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Demographic Transition and Economic Growth Potential in Indonesia

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Demographic Transition and Economic Growth Potential in Indonesia

MIRANDA S. GOELTOM and SOLIKIN M. JUHRO

Abstracts

Compared to other Asia’s most dynamic economies, currently Indonesia is still in the earlier stage of demographic transition, with 7.9 percent of the population aged 60 years or older in 2010. Nevertheless, demographic transition is considered as a quite important issue, not only its implication to macro economic developments in the medium-long run, but also its relationship with social values prevailing in society. The preliminary exercises conclude that the impacts of aging population on economic growth potentials can be explained well through labor force effect and the changes in national saving behavior. In this regard, based on a preliminary exercise, it is estimated that the increase in the proportion of aging population over the next two decades will hamper economic growth potentials, with approximately 0.5 to 0.7 percent potential loss per year. Beyond these findings, the challenges in Indonesian demography are also inseparable with the problem in fostering a higher quality of life and promoting a balance between population dynamics, natural resources and socio-economic development. It seems also that the future economic growth must come from the growth of productivity. The fact that productivity growth tends to slowdown during the last ten years implies that the Government needs to re-examine the policies with regard to education and training and technology development.

Keywords: Demographic Economics, Aging Population, Labor Supply, Social Welfare

JEL Classification: I38, J13, J14, J22, O47

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1. Introduction

A demographic transition is under way in many countries, accelerating with the decline in mortality that began near the end of World War II. The populations of some major economies have begun to age noticeably, although there are variations in its speed and extent, as a result of declining or stable fertility rates and an increase in life expectancy. While the populations of most developed countries have been aging for a long time and have currently reached the final stage of demographic transition, emerging economies are still early in the demographic transition process, and the final stage possesses new and unprecedented national and international economic policy challenges. The changing age composition of the world population will have profound implications for the nature of employment and the economy.

From a theoretical viewpoint, especially in the economic and financial areas, this demographic transition will have several serious implications for economic growth, savings and investment, labor market, public finance and financial markets. Changes in the age structure of the population affect an economy’s behavior, including the level of savings and the choice of investments. The aging population is expected to have negative impacts on private and public savings, with the subsequent decline in savings placing downward pressure on asset prices. The prior phase of asset accumulation would give way to a long period of asset decumulation, as the aging population begins to draw on their pension assets to finance their retirement.

From an empirical perspective, though the populations of most developed countries have been aging for a long time, Asian countries have just recently experienced a dramatic fall in fertility rates. For example, China has seen a sharp decline in fertility over the past three decades, due to rising incomes and the coercive Family Planning government policies taken in the late 1970s. Some studies show that Asia’s most dynamic (emerging) economies—i.e., the Republic of Korea, Thailand, Taiwan, Singapore, Malaysia and Indonesia—will share certain demographic trends including declining population growth and an aging population.

In Indonesia, intensive programs on population welfare, especially Family Planning (Keluarga Berencana) as well as health programs in general, have succeeded in accelerating the demographic transition faster than, or at least at the same level as, economic development.³ This

³ The National Population Census (Sensus Penduduk Nasional) is conducted in Indonesia on a ten-year base. The first census was conducted in 1961, and was followed by censuses in 1971, 1980, 1990, 2000 and 2010. Meanwhile, the Intracensal Population Surveys (Survei Penduduk Antar-Sensus) were also run in periods between population censuses, namely 1976, 1985, 1995, and 2005.
The demographic transition is reflected in the rising trend in the number of aging population in the last three decades. The significant progress Indonesia has made in its economic and human development has resulted in better health conditions for Indonesians and a longer life expectancy. For example, the country’s life expectancy has increased dramatically from 45 in 1970 to 68 in 2010. Consequently, the number of Indonesians aged 60 and older have increased from 4.5 percent of the population in 1971 to 7.9 percent of the population in 2010 (Table 1).

Compared to Asia’s other dynamic economies, Indonesia is still in the earlier stage of demographic transition. Nevertheless, the demographic transition is considered to be an important issue, not only because of its implication for macroeconomic development in the medium and long run, but also because of its relationship with social values prevailing in society. In this regard, care for elderly citizens largely falls under the jurisdiction of their families, since it is assumed that productive citizens will take care of their aged and infirm parents. Very few government resources had been allocated to assist elderly Indonesians, especially those who are poor and/or have no immediate family members to assist them. However, since the late 1990s, changes began to occur in the way the Indonesian government viewed the problem of the aging population. This is due to changes in family structures and economic conditions, which have made it increasingly difficult for families to support the care of elderly Indonesians by themselves, thus leaving many elderly Indonesians to fall below the poverty line or become vulnerable towards poverty.

Table 1. Aging Population in Asian Emerging Economies (2010)

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (Million)</th>
<th>Fertility Rate *)</th>
<th>Mortality Rate</th>
<th>Aging +) Pop (%)</th>
<th>Life Expect. *)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>237.6</td>
<td>2.1</td>
<td>27.0</td>
<td>7.9</td>
<td>68</td>
</tr>
<tr>
<td>Malaysia</td>
<td>28.3</td>
<td>2.7</td>
<td>5.0</td>
<td>5.0</td>
<td>74</td>
</tr>
<tr>
<td>Singapore</td>
<td>5.2</td>
<td>1.2</td>
<td>2.0</td>
<td>6.8</td>
<td>81</td>
</tr>
<tr>
<td>South Korea</td>
<td>48.9</td>
<td>1.1</td>
<td>4.0</td>
<td>11.0</td>
<td>80</td>
</tr>
<tr>
<td>Chinese Taipei</td>
<td>23.2</td>
<td>1.6</td>
<td>16.0</td>
<td>10.7</td>
<td>73</td>
</tr>
<tr>
<td>Thailand</td>
<td>63.9</td>
<td>1.6</td>
<td>11.0</td>
<td>7.9</td>
<td>74</td>
</tr>
</tbody>
</table>

