



Philippines 2007 NTA: Consumption,  
Income, and Intergenerational Reallocation  
of Resources - Revised Estimates

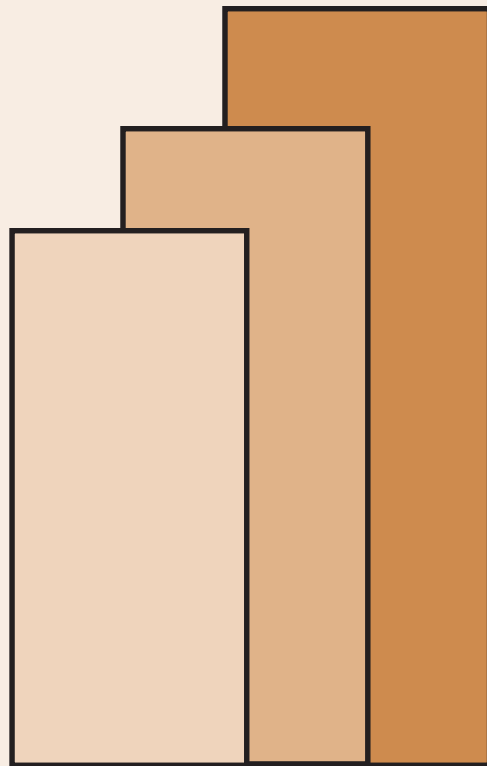
*Michael Ralph M. Abrigo, Rachel H. Racelis  
and J.M. Ian S. Salas*

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**Philippines 2007 National Transfer Accounts (NTA):  
Consumption, Income and Intergenerational Reallocation of Resources –  
Revised Estimates<sup>1</sup>**

Michael Ralph M. Abrigo, Rachel H. Racelis, and J.M. Ian S. Salas<sup>2</sup>

September 2012

Abstract

This paper describes the revised national level estimates of the 2007 Philippines NTA. The differences between the previous and the revised 2007 Philippines NTA Flow Accounts estimates are due to the change in the treatment of Overseas Filipino Workers' (OFW) remittances: treated as inter-household transfers in the previous estimates; and treated mainly as labor income (earnings) in the revised estimates. The main changes in the estimates and results are those related to labor income and lifecycle deficit including: (1) the peak ages in per capita earnings and self-employment are both lower by one year at 28 years (previously 29 years) and 44 years (previously 45 years), respectively; (2) lifecycle deficit age cut-off are 24 years (previously 25 years) for the young and 59 years (previously 58 years) for the elderly; and (3) there is negative lifecycle deficit (i.e., there is surplus) for ages 25-58 years (previously 26-57 years).

Keywords: National Transfer Accounts, economic lifecycle, intergenerational transfer, labor income age profile, consumption age profile, lifecycle deficit

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<sup>1</sup>. This paper is an output of the “Intergenerational Transfers, Population Aging and Social Protection in Asia” Project. The Philippine Institute for Development Studies (PIDS) and Nihon University Population Research Institute (NUPRI) are implementing the Philippines component of said Project with support from the Thailand Development Research Institute (TDRI) and the International Development Research Center (IDRC). The Project is part of an international collaboration to develop and apply the National Transfer Accounts (see [www.ntaccounts.org](http://www.ntaccounts.org).)

<sup>2</sup> Philippine Institute for Development Studies, University of the Philippines and University of California at Irvine, respectively.

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1. Introduction

This paper describes the revised national level estimates of the 2007 Philippines NTA. The differences or changes between the previous and the revised 2007 Philippines NTA Flow Accounts estimates are due to the change in the treatment of Overseas Filipino Workers' (OFW) remittances: treated as inter-household transfers in the previous estimates; and treated mainly as labor income (earnings) in the revised estimates. The previous set of 2007 NTA estimates is reported in the paper by Abrigo, Racelis and Salas (2012).

This paper has seven sections. A brief description of data and methods is provided in the next section. Results of the revised 2007 NTA flow accounts for the Philippines are discussed in four parts. Section 3 discusses overall consumption, labor income and lifecycle deficit age profiles. Section 4 presents estimates of age profiles of each component of consumption and labor income. Financing of lifecycle deficit and consumption are presented in Sections 5 and 6. The last section, Section 7, concludes this paper.

2. Estimation of the revised 2007 NTA

The main sources of data for the estimation of the revised 2007 Philippines NTA Flow Account remains the same as those used in the previous set of estimates. These include: the 2007 National Income Accounts, specifically the Income and Outlays breakdown, obtained from the National Statistical Coordination Board (NSCB); the most recent estimates available of the National Health Accounts and the National Education Expenditure Accounts (also from NSCB); the 2006 Family Income and Expenditure Survey (FIES) and the 2007 Annual Poverty Indicator Survey (APIS) by the National Statistics Office (NSO); and government finance and budget documents containing 2007 data obtained from the Department of Budget and Management (DBM) and the Commission on Audit (COA).

The same estimation procedures as those described in Abrigo, Racelis and Salas (2012) are followed. The main difference between the revised and the previous 2007 NTA estimates is in the aggregate control total used for the earnings component of labor income. The control total for earnings increased from PhP1,987 billion (used in previous estimates) to PhP2,614 billion in the revised estimates. The aggregate control totals used

in the estimation of the revised 2007 NTA Flow Accounts components are shown in Table 1.

