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Economic Gain, Age Structure Transition and Population Groups in the Philippines¹

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Abstract

A recent Philippine study examined economic gain from age structure transition at the national level using economic support ratios and National Transfer Accounts estimates for the years 1991, 1999 and 2011. The study showed that the Philippines has steadily been experiencing demographic change (increasing percentage of the population in the working ages) and that there was economic gain from such change, as indicated by increasing support ratios during the indicated period. Support ratio is the ratio of the number of effective workers to the number of effective consumers in a population. But in any given year, the support ratio that is observed at the national level is actually an average across diverse groups. This paper attempts to answer the following questions: In a given year, how do support ratios vary between groups? How do the variations in support ratios between groups compare across different years? Population groups are studied to determine whether those that have higher proportions in the working ages would in fact show higher support ratios – a pattern that was found in the study cited when the Philippines was observed at the national level over time. The population is grouped in this study on two attributes, namely, household income (terciles) and location of residence (urban or rural) for a total of six groups. These six groups are used to observe variations in population age distributions, economic lifecycle patterns and support ratios in the years 1991, 1999 and 2011, parallel to the years covered in the national level study cited and with each year representing periods with different economic conditions.

Keywords: National Transfer Accounts, first demographic dividend, economic support ratio, urban economic lifecycle, rural economic lifecycle, population age structure transition

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1. Introduction

The demographic transition leads to systematic changes in population age structure that influence the share of the population in the working ages, a phenomenon often referred to as the first demographic dividend (United Nations 2013). During the transition period, the working age population temporarily grows faster than the total population, there will be more workers relative to consumers and, other things being equal, per capita income would rise faster. Low-income countries are thus presented with the possibility that more rapid economic growth can be achieved through this demographic change. But as Mason (2005) reiterates, the economic outcome from demographic change is policy dependent. In the absence of complementary economic policy, the potential economic gain from the first demographic dividend may not be realized.

Economic support ratio, or simply support ratio, as defined in the National Transfer Accounts (NTA) measures total effective workers relative to total effective consumers. It is estimated using population data by age and per capita consumption and labor income age profiles of the same population. The support ratio has become a standard tool used to consider the economic effects of changing population age structure. The first demographic dividend operates through growth in the support ratio (United Nations 2013). There is economic gain from age structure transition when there is increase in the support ratio. The first dividend phase is marked by the interval during which the support ratio is increasing and during which the average annual change in support ratio or the year to year change in the support ratio is positive. The ending of the first dividend phase is indicated when the support ratio levels off, begins to fall and the average annual change turns negative.

Economic gain from the age transition of a population is in general studied by observing countries over time (United Nations 2013; Mason and Lee 2004; Mason 2005; Li, Chen et. al. 2011). This overall approach logically follows because change in population age structure is a phenomenon that naturally occurs over time. A recent study for the Philippines was done in 2015 observing demographic change and economic gains over three time points, and using support ratios and multi-year National Transfer Accounts (NTA) estimates. This “2015 study” showed that there was increasing percentage of the Philippine population in the working ages over the years 1991, 1999 and 2011, and that there was increasing economic support ratio over the same

years (Racelis, Abrigo, Salas and Herrin 2015). But in any given year, the support ratio that is observed at the national level is actually an average across diverse groups. Different groups could be at different stages of population age transition and show different population shares in the dependent and working ages. Different groups could have different economic lifecycles. And, thus, as a result of these differences the groups could manifest varying economic support ratios.

The grouping of the Philippine population for this study focuses on two attributes, namely, household income (terciles) and location of residence (urban or rural) for a total of six groups. Previous studies in the Philippines have shown that fertility rates vary according to these attributes (i.e., lower fertility rates in the higher income group and in urban areas, and higher fertility in the lower income group and in rural areas), and the population age structure of these groups are expected to vary accordingly. A previous study also showed income tercile groups to have different per capita consumption and labor income age profiles, and different population age distributions particularly up to about age 20 years (Racelis, Abrigo and Salas, 2012a).

This paper takes off from the 2015 Philippine study on national level support ratios and attempts to answer the following questions: In given year, how do support ratios vary between groups? How do the variations in support ratios between groups compare across different years? What can be learned from cross-section analysis of support ratios about economic gain and age structure transition? The population groups are used to determine whether those that have higher proportions in the working ages would in fact show higher support ratios – a pattern found in the 2015 study that observed the Philippines at the national level over time. The variation in support ratios are examined across the six groups in the three reference years, 1991, 1999 and 2011, each year representing periods with different economic conditions. The roles of population age distributions and economic lifecycle patterns in shaping support ratios of groups are examined. To provide the context to the cross-section analysis or the analysis across groups done in Section 4, findings from the 2015 study about population distributions and support ratios at the national level are presented first in Section 3.

As background, related materials are presented in this introduction. These include the patterns of fertility in the Philippines and a description of the Philippine economic condition in the periods 1991-1999 and 1999-2011. Section 2 describes the methods and data used in the study. Section 3 provides the national context for the group comparisons in Section 4 and discusses age structure transition, support ratios and economic gain at the national level drawing from the 2015 study covering the years 1991, 1999 and 2011 (Racelis, Abrigo, Salas and Herrin 2015). Section 4 examines age structures and economic lifecycle patterns across the six population groups in each of the years 1991, 1999 and 2011, and discusses the roles of the two sets of factors in determining support ratios of groups. Section 5 concludes the paper.