Sources: World Bank and Bappenas (National Development Planning Agency)
* For Indonesia 60 years or older, for other countries 65 years or older
* as of 2009

4 According to the United Nations, the term “aging” or “elderly” refers to the group of population aged 65 years or older. In contrast, in Indonesia, 60 years of age is commonly used as the start of aging. This classification is in line with the average rate of life expectancy in Indonesia during the last three decades (1970–2010).
This chapter addresses issues arising from the demographic transition and its impact on the economic growth potential within the Indonesian macroeconomic policy context. In particular, this study focuses on two questions. First, can the impacts of an aging population on economic growth potential be explained well through the labor force effect and changes in the national savings-investment behavior? Second, what is the impact of an aging population on potential economic growth in the medium and long run? Following this introduction, the second section reviews Indonesian population dynamics, with emphasis placed on population policies and demographic changes or the aging population in the economy from 1970–2025. Section 3 describes the macroeconomic consequences of a global aging population phenomenon, and in particular, its impact on labor supply, national savings and fiscal burden. Furthermore, the study presents opportunities and challenges facing the economy as well as several efforts that are being and will be undertaken by Indonesian policy authorities in order to promote social welfare. The final section includes several concluding remarks.

2. Population policies and demographic transition in Indonesia

2.1 Population policies

Population policies were initially narrowly construed with the policies focusing on fertility control. This interpretation is incorrect because population policies are not only about fertility control (known as the Family Planning in Indonesia); rather, population policies are much broader and include policies on population mobility (migration) and health, particularly reducing the mortality rate of mothers and children. Thus, population policies may be defined as those policies that are directed towards influencing three main variables of demography: fertility, mortality and mobility. More recently, population policies are construed to influence not only the aspect of quantity (total, composition and distribution) of population but also its quality. Some of the policies are applied either directly or indirectly through the development of other sectors. In general, population policies in Indonesia include policies in the fields of fertility control and population mobility.

Fertility control policy: During the six decades after independence, government population policies have brought about significant changes in the demographic profile of Indonesia’s population. During the first years of independence, the traditional thought adhered to by the majority of people resulted in a population explosion, with 5–6 children per family on
average. Efforts to encourage people to be more aware of birth control was launched for the first time by the government with the establishment of the National Family Planning Institution (LKBN) in 1968. Furthermore, in order to strengthen its function, the LKBN status was increased and changed to become the National Family Planning Coordinating Board (BKKBN) in 1970, and the head of the organization was responsible directly to the President.

In retrospect, it can be argued that the Family Planning program has been successful with the number of children on average per family being reduced to 2–3 in the 1990s. In general, the success of the program is phenomenal and is an example for other countries facing problems in controlling their population growth. In addition, the success of the Family Planning program in reducing the population growth from 2.1 percent in the early 1970s to 1.4 percent in the early 2000s has positive impacts on several variables that are used as indicators of the level of people’s welfare. Success in reducing the birthrate has also changed the age structure of the population. The proportion of the young-age population (0–14 years) declined from 36.7 percent (1990) to 30.7 percent (2000), while the productive-age population (15–59 years) increased from 57.2 percent to 62.2 percent, and the aging population (60 years above) increased from 6.1 percent to 7.1 percent. Consequently, the dependency ratio declined from 74.9 percent to 60.8 percent, and the people now tend to have a longer lifespan.

It should be noted that in the era of political reformation and regional autonomy, since the beginning of 2000, the existence of Family Planning program was not introduced aggressively to the public. In this era there was a tendency for policy makers’ agenda to be focused on political issues rather than demographic issues. Population-oriented activities in an effort to improve the quality of human resources through Family Planning program was inaudible anymore. This situation has affected the rate of population growth, which was not as low as the rates in the previous era. Indonesian average population growth rate during 2000-2010 reached the level of 1.5%. This number was even higher than the average world population growth rate of 1.2%.

Having concerned over a repeat explosion of population number, in recent years the Government has raised a discourse to re-enable Family Planning program. This is in line with common view that Indonesia still needs Family Planning program, but it should be implemented with different orientation. Some people argue that the target should be no longer the lower the birth rate, but rather to improve the quality of service to the community in the birth setting. This
includes actions to provide a variety of contraceptive devices which is available at affordable price and to make the public aware of the contraceptive choices.

Population mobility policy: The population mobility policy has been applied since the Dutch colonial era through the migration of the population from Java to Sumatra. In 1905, 155 farmer families from Kedu (Central Java) migrated to Lampung (southern part of Sumatra). The momentum was a milestone, marking the beginning of the transmigration program in Indonesia. After independence, the government continued the effort to migrate the population by means of a better-planned transmigration program.

Unlike the fertility control policy (i.e., Family Planning), the success of the population mobility policy through transmigration has been relatively insignificant. In the beginning, the transmigration program was conducted to distribute the population more evenly across regions to address the imbalance of population distribution between Java and other islands. Up to the present, however, the distribution imbalance has continued, and more than 60 percent of the population lives in Java, which is only 6.7 percent of the Indonesian territory.

Other population policies: In addition to the two main policies above, the government also indirectly improves people’s welfare by means of other policies that support the welfare and quality of human resources. The policies are, among others, in the fields of health, improving the role of women, education and social welfare.