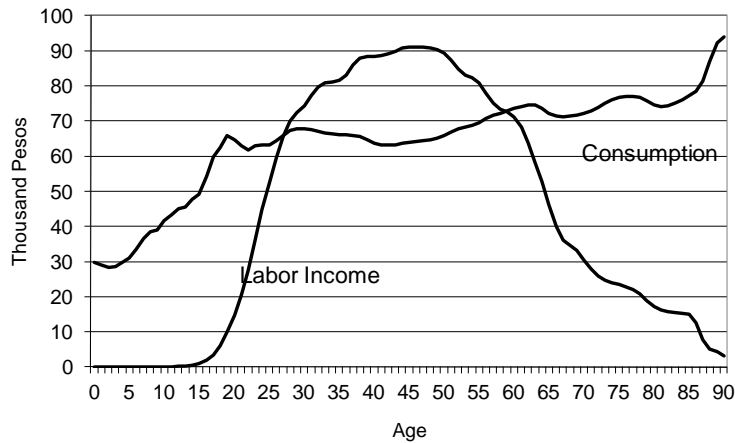
**Table 1. NTA aggregate controls: Philippines, 2007**  
(value in million PhP)

<i>NTA Component</i>	<i>Control Total Description</i>	<i>Value</i>
<b>CONSUMPTION</b>		<b>4,770,266</b>
Public – Total	Government consumption expenditures (GCE)	653,760
Education	GCE * (education budget share)	151,038
Health	GCE * (health budget share)	43,767
Other	GCE less public education and health expenditures	458,954
Private – Total	Personal consumption expenditures (PCE) less net indirect taxes paid by households (=netPCE)	4,116,506
Education	netPCE * (education household expenditure share)	225,212
Health	netPCE * (health household expenditure share)	149,571
Other	netPCE less household education and health expenditures	3,741,722
<b>LABOR INCOME</b>		<b>3,940,664</b>
Earnings	Compensation of domestic workers plus net compensation from rest-of-the-world (ROW)	2,614,907
Self-employment	2/3 * operating surplus of households	1,325,757

### 3. Lifecycle deficit by age

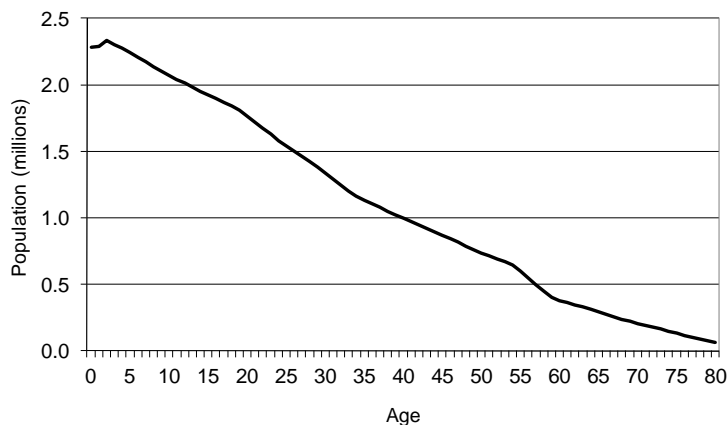
The per capita age profiles in Figure 1 show the labor earnings and consumption patterns over the lifecycle of the average Filipino individual. The profile for labor income has the expected bell-shape, rising sharply between ages 15 to 25, coinciding with the age of entrance into the labor market; peaking at age 42; dropping sharply between ages 60 to 65, coinciding with retirement in the formal labor market; and declining more slowly thereafter. Per capita current consumption is largely influenced by the ad hoc equivalence scale (see Racelis and Salas 2007 for estimation details) used to distribute private non-education, non-health consumption to members, which comprise 78 percent of total consumption in 2007. The per capita current consumption shows steep increase up to around age 19, staying relatively unchanged up to age 45 and gradually increasing again towards old age. The sharp increases in per capita consumption at younger ages are due to education expenditures while the gradual increase in the older ages is due to health care consumption that increases with age.

**Figure 1. Age profile of per capita consumption and labor income, Philippines, 2007, current prices (in PhP thousands)**



The population size of the Philippines was 88 million in 2007 and is projected to increase to 142 million in 2040 (United Nations, 2010). Average annual growth rate is projected to decline from about 2.0 percent in 2007 to about 1.0 percent by 2040<sup>3</sup>. In 2007 the distribution of the Philippine population by age was typical of an expansive or growing population (Figure 2), with the young accounting for the highest percentage of the population. The ratios of the young (0-14 years) and the elderly (60 and above years) populations to the working-age population are 0.63 and 0.09, respectively, or a combined ratio of 0.72. By 2040 the population age structure is projected to change significantly: compared to 2007, the proportion of the young age groups relative to the total population will decrease by about nine percentage points, while that for older age groups will increase by about seven percentage points. Thus, the ratios of the young (0-14 years) and the elderly (60 and above years) populations to the working-age population will decline to 0.38 and increase to 0.12, respectively, or a lower combined ratio of 0.50.

**Figure 2. Age profile of population, Philippines, 2007 (in millions)**

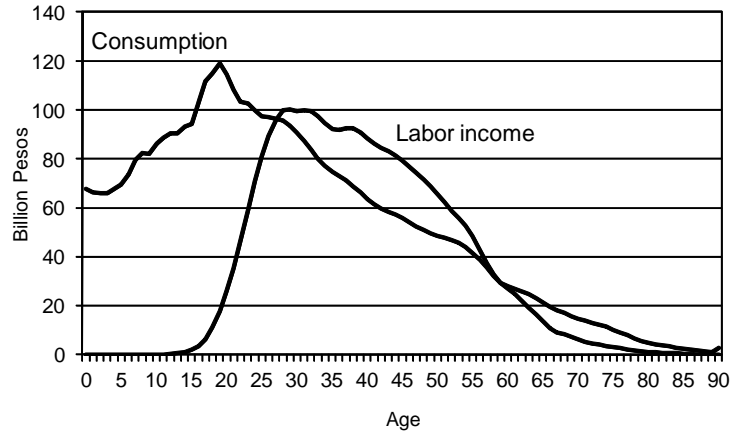


Multiplying the 2007 per capita age profiles for consumption and labor income (Figure 1) with the population size at each age for the same year (Figure 2) produces the

