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High Fertility Rate and High Youth Unemployment: Twin Challenges to the Demographic Dividend for the Philippines

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ABSTRACT

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In the last 60 years, the age structure of the population has been rapidly changing in most countries all over the world and this phenomenon, given the right economic policies in the labor market, health, governance and economy, has created a rare window of opportunity for countries to experience rapid economic growth over a relatively long period. The idea behind this link between population dynamics (or changing age structure) and economic development is the demographic transition. The demographic transition is described as a change from a situation of high fertility and high mortality to one of low fertility and low mortality. A country that enters into a demographic transition experiences sizable changes in the age distribution of the population. The changes in the age structure are foreseeable consequence of the demographic transition. These changes, coupled with the right policies, affect economic growth.

Studies that investigated the impact of the demographic transition on economic growth have shown that demographic transition accounts for a sizeable portion (about one-third) of the economic growth experienced by East Asia's economic tigers during the period 1965 to 1995. It has been observed, however, that unlike most of its East Asian neighbors, the Philippines failed to achieve a similar demographic transition in the past decades. In all of these countries (including the Philippines), the mortality rates broadly declined at similar pace. However, fertility rates dropped slowly in the Philippines resulting in relatively high population growth rate for the country, compared to its neighbors in Asia.

This paper looks at the population structure of the country from 2010 to 2100, using census data and projections on future population, to estimate the period when the country will experience the demographic dividend. The paper will show that at current conditions (baseline scenario) there is a high probability that the country will entirely miss this rare opportunity of additional economic growth. This is primarily so because of the challenges related to the relatively high fertility rates, particularly among the poorest households, and the relatively high unemployment rate, particularly among the youth population. The paper will then provide counterfactual conditions, from the results of the econometric models, and simulate alternative scenarios resulting from fine-tuning certain policy handles.

Key Phrases: Demographic Transition, Demographic Dividend, Effective Worker, Effective Consumer, Support Ratio

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I.   INTRODUCTION

In the last 60 years, the age structure of the population has been rapidly changing in most countries all over the world and this phenomenon, given the right policies in the labor market, health, governance and economy, has created a rare window of opportunity for countries to experience rapid economic growth over a relatively long period. The idea behind this link between population dynamics (or changing age structure) and economic development is the demographic transition. The demographic transition is described as a change from a situation of high fertility and high mortality to one of low fertility and low mortality (refer to Figure 1.1). A country that enters into a demographic transition experiences sizable changes in the age distribution of the population. The changes in the age structure are foreseeable consequence of the demographic transition and coupled with the right policies, affect economic growth.

The demographic transition has three phases, with each phase having a different impact on the economy. The first phase of the demographic transition is triggered by an initial decline in infant mortality (death rate) but fertility (birth rate) remains high, resulting in the swelling of the youth dependency group (like the Philippines in figure 1.2). This phase creates a challenge to the economy as scarce resources are channeled to consumption rather than investment, as demand for basic education, primary health care, and other population-related services increases, thereby hindering economic growth. The second phase of the demographic transition (like Thailand in figure 1.3) is when the proportion of working-age population (defined as those aged 15 to 64) is larger relative to the young dependents (0 to 14 years) and the older population (65 years and above). This is the phase when the number of productive working age population is the highest. The policy challenge at this stage of the demographic transition is how to absorb the growing working age-group, particularly those coming from the aged 15 to 24 group (the first group to enter the labor market). If employment opportunities expand, the second phase of the demographic transition will accelerate economic growth. The third and last phase of the transition (like Japan in figure 1.4) is when the older cohort (those aged 65 years and above) swells relative to the total population. The growing aging population during the third phase of the demographic transition can create a slowdown in the

country's economic growth as the number of consumers (the older population) grows faster compared to productive workers.

Figure 1.1. Declining Mortality, Declining Fertility and the Demographic Transition
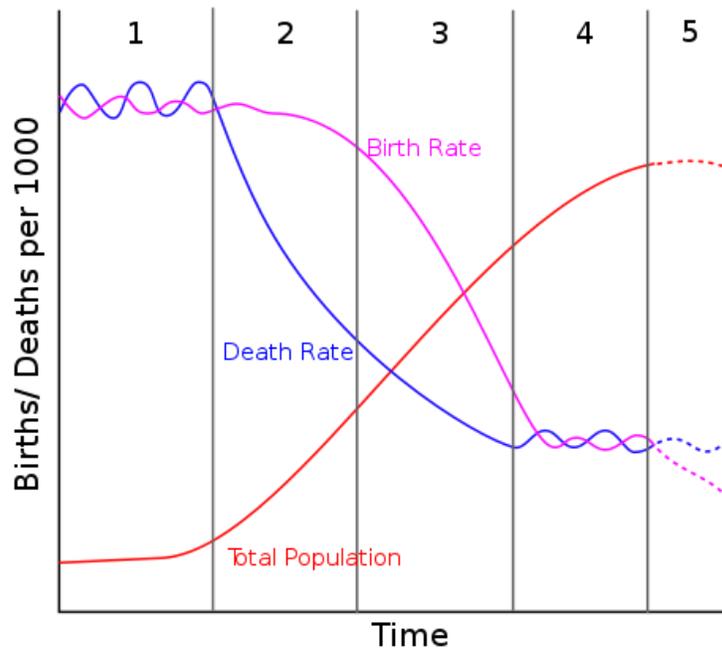
Source: IUSSP and UNFPA

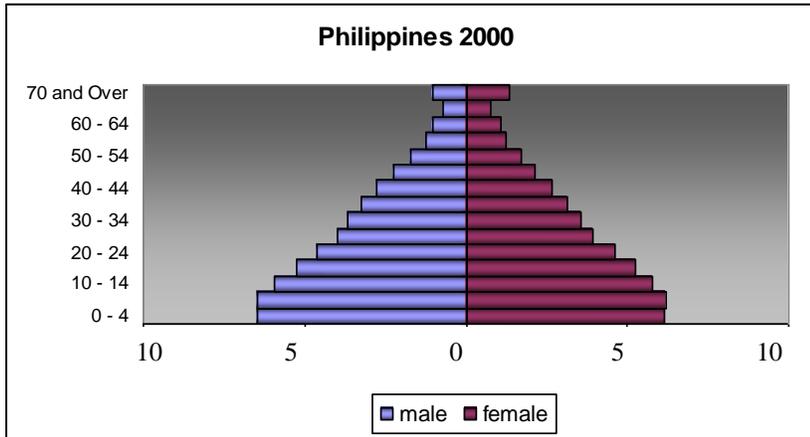Figure 1.2. Phase One of the Demographic Transition