In the field of health, the main policy applied by the government is prioritizing the efforts to improve health, prevention, healing, recovery and rehabilitation from fertilization to an advanced age. In addition, there are efforts to improve and maintain the quality of the institutions and services that provide health care in a sustainable manner by empowering the human resources, facilities and infrastructure, including the availability of medicines affordable to the people. In the field of education, the main policy applied by the government is its effort to expand and evenly distribute opportunities to obtain high-quality education for all Indonesian people by increasing the education budget to significant levels. In addition, the government is updating the education system, including diversification of the curriculum, in order to serve diversified learning participants, formulation of the curriculum to be applicable nationally and locally, in accordance with the local needs, and diversification of the types of education professionally. In the field of improving the role of women, the policy applied by the government includes the realization of gender equality and justice and improving the quality of
the role and independence of women’s organizations, maintaining the values of integrity and unity as well as the historical values of the struggles of women in the framework of continuing women empowerment and welfare of the families and people.

Finally, no less important is the policy in the field of social welfare, including several efforts, among others, to: (i) develop the manpower social security system for all to obtain adequate protection, security and safety, the management of which involves the government, companies and workers; (ii) build appreciation of the aging population and veterans to maintain their dignity and make use of their experiences; and (iii) improve care of the handicapped, the poor, and neglected children, and other socially vulnerable groups by providing intensive employment opportunities in the framework of improving the people’s welfare.

Implementation of these population policies has generally been successful in improving the Indonesian people’s welfare. In line with the achievements of the fertility control policy, the results achieved by the policies on health are reflected in the improvement of health indicators such as life expectancy, infant mortality rate, under-five mortality rate, pregnant mother mortality rate/still-born rate, and people’s nutritional condition. However, there remains much to be done in the field of health as a consequence of the social and economic changes that have occurred. These include, among others, issues regarding the disparity of the health status, multiple burdens of diseases, low performance of healthcare services, people’s inadequate behavior and pattern of a healthy lifestyle, low environmental health conditions, and limited scope of healthcare services and personnel.

Meanwhile, the achievements of the education policy may be observed from the facts illustrated in 2010, such as the APS (school participation rate) of the population aged 7–12 years reaching 98.0 percent, the population aged 13–15 years reaching 86.1 percent, and the population aged 16–18 years reaching 55.8 percent. The gross participation rate (APK) for the elementary school level has attained a level of 114.6 percent, while participation at the junior-high level has reached 80.4 percent, the senior high school level has reached 62.5 percent, and the university level 16.4 percent. Nevertheless, it is undeniable that the quality of national education still needs to be improved in order to meet the competency needs of the learning participants. The main factor that has to be considered is the unevenness in education quality and quantity, including the educators’ welfare and the quality of teaching and learning facilities.
In recent years, the Government has increased spending for education, including raising teacher salaries, which currently reaches the amount of about 17 percent of total government expenditure. This amount is still below the 20 percent required for education improvement as required under the Constitution and the Law on National Education. Currently, the local governments are responsible for about two-thirds of public spending for education and use it exclusively for teacher salaries. Meanwhile, the central government still controls most of the funding for new schools and classrooms, and provide scholarships for poorest students.

The data also indicate that the declining fertility and number of children in families have motivated women to enter the labor force. With a smaller number of children and a shorter period of delivery and childcare, women have more time and opportunities to enter the labor force and contribute to raising production/per capita income. Despite a declining tendency, the main problem still overwhelming women today is their low participation rate in development, due to various discrimination practices. In addition, the phenomenon of domestic violence against women and children also needs government attention, as it is suspected that such violence is on the rise following the 1997/98 economic crisis that has downgraded the quality of household welfare in general.

Despite the improved welfare of Indonesians over the last three decades, the number of people living below the poverty line remains high, reaching 31.0 million or 13.3 percent in 2010. Incorrect handling of the problem would result in wider social disparity that further weakens the people’s social resilience and encourages social conflicts.

2.2 Demographic transition

The Indonesian population has been growing rapidly since the Five-Yearly Development Plan (Repelita) that began in 1969. Despite the upward trend of population growth through the years, a number of relevant demographic indicators, such as fertility and mortality, tend to decline constantly. The trend of the main demographic indicators—such as fertility, mortality, total population growth, age structure, dependency ratio and life expectancy—during the 1970–2025 period will be described in the next section. As the latest Indonesian population census was conducted in 2010, the description of the population dynamics will use the figures of that year as the base, and the figures of the following period (2011–25) are projected figures (Table 2).
Table 2.
Key Demographic Indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (Level 1000)</th>
<th>Age Structure (% of Pop)</th>
<th>Sex Ratio (F/M)</th>
<th>Dep. Ratio (%)</th>
<th>Life Expect.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;15</td>
<td>15 – 59</td>
<td>60+</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>118368</td>
<td>2.1</td>
<td>44.0</td>
<td>51.5</td>
<td>4.5</td>
</tr>
<tr>
<td>1976</td>
<td>132304</td>
<td>2.2</td>
<td>41.1</td>
<td>53.8</td>
<td>5.0</td>
</tr>
<tr>
<td>1980</td>
<td>146777</td>
<td>2.3</td>
<td>40.9</td>
<td>53.5</td>
<td>5.6</td>
</tr>
<tr>
<td>1985</td>
<td>164630</td>
<td>1.9</td>
<td>38.8</td>
<td>55.5</td>
<td>5.7</td>
</tr>
<tr>
<td>1990</td>
<td>179830</td>
<td>1.9</td>
<td>36.7</td>
<td>57.2</td>
<td>6.1</td>
</tr>
<tr>
<td>1995</td>
<td>195294</td>
<td>1.6</td>
<td>32.8</td>
<td>60.4</td>
<td>6.9</td>
</tr>
<tr>
<td>2000</td>
<td>205132</td>
<td>1.4</td>
<td>30.7</td>
<td>62.2</td>
<td>7.1</td>
</tr>
<tr>
<td>2005</td>
<td>219852</td>
<td>1.6</td>
<td>28</td>
<td>64.5</td>
<td>7.5</td>
</tr>
<tr>
<td>2010</td>
<td>237641</td>
<td>1.5</td>
<td>26.4</td>
<td>65.7</td>
<td>7.9</td>
</tr>
<tr>
<td>2015</td>
<td>238280</td>
<td>1.1</td>
<td>25.0</td>
<td>65.3</td>
<td>9.7</td>
</tr>
<tr>
<td>2020</td>
<td>261540</td>
<td>1.0</td>
<td>23.9</td>
<td>65.0</td>
<td>11.1</td>
</tr>
<tr>
<td>2025</td>
<td>273651</td>
<td>0.8</td>
<td>22.8</td>
<td>64.0</td>
<td>13.2</td>
</tr>
</tbody>
</table>