Fertility trends and population age structure change

Based on estimates from the various National Demographic Surveys (NDS: 1973, 1983 and 1993) and National Demographic and Health Surveys (NDHS: 1998, 2003, 2008 and 2013), fertility has declined in the Philippines from a total fertility rate (TFR) estimated at 6.0 births per woman in 1970 to 3.0 births per woman in 2012. Based on census data, the population age structure has steadily changed with the proportion of young population age 0-14 years declining from 46.0% in 1970 to 33.4% in 2010, while the proportion of working age population 15-64 years old increasing from 51.0% in 1970 to 62.3% in 2010.

Also known facts about fertility in the Philippines are differentials between population groups based on data from as early as the 1970s, in particular between socio-economic or income groups and between populations in urban and rural areas. The differentials have persisted over time. Data from the NDHS show that the TFR in 1991 (from NDHS 1993) was 3.5 births per woman in urban areas and 4.8 births per woman in rural areas. These rates declined to 2.6 births per woman in urban and 3.5 births per woman in rural areas in 2012 (from NDHS 2013). The TFR based on wealth index constructed for the NDHS is estimated at 5.3 births per woman for the bottom tercile group and 2.4 births per woman for the top tercile in 2001 (from 2003 NDHS) and 4.5 births per woman and 2.1 births per woman, respectively, in 2012 (from 2013 NDHS). Given the continuing fertility differentials among population groups over the years, it is expected that the age structures of the different groups would remain to be different for some time. Findings in Section 4 show this to be the case.

General economic condition in the period 1991 to 2011

The economic condition during the period provide part of the explanation for the patterns of change observed in the per capita consumption and labor income age profiles estimated for the selected reference years. In the period 1991–2011 the Philippines experienced varying economic performance. Generally low and even negative real growth rates in per capita Gross Domestic Product or GDP was experienced in the first half of the period (PSA 1997, 2003, 2013). The annual real growth rates were negative throughout 1989–1993, going as low as -3.1% in 1990–1991, and then again in 1997–1998 at -2.1%. In the years 1998 and onwards the annual real growth rates of per capita GDP were consistently positive, generally exceeding 3.0%. The lowest growth experienced was in 2008-2009 at 1.1% and the highest since 1998 exceeding 6% were experienced in 2003-2004 at 6.7%, 2006-2007 at 6.6%, 2009-2010 at 7.6% and 2011-2012 at 6.8%.

2. Data and Methods

The NTA computational approach for support ratio is used and the data needed are labor income and consumption age profiles along with population size data also by age. More specifically, the population data and the age profiles needed are for the six groups (income tercile groups by urban-rural residence) and for the years 1991, 1999 and 2011.

Population data in single ages for the years 1991, 1999 and 2011 for the Philippines are taken from the United Nations (2011).

The main sources of data for the estimation of the consumption and labor income age profiles of Philippines NTA for the three years include the following: National Income Accounts data for the specific years, specifically the Income and Outlays breakdown, obtained from the Philippine Statistics Authority (PSA); estimates of the National Health Accounts and National Education Expenditures Accounts available for the specific years (from PSA); Family Income and Expenditure Survey (FIES) and Annual Poverty Indicator Survey (APIS) closest to or exactly for the specific years (1991, 2000, 2012 FIES and 1999, 2011 APIS from PSA); price index data from PSA; and government finance and budget documents containing data for the specific years obtained from the Department of Budget and Management (DBM) and the Commission on Audit (COA).

The methods for producing the NTA estimates used in this paper generally followed those described in Racelis and Salas (2007) and those recommended in the NTA Manual (United Nations 2013). Refer to Racelis, Abrigo, Salas and Herrin (2015) for more detail on the estimation of the revised 1991, revised 1999 and 2011 national level NTA (estimates discussed in Section 3). Refer to Racelis, Abrigo, Salas and Herrin (2016) for more detail on the estimation of the 1991, 1999 and 2011 NTA by urban-rural residence and by income tercile group (estimates discussed in Section 4) and the population age distributions of groups for the same years.

Economic support ratio as defined in the NTA and the way it is computed captures the effects of two sets of factors, demographic and economic lifecycle factors. The demographic profile of a population is captured by its distribution by age. The economic lifecycle of the population is depicted by its consumption and labor income age profiles. The per capita labor income age profile captures age variation in labor force participation, hours worked, unemployment, and productivity or wages. Similarly, the per capita consumption age profile captures age-specific variation in consumption. Per capita labor income and per capita consumption age profiles, thus, represent worker and consumer behaviour. The two age profiles also capture and represent to some extent the general economic environment.

The computation of a support ratio involves first deriving the equivalence scales for consumption and labor income at each age (with the age group 35-49 as reference) using a specific set of per capita age profiles such as those estimated in the NTA. Next the product of the equivalence scales and the population size at each age for a given year are obtained yielding the effective number of consumers and effective number of workers for the different ages. Then the sums across all ages are taken to generate the values for total effective number of consumers and total effective number of workers. The support ratio is computed as the ratio of total effective workers to total effective consumers (United Nations 2013, p. 109). Support ratios for groups are computed in the same manner but the group-specific population age distribution and group-specific income and consumption age profiles are used.

While the support ratio is intended to be used in the analysis of the contribution of age structure change to economic growth at the national level (United Nations 2013), for the cross-section or group comparison done in this paper it is simply used as an indicator or tool to describe the experiences of groups as effective consumers and producers. The support ratios computed specific to groups are not intended as decomposition of the national support ratio, but rather only for studying variation among groups. And, given its computational form, the effects of different population age structures and economic lifecycles of groups on the variation of their support ratios can be sorted out.