<sup>3</sup> Previous estimate by UN (2007) points to a lower 0.5 growth rate in 2040; see Salas and Racelis (2008)

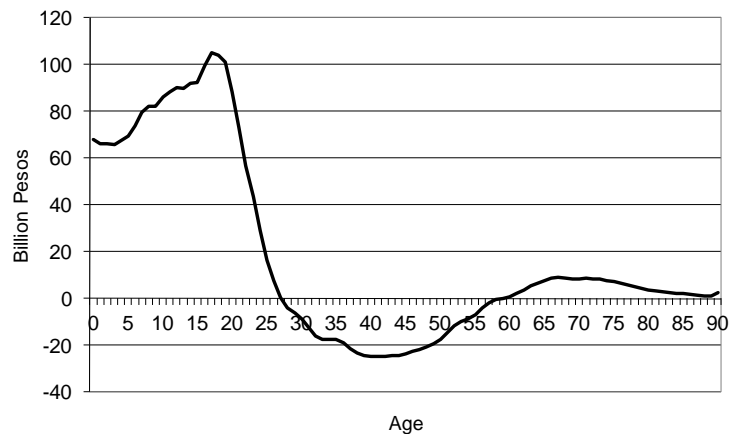
aggregate age profiles shown in Figure 3. The aggregate lifecycle deficit computed as the difference between the aggregate consumption and aggregate labor income at each age is presented in Figure 4. The aggregate age profiles indicate the magnitude of the lifecycle deficit of the young and the elderly relative to the surplus generated by the middle age group. Aggregate values of consumption, labor income and lifecycle deficit are summarized by broad age groups in Table 2.

**Figure 3. Age profile of aggregate consumption and labor income, Philippines, 2007, current prices (in PhP billions)**



There is lifecycle deficit, i.e. consumption exceeds labor income, for the young up to age 24 and for the elderly from age 59 onwards (Figures 3 and 4). The age groups 0-24 years and 59 years or older are referred to as the dependent age groups or the deficit groups – defined based on lifecycle deficit rather than simply based on age.. There is lifecycle surplus, i.e. labor income exceeds consumption, from ages 25 to 58 years, a span of 34 years. The aggregate lifecycle deficit for all dependents in 2007 amounted to about PhP1,980 billion with the young accounting for around 91 percent and the elderly the remaining 9 percent. Aggregate surplus generated by the 25-58 age group amounted to PhP1,151 billion and the surplus-to-deficit ratio was about 0.58.

**Figure 4. Age profile of aggregate lifecycle deficit, Philippines, 2007, current prices (in PhP billions)**



#### 4. Age profiles of consumption and labor income components

Table 2 summarizes the aggregate values of consumption and labor income components by broad age group. The grand totals in this table may not exactly tally with the control totals shown in Table 1 because of rounding in the age-specific computations.

Financing for consumption is mediated by public and private institutions. Public consumption accounted for around 15 percent of total consumption in 2007. Both public and private consumption are comprised of consumption on education, health and others. Total education and health consumption accounted for 23 and 7 percent of public consumption, respectively, and 5 and 3 percent of private consumption, respectively. Taking into account age-specific variations in consumption, however, shows higher proportion of consumption accruing to education for the population aged 0 to 24 years at 34 of public consumption and 12 of private consumption, and higher proportion of health consumption for the population 59 years or older at 14 percent of public consumption and 11 percent of private consumption.

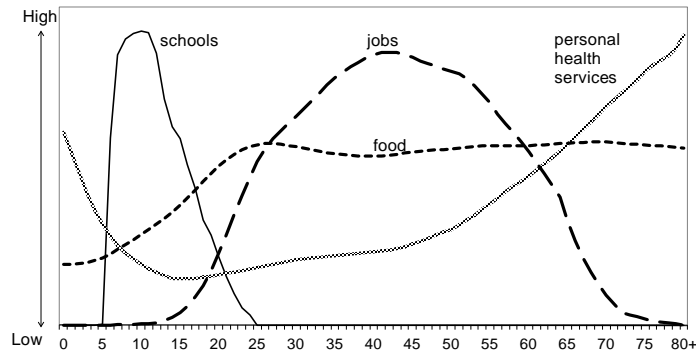
Labor income consists of earnings, including fringe benefits, from paid employment of both local and overseas workers, and income from self-employment. Labor income in 2007 is divided between earnings from paid employment and income from self-employment, with the latter accounting for about 34 percent of total labor income.

**Table 2. Aggregate consumption, labor income and lifecycle deficit by age group, Philippines, 2007, current prices (PhP Billion)**

	0-14	15-24	25-58	59+	All
LIFECYCLE DEFICIT (SURPLUS)	1,167.2	641.7	(1,150.9)	171.6	829.6
CONSUMPTION	1,173.7	1,111.6	2,114.6	370.3	4,770.3
Public	290.1	143.4	189.0	31.3	653.8
Education	106.4	44.6	0.0	0.0	151.0
Health	15.9	7.1	16.5	4.3	43.8
Others	167.8	91.7	172.5	27.0	459.0
Private	883.6	968.3	1,925.6	339.0	4,116.5
Education	83.2	142.0	0.0	0.0	225.2
Health	40.3	14.4	56.4	38.5	149.6
Others	760.1	811.9	1,869.2	300.6	3,741.7
LABOR INCOME	6.5	469.9	3,265.5	198.7	3,940.7
Earnings	1.9	304.8	1,482.9	61.2	1,850.9
Self-Employment	4.6	125.7	1,073.1	122.3	1,325.8

Shown in Figure 5 are age profiles of service requirement taken from Corsa and Oakley (1971) as cited in NEDA (1993). The profiles in Figure 5 suggest that a person exerts pressure on specific services differently at different points in his lifecycle.