Source: BPS (Statistics Indonesia)

It can be seen that the fertility rate in Indonesia has declined rapidly since the national Family Planning program was launched in 1968. In 1971, women had 5.6 children in their productive periods; by 2010, this figure had declined drastically to 2.1. Such a development largely relates to the increasingly intensive implementation of the Family Planning/reproductive health programs, widespread use of contraceptives, and improved education of the people, particularly women.

Similar to the fertility rate, Indonesia has experienced significant changes in its mortality rate since 1971. In this respect, the infant mortality rate declined from 145 in 1,000 births in 1971 to 27 in 2010. However, compared to other emerging economies in Asia, this figure is still considered to be very high. As for the main causes of such deaths, several serious diseases are dominant, such as infection, cardiovascular and other degenerative diseases. In line with this, the life expectancy of Indonesians also increased dramatically from 45.7 years in 1971 to 68 in 2010.

The fertility and mortality transition affects the growth pattern of the population. In this respect, population growth has declined gradually over the last three decades, namely, 2.2 percent per year in the period 1971–80 to 1.8 percent per year in 1991–2000, and further to 1.5 percent per year in 2001–2010 on average. Meanwhile, over the next fifteen years, the population growth is expected to continue declining, reaching 0.8 percent in 2025. Given the high rate of population growth in the past among the young population, it is anticipated that the
absolute total of the population will be growing. In 1971, the population stood at approximately 118.4 million and grew to 205.1 million in 2000 and 237.6 million in 2010. It is estimated that in 2025, the Indonesian population will reach 273.7 million. This means, as estimated, that in fifteen years from the last population census in 2010, there will be nearly 36 million “new population” in Indonesia, approximately a half of the Thai population or six times that of Singapore in 2010.

This extremely dynamic population growth will, in turn, affect the age structure. The proportion of the population aged under 15 years declined rapidly from 44 percent in 1971 to 26.4 percent in 2010, and it is estimated that in 2025, this age group will reach 22.8 percent. This development is closely related to the improved level of health and nutritional status that will, in turn, improve the people’s life expectancy and life span. By contrast, the proportion of aging population (60 and over) increased significantly, particularly since 2000s, from 4.5 percent in 1971 to 7.9 percent in 2010, and it is estimated to reach 13.2 percent at the end of 2025.5

These changes in age structure, where the young population declines by half and the aging population increases threefold, reflect the demographic transition in Indonesia (Figures 1 and 2). Before or in the beginning of the 1970s, the Indonesian population was considered to be a “young population,” but in 2025, it will have become an “old population.” An interesting fact is that the proportion of the productive-age population (i.e., 15–59 years of age) continues to increase gradually, from 51.5 percent in 1971 to 65.7 percent in 2010; it is estimated to reach 64 percent in 2025. Moreover, it can be seen that the female population consistently predominates the male population within the aging population structure. This is in line with the fact that the average life expectancy of females is higher than that of males.

As a result of the demographic transition process, the dependency ratio of the young and aging population against the productive-age population continuously declined from 94.0 percent in 1971 to 60.8 percent in 2000. This ratio declined to 51.2 percent in 2010, and thereafter it is estimated will increase again and reach 56.2 percent in 2025. Despite the fact that the total dependency ratio declines, it is estimated to increase in the future, and the composition of the

5 Of the aging population in 2010, a half of them live in rural areas. There are 11 provinces whose population has entered the old structure, that is: Special Region of Yogyakarta (14.04 percent), Cebtral Java (11.16 percent), East Java (11.14 percent), Bali (11.02 percent), South Sulawesi (9.05 percent), West Suamatera (8.74 percent), North Sulawesi (8.62 percent), West Nusatenggara (8.21 percent), West Java (8.08 percent), Lampung (7.78 percent), East Nusatenggara (7.68 percent)
dependency ratio will experience a fundamental change. In this respect, the “young population dependency ratio” (i.e., the ratio of the young population against the productive-age population) will decline from 95.3 percent in 1971 to 35.7 percent in 2025, while the “old population dependency ratio” (i.e., the ratio of the aging population against the productive-age population) will increase from 8.7 percent in 1971 to 20.5 percent in 2025.

Figure 1. The Changes of Age Structure

![Figure 1](image1.png)

Source: BPS and Bappenas

Figure 2. The Changes of Age Structure by Sex Ratio (Female/Male)

![Figure 2](image2.png)

Source: BPS and Bappenas

In line with the demographic transition, one of the phenomena that should be noted is the potential to obtain an economic benefit referred to as the demographic dividend (demographic bonus). The demographic dividend refers to the achievement of an economy when the birthrate declines significantly and the proportion of the young population will become smaller, making
the young population dependency ratio smaller as well. This smaller young population dependency ratio will significantly reduce the investment required to meet the needs of the young population and improve family welfare, surpassing the total expenses required to maintain the welfare of the aging population as the consequence of the increased old population dependency ratio. Certainly, the demographic dividend cannot be obtained automatically. In addition to the abundant productive age population, policies that are conducive to making use of the population’s potential also play an essential role.  