As mentioned earlier the population grouping used in this study are based on income terciles and urban-rural residence. Urban-rural residence is standard population grouping in both censuses and surveys. Caution is needed in using these group categories when comparing results over time. The composition of the groups could change at different time periods due to movement of households across income terciles and across geographic areas. Indicators of socio-economic status other than income that have been used in studies include education (e.g., Ogawa, 1982; Mejia-Guevara, 2015) and wealth quintiles, the latter indicator is based on a composite of living standards indicators, which is closely correlated with income. In surveys such as NDHS, the use of wealth quintiles generally show expected pattern of fertility differentials than education of the woman. Education of household heads could vary according to transition from male to female as household head. Whichever the indicator used for the grouping, caution is still needed in comparisons over time.

Comparison over time is done only at the national level, such as the findings from the 2015 study presented in Section 3, since the comparability of population being observed through time is not an issue. The comparison among population groups (cross-sectional) in Section 4 is limited within each reference year. The idea is to see how the average national population experience in each reference year had manifested among different population groups – considering that groups had different population age structures and different economic lifecycles. Population groups observed in 1991 represent groups who have undergone demographic change

up to that year, and whose income and consumption patterns have been influenced by the same economic environment around that year. The population groups observed in 1999 and 2011 have had longer time for demographic change to unfold and the groups will have been influenced by the economic environment surrounding their respective year of measurement.

3. Age Structure and Support Ratios (National Experience): 1991, 1999 and 2011

The findings presented in this section are drawn from Racelis, Abrigo, Salas and Herrin (2015), the “2015 study”. This study estimated consumption and labor income age profiles, and support ratios for the years 1991, 1999 and 2011 for the Philippines. The time points of the study were chosen to have enough intervals for fertility decline to be observed. Highlights about the changes in Philippine population age distribution, and consumption and labor income age profiles are presented first in this section as these partly provide explanations to the changes observed in the national level support ratios. Consumption and labor income are discussed valued at constant 2010 prices.

Population Age Distribution

Philippine population grew from 63 million in 1991, to 76 million in 1999 and to 95 million in 2011. The growth had in fact slowed down from an average annual growth of 2.34% in 1991-1999 to 1.86% in 1999-2011.

In terms of age structure the Philippine population was still predominantly young in the period 1991-2011 but discernable changes in the age distribution had taken place. The proportion under 15 years old declined at 41% in 1991, 39% in 1999 and 35% in 2011, consistent with falling national fertility rates. The proportion in the working ages or ages 15-64 years old increased at 56% in 1991, 58% in 1999 and 61% in 2011. The proportion of older persons hardly changed at around 3% in 1991, 1999 and at 4% in 2011. Overall, as a result of these age distribution changes the median age of the Philippine population increased from 18.5 years in 1991, to 19.5 years in 1999 and to 21.5 years in 2011, indicating a definite but slow process of ageing of the population. Still, Philippine population remains to be predominantly young since half or 50% of the population is aged 21.5 years or younger in 2011.

Based on the increasing share of the population in the working age from 1991 to 2011, the Philippines was still within the demographic phase where it could potentially gain economically from population change. However, as the succeeding discussions show, the economic gains achieved from age structure transition also depend very much on the economic lifecycle patterns of the population and favorable economic environment.

Per Capita Consumption and Labor Income

The average annual change in per capita consumption and per capita labor income as shown in Table 1 in the periods 1991-1999 and 1999-2011 reflect the general economic conditions as described earlier. Real per capita consumption and per capita labor income levels seem to have stayed nearly the same in 1991 and 1999, with near zero average annual growth rates. Then these two components showed spectacular annual growth in the next period, 1999-2011.

Table 1. Per capita consumption and labor income: 1991, 1999 and 2011, Philippines, constant 2010 prices (in PhP)

NTA Component	Per capita (in PhP)			Average annual change (percent)	
	1991	1999	2011	1991 - 1999	1999 - 2011
Consumption	50,050	50,484	78,819	0.1	4.7
Public	6,636	8,551	9,908	3.6	1.3
Private	43,415	41,933	68,911	-0.4	5.4
Labor Income	37,782	36,906	71,374	-0.3	7.8
Earnings - Domestic	17,019	17,901	35,990	0.6	8.4
Earnings - Abroad	3,098	4,894	22,398	7.2	29.8
Self-Employment	17,665	14,111	12,986	-2.5	-0.7

The patterns of change for the individual components of consumption and labor income, however, are mixed. The annual growth in per capita public consumption, including those for education and health, contrary to the pattern of growth in the general economy was higher in the first period compared to the second period. It is private consumption and its components that showed very low or even negative annual growth in real per capita spending during the first period but recovering, as the general economy did, in the second period.

Labor earnings from domestic paid employment generally followed the pattern of growth of the general economy. Per capita income from self-employment, however, had consistently declined showing negative annual growth in both periods. Per capita net earnings from abroad or Overseas Filipino Workers (OFW) remittances is the only component that had very high annual growth rates in both periods making up for the steady decline in per capita self-employment income.

The patterns of change in the age profiles of components of consumption and labor income generally reflected the findings in Table 1. Overall, the per capita total consumption and per capita labor income by age had stayed practically the same at all ages from 1991 to 1999, and had increased significantly at all ages from 1999 to 2011. The ages with lifecycle surplus (ages at

which labor income exceeded consumption) were around 26 to 60 years in 1991 and 1999, and 22 to 58 years in 2011.

