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Are We Missing Out on the Demographic Dividend? Trends and Prospects

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Abstract

The Philippines is slowly ageing. In a little over a decade, the country's elderly will comprise at least seven percent of the total population. This rising tide may pose some substantial burden to the country's resources. But the same economic and demographic forces that will eventually lead to population ageing also provide potentials for economic growth. In this paper, we document the country's historical experience of this so-called demographic dividend using new National Transfer Account time-series estimates for the Philippines. We also used these estimates to simulate how the interaction between public policy and population ageing may affect household welfare and fiscal balance in the foreseeable future.

Keywords: Demographic dividend, National Transfer Accounts, Population, Philippines

Table of Contents

List of Figures

List of Tables

Are we missing out on the demographic dividend? Trends and prospects

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1. Introduction

The Philippines has seen a slow but steady decline in fertility rates in the past twenty-five years. In the early 1990s, an average woman may expect to have around four children throughout her lifetime. This has since gone down to less than three more recently (Philippine Statistics Authority [PSA], 2018). This secular decline in fertility rates has contributed to the slow demographic transition of the country. Over the same period, the share of prime age adults in the population has increased from about 36 percent in 1990 to 44 percent in 2015. The proportion of elderly aged 65 years and older, on the other hand, has increased only slightly from 3.1 percent in 1990 to 4.6 percent in 2015. The Philippines is barely an ageing society.

But this will soon change. If recent demographic trends continue, the UN (2017) projects that the Philippines will transition to an ageing society, i.e. when the elderly aged 65 and older constitute at least seven percent of the total population, by 2032, and eventually an aged society, i.e., when the share of the elderly population is at least 14 percent, by 2069 (Figure 1). In absolute terms, the elderly population is expected to increase from 4.7 million in 2015 to 9.9 million in 2032 and to 23.7 million in 2069. This may pose a heavy burden on the country's resources, particularly on its pension system (e.g. Chomik and Piggot, 2015).

Governments are particularly affected by population ageing. Taxes levied on labor, such as direct income tax, health insurance premiums and pension contributions, as a proportion of the total population may decline. This, in turn, may affect the sustainability of services that can be provided by government. Programs that are exceptionally generous to the elderly may be more acutely affected. Reforms may therefore be necessary to balance the generosity with the sustainability of government transfer programs.

While population aging presents an emerging challenge, the same economic and demographic forces that will eventually lead to it provides opportunities for economic growth. Demographic dividends may arise, first, from the compositional effect of having more productive population relative to consumers, and, second, from the behavioral changes induced by demographic change that ultimately results in greater labor productivity. The demographic dividends are growth potentials, but unlocking these potentials necessarily requires both responsive and effective policies (Mason and Lee, 2007).

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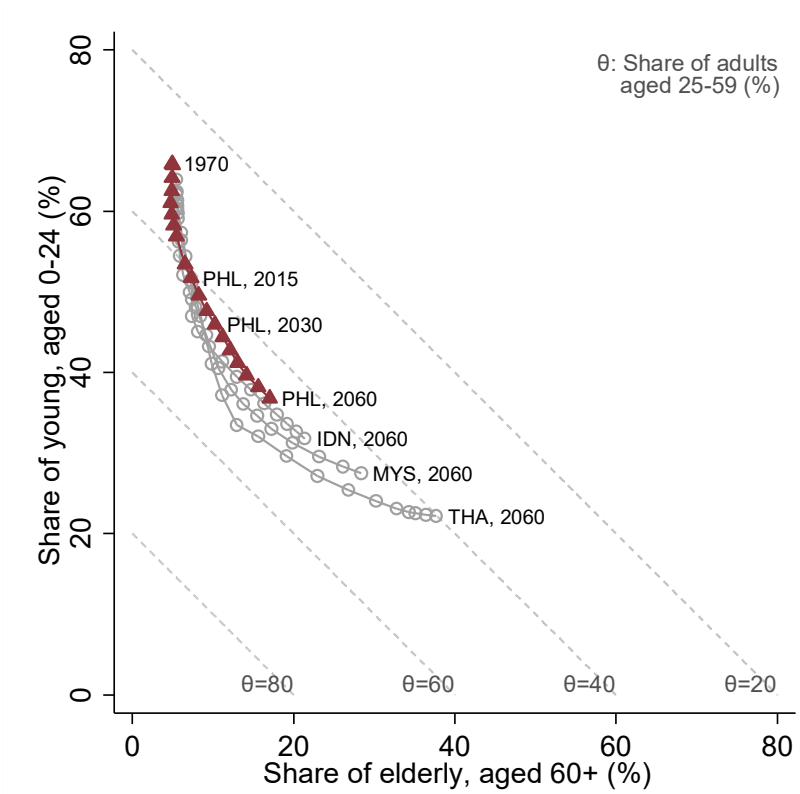
Figure 1. Population age distribution: Selected countries, 1970-2060



Note: Country codes are as follows: PHL – Philippines, IDN – Indonesia, MYS – Malaysia, and THA – Thailand.
Source of basic data: United Nations (2017).

In this paper, we document the Philippines' experience of the demographic dividend in the past 25 years using new National Transfer Account (NTA) time-series estimates for the country. We then use these estimates to explore how public policy and population dynamics, particularly population aging, may interact to promote household welfare and fiscal balance. Overall, we find that the country has benefitted from the country's population age structure transition. More particularly, the demographic dividend contributed to greater consumption per person, specifically on health and education, over the last twenty-five years. This deepening of human capital investments in children is expected, in turn, to raise material measures of well-being in the future as a result of greater labor productivity. However, we also document potential substantial fiscal burden as a result of population ageing in the country.

The rest of the paper is organized as follows. In the next section, we qualify what we mean by demographic dividends by drawing from earlier works in the literature. We distinguish between dividends that arise from the compositional and those from the behavioral effects of demographic change. We then discuss the concept of economic lifecycle in Section 3. We also introduce the NTA, a satellite account to the United Nations System of National Accounts, which we used to quantify the generational economy. In Section 4, we present new NTA estimates for the Philippines from 1990 to 2015. We use these estimates to assess the contribution of the demographic dividends to the country's growth experience in the past 25 years. In the next section, Section 5, we then underscore the importance of government and

public policy in the generational economy. We rely on a macroeconomic-demographic simulation model to assess how different policy options may impact household welfare and fiscal sustainability when interacted with the country's demographic transition. Finally, in Section 6, we summarize the results and provide potential implications for policy.

2. Demographic Dividend

The demographic transition that is brought about by declining fertility rates and increasing longevity may contribute to improve household welfare. As fertility rates drop, the population becomes increasingly concentrated among working ages. This raises average incomes per person. At the same time, a decline in fertility means that parents have to care for fewer children thereby allowing greater human capital investments for every child (e.g., Becker, 1960; Becker and Lewis, 1973). This raises children's productivity when they eventually join the workforce. Further along the demographic transition, the population then becomes increasingly concentrated among the elderly. Depending on the support systems that are available in an economy, this raises aggregate saving from a growing share of elderly who are faced with long years in retirement (e.g., Mason, 1981). This, in turn, expands the available capital in an economy, which, again, raises productivity. The increase in incomes per person brought about by the demographic transition may then be used to improve material measures of well-being among households.

These demographic dividends (DDs) may be formally illustrated using the growth accounting framework in Mason and Lee (2006) and later in Mason, et. al. (2017) that draw from earlier theoretical work by Cutler, et. al. (1990). It is trivial to show that the consumption per effective consumer, C_t/N_t, may be decomposed as the product of three factors, namely, (i) support ratio, L_t/N_t, (ii) consumption rate, C_t/Y_t, and (iii) labor productivity, Y_t/L_t:

$$\frac{C_t}{N_t} = \frac{L_t}{N_t} \cdot \frac{C_t}{Y_t} \cdot \frac{Y_t}{L_t} \tag{1}$$

where

$$C_t = \sum_a c_t(a) \cdot P_t(a),$$
$$Y_t = \sum_a y_t(a) \cdot P_t(a),$$
$$N_t = \sum_a \gamma(a) \cdot P_t(a),$$
$$L_t = \sum_a \zeta(a) \cdot P_t(a).$$

The age-specific consumption weights, $\gamma(a)$, convert the age-specific population, $P_t(a)$, to its equivalent number of "prime-age" adult consumers, i.e., the effective number of consumers. Similarly, the weights $\zeta(a)$ convert the population head-counts to its equivalent effective number of "prime-age" workers. These weights are assumed to be fixed through time, t. Age-specific consumption and labor income per person, given by $c_t(a)$ and $y_t(a)$, respectively, on the other hand, may vary through time.

The above expression may be readily converted to growth rates as follows:

$$g\left(\frac{C_t}{N_t}\right) = g\left(\frac{L_t}{N_t}\right) + g\left(\frac{C_t}{Y_t}\right) + g\left(\frac{Y_t}{L_t}\right). \quad (3)$$

The growth in the support ratio captures the compositional effect of the demographic transition. This is the First Demographic Dividend. In the early stage of the demographic transition the effective number of workers grows faster than the number of effective consumers. All else being the same, this raises incomes per person, i.e., a positive growth from the First DD. However, later in the demographic transition, as the share of elderly retirees grow faster than the number of workers, the contribution of the First DD becomes negative. That is, the First DD is no longer really a dividend.