In addition, the demographic dividend phenomenon cannot exist forever. In line with the passing of time, the opportunity for the government investment to increase, due to the switch in the population composition, will disappear. This is because the population composition will finally be changed with the declining child-age population and, on the other hand, the aging population will increase. This switch will cause the opportunity for the demographic dividend to disappear because the declining investment for the welfare of the child-age population will finally be compensated for by the increase in investment for the welfare of the aging population.

Based on the change of the age structure, a question arises: will there be an economic dividend in Indonesia? Figure 3 indicates that, following the success of the national Family Planning program, since the 1980s, the young population dependency ratio decreased consistently along with an increase in the old population dependency ratio. These developments lead to a significant decrease in the total dependency ratio, which reaches a minimum level throughout the period 2010–20, and starts increasing afterward. From this behavior, we can conclude that the window of opportunity for the demographic dividend will occur during the period 2010–20. This estimate is slightly different from that of the United Nations (Bappenas/Unsfir 2002), which predicted that window of opportunity for the demographic dividend will open beginning in 2015. The difference in these two estimates is mainly due to the difference in the definition of aging; according to the UN, the term “aging” refers to the population aged 65 years or older, whereas in Indonesia, 60 years is commonly used as the start of aging.

6 The example often cited is South Korea. When the birthrate declined in the mid-1960s, the number of children enrolled in elementary schools declined. In response to this, the South Korean government switched basic education funds to improve the quality of education at higher levels (senior/junior high schools). This change finally appeared in the pyramid of the South Korean population composition in 2000, indicating a larger proportion of the manpower age group compared to the child-age group, and the government budget expenses for children’s education and health were relatively smaller (Ross 2004).
3. Macroeconomic consequences of an aging population in Indonesia

3.1 Empirical facts about population growth and economic growth in Indonesia

The debate on the effects of population growth on economic growth is thus far inconclusive; does population promote or hamper economic growth, or is it independent of economic growth? Empirical studies have been completed that support each of the three hypotheses.\(^7\) As a neutralist theory, the case of Indonesia indicates less significance of a statistical relationship between population growth and economic (per capita) growth. Observation of Indonesia’s development during 1970–2010 in Figure 4 (left panel) shows that although population growth is accompanied by slowing economic growth (the regression coefficient -0.7) the significance level is greater than 10%. The correlation of the residual growth proportion with population growth is considered weak. Thus, if these unexplained factors (i.e., other fundamental economic conditions, including capital stock, technological levels and human capital) are controlled, there will be no significant evidence on the relationship between population growth and economic growth.

Meanwhile, an observation of the relationship between population growth and economic growth in the same sample shows that there is no significant positive relationship between them as a whole (right panel). It can also be seen that individual deviations from the overall trend (regression) line are relatively large, suggesting that although a population increase may potentially expand economic capacity through increased labor input, the other fundamental

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\(^7\) See, for example, United Nations (2001), Sachs et al. (2001), Simon (1981) and Kelley (2001).
economic conditions, including capital stock, technological levels and human capital are still predominant.

Figure 4. Relationship between Population Growth and Economic Growth

The above indicates that neither per capita GDP growth nor GDP growth has a significant correlation with population growth. Such a condition supports the view of population neutralism. The observation results are fairly reasonable for at least two reasons. First, the observation focuses more on the size of the population rather than the age structure of the population. Second, other variables that affect economic growth—such as structure maturity and economic openness, education level, quality of civil society, and institutional structure maturity—are not included in the analysis. This may be seen in the very small (less than 10 percent) regression determination coefficient (R-squared) on both results, reflecting the unexplainable huge economic growth determinant. In this respect, the demographic change accompanied by the control of other fundamental variables through the creation of adequate policies is hypothesized as being capable of motivating economic growth in the long run.

The result thus supports the thought on the importance of age structure in the observation of population dynamics in economic growth. The change in age structure or age distribution within the population will bring about fundamental consequences because the population in each age group will have different behaviors. The next section looks into the implications of the increased total (or distribution) of the aging population on economic growth potential.
3.1 Impact of an aging population on labor supply and savings-investment behavior

A great deal of attention has been paid to the increased portion of the aging population in numerous countries; this interest on aging is predicated on the belief that such a condition may increase pressure on economic growth, unless it is anticipated early. Developed countries are presently beginning to feel the pressure of the aging population issue. Rogers et al. (2000), for instance, pointed out that in the U.S. there are fears that the “baby boomers” generation (i.e., persons born between 1946 and 1964) is going to enter retirement age in the second decade of the 21st century. This demographic condition, if not accompanied by a change in household behavior and government fiscal policies, will reduce the workforce that can support the whole population (its increasing dependency ratio) and reduce the growth of national savings. This will, in turn, slow down the growth of national revenue and consumption after 2010. Furthermore, Bosworth and Burtless (1997) estimated that prior to 2030, the old dependency ratio (i.e., the ratio of population aged over 64 years against 15–64 years) will be around 30 percent in the U.S., 40 percent in the U.K., and nearly 50 percent in Germany and Japan. For these countries, government expenditures to provide pension benefits will increase significantly and can be burdensome on state budgets.