Figure 5. Relationship Between Service Requirement Per Person and Age (Source:L.Corsa & D.Oakley 1971 cited in Herrin 1983)



While the profiles in Figure 5 are for amounts of services to be consumed at each age and the profiles presented in this paper are for consumption in monetary terms, the profiles in Figure 5 are still useful as reference for what general shapes to expect for the various consumption and income items. The age profile for jobs can be used as the reference for the shape that the labor income age profile is expected to take. In low-income countries food tends to take the largest share of household spending. Thus, the age profile for food requirement makes a good reference for what the profile of other consumption (i.e., consumption excluding education and health) should look like. In general, the 2007 age profiles presented in the succeeding sections for the Philippines have similar shapes as those represented in Figure 5.

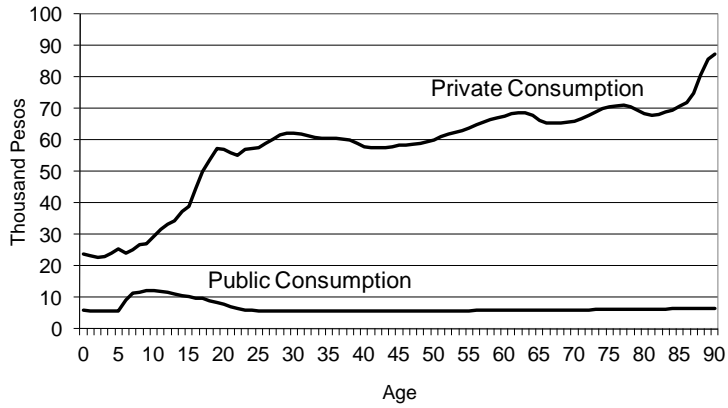
### *Current Consumption*

Public consumption accounts for about 15 percent of total consumption overall, the percentages are observed to vary at different ages (Figure 6). At the early ages of 0-14 years public consumption reaches a high of 32 percent of the group's total consumption, and then settles to a low 9 to 10 percent for ages 25 years and older. By consumption item (Figures 7 and 8), public consumption is observed to be targeted to ages attending the basic education level, i.e. ages 5-16 years, while private education consumption is highest in ages attending the tertiary education level, i.e. ages 17-24 years. The patterns in these education consumption age profiles reflect the fact that basic education in the Philippines is provided by the government for free and that private household expenditures are paying for education costs that are not covered by the government. Expenditures are highest for child and elderly health care as observed in both the per capita public and private health consumption age profiles. The shape of the age profile of private other consumption is driven primarily by the ad hoc equivalence scale used to distribute household other consumption expenditures to its members. The allocation method assigned weights to household members on the basis of age as follows: 0.4 for children age 0 to 4; linearly increasing from 0.4 to 1.0 from age 5 to 19; and 1.0 for ages

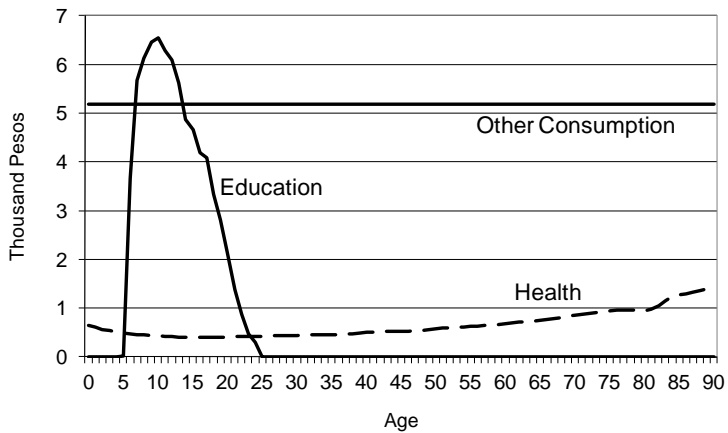


20 and older. Public other consumption expenditures are assumed to benefit all individuals in the population equally, hence the equal per capita means across all ages.

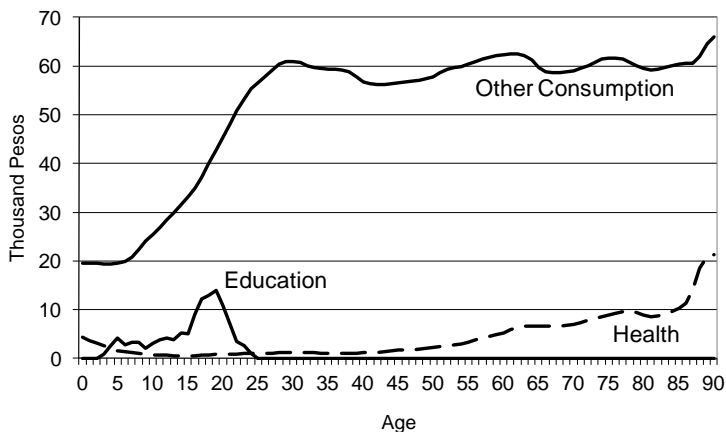
**Figure 6. Age profile of per capita public and private consumption, Philippines, 2007, current prices (in PhP thousands)**