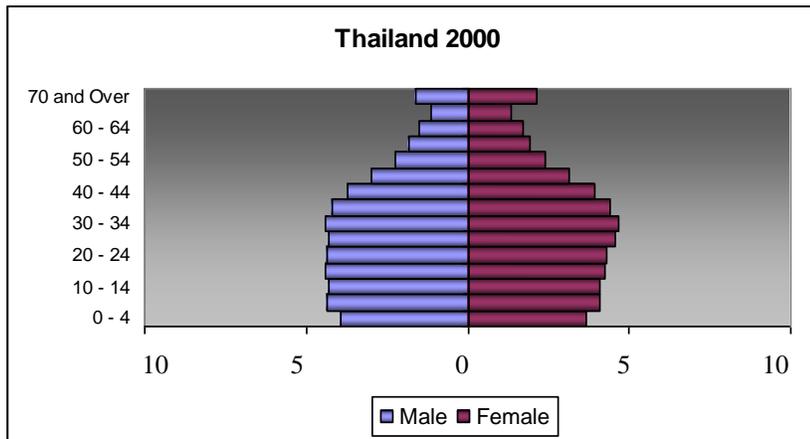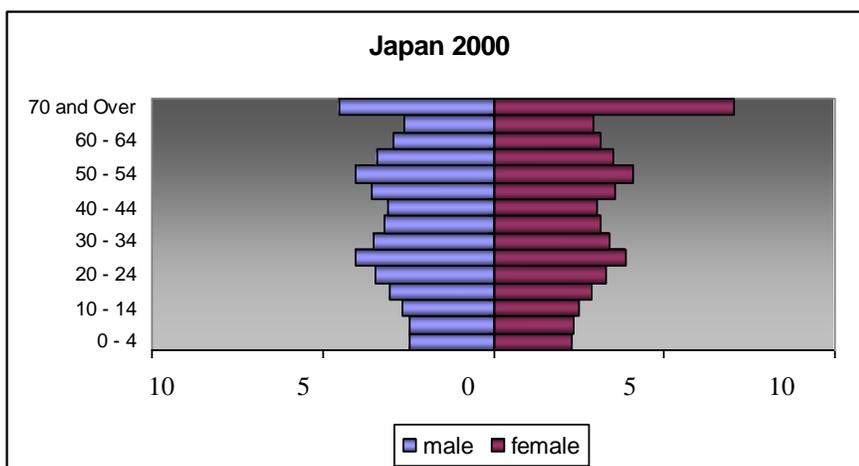Figure 1.3. Phase Two of the Demographic Transition

Figure 1.4. Phase Three of the Demographic Transition

1.1.   Demographic Window of Opportunity and Demographic Dividend

Studies [Bloom and Williamson (1997), Bloom and Canning (2001), Bloom, Canning and Sevilla (2001) and Radelet, Sachs and Lee (1997)] that investigated the impact of the demographic transition on economic growth have shown that demographic transition accounts for a sizeable portion (about one-third) of the economic growth experienced by East Asia's economic tigers during the period 1965 to 1995. It is sad to note that unlike most of its Southeast and East Asian neighbors, the Philippines failed to achieve a similar demographic transition in the past decades. In all of these countries (including the Philippines), the mortality rates broadly declined at similar pace. However, fertility rates dropped slowly in the Philippines resulting in relatively high population growth rate for the country, compared to its neighbors in Asia. Due to this slow reduction in the fertility rate, the country may not able to benefit fully from the demographic dividend and the demographic window of opportunity is closing fast for the country.

First Demographic Dividend

The effect of the demographic transition on income growth is referred to as the first demographic dividend. In the course of the demographic transition, countries experience an increasing share of the working age population relative to the total population and this creates favorable effect on the per capita income. To measure the impact of the demographic transition on income growth in the Philippines, Mapa and Balisacan (2004), using cross-country data from 80 countries over the period 1975 to 2000, showed that differences in the population structure of Thailand (at that time in the second phase of the demographic transition) and the Philippines (first phase of the demographic transition) account for about 0.77 percentage point of forgone average annual growth (missed first dividend) for the Philippines from 1975 to 2000. This forgone growth accumulates to about 22 percent of the average income per person in the year 2000. The forgone growth is even more impressive when translated into monetary values. It would have meant that rather than a per capita GDP of US$993 (in PPP) for the year 2000, Filipinos would have gotten US$1,210 (in PPP) instead. Moreover, poverty incidence would have been reduced by about 3.6 million. Fewer Filipinos would have been counted among the poor by the year 2000.

In the follow-up study of Mapa, Balisacan and Briones (2006) to measure the missing first dividend, this time using Philippine provincial data from 1985 to 2003, the authors showed that a one-percentage point increase in the proportion of young dependents in 1985 (proxy for the demographic transition variable) results in an estimated 9 basis points decrease in the average growth rate of income per person in the provinces from 1985 to 2003, controlling for other factors. This shows that had the provincial average proportion of young dependents in 1985 been lower at 36 percent (which is the average for the lowest 10 provinces) rather than a high of 42 percent (the actual value), the average per capita income growth could have risen by 0.63 percentage-point per year, representing an increase of 7.12 percent in the average per capita income in 2003.

<u>Second Demographic Dividend</u>

In addition to the commonly identified first dividend, Mason (2007) discussed another form of dividend from the demographic transition and he refers to this as the second demographic dividend. The second demographic dividend is realized from the society's response to the prospect of an aging population, an outcome as the nation's age structure enters into the third phase of the demographic transition. The challenge faced by societies (and governments) when there is a substantial percentage of the older population is how to support their consumption, given a reduction in their income. There are common approaches to this problem and these include: (a) relying on public (or familial) transfer systems and (b) increasing saving rates and (c) accumulating greater physical wealth or capital.

Individuals accumulate savings in their working years and this serves as a buffer during their retirement years. While accumulation of capital can be used to deal with the life-cycle deficit in the older ages, this capital also influences economic growth. As Mason points out, increased saving rate in a society results in more rapid economic growth, creating the second demographic dividend. Mason estimated that the first and second demographic dividends account for about one-third of the yearly average per capita growth rate of Japan from 1950 to 1980.

It should be emphasized though that demographic dividend is not automatic. The demographic transition simply creates a demographic window of opportunity that should be given the right kind of policy environment to produce a sustained period of economic growth. The growing number of adults (particularly those between 15 to 24 years) during the second phase of the transition will be productive only when there is flexibility in the labor market to allow expansion. Government policies play vital role to guarantee the creation of this demographic dividend.

This paper looks at the population structure of the country from 2010 to 2100, using census data from the Philippine Statistics Authority (PSA) and projections on future population from the United Nations (UN), to estimate the period when the country will experience the demographic window of opportunity. The study will show that at current conditions (baseline scenario) there is a high probability that the country will entirely miss this rare opportunity of additional economic growth, over a long period of time, due to the demographic dividend. This is primarily due to the challenges related to the relatively high fertility rates, particularly among the poorest households, and the relatively high unemployment rate, particularly among the youth population. The study will then provide counterfactual conditions, from the results of the econometric models, and simulate alternative scenarios coming from fine-tuning of certain policy handles.