In the literature, the contributions of the First DD to the economy are often estimated using either (i) growth models using cross-country aggregate time-series data (e.g., Bloom and Williamson, 1998; Kelley and Schmidt, 2001; Mapa and Balisacan, 2004), or direct growth accounting using a similar framework to the above equation (e.g., Mason, 2006; Mason, et. al., 2017; Abrigo, et. al., 2016). In the Philippines, estimates by Mapa and Balisacan (2004) show that the country's population dynamics contributed about 1.1 percentage points to the Philippines' 4.1 percent average annual growth between 1970 and 2000 based on econometric growth models using cross-country data. Direct growth accounting by Mason, et. al. (2017), on the other hand, provide a much conservative estimate of 0.5 percentage points for the same period. Although the First DD is only transitory, it may extend for some considerable period. Mason, et. al. (2017), for instance, show that the First DD across economies around the world may span from about 30 to more than 90 years based on estimates for more than 160 countries.

The behavioral effects of the demographic transition are captured in the growth rates of both the consumption rate and labor productivity. Assuming that labor productivity and the support ratio do not change, a decline in the consumption rate (or, equivalently, the increase in saving rate) implies a decline in the welfare of the current population as proxied by the average consumption of an effective consumer. But this increases the available capital in an economy, which raises the productivity of future workers. A growing elderly population may induce such increase in saving propensity as documented in the Philippines (e.g., Mapa and Bersales, 2008) and elsewhere (e.g., Mason, 1981; Lee, et. al., 2001; Kelley and Schmidt, 1996). More generally, the demographic transition may encourage greater investments, either on the human capital of children or on other forms of capital, that raises productivity. This is the Second Demographic Dividend.

While the positive contribution of the First DD to economic growth is only transitory, the potential gains from the Second DD may be had for much sustained periods. In simulations by Mason, et. al. (2017), for instance, the Second DD may extend for more than 100 years. Further, the contribution to economic growth of the Second DD are also more substantial relative to the First DD (Mason and Lee, 2010; Mason, et. al., 2016).

It must be emphasized that the First and Second DDs represent potentials for growth that relies on effective policies in order to materialize (Mason and Lee, 2006). The First DD, for instance, assumes that employment is available for those who seek work. The Second DD, on other hand, requires that schools and public health institutions are available to allow greater human capital investments on children, or that financial markets are working to allow the flow of investments. Indeed, as documented in Abrigo, et. al. (2016), the gains from the DDs may be amplified or negated by prevailing conditions in an economy.

3. Generational economy and the NTA Framework

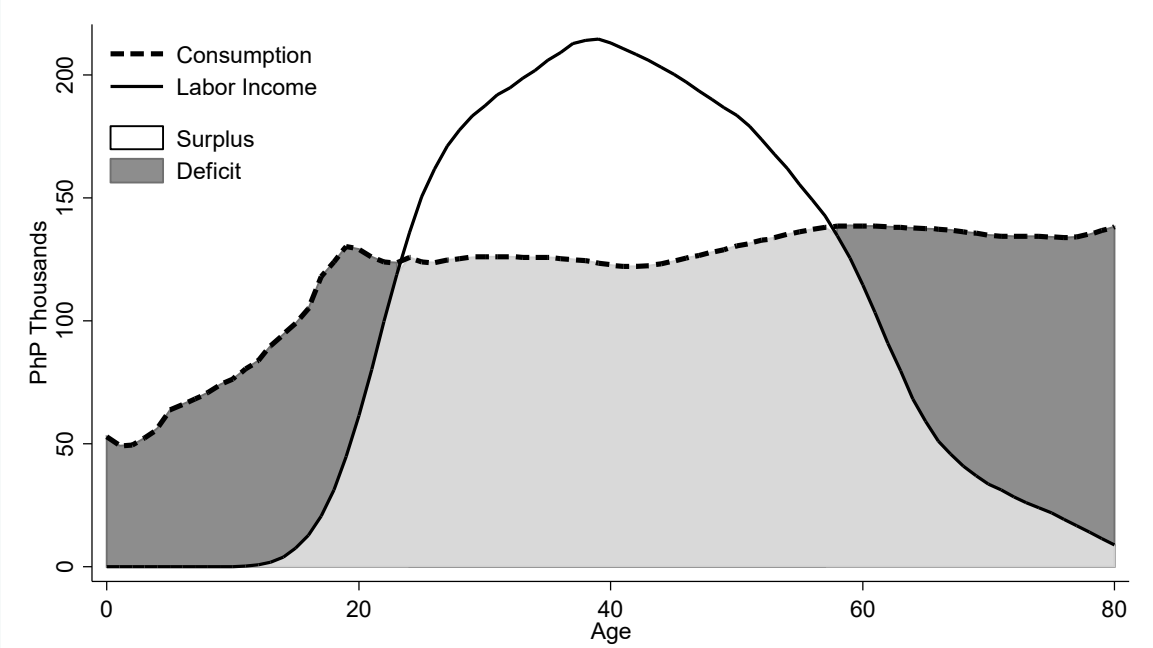
Economic behaviors change in systematic ways across a person's lifetime. Take consumption, for example. A child's consumption pattern may be very different from that by a prime-age adult or by an elderly person. For one, children consume less food and use smaller clothing articles than adults. But more importantly, investments on their human capital, such as on healthcare, e.g., essential vaccines, etc., and education, are expended largely at this stage of their lifetime. As children mature into adulthood, they eat more food and uses adult-sized clothing. Their consumption patterns change, too, say exchanging milk for more adult consumer items. Further into the lifecycle, adults become elderly, and expenditures for health- and long-term-care become more prominent in their consumption. Earnings, specifically labor income, also have a more or less distinct lifecycle pattern. It starts out zero when young, increases into adulthood, peaks at prime-age, and eventually tapers off back to zero as persons leave the labor force.

These patterns, of course, may vary from person to person, from population to population, and from generation to generation. Ultimately, these economic patterns are shaped by the existing support systems that are available to each generation that allow individuals to consume what they do, and earn what they can. For instance, effective public education systems may induce higher human capital investments among school-aged children and dissuade them from working early, but, in turn, may lead to their greater productivity later. Public pension systems, on the other hand, may condition the timing of when people retire from working. Fertility may also impact these economic profiles to the extent that having more children may put a constraint on the use of household resources.

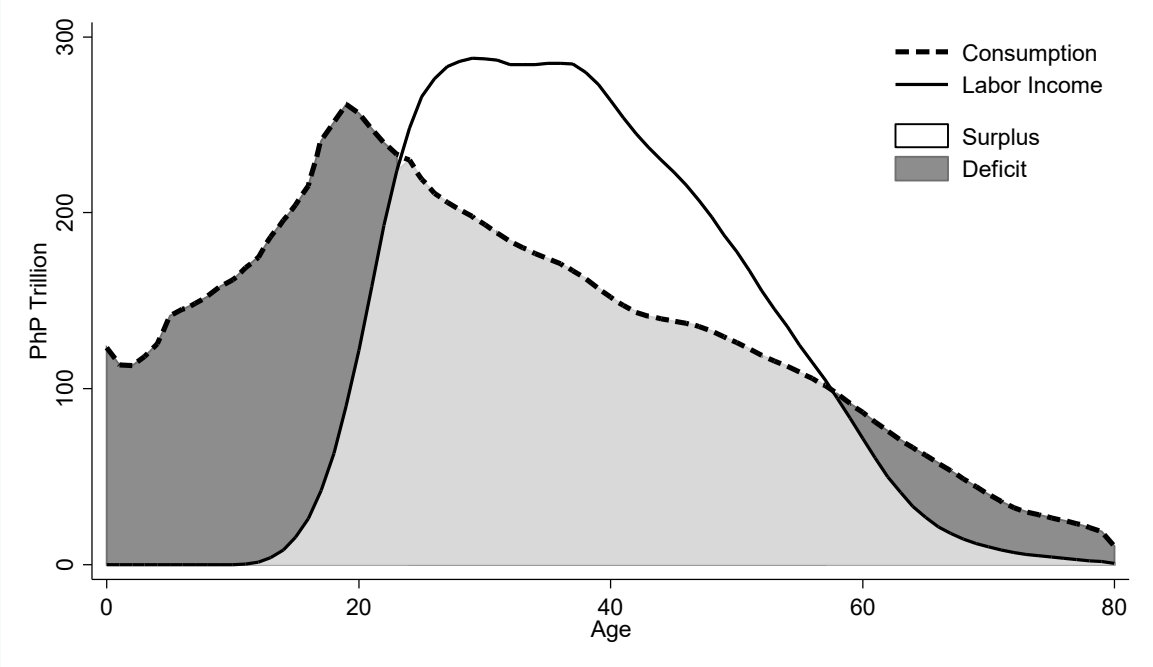
In all modern-age economies, however, these patterns of consumption and earnings dictate the inevitability of imbalances between what a person may require to survive and the means to satisfy them through working. This general feature among all contemporary economies are captured by the lifecycle profiles of consumption and labor income of the Philippines presented in Figure 2. Consumption includes both public and private consumption. Labor income includes the earnings of employees working locally and abroad, and the returns to labor from self-employment. The values are all pre-tax.

Figure 2. Age profiles of consumption and labor income: Philippines, 2015

A. Per capita age profile



B. Aggregate age profile



Note: Authors' calculations.

As shown in the figure, there are extended periods at the beginning and towards the end of the economic lifecycle when consumption exceeds earnings from labor. These lifecycle deficits may be filled-in through a number of different ways, although they generally fall under any of two – and only two – categories, i.e., sharing or saving (Mason and Lee, 2011). The most straightforward may be the transfer of resources from those generations with surpluses to those generations with deficits. This may be in the form of prime-age working adults providing for a child's needs within a household. But it may also be mediated by governments, such as in the case of social health insurance and unfunded pay-as-you-go pension systems wherein governments pool resources for subsequent distribution. Alternatively, individuals may also use returns from their investments or draw out from savings or even take out loans either from other individuals or through government to fill-in the deficits.