**Figure 7. Age profile of per capita public consumption, Philippines, 2007, current prices (in PhP thousands)**



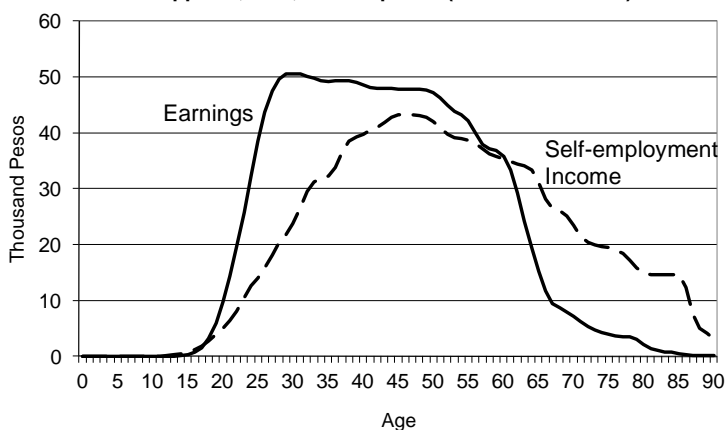
**Figure 8. Age profile of per capita private consumption, Philippines, 2007, current prices (in PhP thousands)**



*Labor Income*

The age profile of paid employment earnings and self-employment income for 2007 resemble the inverted U-shape seen in Figure 5, with per capita means peaking at ages 28 and 44 years, respectively. The two per capita age profiles, however, differ in overall shapes. Earnings from paid employment largely follows patterns expected in the formal labor market, i.e. sharp increase in per capita means between 15 to 24 years coinciding with entrance into the labor market, rapid decrease after 65 years coinciding with retirement, and relatively flat in between. Self-employment income, on the other hand, shows a more gradual increase from age 15 years up to its peak at age 44 years and gradually declining thereafter. Per capita means for earnings are generally higher than the means for self-employment income up to age 60 years, but the pattern reverses beyond this age. As noted by Salas and Racelis (2008), the differences in the level and shape of the two age profiles reflect the difference in the educational attainment of salaried versus self-employed workers.

**Figure 9. Age profile of per capita labor income components, Philippines, 2007, current prices (in PhP thousands)**

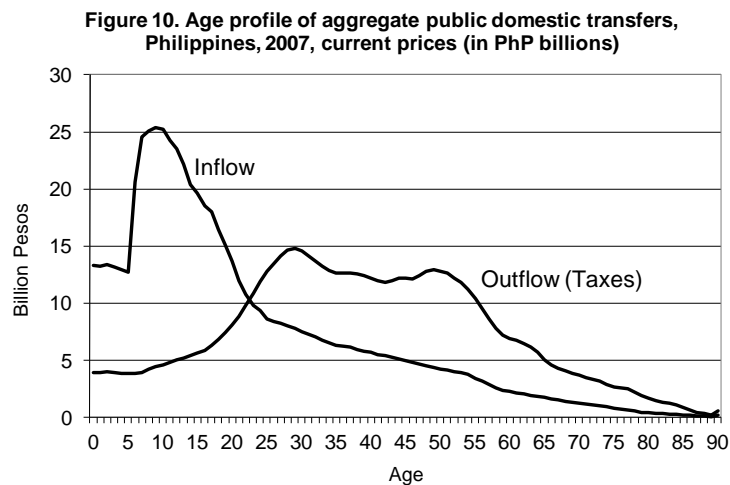


## 5. Intergenerational reallocation of resources

The deficit or surplus of an individual, a household or a nation must be matched by age reallocations consisting of net public transfers, net private transfers, and asset reallocations.<sup>4</sup> Resource reallocations in the Philippines done through each of these systems are examined in terms of age profiles of inflows to identify the age groups of recipients of resources and age profiles of outflows to identify the age groups providing the resources. Then the net resources taken or given by each age group through all systems combined are summarized at the end of this section. Age profiles are presented in this section in aggregate rather than in per capita terms.

### *Public Transfers*

The age profile for aggregate inflow of public domestic transfers shows that a sizeable amount of public transfers go towards the schooling ages, primarily for the provision of basic education (Figure 10). The bulk of aggregate outflow, which is composed of direct and indirect taxes, are expectedly coming from the working ages. Outflows from other ages are also observed because of consumption taxes.



### *Private Transfers*

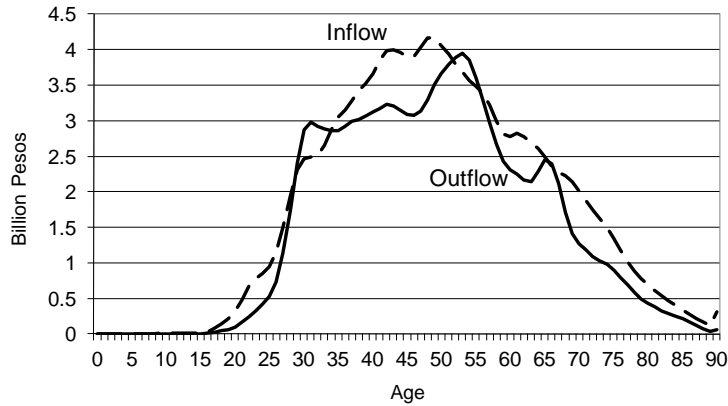
Private domestic transfers made through households consist of those made between, i.e. inter-, households and those made among members of the same, i.e. intra-, household.

For inter-household domestic transfers, inflows exceed outflows at the young and older ages. This finding shows that households with the young and elderly heads are on average net recipients of inter-household transfers. (Note that given the closed economy assumption used in NTA, aggregate inflows are set equal to aggregate outflows. It is not

<sup>4</sup> The governing equation for the NTA flow accounts is as follows: Consumption minus Labor Income = Lifecycle Deficit = Net Public Transfers + Net Private Transfers + Asset Reallocation. See Section 2 of Abrigo, Racelis and Salas (2012) for more detailed discussion.