II. Accelerating the Demographic Transition: Low Fertility is Key

The relationship between rapid population growth (or high fertility level) of a country on its economic growth and poverty incidence have already been studied, documented and quantified by a number of researchers all over the world. The unquestionable results point to the same conclusion: *that rapid population growth in poor and developing countries hinders economic development, pushing the next generation of citizens into the poverty trap.* That is why many countries have responded to this problem by initiating or expanding voluntary programs to reduce fertility rate among households. It is only in the Philippines where the population issue remains a controversial issue to this day.

How do we accelerate the demographic transition that will provide the rare window of opportunity for the demographic dividend? The necessary condition for a country to speed up the demographic transition is to lower its fertility rate. Sachs (2008) pointed out that demographic transitions, where they have occurred, have typically been accelerated and even triggered, by proactive government policies related to the voluntary reduction in fertility rates, particularly among poor households.

The Goldilocks Period: Replacement Rate of Fertility

As countries move from large families (high fertility rate) and high poverty into small families (low fertility), high living standards and ageing, they pass through what is called a **_Goldilocks period_**: a generation or two in which fertility rate is neither too high nor too low (The Economist, 2009). This fertility rate consistent with stable population is about 2.1, also known as the replacement rate of fertility. The fall to replacement fertility is a unique and precious opportunity for higher economic growth.

The figures in Table 1 show the Total Fertility Rates (TFR) for selected countries in East Asia from the period 1960 to 2013. The table shows rich countries that have gone through, and poor countries racing through the demographic transition and achieving the replacement fertility rate of 2.1: Singapore in the mid-1970s, South Korea in mid-1980s, Thailand in 1990, Vietnam and Myanmar in 2006. It is interesting to note that only three (3) countries in the table have TFRs of about 3.0 in 2013: the Philippines (3.0), Lao PDR (3.0) and Cambodia (2.9). It would be disheartening to see that years down the road, Lao PDR and Cambodia will enjoy the dividend associated with the demographic transition and transform their economies to the level that will improve the lives of millions of their citizens, while the Philippines continues to languish in the high population growth-high poverty incidence trap.

The slow pace by which the total fertility rate has been reduced in the country, (from about 7.0 in 1960 to 3.0 in 2013), a measly 1.6 percent per year, can be attributed to a lack of concrete and proactive government policies on population management aimed at accelerating the demographic transition (e.g., continued low contraceptive prevalence rate).

Comparing the Philippines and Vietnam, a study conducted by the National Transfer Accounts (2012) concluded that the Philippines is experiencing a slower demographic transition due to its continued high fertility rate and it will be at 2050 when the country will have a favorable demographic condition compared to Vietnam, but without the important opportunities to save and invest (outcome of the first and second demographic dividend) that Vietnam will experience from 2010 to 2050.

Table 1. Total Fertility Rate (TFR) in the ASEAN and South Korea (1960-2013)

Country	Year						
	1960	**1970**	**1980**	**1990**	**2000**	**2006**	**2013**
South Korea	5.7	4.5	2.8	1.6	1.5	1.1	1.2
ASEAN 5							
Singapore	5.5	3.1	1.7	1.9	1.4	1.3	1.2
Thailand	6.4	5.3	3.2	2.1	1.9	1.9	1.4
Indonesia	5.5	5.4	4.4	3.1	2.4	2.2	2.3
Malaysia	6.8	5.5	4.2	3.7	3.0	2.7	2.0
Philippines	7.0	6.2	5.2	4.3	3.6	3.3	3.0
Rest of SE Asia							
Vietnam	6.1	5.9	5.0	3.6	1.9	2.1	1.7
Myanmar	6.1	6.0	4.5	3.4	2.4	2.1	1.9
Brunei Darussalam	6.8	5.6	4.0	3.2	2.6	2.3	2.0
Cambodia	6.3	5.8	5.8	5.7	4.0	3.3	2.9
Lao PDR	6.4	6.4	6.4	6.1	4.0	3.3	3.0

Source: World Development Indicators, World Bank; TFR is the average number of children a woman would bear during her lifetime given current age-specific fertility rates

While the country's average TFR in 2013 is 3.0, the picture is not so good when one compares the TFR across the different wealth quintile groupings, as shown in Table 2. The TFR of the poorest 20 percent of the households in the country did not change from 2008 to 2013, still registering a high TFR of 5.2. The TFR of the poorest households in the Philippines is almost the same as the country's average TFR in 1980. Given the strong relationship between number of children and poverty incidence, it is not surprising these households are caught in the vicious cycle of high fertility and poverty.

Table 2. Total Fertility Rate (TFR) by Wealth Quintile, 2008 and 2013

Total Fertility Rate (TFR) by Wealth Quintile		
Wealth Quintile	NDHS 2008 (Reference year: 2007)	NDHS 2013 (Reference year: 2012)
Bottom (Poorest)	5.2	5.2
Second	4.2	3.7
Third	3.3	3.1
Fourth	2.7	2.4
Highest (Richest)	1.9	1.7
Overall	3.3	3.0

Source: National Demographic and Health Survey (NHDS) 2008 and 2103, Philippine Statistics Authority (PSA)

The figures in Table 3 are the Regional TFRs for the survey periods 1998, 2003, 2008 and 2013. Of the 17 regions, only the National Capital Region (NCR) has a TFR (2.3) that is near the replacement rate of 2.1 in 2013. The rest of the 16 regions have average TFR of at least 3.3, with eight regions having a TFR of at least 3.5 in 2013. The regions with the highest TFR in 2013 (the ARMM and Bicol Region) have also high poverty incidence among families (ARMM with 48.7 percent and Bicol with 32.3 percent) as officially reported by the Philippine Statistics Authority (PSA) in 2012.

Table 3. Total Fertility Rate (TFR) by Region, 1998, 2003, 2008 and 2013

Region	Total Fertility Rates			
	1998	2003	2008	2013
NCR	2.5	2.8	2.3	2.3
CAR	4.8	3.8	3.3	2.9
Ilocos Region	3.4	3.8	3.4	2.8
Cagayan Valley	3.6	3.4	4.1	3.2
Central Luzon	3.5	3.1	3.0	2.8
CALABARZON	3.7	3.2	3.0	2.7
MIMAROPA	-	5.0	4.3	3.7
Bicol Region	5.5	4.3	4.1	4.1
Western Visayas	4.0	4.0	3.3	3.8
Central Visayas	3.7	3.6	3.2	3.2
Eastern Visayas	5.9	4.6	4.3	3.5
Zamboanga Peninsula	3.9	4.2	3.8	3.5
Northern Mindanao	4.8	3.8	3.3	3.5
Davao Region	3.7	3.1	3.3	2.9
SOCCSKSARGEN	4.2	4.2	3.6	3.2
Caraga	4.7	4.1	4.3	3.6
ARMM	4.6	4.2	4.3	4.2

Sources: NDHS 1998, 2003, 2008, 2013 Final Reports, PSA; Collado (2010).