The forces that shape the age distribution of the population, e.g., fertility, mortality, migration, etc., are intimately intertwined with forces that shape other economic decisions, with the direction of causation possibly going both ways. This is very evident within households wherein fertility and migration, for example, affects child investment decisions, which may influence the child's future fertility and migration decisions. But population dynamics also has important, direct and quantifiable effects on the macroeconomy. This is demonstrated by the age profiles of total consumption and total labor income that are presented in Panel B of Figure 2.

While a child's usual consumption may be only a fraction of what a prime-age adult typically consumes (Figure 2, Panel A), the total when summed over all children could be more substantial depending on an economy's population age distribution. This is true in the case of the Philippines where more than half of the population are below 25 years old (PSA, 2017). However, as an economy's population ages much of the weight will shift towards later in life. This will reflect in more symmetric aggregate age profiles if average profiles per person by age remain the same.

These features of the generational economy are captured in the National Transfer Account [NTA] (Lee and Mason, 2011; United Nations, 2013). The NTA is an accounting framework that is designed to measure how much different generations consume, produce, save and share at the macroeconomic level. It combines different information from household surveys, administrative data, national macroeconomic accounts, population censuses and projections, and even household allocation models in order to provide estimates of different economic lifecycle age profiles. The NTA is consistent with the United Nations System of National Accounts, with the NTA providing greater elaboration of the contribution and interaction of generations within an economy. By 2017, basic NTA profiles have been estimated for at least 160 economies with the support of more than 60 cooperating research teams in various countries around the world (Mason, et. al., 2017).

4. Philippine NTA in historical perspective

In this section, we describe lifecycle patterns of production, consumption, and reallocations in the past 25 years based on NTA estimates for the Philippines for 1990 to 2015. The accounts were estimated following the guidelines provided in the UN NTA Manual (United Nations, 2013), and adjusted to 2015 constant prices for comparability. Previous NTA estimates for the Philippines have been used, for example, to document changes in consumption and labor income by age across years (Racelis and Salas, 2011), decompose economic gains from

demographic transition by socioeconomic groups (Abrigo, et. al., 2016), and simulate the potential effects on household income and fiscal balance of human capital investments by the public sector (Abrigo, et. al., 2018).

4.1. Economic Lifecycle

The levels of consumption and labor income have grown considerably in the past 25 years (Figure 3). Much of the growth, however, comes towards the latter part of 2000s. This is not unsurprising given the many challenges that the country had faced during the 1990s, including the oil price hikes resulting from the Gulf War in the early 1990s, the widespread droughts in 1994 and 1997, the Asian financial crisis of 1997-1998, and the dotcom bubble in the early 2000s. Indeed, between 1990 and 2005 the peak of per capita labor income had barely increased. From about PhP128,000 per person in 1990, per capita labor income dipped to PhP120,000 in 1995, then returned close to its previous level at PhP129,000 in 2000, and finally grew to PhP137,000 in 2005. Since then, labor incomes have been growing robustly, with the peak growing by around 4.5 percent annually between 2005 and 2015. By 2015, labor income at its peak averaged at PhP215,000 per person.

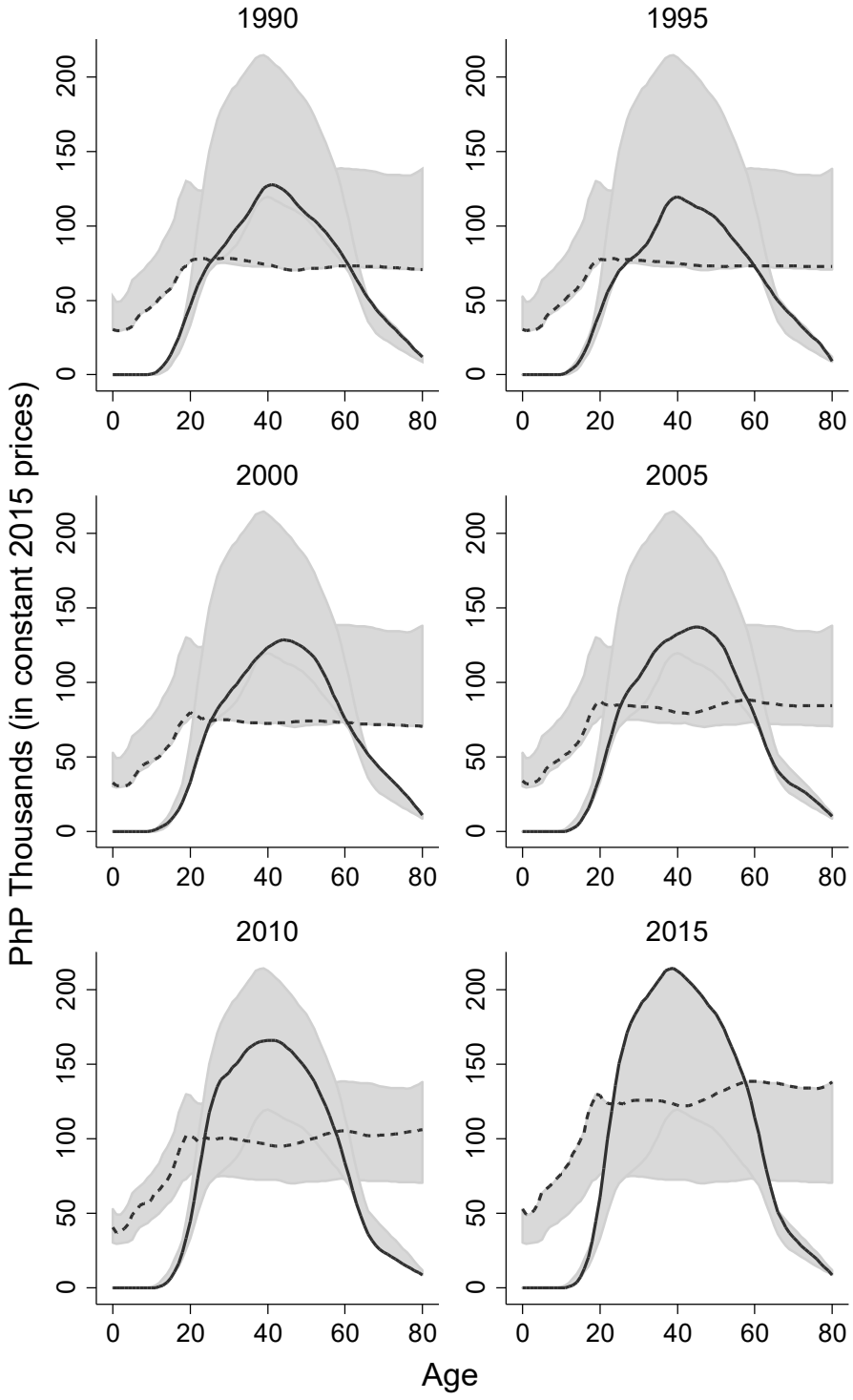
When disaggregated by type of employment, the expansion in labor incomes may be attributed to the vigorous growth in earnings among employees working domestically and abroad. The labor share of self-employment income remained largely unchanged between 1990 and 2015. Details of labor income, as well as of consumption, are provided in Table 1.

Over the last 25 years, per capita earnings from local employment among those aged 25 to 64 grew by 3.2 percent annually on average, although it had grown more rapidly in more recent years. Between 1990 and 2000, per capita income of prime-age adults only increased by 0.5 percent annually. It picked up pace to 4.6 percent between 2000 and 2010, and finally reaching 5.9 percent between 2010 and 2015. In 2015, the labor earnings from local employment totaled PhP5.0 trillion from only PhP1.3 trillion in 1990.

Total earnings from employment abroad, on the other hand, were still relatively small in the 1990s. Although the government policy on managing international labor migration had been introduced in the early the 1970s, the annual flows of temporary migrant workers in 1990 were still relatively small at around half a million workers per year.[†] During the same period, total earnings from employment abroad only reached PhP0.2 trillion. It barely reached PhP0.5 trillion by 2000. In 2010, however, total labor earnings from abroad has ballooned to PhP2.3 trillion before settling at PhP3.0 trillion in 2015. This coincides with larger flow of temporary migrant workers from the Philippines, which breached one million workers annually since the middle of the 2000s. Between 1990 and 2015, the prominence of earnings from abroad had grown from only 6.4 percent of all labor incomes in 1990 to about a third by 2015.

[†] See Orbeta and Abrigo (2009) for a discussion of trends in labor migration from the Philippines.

Figure 3. Per capita age profiles of labor income and consumption: Philippines, 1990-2015



Note: Authors' calculations.