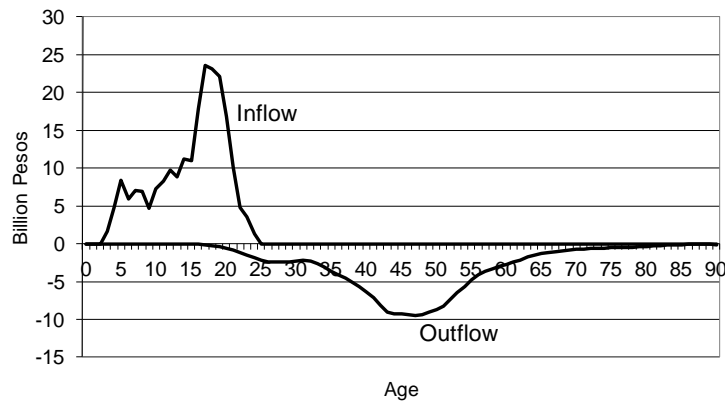
atypical, however, for household surveys to yield aggregate inflows and outflows that do not match.)

**Figure 11. Age profile of aggregate (private) inter-household domestic transfers attributed to the household head, Philippines, 2007, current prices (in PhP billions)**



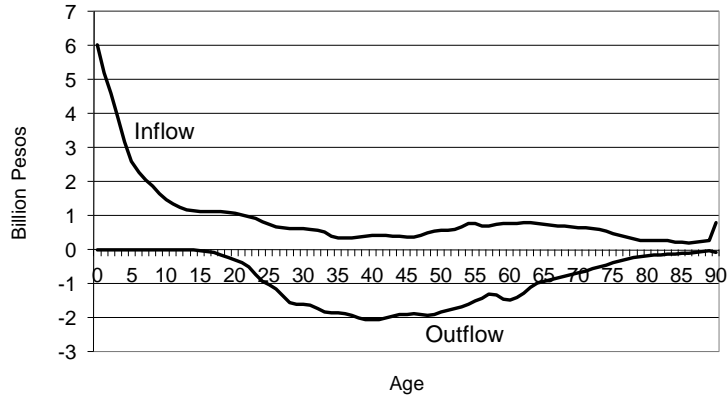
Intra-household transfers in the synthetic model of familial transfers in NTA are also formulated in terms of inflows to and outflows from age groups and by type of consumption item. For education consumption, inflows occur with pronounced sharp increases towards ages 7 and 18, or when most young people enter elementary or tertiary level school (Figure 12). Corresponding outflows come from age groups 20 to 65 years.

**Figure 12. Age profile of aggregate (private) intra-household transfers for education consumption, Philippines, 2007, current prices (in PhP billions)**



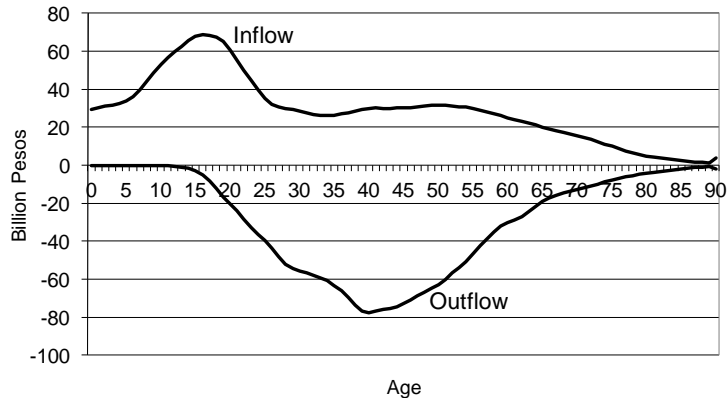
For health consumption, the age profiles in Figure 13 show intra-household inflows for health consumption going mostly to the young under age 5 years. Outflows are spread out but rise early on due to co-residence of parents with the very young.

**Figure 13. Age profile of aggregate (private) intra-household transfers for health consumption, Philippines, 2007, current prices (in PhP billions)**



In Figure 14 the age profile of intra-household inflows to finance consumption other than for health and education increases as individuals approach adulthood (but while still in deficit) and then starts to decline (despite increasing consumption requirements) as individuals begin to pay their own way and enter the surplus ages. The bulk of outflows come from the working or surplus ages.

**Figure 14. Age profile of aggregate (private) intra-household transfers for other consumption, Philippines, 2007, current prices (in PhP billions)**



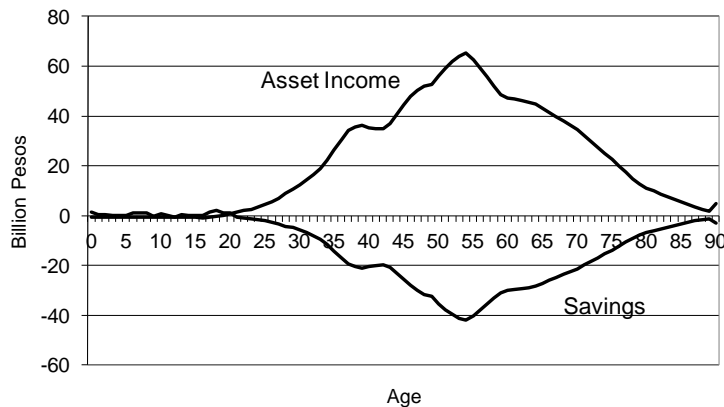
The range of ages for intra-household transfer outflows for education (Figure 12) is narrower compared to the age ranges of outflows for health (Figure 13) and other consumption (Figure 14). This observation is readily explained by Figure 12: inflows to the young ends at around age 24 years when their schooling is completed and at this time outflows from the parents who are in their fifties or early sixties (at the latest) also ends. The wider age range of outflows for health and other consumption is explained by the high headship rates of older persons even beyond age 65 years (see Table 3) and, thus, their continuing role in the household as the source of support (outflows) to other ages.