III. Policy Handles in Reducing Fertility Rates

The critical element in achieving the demographic window of opportunity is to reduce fertility rate at a manageable level that is conducive to higher economic growth. Herrin and Costello (1996) identified three possible sources of future population growth (estimated at an average of 1.90 percent per year during the period 2000 to 2010): (a) unwanted fertility, (b) wanted fertility and (c) population momentum. The authors' estimates show that unwanted fertility will contribute about 16 percent to the future population growth; wanted fertility will add another 19 percent; and population momentum will contribute the remaining 65 percent.[1] While unwanted fertility accounts for only 16 percent of the future population growth, a government intervention, through Republic Act No. 10354 entitled, *"An Act Providing for a National Policy on Responsible Parenthood and Reproductive Health"* (popularly known as the RH Law of 2012), can have significant impact in lowering the country's overall fertility rate, particularly among the poorest 20 percent of the country's population, where the TFR number is still high.

Simulations made by Mapa, Balisacan and Corpuz (2010) showed that, using the 2008 Total Fertility Rate (TFR) of 3.3 as base value, the *Goldilocks period* (TFR of 2.1) will be reached by 2030 under the business−as−usual (BAU) scenario. In another (second) scenario where government intervention (e.g., implementation of the RH Law) targets only households with unwanted fertility and with a 90 percent success rate, the *Goldilocks period* will be achieved 10 years earlier or in about 2020. Moreover, the TFR of the poorest 20 percent of the households will still be at a high of 3.5 by 2040 if the government does not intervene. Under the second scenario where government intervenes through proactive population management policies, the TFR of the poorest 20 percent will be at a manageable level of 2.3 by the year 2040.

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[1] Births are considered unwanted if they occur after a woman has reached the point at which she does not wish to continue child bearing. All other births, including those that are mistimed will be considered wanted. Population Momentum refers to the tendency for population growth to continue beyond the time that replacement-level fertility has been achieved because of a relatively high concentration of people in the childbearing years. This phenomenon is due to past high fertility rates which result in a large number of young people. As these youth grow older and move through the reproductive ages, the greater number of births will exceed the number of deaths in the older populations (World Bank). Population momentum is relevant to the Philippines given that its population is composed mostly of young individuals (median age is between 23 to 25 years).

While there is a pressing need to identify policies that will reduce or better yet eliminate unwanted fertility to speed up the demographic transition, it is also important to identify other policy options that will help lower the fertility rate, targeting the effects of wanted fertility (e.g., encouraging households to reduce family size) and the population momentum. It should be noted that wanted fertility and population momentum contribute an estimated 84% to our future population growth. Efforts to lower fertility through direct government initiative (e.g. RH Law) can complement the other policy options that will lower wanted fertility and lessen the impact of population momentum. The challenge is to identify the drivers of income growth which, in turn, has been shown to be a major determinant of fertility rate. A second-best solution to the problem of reducing fertility rate is to identify which of these drivers have the most impact on fertility rate for a given amount of investment.

McNicoll (2006) identified some key policy lessons of the demographic transition that played a crucial role in the "East Asian Economic Miracle" (countries studied: China, Indonesia, Malaysia, South Korea, Taiwan, Thailand and Vietnam). Three relevant government policies that had major influences in accelerating the demographic transition: (a) health services; (b) family planning and (c) education.

Three main fertility-reducing variables have merited the attention of researchers in demography and economics: education of women, female labor force participation, and health of children. These determinants have also been the mainstream policy variables that influence income growth or economic well-being. Studies show these three variables to be significant in reducing fertility rate and many have taken these as feasible solutions to the problems brought about by rapid population growth. It is also worth noting that these solutions could be identified as second-best policy options that will lower fertility rate, that is, these are different from addressing biological and behavioral factors through which socioeconomic, cultural, and environmental variables affect fertility (Bongaarts, 1978). The latter set of variables are called the intermediate fertility determinants and include exposure factors (proportion married), deliberate marital fertility control factors

(contraception) and natural marital fertility factors (sterility, spontaneous intrauterine mortality, and duration of the fertile period)[2].

Education of Women

Education is a key determinant of fertility, and it is commonly perceived to be negatively correlated with fertility. This idea is in fact supported by an economic theory of fertility, in which women value the sum quality of all their offspring and optimize fertility and child investment choices accordingly (Becker, 1960). There are several channels through which women's education can affect fertility[3]. First, a higher permanent income due to better education will induce a woman to tilt her optimal fertility choices toward fewer offspring of higher quality (Mincer, 1963; Becker and Lewis, 1973). Second, a highly educated woman will more likely pair herself with a highly educated man via what is called *positive assortative mating* which can further increase household permanent income and alter optimal fertility choices (Behrman and Rosenzweig, 2002). Third, a woman's education may directly improve her knowledge of fertility options and healthy pregnancy, as well as her ability to process the information thereby resulting in a lower fertility rate (Grossman, 1972). Education affects fertility at the aggregate and individual levels. At the aggregate level[4], proxy variables include the number of schools in the nearby village where the household is located (Casterline, 1985), average length of education on cumulated fertility (Tienda et al., 1985), measures of cumulated fertility and proximate determinants (Lesthaeghe et al., 1985), proportion of women with post-primary education (Hirschman and Guest, 1990), mean educational level in the community (Thomas, 1999), and proportion of literate women (Diamond and Steel, 1996). The results of these different studies show that the aggregate level of education has negative effects on the first and higher-order births. Moreover, these studies show that women living in areas with a higher percentage of literate women and a high average level of education have weaker fertility desires than women with the same educational level living in other areas (Kravdal, 2001). The result, however, is only significant from models with an urban or rural area as part of the control variables. By facilitating the diffusion of new ideas and information about the

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[2] Refer to Davis and Blake (1956) article for a more detailed discussion on this.
[3] These were drawn from McCrary and Royer (2005).
[4] See Kravdal (2000) for a more detailed discussion.

advantages of smaller families and by presenting a new set of opportunities for women which make childbearing and rearing more costly, households in more highly educated communities promote lower fertility (Tienda et al., 1985). At the individual level, education creates a substantial and significant difference in fertility between an educated and an uneducated woman. The former normally displays lower fertility than the latter. Kravdal (2001) gives a summary of the reasons why this is so: (1) the high opportunity costs of childbearing involved in some types of work that may be offered to the better-educated woman, (2) the cash expenses and children's reduced contribution to domestic and agricultural work as a result of children's schooling, which tends to be encouraged by educated mothers, (3) the reduced need for children as an old-age security, (4) the higher prevalence of nucleated families, which may reduce fertility partly because childbearing costs to a larger extent must be covered by parents, (5) a stronger desire to spend more time caring for the child and to invest more in each child, (6) stronger preferences for consumer goods or other sources of satisfaction, (7) a lower infant and child mortality (due to better maternal knowledge), (8) a possible stimulating impact of higher purchasing power resulting from the educated woman's own work or their marriage into a relatively rich family, (9) the relatively higher age before entering married life among better educated women, (10) their knowledge about and acceptance of modern contraception, and their ability to use it sufficiently, as well as their more efficient use of traditional methods because of better knowledge about their own bodies. These studies have further shown that women's schooling is negatively correlated with fertility and positively correlated with contraception use. Significantly, it was argued that while investment in primary education is necessary, it is better to invest in higher level of education as fertility and contraception models show that the impact of education increases with educational level (Tuman et al., 2007). Some of the econometric models show a positive relationship between some primary schooling and fertility suggesting that schooling does not have a depressing effect on fertility until the secondary level (Ainsworth et al., 1996). Apart from the inconsistent effect of primary education on fertility, it was also established that the marginal effects of higher levels of education have a strong and negative effect on fertility in rural areas, which is associated with women's labor market potential.