The shape or pattern of per capita public consumption by age, relatively flat except for the bump in the schooling ages 5-24 years, had generally stayed the same across the years, but there was increase in per capita spending at all ages in both periods 1991-1999 and 1999-2011. Similarly, the overall pattern of per capita private consumption by age had also stayed relatively constant across the years, but there was a distinct rise with age in per capita spending at the older ages in 2011 instead of the relatively flat pattern seen in 1991 and 1999. Per capita private spending stayed relatively constant at all ages in the period 1991-1999 and had increased at all ages from 1999 to 2011.

Per capita domestic wage by age while generally the same from 1991-1999, with earnings peaking at ages 40-45 years, had increased at all ages in 2011 with a longer range of ages at which earnings are highest, i.e. ages 30-45 years. Per capita earnings by age from abroad was found to be generally the same in 1991 and 1999 with earnings highest at ages 35-45 years, and to have increased tremendously at most ages from 1999 to 2011 with earnings highest at relatively younger ages 30-40 years in 2011. Unlike employment earnings, per capita self-employment income had steadily decreased at all ages from 1991 to 1999 and from 1999 to 2011. The overall shape of self-employment income age profile showed peaks that were defined at a specific age in 1991 and 1999, around age 45 years old, and then flattened out showing a longer range of ages at which per capita income was highest in 2011.

Economic Support Ratios

Table 2. Actual and simulated support ratios, Philippines, selected years

Type of support ratio	Year of population data by age		
	1991	1999	2011
Actual (current year NTA and population data)	0.433	0.445	0.545
Simulated (1991 NTA and current year population data)	0.433	0.453	0.482

Actual support ratios for the Philippines for the years 1991, 1999 and 2011 are shown in Table 2. The “actual” support ratio for a given year is computed based on population data and per capita consumption and labor income age profiles for the same year. Thus, any change observed in the support ratio from one year to another year is a result of change in one or both the population and age profiles between the indicated years. Also shown in Table 2 are support ratios simulated using the population data for the different years and the per capita consumption and labor income age profiles of one specific year, 1991. The simulated support ratios are used to

sort out the influences of population change and per capita age profiles change on national support ratios.

There were 43, 46 and 54 effective workers for every 100 effective consumers in 1991, 1999 and 2011, respectively (Table 2). The support ratios remained nearly the same from 1991 to 1999, increasing only by an average of 0.35% per year, and then had risen significantly from 1999 to 2011, increasing by about 1.87% per year. The positive growth in the support ratios indicate that in the period 1991-2011 the Philippines was within the first demographic dividend phase.

But what can explain the lower growth in support ratio in 1991-1999 compared to that in 1999-2011? Population age structure change in the Philippines was consistently favorable to increasing the number of effective workers (the numerator of the support ratio) with the steady increase in the proportion of the population in the working ages in both periods. The influence of purely the age structure change is demonstrated by simulations of the support ratio shown in Table 2. If indeed only the population age structure had changed (and per capita age profiles had stayed the same as that in 1991), the support ratios would have shown steady average increases of 0.57% per year in 1991-1999 and 0.55% per year in 1999-2011.

Instead, the actual economic gain achieved in terms of average increase in support ratio per year was lower in 1991-1999 (actual 0.35% < 0.57%) and higher in 1999-2011 (actual 1.87% > 0.55%) compared to the potential gain due to age structure transition alone. Obviously, the economic lifecycle of the population and the general economic environment are equally important factors that had influenced the extent of economic gain in each period. In 1991 to 1999, per capita consumption had slightly increased but per capita labor income had slightly decreased (Table 1); while in 1999-2011 both per capita values had increased but much more for per capita labor income. These changes in the per capita values of consumption and labor income reflect the general economic condition of the two periods. The potential gain from population change was not achieved fully in 1991-1999 because of an unfavorable economic environment while the condition had turned around in 1999-2011.

The changes in the shapes of the per capita age profiles contributed to the remarkable increase in support ratio from 1999 to 2011. While the age profiles had been generally similar from 1991 to 1999, several changes were observed from 1999 and 2011. Compared to 1991 and 1999, in 2011 there was a wider range of ages at which per capita labor income was high and there was a general shift in the peak or high per capita income towards the younger ages – both favoring increase in number of effective workers. There was also a rising pattern of consumption with age past age 50 years (flat in previous years) favoring increase in number of effective consumers in 2011. But overall the effect of the changes in the labor income age profile had prevailed over the change in the consumption age profile as indicated by the increase in the support ratio from 1999 to 2011.

4. Age Structures and Support Ratios by Population Group: By Income Tercile and By Urban-Rural Residence, 1991, 1999 and 2011

The findings from other NTA studies, such as that discussed in Section 3, and that which looked at population groups by income terciles (Racelis, Abrigo and Salas, 2012a and 2012b) posed an interesting question on how lifecycle consumption and labor income would vary among population groups at different time periods reflecting different economic environments. The analysis in this section looks at patterns and variations in the age structures, economic lifecycles and support ratios of the six population groups as defined earlier in the years 1991, 1999 and 2011. Consumption and labor income are discussed valued at constant 2010 prices. More detail on population age structure and economic lifecycle of the six population groups for three reference years is presented in another paper (refer to Racelis, Abrigo, Salas and Herrin 2016).

Population Age Distribution by Group

There are less people in the top tercile compared to the middle and bottom terciles in both urban and rural areas in all the years (Table 3). The grouping of the population by income tercile was done using households as reference and average household size is generally smaller in the top tercile compared to middle and bottom tercile households.