Table 1. Lifecycle account: Philippines, 1990-2015

	1990			2000			2010			2015		
	0-24	25-64	65+	0-24	25-64	65+	0-24	25-64	65+	0-24	25-64	65+
A. Per Capita (in constant 2015 PhP Thousands)												
Consumption	52.9	73.9	72.0	54.0	73.5	71.4	70.0	99.9	103.6	89.2	129.1	135.5
Private Consumption	44.3	67.3	65.2	42.6	65.5	62.8	58.0	90.9	94.0	72.7	116.6	121.4
Education	2.1	0.0	0.0	3.3	0.0	0.0	5.5	0.1	0.0	7.4	0.0	0.0
Health	0.6	1.3	1.8	0.6	1.8	3.2	0.9	2.8	6.6	1.1	4.2	9.4
Others, N.E.C.	41.6	66.0	63.5	38.7	63.6	59.7	51.6	88.1	87.4	64.2	112.4	112.1
Public Consumption	8.6	6.6	6.7	11.4	8.1	8.5	12.0	8.9	9.6	16.5	12.5	14.0
Education	2.0	0.0	0.0	3.3	0.0	0.0	3.3	0.0	0.0	4.6	0.0	0.0
Health	0.3	0.3	0.4	1.5	1.4	1.9	0.4	0.7	1.3	1.3	1.8	3.3
Others, N.E.C.	6.3	6.3	6.3	6.7	6.7	6.7	8.3	8.3	8.3	10.7	10.7	10.7
Labor Income	17.9	100.0	32.3	13.6	102.9	33.1	18.7	135.1	21.4	24.7	172.8	29.3
Earnings, Domestic Producers	12.4	38.7	3.4	9.0	40.5	6.1	13.8	63.7	6.3	19.2	85.0	9.6
Earnings, Overseas Workers	0.6	6.1	0.0	1.1	13.7	0.2	3.5	48.9	0.6	3.9	59.2	1.0
Self-employment Labor Income	4.8	55.2	28.8	3.5	48.7	26.8	1.5	22.5	14.5	1.6	28.7	18.6
Lifecycle Deficit	35.0	-26.1	39.7	40.4	-29.4	38.2	51.3	-35.2	82.2	64.5	-43.7	106.2

Note: Authors' calculations.

Table 1. Lifecycle account: Philippines, 1990-2015 (continued)

	1990			2000			2010			2015		
	0-24	25-64	65+	0-24	25-64	65+	0-24	25-64	65+	0-24	25-64	65+
B. Aggregate (in constant 2015 PhP Billions)												
Consumption	1,888	1,665	125	2,343	2,210	161	3,413	3,948	356	4,609	5,670	556
Private Consumption	1,565	1,518	113	1,824	1,970	141	2,809	3,594	323	3,737	5,119	499
Education	72	0	0	135	0	0	265	3	0	377	3	0
Health	21	28	3	27	49	7	44	98	21	58	169	36
Others, N.E.C.	1,472	1,491	110	1,662	1,920	135	2,500	3,492	301	3,303	4,947	463
Public Consumption	324	146	12	519	240	19	604	354	33	872	551	57
Education	73	0	0	148	1	0	168	1	0	242	1	0
Health	13	7	1	69	40	4	23	25	4	68	75	13
Others, N.E.C.	237	139	11	303	200	15	413	328	28	562	475	44
Labor Income	546	2,239	64	506	3,129	87	810	5,683	85	1,195	8,055	143
Earnings, Domestic Producers	380	906	8	333	1,301	18	600	2,703	27	930	4,005	52
Earnings, Overseas Workers	18	164	0	40	453	1	145	2,137	3	186	2,870	6
Self-employment Labor Income	148	1,169	56	133	1,374	68	64	843	55	79	1,180	86
Lifecycle Deficit	1,343	-574	61	1,837	-919	74	2,603	-1,735	271	3,414	-2,385	413

Note: Authors' calculations.

It is not only the levels that had changed in the past 25 years. Between 1990 and 2015, there appears to be some narrowing in the per capita age profile of labor income. That is, labor income is progressively being concentrated among prime-age adults. Further, the shape of the labor income profile had also tilted towards younger ages. The latter observation may be a result of the greater importance of earnings from workers abroad, which has been documented to be selective in favor of younger cohorts (Orbeta and Abrigo, 2009). This observation may also be a reflection of younger cohorts being more productive than earlier generations (e.g., Lee and Ogawa, 2011), such in the case of economies transitioning from predominantly agriculture-based to more industry- and services-based like the Philippines.

The inward shift in per capita labor income among the elderly may be explained to some extent by the growing dominance of earnings by employees relative to self-employment labor income. More particularly, employees in the formal sector are more likely than those self-employed to be covered by the country's mandatory pay-as-you-go pension system (Orbeta, 2010). Previous studies have shown that the timing of pension benefits affect workers' retirement decisions (e.g., Gruber and Wise, 1999). In the case of the Philippines, the steep decline in per capita labor income begins at around age 60 when most retirees may start claiming for pension benefits. The declining role of self-employment in the population is expected to result in much steeper decline in overall labor income around this particular age.

Increasing school participation rates, on the other hand, may have contributed to the rightward shift in per capita labor income among the young. Based on estimates from the October Labor Force Survey by the National Statistics Office (now the Philippine Statistics Authority), about 63 percent of those aged 15 to 19 were attending school in 1990. By 2015, the rate had grown to 67 percent. Over the same period, the labor force participation rate among those aged 15 to 19 had dropped from about 40 percent in 1990 to just 25 percent in 2015.

The age profile of consumption had also grown and shifted in the last 25 years. Similar to the trend in per capita labor income, consumption per person among prime-age adults barely moved between 1990 and 2000. By 2010, their consumption per capita increased to about PhP100,000 from PhP74,000 in 1990 and 2000. In 2015, this has increased further to PhP129,000 per person (Table 1). The government share in consumption fluctuated between 10 to 20 percent over same period. When disaggregated by age group, the share of the public sector in the consumption of those aged below 25 years hover around 20 percent, while those for adults are much closer to 10 percent.

In education, the split between public and private consumption among population below 25 years old are almost close to parity in 1990 and 2000, but the government's share has since been eroded. In 2015, only 40 percent of education consumption is funded by government. Although public and private per capita education consumption were about the same in 1990 and 2000, government spending per person stagnated between 2000 and 2010 at about PhP3,300 per person, before settling at PhP4,600 per person in 2015. Private education consumption, on the other hand, has since been growing upwards of five percent annually. In 2015, private education consumption per capita was at PhP7,400. Taken together, total education spending per capita more than doubled between 1990 and 2010. By 2015, annual spending per capita on education reached PhP12,000, which is about thrice that in 1990.

Health consumption also increased considerably over the same period. In 2015, aggregate health consumption from both public and private sectors totaled PhP419 trillion. That is 5.7 times its value in 1990 of only PhP73 trillion. This growth may be explained party by the slowly

increasing share of elderly in the population. But more importantly, the growth in health consumption is driven by larger spending at each life stage. Between 1990 and 2015, per capita health consumption of those aged below 25 years increased from PhP900 to PhP2,400. Among prime-age adults, the increase was also substantial with spending per person growing from PhP1,600 in 1990 to PhP5,900 in 2015. The most significant increase, however, are among the elderly aged 65 and older, wherein per capita spending on health increased from only PhP2,200 in 1990 to PhP12,700 in 2015.

The increase in health spending may be attributed to some degree to the greater health expenditures that are mediated by the government, particularly through the social health insurance (SHI) system. With the reorganization of the country's SHI system in 1997, a number of programs have been initiated to expand the system's coverage. For instance, a sponsorship program was launched to provide SHI coverage to individuals from low-income households. This program was subsequently financed by tax collections from tobacco and alcoholic beverages. Further, starting in 2014, all elderly aged 60 years and older are automatically covered in the SHI system. Despite these innovations, however, the share of the private sector in health spending remains substantial at about 60 percent.

Indeed, the more substantial increase in health spending over the last 25 years are borne directly by households. Between 1990 and 2015, private health consumption per capita among those aged below 25 years increased from around PhP600 in 1990 to PhP1,100 in 2015. Among prime-age adults, the increase is from PhP1,300 to PhP4,200. The greatest increase comes from the elderly population, wherein private health spending per capita grew from PhP1,800 per person in 1990 to PhP9,400 in 2015.

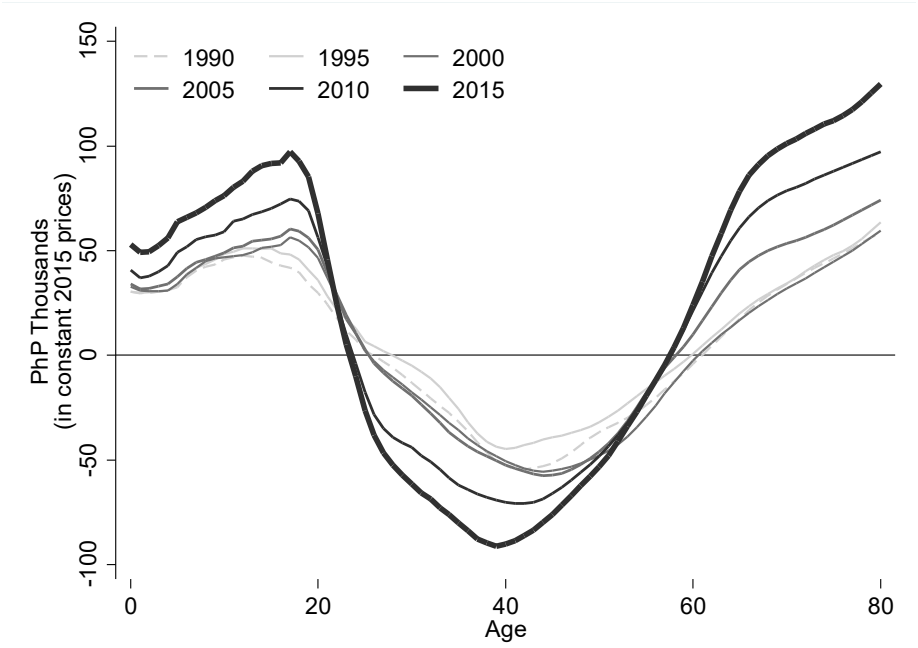
These two types of consumption together have important implications on the shape of the consumption age profile. Because of the substantial rise in education consumption, a small bump around ages 10 to 20 has become more apparent in the total consumption age profile (Figure 3). The increase in the health consumption among the elderly, on the other hand, has contributed to the gradual flattening and eventual upward trend in the consumption pattern by age in the cross-section. These features closely resemble those of upper-middle- and high-income countries (c.f. Mason, et. al., 2017).