Labor Force Participation of Women

In establishing the relationship between fertility and female labor force participation, empirical researches have been supported by main economic theories such as Easterlin's (1973, 1980) relative income hypothesis, Becker's (1981) new home economics and Cigno (1992) and Cigno and Rosati (1996) asset theory of children[5]. The relative income hypothesis emphasizes the role of male incomes, relative to economic aspirations, as the driving force behind fertility and female labor force participation. The theory of the new home economics stresses the role of female wages, representing the opportunity costs of childbearing, as determinant of fertility. Finally, the asset theory of children focuses on the children as investment goods in a model of intergenerational transfers. Like women's education, labor force participation is also important in explaining the fertility behavior of women, and the main explanation has something to do with childbearing and child rearing. Child-bearing involves time-consuming efforts that often restrict the parents, particularly the mother, from participating in the labor market (Weller, 1977). Similarly, child rearing or the process of caring for and raising a child from birth to adulthood leads to the negative relationship between female labor force participation and fertility. Brewster and Rindfuss (2000) suggest that women who wish to participate in the labor force must either limit their fertility or make an alternative arrangement on how to take care of their children. The study also shows that the mother's time spent in child care has a significant and negative effect on the likelihood of having another birth. It also tends to reduce the mother's labor supply (Hotz and Miller, 1988). This relationship has been observed mostly in the developing countries. Women in developing countries are less likely to participate in the labor market when they have multiple births (Porter and King, 2009). Using sex of the first child as instrument for fertility decisions in Korea, Chun and Oh (2002) find that, on average, having an additional child reduces labor force participation by almost 40 percent. These studies have shown that it is important to examine and analyze the roles of institutions and public policies in the labor market. Adsera (2003) finds that, on the one hand, when unemployment is low and institutions easily accommodate the entry-exit of the labor market, fertility rates are around replacement rate. On the other hand, whenever the costs of childbearing in terms of loss of present or future income are intensified by high unemployment and rigid labor markets,

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[5] Refer to McNown and Rajbhandary (2003) for more information on these theories.

fertility rates are very low. Government employment can have positive effects on fertility as it provides more stable opportunities for women's employment during economic downturns as well as more liberal leave programs. In developed countries, women in general have found ways to combine work and child rearing (Brewster and Rindfuss, 2000).

Child mortality

The negative relationship between mortality[6] and fertility is explained by two hypotheses. The first is referred to as the *child survival hypothesis* and the second is called the *replacement hypothesis*. The *child survival hypothesis* refers to the parents' perceptions of the child mortality conditions in their social setting while the *child replacement hypothesis* refers to parents' response to mortality incidence in their own household. Scrimshaw (1978) believes that the assumption that high fertility is a necessary biological and behavioral response to high mortality is manifested in different theories and hypotheses such as demographic transition theory, child replacement hypothesis, and child survival hypothesis. Demographic transition theory states in its simplest form that mortality declines are eventually followed by fertility declines, *child replacement hypothesis* states that parents try to replace children who die and *child survival hypothesis* states that couples target a specific number of children who can survive to adulthood. Ben-Porath (1976) discusses two types of fertility response to child mortality: (a) *hoarding* or the parents' response to expected mortality; and (b) *replacement* or the parents' response to an experienced death of a child in the household. Using micro data of retrospectively reported births of Israeli women, the researcher shows that experienced mortality reduces the probability of stopping at a given birth and reduces the intervals between births. In another study by Hondroyiannis and Papapetrou (2002), the authors show that, in the long run, a decrease in infant mortality rates reduces fertility rates, controlling for economic performance and the labor market policies. However, there are some researchers who remain skeptical about the fertility-inflating effects of child mortality. In particular, Sah (1991) argues that a single-stage choice model can only give ambiguous explanation of the mortality-fertility relationship. He presented a more complex

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[6] In the literature, mortality can refer to either infant or child mortality.

fertility model and showed that, on the contrary, fertility increases as mortality rate declines. Dyson and Murphy (1985) also showed that, in some cases, a decline in mortality rate can be accompanied by a brief increase in fertility rate due to the contemporaneous changes in other factors such as a decrease in widowhood and disease related sterility. Chowdhury et al. (1976), using data from Pakistan and Bangladesh where moderately high levels of fertility and mortality are observed, found no significant evidence of increased desire to replace a child in households who experienced a death of a child. In summary, the research studies have varying results on whether reducing child mortality will really reduce fertility rate, controlling for other factors.

IV.   Intra-Country Econometric Models

An econometric model using an intra-country provincial panel data[7] is constructed to quantify the impact of *women's education* (measured as the average number of years of schooling), *health services* (proxied by under-5 year mortality rate), *family planning* (using contraceptives, both modern and natural methods) and *employment rate of women* (aged 15 to 49 years old) on *total fertility rate* (average number of births a women would have during her entire reproductive age; 15 to 49 years old). The panel data set covers the period 1993, 1998, 2003, 2008 and 2013. These years coincide with the National Demographic and Health Survey (NDHS) conducted by the PSA every five years. The data were supplemented from provincial averages on other variables using the LFS and the FIES.

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[7] The provincial database of the former Asia-Pacific Policy Center (APPC) was updated and used in the econometric models. The resulting provincial panel data has 73 cross sectional units (provinces) and 5 time periods (1993, 1998, 2003, 2008 and 2013), for a total of 365 observations.

Table 4. Econometric Models for Total Children Ever Born, Provincial Panel Data (1993 - 2013)

Variables	Model 1		Model 2	
	Least Squares		Panel Fixed Effects	
Log of Per Capita Income	-0.29	**	-0.16	
Average Years of Education of Women	-0.27		-0.25	***
Labor Force Participation Rate of Women	0.001		-0.02	***
U5MR	0.008	***	0.003	*
Contraceptive Prevalence Rate	-1.41	***	-1.52	**
Constant	8.623	***	6.347	***
N	362		362	
R-Squared	0.361		0.215	
F-Stat	33.42		18.76	
p-value	0.000		0.000	
Significance: * 10% level one-sided test; ** 5% level; *** 1% level of significance				
Note: Panel Fixed Effects Model is better compared to Least Squares based on unobserved effects F-test				

The figures in Table 4 show the results of the econometric model employed to determine the factors that influence the average number of children a woman aged between 15 to 49 years old (TFR) would have. It is interesting to note that, controlling for other factors such as per capita income, the education of the woman has the largest impact on the TFR. The result shows that increasing the number of years of schooling of a married woman by one more year will decrease TFR by about 0.25 children (using the fixed effects model). This result supports the findings of McNicoll (2006) that education, particularly of women, played a significant role in accelerating the demographic transition in East Asian economies. Note too, that education has a positive and significant effect on the average per capita income growth rate of the country. In an earlier study based on Philippine data from 1985 to 2003, Mapa, Balisacan and Briones (2006) showed that the education of the household head (the variable used in their econometric model) has a

significant and positive impact on the average per capita income growth. The result of the study showed that increasing the education of the household head by one more year will increase the average yearly per capita income growth rate by about 0.16 to 0.27 percentage point, all things being the same. This shows that education is a significant factor in decreasing total fertility rate and in increasing average income growth rate.