For developing countries, including Indonesia, the aging population condition is inevitable although in an earlier transitional phase and at a low percentage. As described earlier, based on the projection figures, the age group above 60 years in Indonesia will reach 13.2 percent in 2025, which indicates a substantial increase from around 7.9 percent in 2010. The next section considers the implications of the increasing aging population on Indonesia’s economic growth potential, particularly through its impacts on labor supply as well as on national savings and investment.\(^8\)

**Impacts of an aging population on labor supply:** Projection of the population of the productive age group (i.e., aged 15–60 years) in the next 15 years will absolutely increase by about 2 million from its current position in 2010. This level is much lower or almost a half of the increase from 1995 to 2010. If viewed as a proportion of the total population, in the future there is a tendency for the ratio to decrease, namely from 65.7 percent in 2010 to 64.0 percent

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\(^8\) Conceptually, economic growth potential can be considered to be that level of economic growth rate that can be achieved without inflation, by fully exploiting such factors as capital stock and labor force. In this connection, savings of a country as a whole (i.e., national savings) is one of the sources for investments, and hence the accumulation of capital stock.
in 2025. This indicates that the increased composition of the aging population is offset to a large extent by the reduction in the young age population group. Because of this changing composition, the aging index (i.e., the ratio of population over 60 years against that of under 15 years) is expected to increase quite sharply in 15 years, namely, from 30 percent in 2010 to 58 percent in 2025.

The impacts of the increased aging population on labor supply and economic growth potential as a whole may be observed, among others, through two indicators—namely, the potential support ratio (PSR) and the labor supply adequacy (LSA). The potential support ratio is formulated as the comparison of the total productive age population relative to the total aging population to indicate the potential burden that will be shouldered by the workforce.\(^9\) Meanwhile, the labor supply adequacy, which is simply the ratio of the total workforce against the total population, is an indicator of the manpower burden against the population, and is one of the important factors that affect the living standard of the population as a whole.

### Table 3. Aging Population and Labour Supply

<table>
<thead>
<tr>
<th>Period</th>
<th>Aging Pop</th>
<th>PSR</th>
<th>%Δ Force</th>
<th>LSA (LF/Pop)</th>
<th>LF Part Rate</th>
<th>UnRate</th>
<th>%Δ Y/Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-1985</td>
<td>5.5</td>
<td>9.6</td>
<td>3.3</td>
<td>37.8</td>
<td>54.3</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>1986-1990</td>
<td>6.0</td>
<td>9.3</td>
<td>4.1</td>
<td>42.3</td>
<td>57.3</td>
<td>2.7</td>
<td>4.4</td>
</tr>
<tr>
<td>1991-1995</td>
<td>6.3</td>
<td>9.4</td>
<td>2.1</td>
<td>43.6</td>
<td>57.2</td>
<td>3.9</td>
<td>5.4</td>
</tr>
<tr>
<td>1996-2000</td>
<td>7.2</td>
<td>8.6</td>
<td>2.1</td>
<td>45.7</td>
<td>63.7</td>
<td>5.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2001-2005</td>
<td>7.2</td>
<td>8.8</td>
<td>2.1</td>
<td>47.7</td>
<td>67.3</td>
<td>9.6</td>
<td>3.0</td>
</tr>
<tr>
<td>2006-2010</td>
<td>7.7</td>
<td>9.3</td>
<td>1.9</td>
<td>48.7</td>
<td>67.1</td>
<td>8.6</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Source: BPS

As indicated in Table 3, the increase in aging population leads to an increase in the burden that will be shouldered by the productive age population. This is clear from the potential support ratio (PSR) which has declined, from 9.6 people shouldering each person aged over 60 years in 1981–85 to 8.8 people in 2001–2005. Although the number increased in the last 5 years, it is predicted that the tendency for PSR to decline will continue as it is estimated to reach 5 people in 2021–2025, in line with the increasing composition of the aging population. The PSR suggests the rising pressure placed on the provision of the people’s social security facilities, such

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\(^9\) The potential support ratio (PSR) is an indicator of the dependency of an age group against another. Technically, this indicator is another version, or an inverse, of the “old population dependency ratio.”
as the pension and health contributions, particularly in the traditional system, where the people who are currently working pay for the benefits of present pensioners.

In line with the increase in the total population and the aging population, the total labor force increased, although on average it appears to have slowed down, from 3.3 percent in 1981–85 to 1.9 percent in 2001–2010, particularly following the economic crisis in 1997/98. This, in turn, led to a slowdown in the labor supply adequacy (LSA). Over the last 25 years, the LSA changed from 37.8 percent in 1981–1985 to 48.7 percent in 2001–2010, or only increased by approximately 1 percent on average per year. Compared to the population growth that occurred at a rate of 1.6 percent on average per year, the slowing LSA growth reflects the relatively heavy burden of the workforce for the population it supports.

Meanwhile, the labor force participation rate continued to increase from 54 percent in 1981–1985 to 67 percent in 2001–2010. Nevertheless, the labor force participation rate of the aging population appeared to decline. According to a UN projection, the labor force participation rate of the population aged 65 years or above in Indonesia reached 35.2 percent in 2000, and will decline to 30.8 percent in 2010. This indicates that although according to the demographic criteria the aging population is considered to be a burden that will be shouldered by the productive age population, in fact, some of the aged population are still actively working. Nevertheless, its portion, indeed, appears to decline in line with Indonesia’s improving per capita income in the future. This proves that a low per capita income is the reason why the people cannot save enough (buying the old-age security, such as pension funds or insurance) to support them when they are old, so that they still have to work until an advanced age. Thus, a higher per capita income will increase the manpower offer in Indonesia.