These two types of consumption are also particularly important to the extent that they raise an individual's human capital, especially among the young. Between 1990 and 2015, the combined per person spending on education and health among those aged below 25 years increased by almost three-folds. In 2015, average spending on health and education reached PhP14,400 per person, compared to about PhP5,000 per person in 1990 (Table 1).

The gap in per capita consumption and labor income is presented in Figure 4. It shows that the lifecycle deficit, i.e., when consumption exceeds labor income, among the young and the elderly has been growing since the 1990s. At the same time, the lifecycle surplus, i.e., when labor income exceeds consumption, has been growing as well, with an evident left-ward shift in ages of transition across the years. This implies that the young starts earning more than what they consume earlier than previous generations. It also implies that the elderly begins to rely more on age-based reallocations earlier to finance their consumption.

Combining the per capita age profile with population age distribution, the NTA estimates show that the aggregate lifecycle deficit among the young and the elderly has more than doubled between 1990 and 2015 (Table 1). From only PhP1.4 trillion in 1990, the aggregate lifecycle deficit has increased to PhP3.8 trillion in 2015. Over the same period, the share of the deficit from the elderly has increased from four percent in 1990 to 11 percent in 2015, reflecting both the changes in the profiles of consumption and labor income, and the growing share of the elderly in the population. This demographic transition also contributes to the growing share of surpluses among prime-age adults that can cover the deficits in other age groups (c.f. Racelis and Salas, 2011). In 1990, the total surplus by prime-age adults can cover about 40 percent of all deficits by the young and the elderly. In 2015, this ratio had increased to about 60 percent.

Figure 4. Lifecycle deficit per capita age profile: Philippines, 1990-2015



Note: Authors' calculations.

4.2. Reallocations

The lifecycle problem of mismatch between the level of consumption and the level of labor income at each age (Figure 4) may be addressed by reallocating resources across generations. The solution may be either of two forms. Transfers involve the sharing of resources among

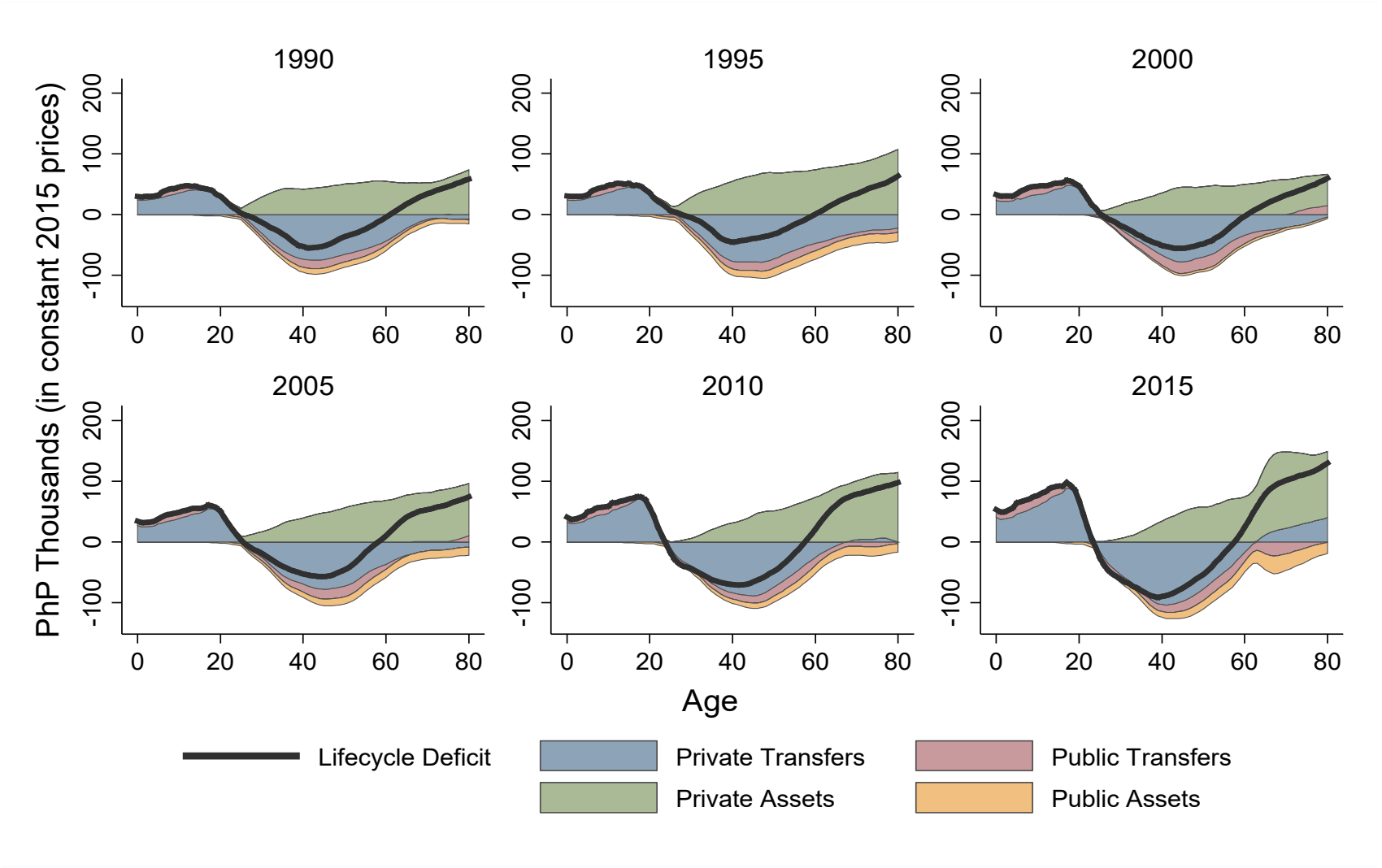
individuals, communities or generations without any explicit *quid pro quo* arrangements. An example of this is the sharing of resources within households. But more complex systems that involve larger intermediary institutions, like unfunded pension schemes, insurance markets and government tax systems, are also part of transfer systems. Asset-based reallocations, on the other hand, involve explicit exchange or contractual obligations, and often rely on inter-temporal substitution of resources. For example, a prime-age adult invests on land using surpluses from earnings. The rental income from the land and the proceeds of its eventual re-sale are all asset-based reallocations. More generally, asset-based reallocations include asset incomes and savings. Similar to transfers, these may be mediated by government or the private sector.

Figure 5 presents the evolution of age-based reallocations in the Philippines over the past 25 years. The values are all net, i.e., inflows less outflows of resources, to a particular age group. Lifecycle deficits are superimposed as reference values. The figure shows that the young are net recipients of inter-generational transfers, particularly of private transfers. The value of net public transfers is relatively small historically, although there appears to be some non-trivial increase in levels since 2010. Adults, on the other hand, rely on more varied forms of age-based reallocations to finance the lifecycle deficit.

Prime-age adults are net givers of transfers. This is not unsurprising given that their labor income often exceeds their consumption. What is remarkable though is that their net transfer outflows are greater than their lifecycle surplus. In 2015, for instance, the net transfers by cohorts in their 40s range between 125 to 175 percent of their lifecycle surplus. In other years, these rates are even higher. In order to perform such feat, prime-age adults rely on asset-based reallocations, which has consistently been positive in the past 25 years starting among cohorts around their mid-20s. This includes a combination of proceeds from investments, sale of capital, and (dis-)saving.

The elderly population rely primarily on private asset-based reallocations to finance their lifecycle deficit. This feature has been observed in other countries as well, particularly in economies where the public pension systems are underdeveloped (c.f. Mason and Lee, 2011; Mason, et. al., 2011). For the most part over the past 25 years, the elderly were net sources of public and private transfers. Exceptions include 2000 and 2005 when the elderly where net recipients of public transfers, and in 2010 and 2015 when they are net recipients of private transfers. It is noteworthy that despite recent reforms in public policy concerning the welfare of the elderly, they – as a group – are still net sources of public transfers. As mentioned earlier, starting in 2014, the elderly aged 60 and above are automatically enrolled in the government's social health insurance scheme. In 2010, the government introduced a social pension program that covers elderly people from low-income households. This public transfer inflows, however, is counter-balanced by payment of taxes, particularly on assets and asset income, which are often accumulated and held by the elderly.

Figure 5. Lifecycle deficit and sources of financing: Philippines, 1990-2015



Note: Authors' calculations

4.3. Demographic Dividends

The Philippines has made significant progress in improving household welfare over the last twenty-five years. As shown in the previous section, average consumption per person increased by almost 80 percent between 1990 and 2015. Human capital investments on children, particularly on health and education, have also increased considerably as part of the general increase in average consumption. To what extent has the country's demographic transition contributed to this growth?

In order to answer this question, we performed the growth accounting exercise due to Mason and Lee (2006) and Mason, et. al. (2017) elaborated on earlier which we applied using NTA estimates for the Philippines. The lifecycle consumption (production) weights that are used to derive the effective number of consumers (workers) are calculated from the 1990 age profiles of per capita consumption (labor income). The consumption (production) weights are calculated by normalizing the age profile of per capita consumption (labor income) relative to the average of persons aged 30 to 49 years. Unlike in the original formulation, however, we replace the aggregate labor income with total primary income in the calculation of the consumption share and labor productivity. The results of the decomposition are presented in Table 2.