Table 3. Summary measures describing populations by income tercile group and by urban/rural residence: Philippines, 1991, 1999 and 2011

Population characteristic	Urban			Rural			National level
	Bottom	Middle	Top	Bottom	Middle	Top	
<i>1991</i>							
Size (thousand)	10,896	10,454	10,001	10,805	10,699	10,621	63,476
Percent age 0-14	48.5	38.8	28.6	53.2	42.4	32.1	40.8
Percent age 15-64	49.2	58.3	67.6	44.8	54.7	63.0	56.1
Percent age 65+	2.3	2.9	3.8	2.0	3.0	4.9	3.1
Median age (years)	14.6	19.3	22.7	12.8	17.2	21.9	18.3
Mean age (years)	20.2	22.9	26.0	19.2	22.4	26.2	22.8
<i>1999</i>							
Size (thousand)	13,997	11,855	9,703	16,029	13,309	11,125	76,018
Percent age 0-14	45.8	32.8	25.5	51.8	39.1	29.0	38.8
Percent age 15-64	51.9	64.2	70.2	46.2	57.4	66.2	58.0
Percent age 65+	2.3	3.0	4.3	2.0	3.6	4.8	3.2
Median age (years)	15.9	21.4	24.5	13.4	18.8	23.0	19.3
Mean age (years)	21.2	24.8	28.0	20.0	23.9	27.5	23.8
<i>2011</i>							
Size (thousand)	19,311	15,374	11,827	20,208	15,749	12,583	95,053
Percent age 0-14	41.7	29.4	21.9	46.3	34.1	25.5	34.8
Percent age 15-64	55.7	67.1	72.7	51.1	61.8	68.4	61.4
Percent age 65+	2.6	3.6	5.3	2.6	4.1	6.1	3.8
Median age (years)	17.9	24.0	27.5	15.5	21.1	25.6	24.5
Mean age (years)	22.8	27.3	31.0	21.5	25.9	30.0	25.7

As discussed in Section 3, the proportion young of ages 0-14 years had declined and the proportion in the working ages 15-64 years had increased at the national level from 1991 to 2011, and this same pattern is observed across all six population groups. Age structure transition had occurred in all the groups from 1991 to 2011; however, they differed in terms of the age distribution from which the transition had started in 1991.

Consistent patterns in the age composition of populations of the three income tercile groups in the urban and rural areas are observed in all the years. In terms of proportions in the young ages, these were consistently highest in the bottom terciles and lowest in the top terciles in both urban and rural areas (Table 3), consistent with the observations made previously about fertility patterns of urban-rural areas and socio-economic groups. Conversely, in terms of proportions in the working ages, these were consistently lowest in the bottom terciles and highest in the top terciles in both urban and rural areas. The proportion of older population continued to be low in all the groups in the three years but had continued to be highest in the top terciles of both urban and rural areas. The urban and rural middle terciles populations had age profiles that were roughly in between those of the other two terciles. Overall, the urban-top tercile group is ahead, followed by rural-top, urban middle, rural-middle, urban-bottom, and the rural-bottom tercile group is lagging the most in the demographic change towards lower population share in the young and higher population share in the working ages. The order stayed the same in the three reference years.

Per Capita Consumption and Labor Income Age Profiles by Group

This section first focuses on data for the year 2011 to compare the six groups: their mean per capita values by NTA component (Table 4); and their per capita age profiles for consumption and labor income (Figures 1 and 2). The comparisons are intended to bring out similarities or differences between groups that may help explain later on the variations in support ratios among groups. Then to provide a systematic and concise profiling of the overall shapes of the consumption and labor income per capita age profiles of all six groups across the three reference years (i.e. 36 age profiles altogether), the age profiles were standardized using a method of equivalence scales and selected simple averages of equivalence scales computed as summary measures (Table 5). For more detail on the consumption and labor income age profiles of the six groups for the three reference years see Racelis, Abrigo, Salas and Herrin (2016).

A summary of the consumption and earning patterns of groups in 2011 are compared using the per capita mean values shown in Table 4. As expected, total per capita consumption and total per capita labor income were highest in the top terciles relative to the other terciles in both urban and rural areas. But within terciles, per capita consumption and per capita labor income levels were consistently higher in the urban area compared to that for the rural area.

Table 4. Mean per capita labor income, consumption and components, by income tercile and by urban-rural residence: Philippines, 2011, constant 2010 prices (Php)

NTA Component	Urban			Rural		
	Bottom	Middle	Top	Bottom	Middle	Top
Lifecycle Deficit	12,463	6,119	-15,242	16,032	13,712	-1,192
Consumption	48,583	85,552	189,207	33,103	49,164	99,955
Private	38,692	76,304	180,880	23,073	39,435	90,690
Public	9,891	9,248	8,326	10,030	9,729	9,266
Labor Income	36,120	79,433	204,449	17,071	35,452	101,148
Earnings - Domestic	19,439	45,238	105,402	7,065	15,357	46,249
Earnings - Abroad	10,338	22,579	71,668	3,887	9,091	33,992
Self-Employment	6,343	11,617	27,378	6,119	11,004	20,907

The difference in per capita total consumption between the groups is driven mainly by private consumption, per capita public consumption being relatively constant across groups. The ratio of per capita self-employment income relative to the total per capita labor income declines from the bottom tercile to the top tercile in both the urban and rural areas. That is, the bottom and middle terciles are deriving more of their income from self-employment income compared to the top terciles. On the other hand, ratios of per capita labor income from domestic and foreign sources (remittances) relative to per capita total income increases from the bottom tercile to the top tercile also in both urban and rural areas.