Finally, the high labor participation rate of the aging population can worsen the condition of Indonesia’s employment opportunities for the labor force or the productive age population. The unemployment rate in Indonesia has, during the last few years, increased quite sharply. Up to 2010, the unemployment rate in Indonesia was estimated to surpass 8 percent. This is a quite sharp increase compared to that of the previous two decades when the unemployment rate stood at average of 3.5 percent. The unfavorable consequences of the economic crisis are indeed some

\[10\] According to the UN projection (2001) until 2010, countries with a high per capita income tend to have a lower old-age labor force participation rate than do countries with a low per capita income. In more developed countries, only 21 percent of men aged 60 years or more are actively working compared to around 50 percent of the same population group in less developed countries.
of the causes of the high unemployment rate during the last nine years. The economic crisis has caused many companies to reduce the number of employees, and even a significant number of them have closed their businesses, resulting in numerous cases of work relation severance (PHK). Under these conditions, the high labor participation rate of the aging population worsens the imbalance between the offers and the demands for manpower because the offers of manpower are abundant while the demands are very limited. Nevertheless, the labor participation rate of the aging population will tend to decline as it is getting increasingly difficult to compete with the population grouped in the productive labor force, due to the smaller number of employment opportunities available, and the fact that their knowledge and skills are becoming obsolete (Drury 1994, Taylor and Walker 1996, UN 2001).

From the description above, it can be concluded that, in general, the effects of the increased aging population on economic growth potential may be explained by the labor force effect. In this case, the increased aging population will encourage the potential support ratio to decline (old population dependency ratio to increase) and slow down the labor supply adequacy development. With the increased unemployment rate and the non-established environmental policy in support of the aging population, the increased aging population will reduce economic growth potential in the future.

**Impacts of an aging population on savings-investment behavior:** In theory, it may be said that saving is a person’s effort to improve his/her ability to produce and consume in the future by sacrificing his/her present consumption level. The tendency of a longer life span of the population and a longer pension age established in a country will have implications on the amount of savings needed to maintain the living standard (Rogers et al. 2000). Nevertheless, the lifecycle model theory points out that age is a factor that determines people’s saving behavior. A larger proportion of the aging population will certainly tend to reduce the amount of savings in a country because the consumption needs of the aging population will be larger, while their incomes tend to decline. Therefore, it may be estimated that a bigger portion of the aging population in a country will hamper its national economic growth if no other policies are taken by the government to increase domestic savings sources or to invite foreign investors in the framework of bridging the disparity between savings and investment.

How is the condition in Indonesia? In order to study this behavior, we need data on the savings/investment per age group of the population. Unfortunately, this level of data is
unavailable in Indonesia. In addition, the development of national savings/investment is still determined by economic policies as a whole. Therefore, observation is conducted on the effects of demographic changes on aggregate savings/investment and public savings/investment. Likewise, due to the fact that the short-term savings/investment behavior shows no clear changing pattern, observation is made by looking into the tendency in five-yearly timeframes.

Table 4. Demographic Changes and Saving-Investment

<table>
<thead>
<tr>
<th>Period</th>
<th>% of Population</th>
<th>Saving – Investment</th>
<th>Private Saving – Investment</th>
<th>Public Saving – Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age 60+ Dep Ratio Old Dep Rat</td>
<td>S/GDP</td>
<td>I/GDP</td>
<td>S-I Gap</td>
</tr>
<tr>
<td>1981-1985</td>
<td>5.5</td>
<td>81.4</td>
<td>10.1</td>
<td>21.8</td>
</tr>
<tr>
<td>1986-1990</td>
<td>6.0</td>
<td>70.7</td>
<td>10.7</td>
<td>30.5</td>
</tr>
<tr>
<td>1991-1995</td>
<td>6.3</td>
<td>63.1</td>
<td>10.7</td>
<td>24.2</td>
</tr>
<tr>
<td>1996-2000</td>
<td>7.2</td>
<td>54.1</td>
<td>11.6</td>
<td>26.7</td>
</tr>
<tr>
<td>2001-2005</td>
<td>7.2</td>
<td>50.0</td>
<td>11.4</td>
<td>24.9</td>
</tr>
<tr>
<td>2006-2010</td>
<td>7.7</td>
<td>54.1</td>
<td>11.9</td>
<td>30.7</td>
</tr>
</tbody>
</table>

Source: BPS

Table 4 shows that in line with the declining dependency ratio, the savings/GDP ratio increased, especially during the last 5 years. Meanwhile, over the last ten years, since the second half of the 1990s, particularly during the economic crisis of 1997/98, the investment/GDP ratio has followed a declining tendency. This development has caused the S-I gap to become smaller, and even resulted in a positive tendency (surplus) afterward. The aggregate data indicate that there is a negative correlation between demographic changes (i.e. declining dependency ratio) and people’s savings/investment behavior. From the viewpoint of the age groups, this phenomenon is also reflected by the positive correlation between the old population dependency ratio and the savings/GDP ratio and the S-I gap. From a narrow dimension, these findings support the lifecycle view that lifecycle savers help to highlight the role of current saving for retirement.11

Nevertheless, the strong correlations between aging population and potential saving are not clearly supported by private and public data classification showing that the increased old

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11 The role of savings on demographic change is well recognized in the economic literature. Most researchers employ models with overlapping generations of lifecycle savers. The models range from stylized 2–3 period representations of the lifecycle that build on Samuelson’s (1958) and Diamond’s (1965) work, to detailed multi-period models that build on Auerbach and Kotlikoff’s (1987) 65–period model. Noteworthy examples include Boersch-Supan et al. (2002, 2005), Brooks (2003), and IMF (2004).
population dependency ratio appears to have a weak positive correlation with the private and public savings/GDP ratio, and thus the private and public S-I gaps. Thus, using aggregate data, the conclusion of the aging population having positive impacts on savings/investment appears to be ambiguous and should be investigated further.