The results of the growth accounting exercise show that the average consumption per effective consumer increased by 2.2 percent annually on average between 1990 and 2015. Over the 25-year horizon, the compositional effect of the demographic transition, i.e. the First DD, contributed an annual average of 0.5 percentage point additional growth similar to estimates by Mason, et. al. (2017). Labor productivity, which includes the effect of greater human capital and other investments, i.e., the Second DD, on the other hand, contributed an average of 2.3 percentage points of additional growth annually in consumption per effective consumer. Finally, the propensity to consume declined by 0.6 percent on average, which may have also contributed to the labor productivity growth through capital deepening.

Table 2. Decomposition of consumption per capita and growth

	Consumption per consumer ('000 PhP)	Support Ratio (%)	Consumption Share (%)	Output per worker ('000 PhP)
A. Level Estimate				
1990	74.1	50.1	88.2	167.6
1995	75.2	51.5	90.8	160.9
2000	74.3	52.6	84.1	167.9
2005	82.1	53.6	81.6	187.6
2010	98.7	55.7	73.0	242.7
2015	126.7	56.7	75.3	296.6
B. Annual Growth Rate (%)				
1990-2015	2.2	0.5	-0.6	2.3
1990-2000	0.0	0.5	-0.5	0.0
2000-2010	2.9	0.6	-1.4	3.8
2010-2015	5.1	0.4	0.6	4.1

Note: Authors' calculations

When disaggregated further by period, the estimates show that during the low-growth years of the 1990s labor productivity has completely stagnated. Without the contribution of the First DD, which was cancelled out by the decline in consumption propensity, the growth in the consumption per effective consumer should have been negative between 1990 and 2000. In more recent years, labor productivity has picked up, growing at 3.8 percent annually between 2000 and 2010, and much faster at 4.1 percent between 2010 and 2015. Notwithstanding the fluctuations in consumption propensity, the First DD provided an additional boost that helped raise consumption per effective consumer by 2.9 percent annually between 2000 and 2010, and by 5.1 percent annually between 2010 and 2015.

5. Public Sector and Prospects for the Future

We explore the potential contribution of public policy on household welfare using a simulation model developed by Mason, et. al. (2015). The macroeconomic-demographic simulation model combines population age structure and realistic age profiles of income, public transfers and saving rates to assess how private consumption changes in a way that is internally consistent. Public policies are introduced in the simulation model through taxation and public transfer programs, as well as limits on the size of government and of public debt. These policies, together with the population age distribution, directly affect the government's fiscal balance. These policies also affect household decisions through the former's influence on the disposable income available to each generation, which ultimately affect the latter's consumption and the residual resources that can be made available for transfers and savings.

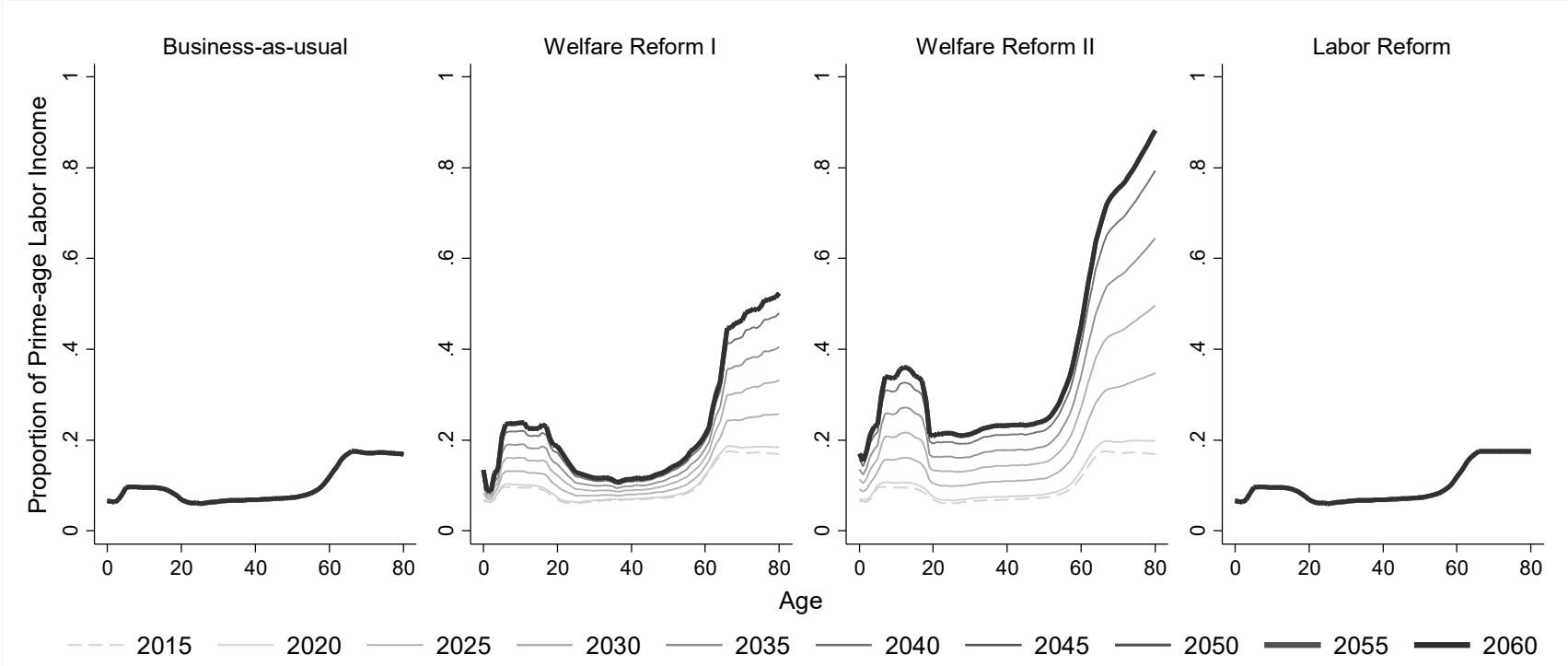
The goal of our simulation is not to provide specific programs of action for government but rather to quantify how population ageing and public policy may interact to promote welfare while ensuring (or endangering) fiscal sustainability. As such, the scenarios that we implement here may not necessarily be realistic options for the Philippines, but are representative of the broad classes of programs that are implemented in different countries around the world.

5.1. Reform Scenarios

We look at three broad set of policy reform scenarios in addition to a baseline case. In the baseline business-as-usual (BAU) scenario, we hold recent age patterns of per capita government spending and taxation fixed over the projection horizon. In the first reform scenario (Welfare Reform I Scenario), the age profiles of taxes and government spending linearly approaches the average age patterns of public transfers in high-income countries with relatively low public transfers to the elderly, specifically the US and Spain. The second reform scenario (Welfare Reform II Scenario) also transitions to public transfer age profiles but in this case of high-income countries with relatively generous public transfers to the elderly, specifically Slovenia, Japan, Finland, Germany, Sweden and Austria. The reforms are implemented beginning in 2020 with the transition lasting for 25 years. In the third and final reform scenario, the age profile of labor income is extended to match improvements in survival rates (Labor Reform Scenario). Figure 6 presents the alternative age profiles under each simulation scenario. The values of the per capita age profiles are all normalized relative to the average per capita labor income between age 30 to 49 years.

Figure 6. Alternative age profiles in projection scenarios

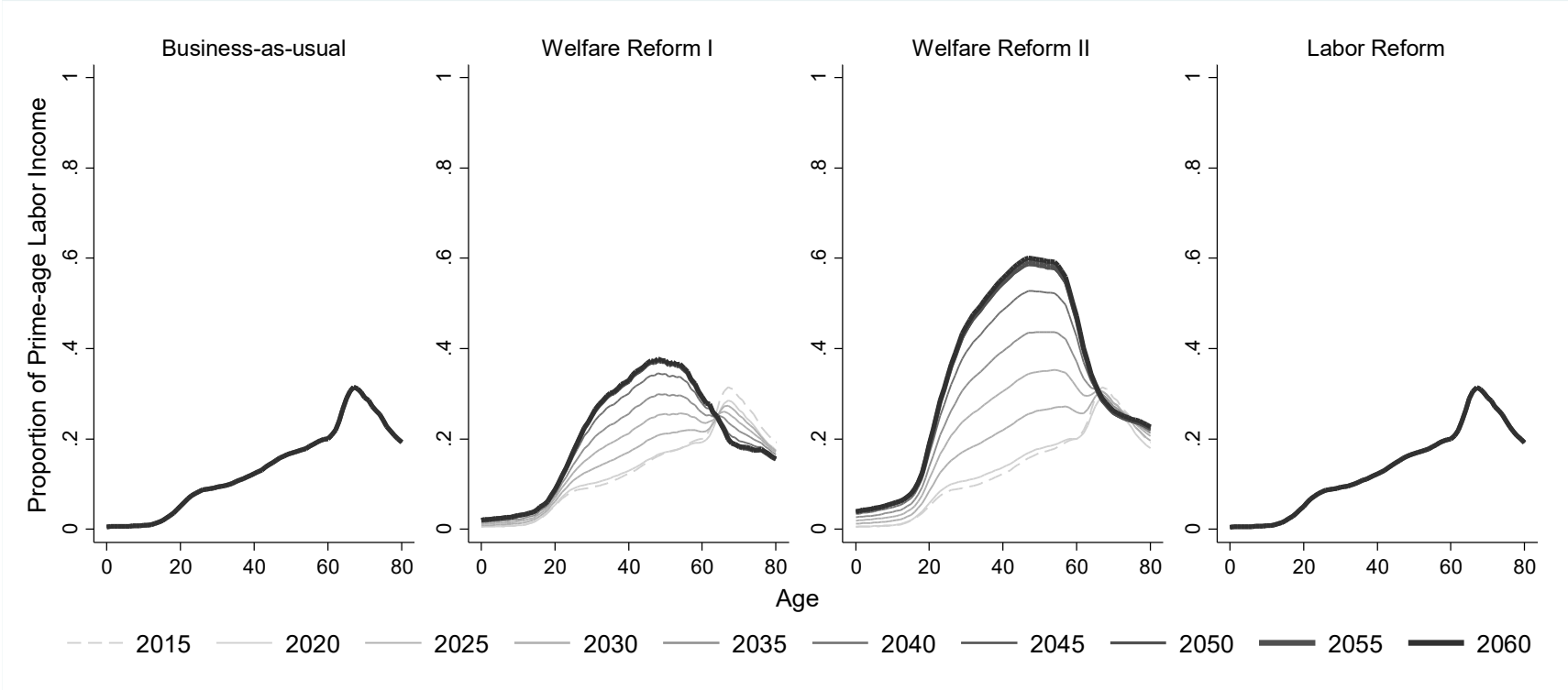
A. Public Transfers, Inflow



Note: Model assumptions.