Figure 1. Urban population per capita consumption (C) and labor income (YL) By age and by income tercile: Philippines, 2011, constant 2010 prices (thousand Php)

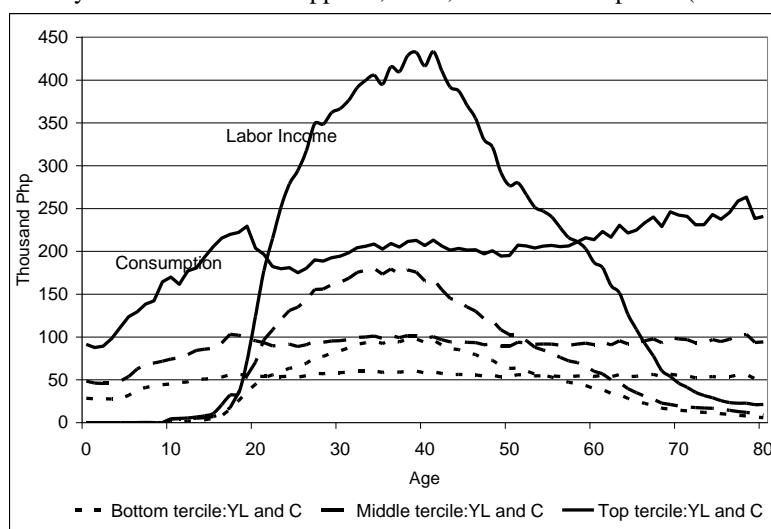
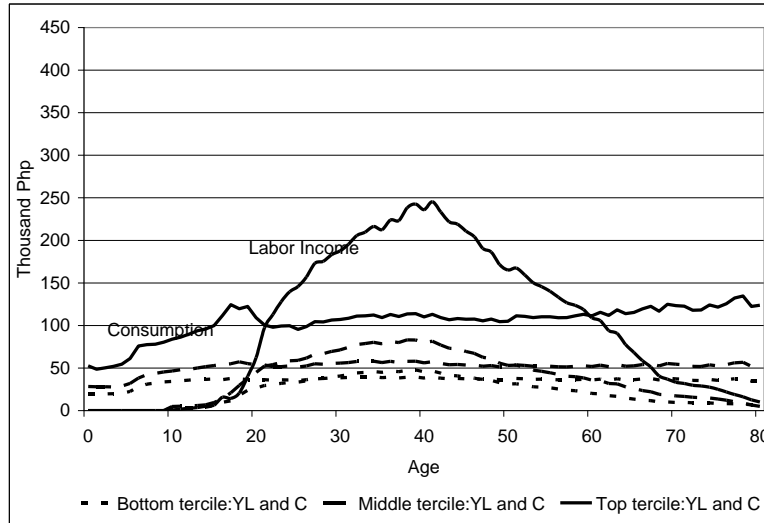


Figure 2. Rural population per capita consumption (C) and labor income (YL)
By age and by income tercile: Philippines, 2011, constant 2010 prices (thousand Php)



The observations about the overall per capita means by group in Table 3 are reflected in the age profiles: per capita labor income and consumption are progressively lower at all ages as one goes from the top tercile to the bottom tercile in both the urban and rural areas (Figures 1 and 2); and, within terciles, urban area per capita labor income and consumption are higher at all ages than those in the rural area. (Note that the scale on the y-axis, i.e. the per capita level, is the same in Figures 1 and 2 making comparisons across the two figures acceptable). Some differences may be noted in the age profiles of labor income and consumption of groups. For example, the income age profiles of the urban and rural top terciles are more pointed (others are relatively flat at the top) showing narrower range of ages at which per capita incomes are high. The consumption age profiles have a more pronounced hump in the college-going ages (16-22 years) for the middle and top terciles in urban areas and for the top tercile in rural areas. There is also slightly increasing per capita consumption as age increases, particularly at ages past 50 years, for the top tercile in both urban and rural areas.

In 2011 lifecycle deficit (consumption minus labor income) for the young and the elderly was experienced starting at different ages in the six groups. These deficit age cut-offs are identified in Figures 1 and 2 by the points where the per capita consumption and per capita labor income age profiles of each group crossover. Lifecycle deficit is incurred among the young up to the following ages (years): urban-bottom tercile 21, urban middle tercile 20, urban-top tercile 21, rural-bottom tercile 27, rural-middle tercile 21, and rural-top tercile 21. And lifecycle deficit is incurred among the elderly starting at the following ages (years): urban-bottom tercile 55, urban middle tercile 53, urban-top tercile 59, rural-bottom tercile 47, rural-middle tercile 51, and rural-top tercile 60. In the rural bottom tercile the young stay in deficit longer and the elderly go into deficit earlier than in the other groups. It may also be noted that while the age cut-offs are generally similar at the young ages across groups, the age cut-offs at the older ages are showing

an increasing pattern as one goes from the bottom tercile to the top tercile in both urban and rural areas.

Standardizing age profiles removes scale differences and units of measurements so that overall shapes can be compared. In this paper the age profiles were standardized using equivalence scales which entailed computing for the ratio of, say, per capita consumption at each age relative to the mean per capita consumption of the reference age group 35-49 years old. All consumption and labor income age profiles for the six groups and for the years 1991, 1999 and 2011 were standardized in this manner. The equivalence scales for purposes of this section are useful for direct comparison of per capita age profile patterns across groups; but more importantly it should be noted that the equivalence scales are used in the computation of support ratios. The equivalence scales derived from the different age profiles are summarized in Table 5 in terms of simple averages for two age groups, ages under 35 years and ages over 49 years. Note that as the reference group, the mean equivalence scale for the age group 35-49 years is 1.0 for both labor income and consumption. The means shown in Table 5 are simple means and not weighted by population size by age.