For the contraceptive prevalence rate (proxy for family planning), the empirical results show that CPR is negatively and significantly related to TFR, holding other factors constant. In model 2, increasing the modern CPR by 10 percentage points will decrease the current TFR by about 0.15, controlling for other factors. The results from the econometric model suggest that the government should increase CPR, particularly the modern family planning method if it wants to significantly reduce the country's total fertility rate. Currently, the CPR (of women ages 15–49) in the Philippines is quite low, estimated at only 48.9 percent in 2011, a decrease in CPR recorded in 2006 at 50.6 percent. [8]

Another relevant variable that has significant impact in reducing fertility rate is the under-5 year mortality rate (the proxy for quality of health services). The result from the econometric model shows that decreasing the under-5 year mortality rate by 1 per 1,000 children will decrease the TFR by about 0.003 children, holding the other factors constant. Similar to the education variable, this empirical result is consistent with McNicoll's findings showing that preventive measures for health outcomes offered a relatively high pay-off in terms of reducing fertility rates, as experienced by the East Asian economies (McNicoll, 2006). The women's employment rate is also negative and significantly related to fertility rate. The result from Table 4 shows that if the employment rate of women increases by 10 percentage points, TFR will decrease by about 0.20, holding all other factors constant.

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[8] The data from the 2011 Family Health Survey (FHS) show that overall CPR decreased to 48.9 percent from 50.6 percent in 2006. Modern methods constitute 36.9 percentage points of the 48.9 percent CPR in 2011, with traditional method at 12 percentage points. The Commission of Population (POPCOM) 2010 target was to increase CPR to 60 percent, obviously not realized.

V.   Demographic Window of Opportunities under Various Scenario

Changes in the age structure of the population affect the growth of the economy because people earn and consume at different levels over their lifetime. For example, working adults in the aggregate produce more than they consume, while young children and the older group consume more than they produce. Understanding what happens during the economic lifecycle, which varies depending on the population structure of the economy, is essential to understanding the strength of the potential demographic opportunity for the country. Researchers (particularly Ronald D. Lee and Andrew Mason) working at the National Transfer Accounts (NTA) project of the East-West Center developed a method of quantifying the impact of the economic lifecycle of countries over a period of time through the computation of the **support ratio** of the country. The support ratio is simply the **ratio of the effective number of workers** over the **effective number of consumers** of the country at any given time.

The authors defined one effective worker as *"a person earning the average income of a person in the prime working age group, at 30-49"* (NTA, 2012). Moreover, those at each age group are counted based on their labor income relative to the prime working age group. For example, a person in his 50s may earn higher compared to the average in the 30-49 aged group and thus be counted as more than one effective worker. A person in his 20s will most likely earn less than the average in the prime-aged group and thus will be counted as less than one effective worker. The effective number of consumers in a country is computed in a similar manner by weighting the population by the average consumption at each age group, using the average of the 30-49 years old as the benchmark (one effective consumer). The support ratio is then computed from the number of effective workers over the number of effective consumers.

A support ratio of 0.5 simply means that each worker, on the average, is supporting himself/herself together with one other consumer. A higher support implies that each effective worker is supporting fewer effective consumers and frees up resources for saving and investment, thereby creating a demographic dividend for the country.

The figures in Table 5 show the labor income ratio of the workers at different age groups, relatively to the prime-aged group of workers (30-49). For both years, 2010 and 2013, the average wage of workers in the 15-24 group is only about 62% of the average wage in the 30-49 group. Thus, a worker in the 15 to 24 age group will be counted as 0.62 "effective worker".

Table 5. Labor Income Ratios by AGE Group Relative to the 30-49 Year Old (2010 and 2013)

Year	Age Group	Labor Income Ratio
2010	15-24 years	0.62
	25-29 years	1.00
	30-49 years	1.00
	50-64 years	1.12
2013	15-24 years	0.62
	25-29 years	0.92
	30-49 years	1.00
	50-64 years	1.14

Source: LFS, PSA (2010, 2013)

To have a more accurate computation of the number of effective workers, the paper incorporated in the formula as weights the labor force participation of each age group and the corresponding number (and percentage) of unemployed workers.   As shown in Table 6, the number of unemployed workers is highest in the 15 to 24 age group. The high percentage of unemployment in the youth workers population has significant negative impact on the economic opportunities provided for by the demographic transition.

Table 6. Number of Unemployed Workers by Age Group, 2010 and 2013

Number of Unemployed Workers (2010 & 2013), in Thousand				
Age Group	2010		2013	
	Count	%	Count	%
Total	2,858.5	100	2,904.5	100
15-24	1,460.7	51.1	1,408.7	48.5
25-34	846.8	29.6	883.7	30.4
35-44	265.1	9.3	305.7	10.5
45-54	180.1	6.3	186.6	6.4
55-64	87.2	3.1	100.2	3.5
65 and Over	18.6	0.7	19.6	0.7

Source: LFS, PSA (2010, 2013)

The figures in Table 7 show the average per capita consumption by age group and the consumption ratio relative to the 30 to 49 (prime-aged group). For example, a young dependent between 0 to 14 years has a consumption ratio of only 0.64 and thus will be counted as 0.64 "effective consumer". An older member of the population (aged 65 and above) has a consumption ratio of 1.07 and will be counted as more than one effective consumer. The effective number of consumers and effective number of workers can be generated by multiplying the corresponding consumption ratios and labor income ratios with the population size by age group, respectively. Then the support ratio can be computed.

Table 7. Per Capita Consumption by Age Group and Consumption Ratio (Relative to 30 to 49)

| Age Group	Average Per Capita Expenditure	Consumption Ratio
0 to 14	Php 22,157.00	0.64
15 to 24	Php 36,057.00	1.04
25 to 29	Php 36,010.00	1.04
30 to 49	Php 34,776.00	1.00
50 to 64	Php 35,946.00	1.03
65+	Php 37,170.00	1.07

Source: PSA, Authors' Computations

Demographic Window of Opportunity at Various Scenarios (Baseline, Low Fertility, Higher Employment Opportunities and Higher Labor Income)

Using the 2010 population data from the census of population, at about 93.135 million, and the medium variant population growth assumption of the United Nations to project the future population structure up to 2100, the paper provides different scenarios on the support ratio.