Figure 6. Alternative age profiles in projection scenarios (continued)

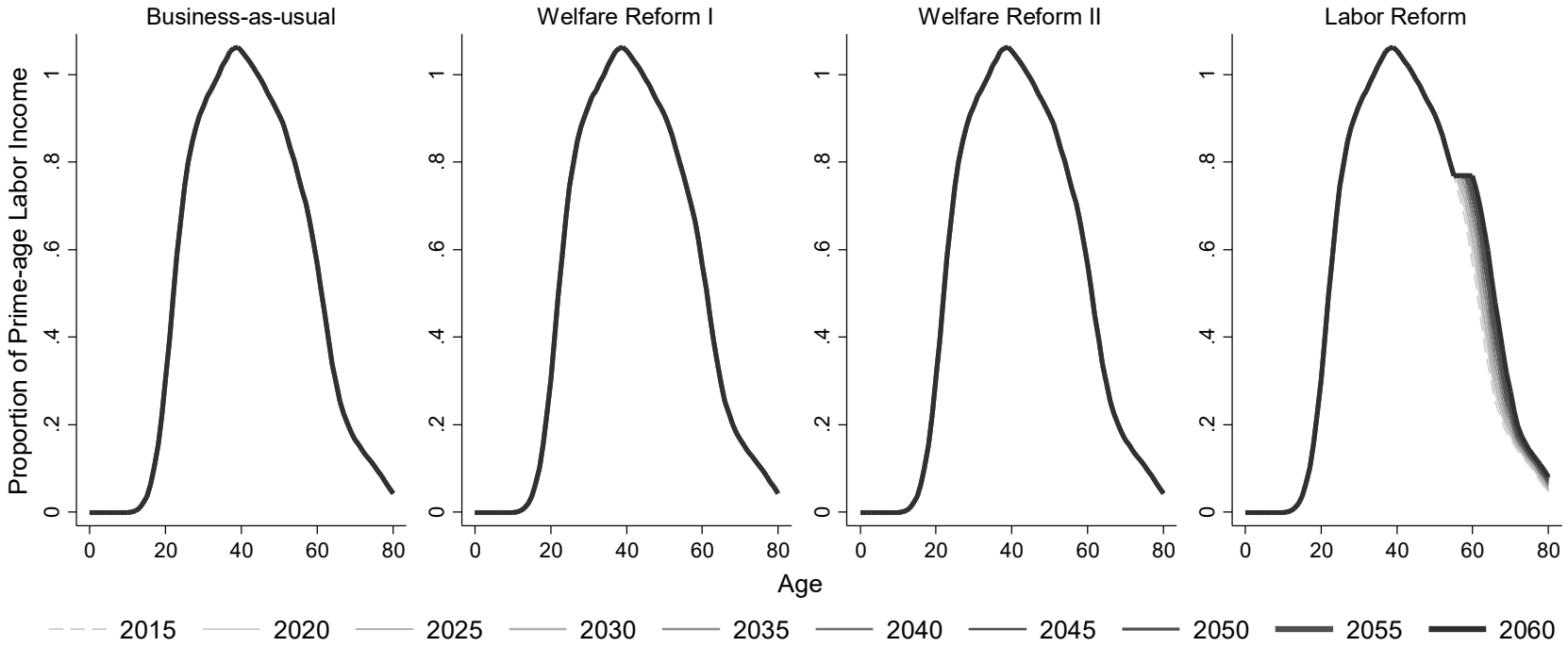
B. Public Transfers, Outflow



Note: Model assumptions.

Figure 6. Alternative age profiles in projection scenarios (continued)

C. Labor Income



Note: Model assumptions.

Under the Welfare Reform scenarios, we can see that public transfers to individuals (Figure 6, Panel A) will increase considerably relative to the baseline scenario. Among the elderly, for instance, annual public transfer inflows will increase to around 50 to 90 percent of a prime-age adult's labor income (PALI) depending on the age and scenario from only 20 percent of PALI in the base case. Taxes or, more generally, public transfer outflows paid by the elderly, on the other hand, are also expected to increase under the Welfare Reform scenarios, but more so for the high-public transfer inflow variant (Figure 6, Panel B). Finally, in the Labor Reform Scenario the labor income per capita age profiles are extend left-ward by about 10 years starting at age 55 in response to improving age-specific survival rates (Figure 6, Panel C).

In all of the scenarios, we use NTA estimates for 2015 as baseline economic lifecycle profiles. We use the medium-fertility population projections by the UN (2017) to account for changes in the population age distribution. In the model, the potential contributions of the demographic dividends are not explicitly taken into account. Specifically, labor productivity growth is exogenously set, in this case linearly approaching the long-run rate of 1.5 percent by 2045 from the baseline of about 4 percent. The contribution of the First DD is implied based on the shape of the age profiles of labor income and consumption, and the trajectory of the population age distribution.

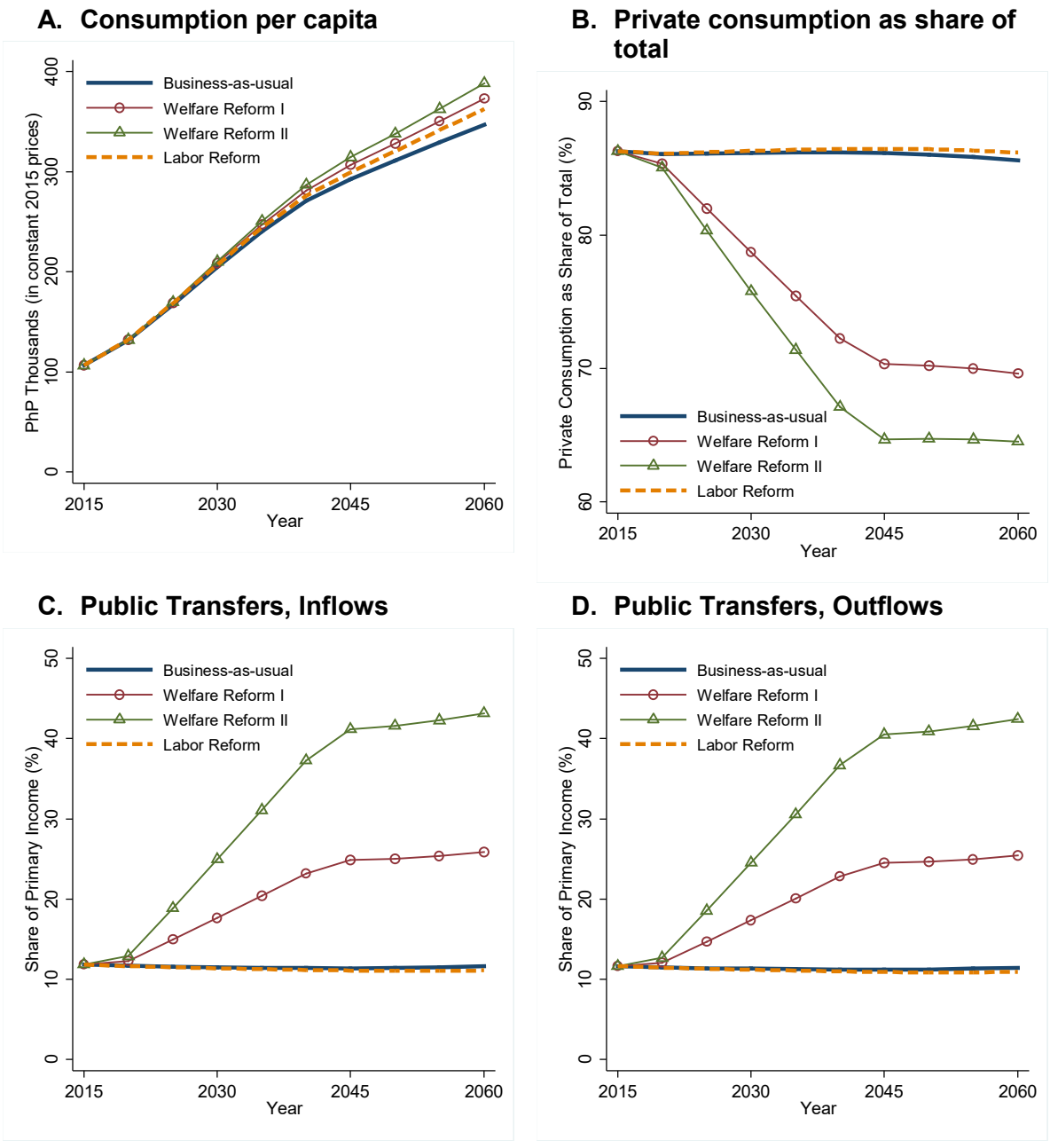
5.2. Consumption and the Public Sector

Figure 7 presents the results of our simulation for consumption and public transfers inflows and outflows under our baseline case and the three reform scenarios. Consumption per capita in all four scenarios are practically indistinguishable from each other until around 2030, coinciding with when the country transitions to an ageing society, after which the projections start to diverge from the baseline case (Figure 7, Panel A). By the end of our projection scenario in 2060 the larger public transfer inflows from the Welfare Reform scenarios imply greater consumption per capita relative to BAU. However, this entails a greater role for government.