In all of the three components of private consumption, the ages for maximum aggregate intra-household inflows and outflows show a downward direction of movement of resources. The ages when aggregate inflows peak are 17 years for education, 0 year for health and 16 for other consumption. Aggregate outflows, on the other hand, reach its maximum at age 47 years for education, 48 years for health and 40 years for other consumption. The median ages for aggregate inflows are 16 years for education, 21 year for health and 27 for other consumption. The median ages for aggregate outflows, on the other hand, are 44 years for education, 44 years for health and 40 years for other consumption. Thus, resources in general are moving from older age groups towards younger age groups. This pattern is expected given the huge life-cycle deficit for the young relative to those for the elderly as shown in Table 2.

### *Asset Reallocation*

In the Philippine NTA, the consumption of any age group not financed by the group's own earnings from work and by net public and private transfers to the group is attributed to net asset reallocation. Similar to the NTA public and private transfer components, asset reallocation also consists of inflows (all types of asset income) and outflows (financial resources put away as saving). In Figure 15, aggregate asset income (inflows) are observed to be earned soon after entering the surplus ages, increases up to age 54 and then declines. The rise in the total asset income up to about age 54 is a reflection of the ongoing accumulation of assets while individuals are in their productive ages. Outflows or saving are observed to get larger with age, but also only up to age 54.

**Figure 15. Age profile of aggregate asset-based reallocations, Philippines, 2007, current prices (in PhP billions)**



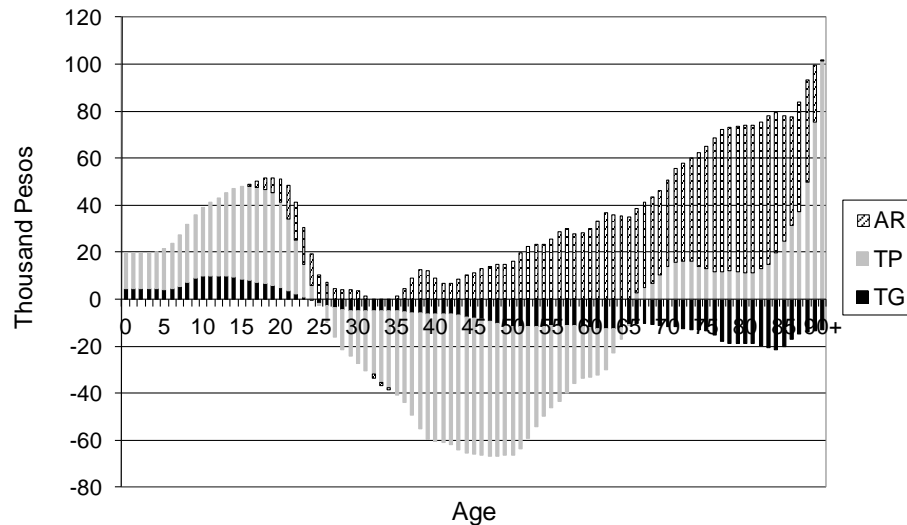
### *Summary of Age Reallocations*

Net resources (i.e., inflows minus outflows) received or given by each age group through government transfers (TG), private transfers (TP) and asset reallocation (AR) are presented in per capita mean and aggregate terms in Figures 16 and 17, respectively. Negative values represent net outflows of resources from, while positive values represent net inflows of resources to, age groups.

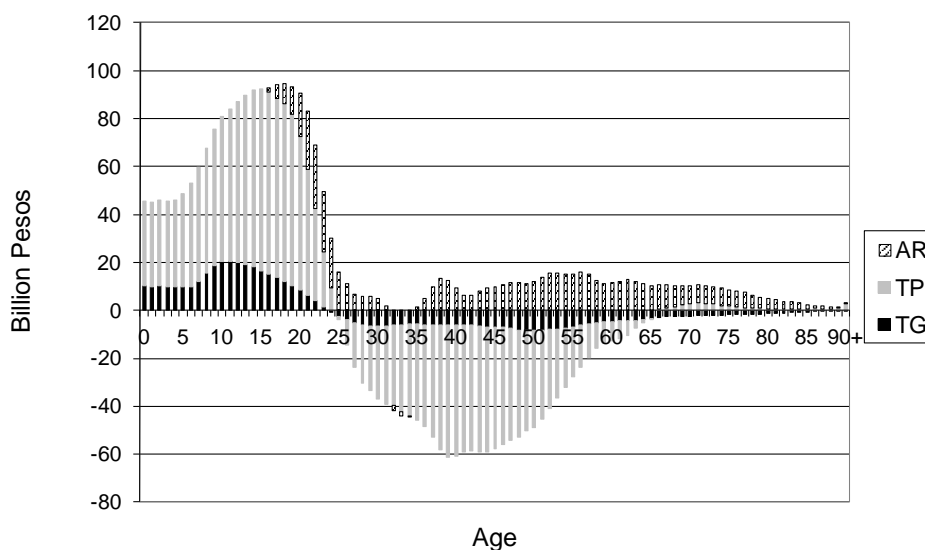
The reallocation systems that support children, i.e. aged 0-24 years, are primarily public and private transfers. Private transfers accounted for 78 percent while public transfers accounted for the remaining 22 percent of total transfers to children. Public transfer share is slightly higher at 25 percent for the elementary and high school ages, i.e. 6-16 years.

The reallocation system that supports the elderly, on the other hand, is mainly asset reallocation. For the young-olds aged 60-69 years, asset reallocation accounts for 95 percent of total net inflows to the age group. For the mid-olds aged 70-79 years, and old-olds age 80 years and older, asset reallocation accounts for 77 and 68 percent, respectively. Interestingly, the elderly continues to support public consumption of other age groups as seen by net negative public transfer by them (Figure 16), even if at the aggregate it appears marginal (Figure 17). This may be a result of the estimation method employed, wherein all asset-based taxes are assigned to the household head. As shown in Table 3, headship among the elderly has increased dramatically between 1999 and 2007. Furthermore, taxes from asset income relative to all taxes received by government increased by three percentage points during the same period. From about Php111 billion asset income-based tax collection in 1999, the collection increased to Php252 billion in 2007.