Table 5. Summary of labor income and consumption equivalence scales, selected age groups, by income tercile and by urban/rural residence: Philippines, 1991, 1999, 2011

Description	Urban			Rural		
	Bottom	Middle	Top	Bottom	Middle	Top
1991						
Labor income equivalence scales						
Mean equivalence scale for age <35 years old	0.39	0.40	0.43	0.44	0.43	0.45
Mean equivalence scale for age >49 years old	0.46	0.47	0.46	0.50	0.48	0.48
Consumption equivalence scales						
Mean equivalence scale for age <35 years old	0.94	0.91	1.02	0.96	0.94	0.96
Mean equivalence scale for age >49 years old	0.92	0.90	0.93	0.94	0.92	0.91
1999						
Labor income equivalence scales						
Mean equivalence scale for age <35 years old	0.39	0.38	0.43	0.40	0.39	0.37
Mean equivalence scale for age >49 years old	0.47	0.46	0.46	0.48	0.48	0.45
Consumption equivalence scales						
Mean equivalence scale for age <35 years old	0.97	0.97	1.06	0.97	0.96	0.98
Mean equivalence scale for age >49 years old	0.95	0.94	0.95	0.96	0.95	0.93
2011						
Labor income equivalence scales						
Mean equivalence scale for age <35 years old	0.39	0.43	0.36	0.43	0.43	0.33
Mean equivalence scale for age >49 years old	0.34	0.30	0.33	0.39	0.38	0.36
Consumption equivalence scales						
Mean equivalence scale for age <35 years old	0.85	0.85	0.84	0.88	0.87	0.84
Mean equivalence scale for age >49 years old	0.95	0.98	1.11	0.96	0.96	1.07

In 1991 and 1999 the mean equivalence scales of per capita labor income of the <35 and >49 age groups were generally either increasing or flat going from the bottom to the top tercile in both urban and rural areas. In the same two years, the mean equivalence scales of per capita consumption of the two age groups were generally the same across all groups. In other words,

the age profiles of consumption and labor income had similar overall shapes across groups in 1991 and 1999. In 2011, however, the mean equivalence scales of per capita labor income had become differentiated across groups, i.e. generally lower for the <35 and >49 age groups of the urban and rural top terciles compared to those for the other groups and unusually higher for the urban middle tercile <35 age group. Also in 2011 the means of equivalence scales of per capita consumption were generally the same across all groups except for significantly higher means for the >49 age group in the urban and rural top terciles. Thus, in 2011 the overall shapes of age profiles were more differentiated particularly for the urban middle, urban top and the rural top terciles.

Support Ratios: Group-Specific and National Level

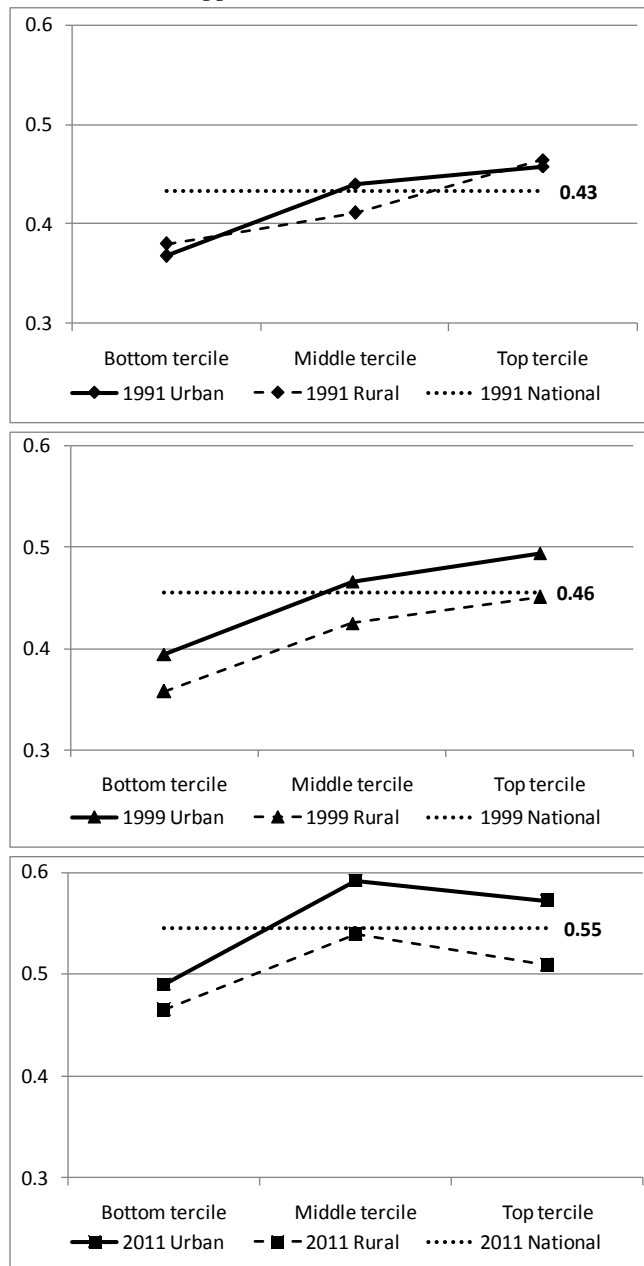
The support ratios computed by income tercile and by urban-rural residence are shown in Figure 3 in separate panels for each of the years 1991, 1999 and 2011. The computation of support ratios for each group for a given year entailed using both population data by age and per capita age profiles specific to the group for the indicated year. In general, it is expected that for given year population age structures with higher proportions in the working ages would have favorable effects on support ratios – this is the pattern indicated in Section 3 from national level findings over time for the Philippines. Indeed support ratios of the top tercile were consistently highest and those for the bottom tercile consistently lowest both in urban and rural areas in the years 1991 and 1999.