Under the Welfare Reform scenarios, the share of public consumption in total consumption grows from below 15 percent at baseline and in BAU to about 30 to 35 percent after the Welfare Reform transition period (Figure 7, Panel B). These set of reforms are expected to increase public transfer inflows from government to as much as 40 percent of primary income from only a little above 10 percent at baseline and in BAU (Figure 7, Panel C). But this requires raising taxes to about the same rate (Figure 7, Panel D).

The results from the Labor Reform scenario, on other hand, suggest that promoting longer working years may have limited impact on average consumption relative to the BAU case.

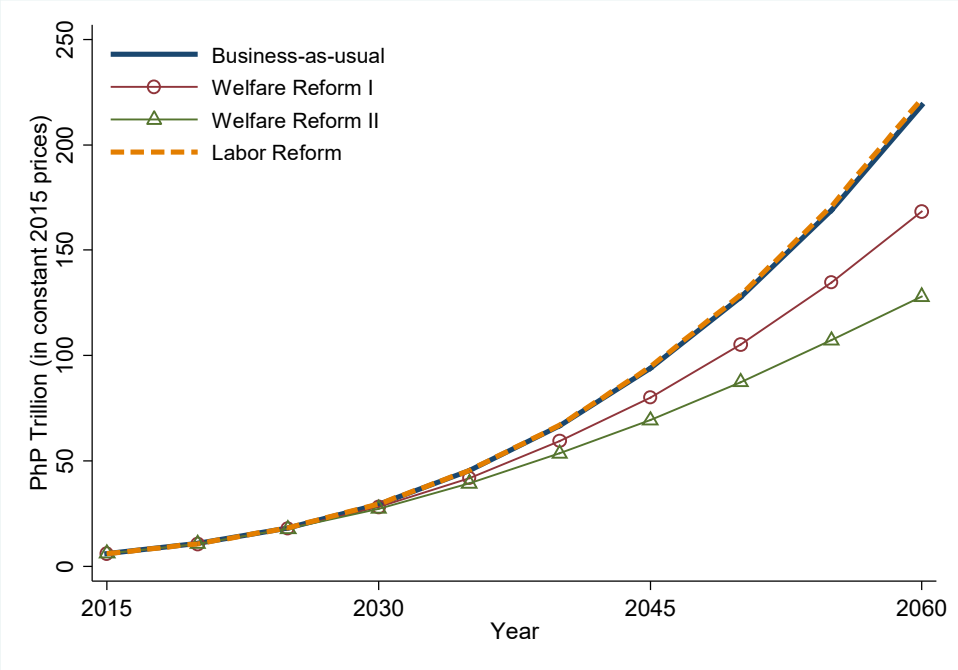
Figure 7. Projected Consumption and Public Transfers, 2015-2060



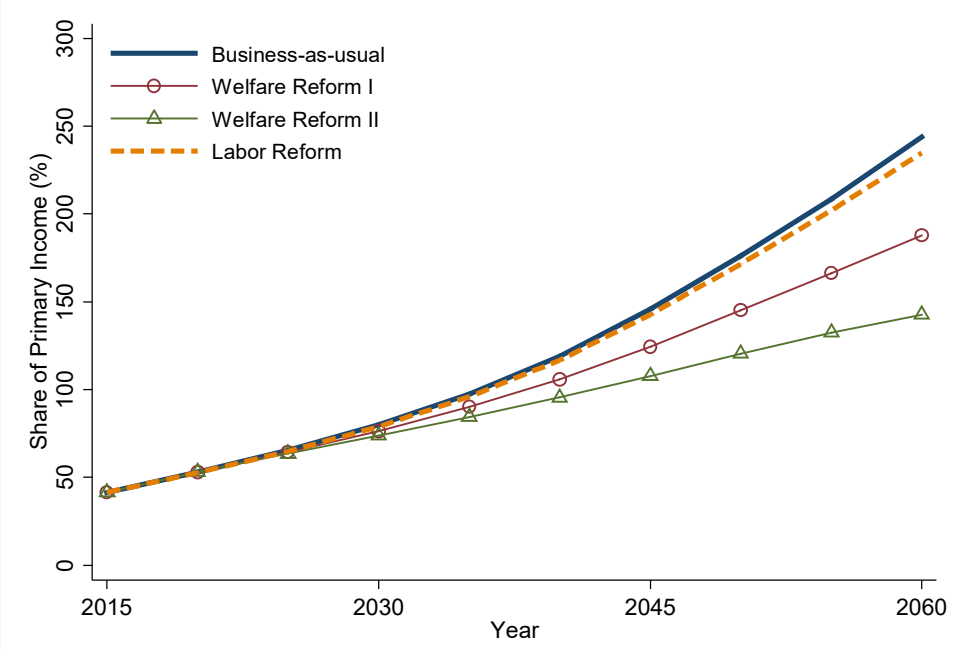
Note: Authors' calculations

Figure 8. Projected Public Debt, 2015-2060

A. Public debt (Trillion PhP)



B. Public debt as share of primary income (%)



Note: Authors' calculations

5.3. Public Debt

The implications of the baseline and the reform scenarios on public debt are presented in Figure 8. Similar to the results for consumption per capita, the trajectories of public debt under each

scenario are very similar until around 2030, beyond which the divergence in estimates become more and more apparent. In the status quo scenario where the per capita age profiles are kept as a constant factor of PALI at baseline, the projected national debt is estimated to increase five-folds by 2030 at PhP29.4 trillion from the 2015 baseline of about PhP6.0 trillion (Figure 8, Panel A). In terms of share of projected primary income, this translates to an increase from about 40 percent of primary income to 80 percent over the same period (Figure 8, Panel B). This comes as a direct result of the country's transition to an ageing society.

With the implementation of the Welfare Reform scenarios, the level and the share relative to primary income of the projected public debt are somewhat subdued compared to the BAU results despite the increase in government transfers to households under these reforms. Still, the resulting public debt are quite substantial, with the debt-to-primary income ratio well above 70 percent in either Welfare Reform scenario in 2030. In all of the scenarios, the projected public debt is expected to breach 100 percent of primary income by 2060.

6. Summary and Policy Implications

The Philippines has made important progress in improving average incomes and consumption over the past 25 years. The country's favorable demography has contributed to this growth. However, as documented in earlier studies, our results suggest that the demographic dividends may be weakened or even negated by existing economic conditions (e.g., Abrigo, et. al., 2016). It highlights that while demographic dividends pose potentials for growth, these are not automatic, but instead rely on various enabling conditions to be fully realized (Mason and Lee, 2006). Public policy is therefore important in ensuring that such enabling conditions are available.

First, it must be recognized that the demographic dividends arise from the demographic transition, which inherently requires fertility rates to decline. Supporting families to achieve their desired fertility levels is an important first step. However, even if average fertility rates drop, it is highly likely that the rates of decline will vary across different populations, thereby potentially exacerbating inequality in the near term. Affirmative actions by government, such as direct cash transfers, may be necessary to ensure that no population get left behind.

Second, the compositional effect of the First DD results from a working population growing faster relative to those of effective consumers. Our decomposition analysis of historical trends has shown that while such potentials may be present, it may be rendered irrelevant if the population wanting work cannot be productively employed. Unlocking the benefits of the First DD therefore goes hand in hand with public policies that promote economic growth in general, and that expands work opportunities in particular.

Third, the productivity enhancing effect of the Second DD, on the other hand, requires that options for investment potentials, regardless whether on human capital, financial markets, or physical capital, be both available and possible among households. The government has made great strides on some aspects, particularly on promoting human capital investments, including ensuring that children are able to attend school and receive necessary healthcare. The challenge is in making certain the continuity of these programs. Still, in other facets, like in stimulating greater household saving or investment, there may be greater room for growth.

The results from our simulations highlight the role that government and public policies play in promoting household welfare, and the contribution of population dynamics on fiscal balance. Our results suggest that even relatively stingy public transfer programs may lead to unsustainable public debt burden in the longer term when changes in the population age distribution, particularly population ageing, are taken into account. It does not mean, however, that government transfer programs cannot be expanded. Indeed, our results indicate that governments can become more generous as long as these are matched with reforms to raise greater government revenues, e.g., tax reform. But whether this holds under much more advanced ageing remains a question.

This research suffers from a number of limitations. For instance, the macroeconomic-demographic simulation model that we employed do not take into account the potential contributions of the Second DD. More particularly, declining fertility and population ageing are both expected to raise labor productivity through capital deepening albeit through different channels. This may be beneficial for fiscal balance to the extent that governments may raise greater revenues from more productive populations that earn higher incomes.

The analysis that we presented focused only on the macroeconomic contributions of demographic change. But much of the processes involved for such change to happen operate at the household level. And the benefits that households derive from macroeconomic growth may vary. While we have shown that the collective household demographic experiences affect the macroeconomy, a more important concern may be in finding ways to ensure that the demographic dividends lead to more sustainable economic growth where the benefits are shared more equitably.

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