**Figure 16. Components of age reallocations in per capita means, Philippines, 2007, current prices (in PHP)**



**Figure 17. Components of age reallocations in aggregate values, Philippines, 2007, current prices (billion PhP)**



**Table 3. Headship rate (in percent) by age group, Philippines, 1999 and 2007**

Age Group	Population (M)		Headship (%)	
	1999	2007	1999	2007
15 – 24	14.13	14.21	1.8	1.9
25 – 44	19.21	20.63	33.6	31.8
45 – 59	8.91	9.95	53.1	54.3
60 – 69	3.34	3.42	60.2	60.9
70 – 79	1.60	1.71	60.0	64.1
80+	0.57	0.63	49.6	56.6

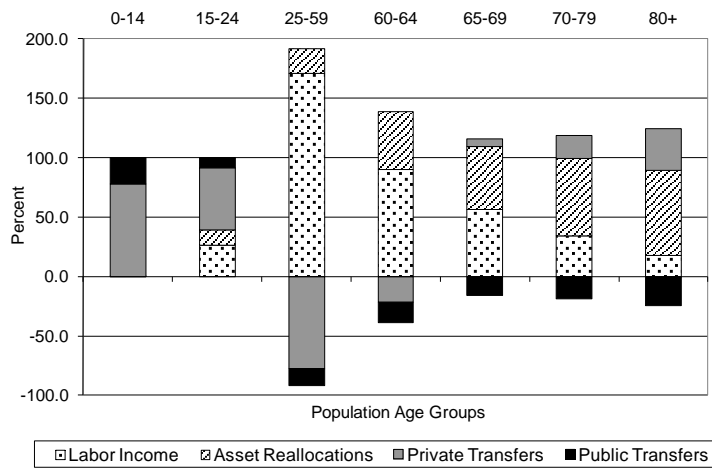
*Source of basic data: 1999 APIS and 2007 APIS*

## 6. Finance of consumption by age

As indicated by Figure 18 there are various means to finance the consumption of Filipinos and these vary across age groups. The means of financing include own labor income, public transfers, private transfers (both intra-household and inter-household transfers) and asset reallocation. The deficit age groups in Figure 18 have been split into smaller groups to bring out variations in the pattern of financing.



**Figure 18. Finance of Consumption, Philippines, 2007**



The financing of consumption of children up to age 14 years is primarily by transfers, with private transfers at 78 percent, and public transfers at 22 percent. For the age group 15-24 years, private transfers still heavily support this group’s consumption at 52 percent, but financing from own earnings is already large at 26 percent.

Labor income of the age group 25-59 years is more than enough to cover their consumption. The surplus plus additional funds from other sources (inter-household transfers and asset reallocation) make it possible for the group to transfer resources to the dependent population through private and public mechanisms (shown in Figure 18 as negative percentages.)

Consumption of the elderly 60 years and older are financed from own earnings, private transfers and asset reallocation. As expected, the shares of elderly consumption financed by own earnings decline while the shares of private transfers increase with age. As noted in the previous section, the elderly continues to transfer funds by public means to other age groups.

**7. Highlight of the differences: previous versus revised 2007 NTA estimates**

The differences or changes observed between the previous and the revised national level 2007 Philippines NTA Flow Accounts estimates are due to the change in the treatment of Overseas Filipino Workers’ (OFW) remittances: treated as inter-household transfers in the previous estimates; and treated mainly as labor income (earnings) in the revised estimates. The main changes in the estimates and results are those related to labor income and lifecycle deficit including:

- (1) lower ages at which per capita earnings and self-employment peak at 28 years (previously 29 years) and 44 years (previously 45 years), respectively;

(2) lifecycle deficit age cut-off are 24 years (previously 25 years) for the young and 59 years (previously 58 years) for the elderly;

(3) there is negative lifecycle deficit (i.e., there is surplus) for ages 25-58 years (previously 26-57 years); and

(4) the aggregate surplus for the age group 25-28 years (previously 26-57 years) is PhP1,161 billion (previously PhP516 billion) and the surplus-to-deficit ratio is 0.58 (previously 0.26).

## 8. Concluding remarks

The NTA estimates for the Philippines in general are generated using the set of methods and definitions/assumptions established when the 1999 NTA was first produced in 2008 (see Racelis and Salas 2007, and Salas and Racelis 2008). Modifications in the estimation are made when new estimation procedures and/or revised definitions/assumptions are implemented. This was the case when the 2007 Philippines NTA Flow Accounts was revised.

The previous set of 2007 NTA estimates produced in March 2012 (described in Abrigo, Racelis and Salas 2012) used the assumption that OFW remittances is inter-household transfers – which was a departure from the assumption in the 1999 NTA where OFW remittances was treated as earnings, a component of labor income. That is, in the previous 2007 estimates the OFWs were treated as separate households and, thus, the remittances were transfers from one household to another. The revised set of 2007 NTA estimates presented in this paper which was produced in August 2007 used the assumption which was closer to the 1999 NTA assumption that a significant part of OFW remittances is labor income and only a small part is inter-household transfers. That is, the OFW is treated as a member of the household from which he or she came from and remittances to their households of origin is treated as labor income.

The methods and definitions used to estimate the Philippines NTA are generally set but modifications in some of the estimation approaches and procedures are expected in the future as NTA methodologies continue to evolve and develop, and as new data or information become available. For comparability, previous years' NTA estimates will be revised according to any new definitions, assumptions or methods that will be implemented in the most recent round of NTA estimates.

## 8. References

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