However, in 2011 the pattern was different: support ratios for the middle tercile surpassed that for the top tercile in both the urban and rural areas even when the top terciles continued to have the highest proportions in the working-ages among the groups. Unlike 1991 and 1999 when per capita consumption and labor income age profiles were found to be generally similar across groups, in 2011 the profiles were to some extent differentiated. The ratios of per capita income earned by those under 35 and by those over 49 years old relative to the reference age group 35-39 were much lower for the urban and rural top terciles (compared to those for the other groups) and unusually higher for the urban middle tercile <35 age group (Table 5). Additionally, the ratios of per capita consumption of those over 49 years old relative to the reference group 35-49 were much higher in the urban and rural top terciles. These differences in the consumption and labor income age profiles of the urban and rural top terciles were not present in 1991 and 1999. These differences in the age profiles contributed to the lower support ratios for the urban and rural top terciles in 2011 compared to those for the middle terciles.

The difference in the patterns in the support ratios of groups seen in 1991 and 1999 versus those seen in 2011 may also be due to the difference in the general economic environment. The year 2011 may have brought different opportunities, challenges and changes to the groups. For example, it seems the top terciles of the urban and rural areas were not able to benefit as much as

the middle terciles from the improved economic situation in 2011. This is one area that still needs to be studied further.

Figure 3. Support ratios by income tercile and by urban/rural residence:
Philippines, 1991, 1999 and 2011



The national support ratios are also plotted in Figure 3. The national level ratios are expectedly located somewhere in the middle of the group-specific support ratios for each given year since, after all, the national ratios represent the average experience across all population

groups. In each of the years shown, there are groups with support ratios that are above and below the national support ratio. That is, there are groups that are ahead and there are groups that are lagging in terms of the support ratio achieved. The urban-top tercile, the urban-middle tercile and the rural-top tercile (only in 1991) are ahead, exceeding the national support ratio, while the urban-bottom tercile and the rural terciles are the groups lagging.

This situation where there are groups ahead and lagging will continue for as long as there are differences in the stages of age transition among groups. With a hastening of the age transition of the lagging groups (for example, through a targeted family planning program), and assuming other things constant, achieving a certain level of national support ratio could be done in a shorter time and, in turn, result to a higher average annual increase in the support ratio. On the other hand, if the differences in the age structures among groups continue without interference, achieving the same level of support ratio could take longer and, thus, result to a lower average annual increase in the support ratio. But it should be noted that, even without any deliberate interference (to age structures), the groups that are ahead and lagging could change over time. The age structure transition of groups continue to progress over time as seen in Table 2. The groups that are ahead in the age transition would begin to experience decline in working age population share also ahead of the other groups, have less favorable population age structure, and eventually become the lagging groups.

The variations found in the group support ratios demonstrate economic gain from age structure transition from a cross-sectional context. The groups with the higher proportions in the working ages were mostly found to have higher support ratios. And this pattern was generally consistent in the three reference years. The analysis across groups also showed that group-specific economic lifecycles and general economic environment also mattered as shown by the experience of the urban and rural top terciles in 2011 – their support ratios were shown to be lower than those for the middle tercile groups even while they had the advantage in population age structures.

5. Concluding Remarks

The Philippines is going through age structure change and a very important part of this change is the increasing share of the population that are in the working age. The Philippines has also been experiencing increasing per capita labor income and consumption. The support ratio at the national level has been rising. But in any given year, what is observed at the national level is expectedly the average experience of diverse groups: groups with different population shares in the working ages; and groups with different economic lifecycles. Hence, this study examined population age structures and economic support ratios using six groups, the income tercile groups in urban and rural areas. Many lessons were learned from the analysis of groups: how

support ratios varied across groups; how the variations in support ratios between groups compared across different years; and some insight gained from the cross-sectional analysis (of support ratios) about economic gain and age structure transition.

The six population groups studied had different population age structures and per capita consumption and labor income age profiles. The examination of support ratios across these groups showed both expected and unexpected patterns. Based on national level experience over time, support ratios increased with increase in the proportion of the population in the working age. Applying this notion in cross-section analysis, it was expected that the support ratios of the rural-bottom tercile and the urban-bottom tercile, the groups with the lowest working-age population shares, would be the lowest compared to the other groups. And this was found to be consistently true in each of the three reference years. However, it was also revealed that contrary to expectation, in 2011 the support ratio of the urban-middle tercile exceeded that for the urban-top tercile and, similarly, the support ratio of the rural-middle tercile exceeded that for the rural-top tercile. The top terciles in urban and rural areas had exhibited differences in 2011 in their per capita labor income and consumption age profiles relative to those of the other terciles that were not present in the earlier years, such as the distinct leaning of the per capita labor income profiles towards the young ages and the increasing pattern of per capita consumption at older ages. The year 2011, representing an economic environment very different from the two earlier reference years, may have also brought different advantages and disadvantages to the various groups – this requires further investigation.

Nonetheless, the findings from the national level across time analysis and the findings from across group comparison are generally consistent, emphasizing the importance of not only the population age structure but also the economic environment in obtaining the economic gains expected from population change. An important lesson is that the potential economic gain from a favorable age structure change can be achieved more securely under a favorable economic environment. Conversely, the effect of a favorable age structure change on total economic gain is mitigated by an unfavorable economic environment.

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