Under the baseline scenario (medium variant population growth assumption), Figure 2 shows the support ratio of the country from 2010 to 2100. Under this baseline scenario, the support ratio will remain low. In fact, the highest support ratio for the country under this scenario is 0.48 expected to occur in 2080 to 2085. This means that, at best, 48 workers will support themselves plus 52 other consumers, not enough to free resources away from consumption and into saving and investment. Under this scenario, the country will not benefit much from the demographic window of opportunity – this rare chance of having increasing economic growth due to favorable demographic conditions will be missed entirely by the country (similar to what is expected to happen in African countries like Kenya and Nigeria).

Figure 2. Support Ratio from 2010 to 2010 under the Baseline (Business-as-Usual) Scenario
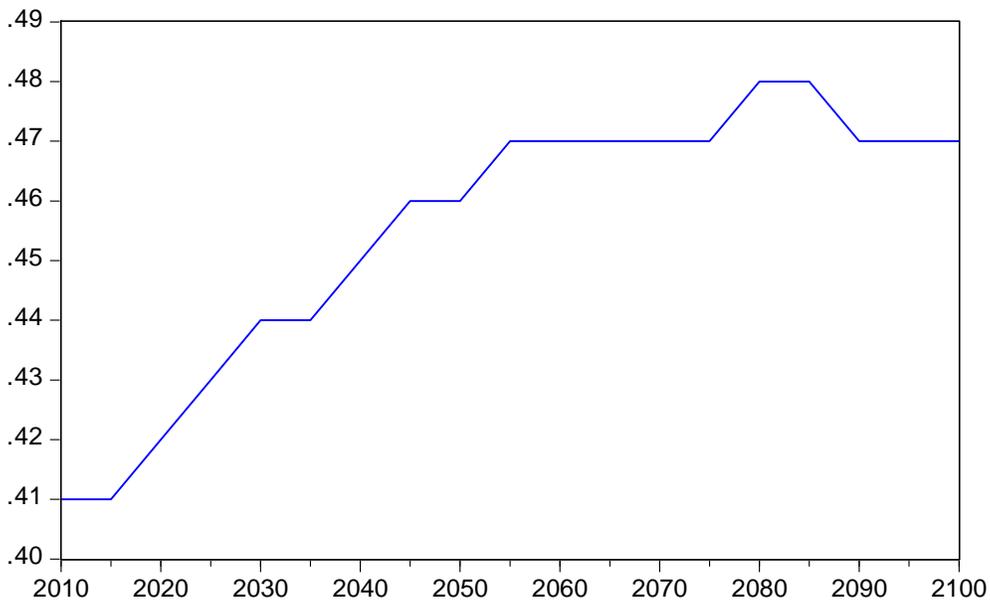
Reducing fertility rate is the critical element for the demographic transition. It is a necessary condition for the creation of this rare window of demographic opportunity for continuous economic growth. The line graph in Figure 3 shows the support ratio under a low fertility scenario brought about by targeting to increase the CPR from the current number of just above 50 percent to 70 percent and adding two (2) more years of schooling, resulting from a successful implementation of the K-to-12 program. Utilizing the results of the econometric models in Table 4, these two interventions will reduce the TFR from 3.0 to 2.5 (using the 2013 as base year) and will produce a favorable condition for a demographic window of opportunity. Moreover, increasing the years of schooling will also increase the wage income, particularly those of the young workers. Using the Mincerian Wage Regression Model (due to Mincer) applied to Labor Force Survey of 2013, the results showed an average return to schooling of about 7.5 percent. An additional year of schooling increases the average wage of the worker by about 7.5 percent, controlling for other factors. Assuming additional increase in the years of schooling of two years because of the K-to-12 program and tweaking the labor income ratios in Table 5, in favor of the young workers population (increasing the ratio from 0.62 to 0.72), the support ratio will change. Simulating the future population and age structure of the country under this low fertility rate scenario and higher years of schooling, the support ratio will be highest at 0.50 from 2050 to 2080 (about 30 years) or 50 workers will support themselves and 50 other consumers, indicating a wider window of demographic opportunity for the country.

Figure 3. Support Ratio with CPR at 70 Percent and Higher Years of Schooling
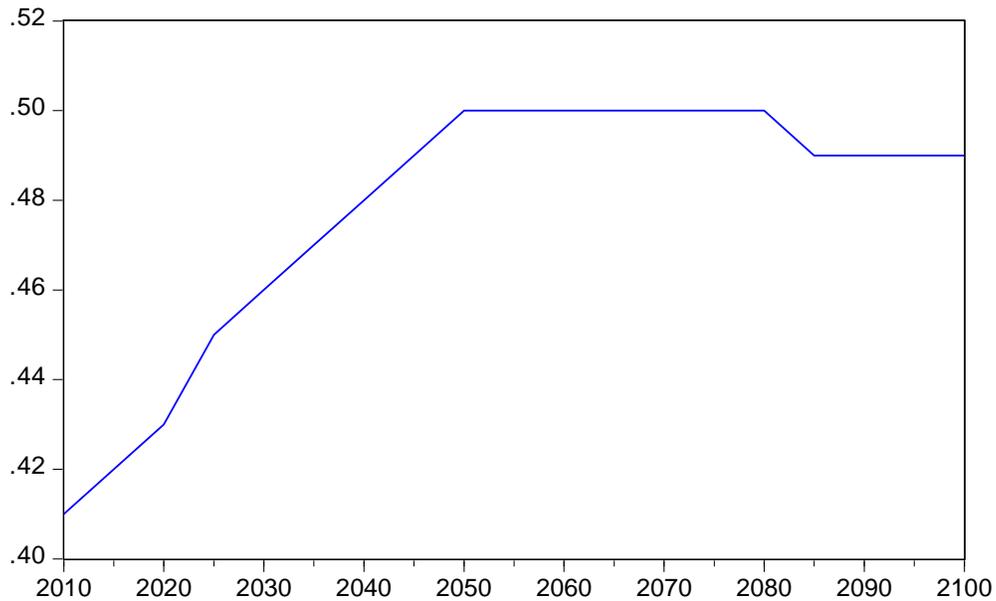
As pointed out in the earlier discussion, the demographic dividend is not automatic. The changing age structure due to reduction in the country's TFR is a necessary but not sufficient condition for harvesting the demographic dividend. It should be given the right kind of policy, particularly in the labor market to absorb the first batch of young individuals (15 to 24) who will enter the workforce. As shown in Table 6, the number and percentage of unemployed workers are highest in the 15 to 24 years bracket. In particular, only about 74% of those in the 20 to 24 years age group, who are in the labor force, are employed (compared to about 90% in the other age-groups). What if, in addition to the lowering of fertility rate and increasing the years of schooling, the employment rate of this group increases to 90%?

