfers for pensions* should use the data on pensioners by type of pension and of sex and age group, distributed by age and sex, • *Public transfers, other in-kind* uses the data and patterns of Public consumption, other than health and education, distributed by the same pattern of age and sex (based on the number of total population), • Public transfers, other cash is also based on the structure of total population by age and sex. **Public Transfers-Outflows** • *Public transfers, outflows* consist of the following kinds of public transfer outflows: education, health, pensions, other in-kind and *other cash*. Each kind of the public transfers outflows should use the structure of Taxpayers' data by age/gender if such is available as survey or administrative data. In addition, it should be discussed if certain kinds of taxes are directed to specific aims (as Public transfers inflows). However, in the absence of survey or administrative data, NTA methodology suggest to use proxies for specific age profiles for taxpayers, such as consumption, asset income and labor income: • More details on the calculation of allocation of taxes by taxpayers' age and sex is presented in the Table 5.
Sources	• Armstat data, used for the previous sections of the NTA model • Ministry of Finance data on Taxes, structure of head of household from Armstat's ILCS, other administrative data • Existing data on pensioners is available at "Social Situation of RA in 2020" report of Armstat, available at https://armstat.am/en/?nid=82&id=2414
Data needs	• Data on pensioners by type of pension and of sex and separate age, as currently there is the data by age groups. • Administrative data on taxpayers by age and sex.

2. Data sources that needs Improvement in future

	NTA indicator	Sub-category or program	Macro control, Age distribution or sex distribution	Possible data needed for improvement	Possible data source for improvement
1	Public Consumption, Education, Public Transfers, Education, Inflows	Additional education	Age and sex distribution	Age/sex structure of government employees participated in the trainings	Ministry of Finance, Civil Service Office
2	Public Consumption, Education, Public Transfers, Education, Inflows	Extracurricular education	Age and sex distribution	Age/sex structure (number) of children involved in the mentioned processes	Ministry of Finance, Ministry of Education
3	Public Consumption, Health, Public Transfers, Health, Inflows	Policlinic services	Age and sex distribution	Single age/sex data on number of patients, diseases or beneficiaries (breakdown of patients, diseases or beneficiaries are currently available by large age groups only (for example 0-14, 15-49, 50+)) - no information is available to distribute general medical services program by single age and sex.	Ministry of Health, National Institute of Health (NIH) in Armenia
4	Public Consumption, Health, Public Transfers, Health, Inflows	Outpatient and Hospital services	Age and Sex distribution for newborns (0 age vs other children)	Current data sources do not allow distinguishing expenditure on newborns from other children and its expenditure had been estimated using different proxy models.	Ministry of Finance, Ministry of Health, National Institute of Health (NIH) in Armenia
5	Public Consumption, Other than Health and Education, Public Transfers, Other in-kind Inflows	-	Age and Sex distribution	More detailed information about age and sex distribution of Public expenditure will allow to be more precise (currently it is distributed by total population structure)	Ministry of Finance

6	Public Transfers, Pensions, Inflows	-	1. Macro control Indicator 2. Age and sex distribution	1. Amount of age-specific pensions is needed (currently working pensions are available (which includes not only age-specific pensions but other types also)) 2.Data on pensioners by type of pension and separate single age-sex (currently data are available by large age groups only)	Ministry of Finance, Ministry of Labor and Social Affairs, Unified Social Services
7	Public Transfers, Outflows (all outflow categories)	Age sex profiles of taxpayers in Armenia	Age and sex distribution	To construct age-sex profiles the best would be to have age-sex breakdown of taxpayers by specific taxes. Since it is difficult to have in many countries, we need the following proxies: asset income (age-sex breakdown of business owners, age-sex breakdown of residential and commercial real-estate owners, age-sex structure of consumption of products that have excise tax).	Ministry of Finance, State Revenue Committee, Armstat
8	Private Consumption, Total Private Consumption, Education Private Consumption, Health	-	1. Macro indicator 2. Age and Sex distribution	1. For more straightforward information, detailed of private final consumption expenditures by COICOP is needed. 2. Currently, Armstat's ILCS provides details for private consumption on education and health by age and sex, but the other private consumption is not available by age-sex.	ArmStat
9	Private Capital Income, business & non-profits	-	Age and Sex distribution	• Age and sex profiles for dividend, interest and rent receivers, • Breakdown by age and sex of owners of businesses	State Register, SRS

10	Private Capital Income, owner-occupied housing	-	Age and Sex distribution	• Age and sex profiles of owner occupied dwellings from household sector, or • Payed property tax on dwellings and houses by age and gender.	SRS
11	Private Property Income	-	Age and Sex distribution	• Dividends, interest income and rent received from the private property by age and gender, • Interest expense of the household including mortgage interest by the age and gender of household head, • Owners of private property by sex and type.	SRS, CBA