The line graphs in Figure 4 show the results of the simulation under this scenario when the employment rate of the 20 to 24 young workers in the labor force is increased to 90%, from the current 74%, together with the lowering of fertility rate and increasing the years of schooling. Under this lower fertility and relatively high employment opportunity scenario, the support ratio will be greater than 0.50 from 2045 to 2095 or a

period of 50 years (even reaching 0.51 from 2050 to 2070), thereby creating a relatively wider demographic window of opportunity.

Figure 4. Support Ratio under Lower TFR, Higher Years of Schooling and Increasing Employment Opportunities for Young Workers in the Labor Force
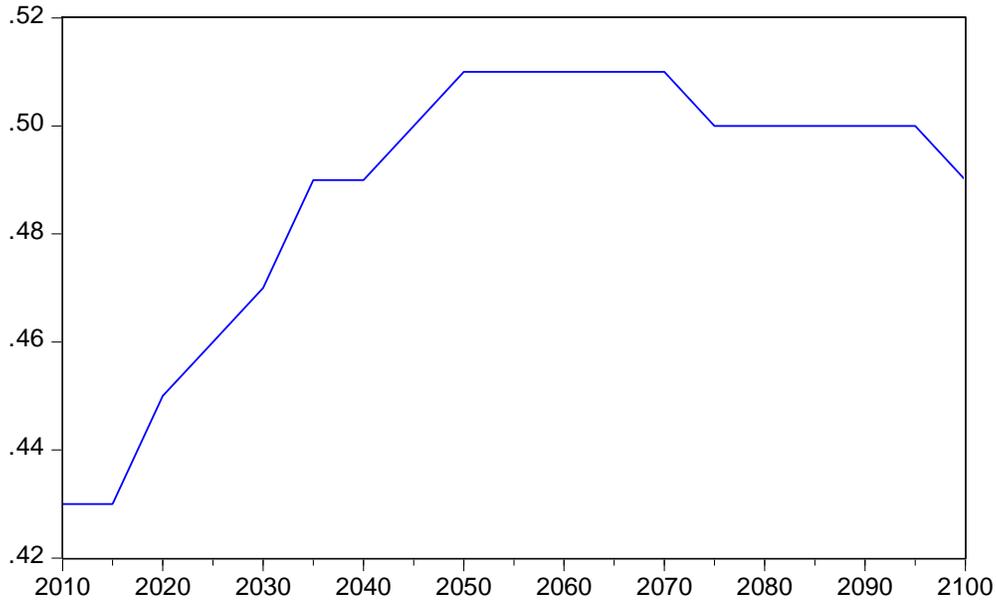
The last scenario simulates the case when employment rate is further increase to full employment, in addition to the lowering of fertility rate and increasing the years of schooling that will benefit the young workers. While this scenario seems to stretch the limit of policy and thus can be treated as a dream scenario, this can be done not necessarily by targeting full employment, but by increasing the labor participation rate that will increase the current number of workers similar to the level of full employment. The support ratio country is shown in Figure 5 and under this scenario, the support ratio will be greater than 0.50 starting 2025 and will be highest at 0.55 from 2055 to 2065. This support ratio under this scenario creates a much wider demographic window of opportunity for the country.

Figure 6. Support Ratio under Full Employment, Lower TFR and Higer Years of Schooling
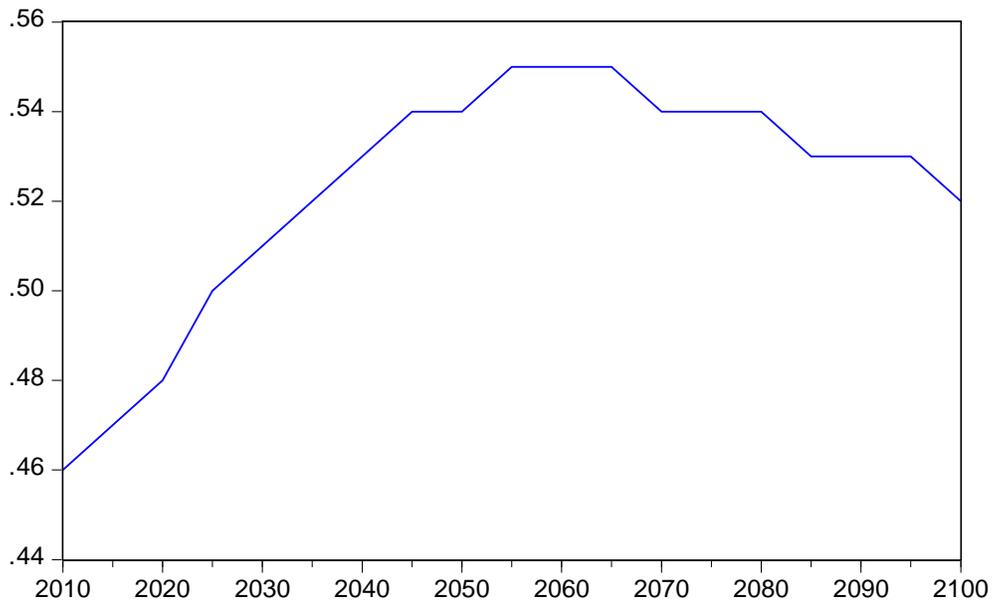
VI.   Conclusion and Policy Recommendations

The country faces a demographic window of opportunity, a rare opportunity for the country to benefit from its relatively young population. This demographic window of opportunity creates the demographic dividend that can further enhance the country's economic growth. However, the country faces two challenges to the full realization of this demographic window of opportunity: high fertility rate, particularly among the poor households, and the high unemployment rate among the young members of the labor force.

Strong reforms are needed if the country is serious in taking advantage of the benefits brought about by the changing age structure. Lowering the fertility rate is a necessary condition to the creation of the demographic window of opportunity. The country must strengthen public efforts in order to speed up the voluntary reduction in fertility rates, particularly among the poor households, as rapidly as possible. Full implementation of the Reproductive Health (RH) Law is the key to lowering fertility rate. The government should target a Contraceptive Prevalence Rate of 70 percent in the next 5 years that is biased in favor of using the modern methods.

Lowering fertility rate is a necessary but not sufficient condition for harvesting the demographic dividend. This will further require the correct government policies, particularly in the labor market. The transition from school to the labor force has important consequences for the human well-being and economic growth. As shown by the data, the first to enter the labor market - the young adults - experience challenges associated with high unemployment and low average income. The highest demographic dividend can be achieved only when the employment opportunities for young adults improved from the current situation.

Employment rate, particularly those in the 20 to 24 age group in the labor force, must be increased to a higher level from the current level of about 75 percent. One often cited reason for this relatively higher youth unemployment is the job-skills mismatch. Government's support for Technical Vocational Courses such as the Enterprise-Based Training (e.g. Dual Training System) will be useful to address the job-skills mismatch.

More importantly, these key policy reforms must be done under the Duterte administration if we serious in taking advantage of the benefits brought about by the demographic transition. Without government aggressive efforts to reduce the country's total fertility rate and policies geared towards creating more jobs, the window of opportunity from the demographic transition will close quickly without us even noticing it.

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