3.2 The aging population, productivity growth and economic growth potential

To estimate the impact of an aging population on economic growth potential, we propose a two-step approach. The first step is to estimate a baseline model of economic growth potential, and the second step is to estimate the impact of aging population on economic growth potential, based on assumptions on related structural parameters. A standard accounting growth model is specified in order to address the long-run economic growth potential, namely, an aggregate Solow-type production function. The aggregate (national) production function is assumed to exhibit a constant returns to scale technology as follows:

\[ Y = aK^\alpha L^{1-\alpha}e^\varepsilon \] (1)

where \( Y \) is real output (GDP), \( L \) is labor, \( K \) is capital, \( e \) is an error term, \( \varepsilon \) is the natural number, and \( a \) and \( \alpha \) are parameters of the function.

We estimate the long-run parameters of equation (1) using co-integration procedure with relevant sample data of period 1971–2010. Since the post-1997/98 crisis period characterizes structural changes, the long-run parameters are obtained by averaging parameter values generated from rolling estimation procedures within 10 different periods, in which the last observation for each estimation ranges from 2000 to 2010. Based on the estimated model, it was computed that \( \alpha \), reflecting the long-run elasticity of capital input of output—for the period covering various events including the crisis—is approximately 0.3. The estimated model also serves as a basis to compute the total factor productivity (TFP) growth of the economy, i.e., based on the estimated long-run parameters, namely \( \Delta\%\text{TFP} = \Delta\%Y - 0.3 \Delta\%K - 0.7 \Delta\%L \).

From historical data, the average long-run growth of Indonesian GDP over the period 1971–2010 was computed to be approximately 5.6 percent per year. While the long-run growth of capital stock and labor factors are approximately 8.5 and 2.8 percent, respectively, according to our estimates, the TFP growth rate is 1.1 percent. This means that economic growth in Indonesia has primarily been driven by factor accumulation, in particular, investment (Table 5). Our TFP estimate is higher than those of other studies which are conducted based on shorter
period of observation, such as Bosworth and Collins (1996), Sarel (1997), and Chowdhury et al. (2002), showing that Indonesian TPF growth estimates ranges from 0.7 to 0.9. It shows that over the last few years there was a significant improvement in the productivity of Indonesian economy (Table 6).

**Table 5. Economic Growth and Share of Production Factors (%)**

<table>
<thead>
<tr>
<th>Period (LR-Movav)</th>
<th>Growth of Output (GDP)</th>
<th>Share of Production Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Capital</td>
</tr>
<tr>
<td>1971 – 1975</td>
<td>8.0</td>
<td>4.8</td>
</tr>
<tr>
<td>1971 – 1980</td>
<td>7.9</td>
<td>4.4</td>
</tr>
<tr>
<td>1971 – 1985</td>
<td>6.8</td>
<td>3.9</td>
</tr>
<tr>
<td>1971 – 1990</td>
<td>6.7</td>
<td>3.6</td>
</tr>
<tr>
<td>1971 – 1997</td>
<td>5.7</td>
<td>3.4</td>
</tr>
<tr>
<td>1971 – 2005</td>
<td>5.5</td>
<td>2.7</td>
</tr>
<tr>
<td>1971 – 2010</td>
<td>5.6</td>
<td>2.6</td>
</tr>
<tr>
<td>1971 – 2010*</td>
<td>6.4</td>
<td>3.2</td>
</tr>
</tbody>
</table>

*) Excluding prior-crisis 1998 data

Based on the estimate of TPF growth, representing productivity growth, it is worth knowing further whether this productivity growth measure would account for the impact of aging population on economic growth potential. Table 6 shows that it is quite difficult to trace a relationship between aging population and productivity growth. While the aging population tends to increase steadily, TFP growth fluctuates significantly, both for the period-to-period base and the long-run moving average base, and the TFP growth tends to increase during the last 10 years. These facts suggest that the issue of productivity is indeed a complex issue, since there are other factors affecting productivity growth —such as education level, quality of civil society and

**Table 6. Aging Population and Productivity Growth**

<table>
<thead>
<tr>
<th>Period</th>
<th>Aging Pop (% of Pop)</th>
<th>TFP growth (%)</th>
<th>TFP growth LR-Movav (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-1985</td>
<td>5.5</td>
<td>-0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>1986-1990</td>
<td>6.0</td>
<td>0.9</td>
<td>0.1</td>
</tr>
<tr>
<td>1991-1995</td>
<td>6.3</td>
<td>2.9</td>
<td>0.8</td>
</tr>
<tr>
<td>1996-2000</td>
<td>7.2</td>
<td>-1.7</td>
<td>0.7</td>
</tr>
<tr>
<td>2001-2005</td>
<td>7.2</td>
<td>2.4</td>
<td>0.7</td>
</tr>
<tr>
<td>2006-2010</td>
<td>7.7</td>
<td>2.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Based on the estimate of TPF growth, representing productivity growth, it is worth knowing further whether this productivity growth measure would account for the impact of aging population on economic growth potential. Table 6 shows that it is quite difficult to trace a relationship between aging population and productivity growth. While the aging population tends to increase steadily, TFP growth fluctuates significantly, both for the period-to-period base and the long-run moving average base, and the TFP growth tends to increase during the last 10 years. These facts suggest that the issue of productivity is indeed a complex issue, since there are other factors affecting productivity growth —such as education level, quality of civil society and
institutional structure maturity—that should be considered but are not included in this analysis.

Furthermore, the model of a long-run relationship involving gross domestic product (GDP), physical capital stock and labor force from 1971–2010 is used to derive the potential growth rate over the period 2011–2025. In this case, in order to estimate the impact of the aging population on economic growth potential, we set prior strong assumptions for a baseline scenario (no aging population impact) that the long-run growth of capital stock and labor will approach their average levels, excluding prior-crisis data (i.e., 1998–99), namely 10.0 and 3.3 percent per year, respectively. The 10.0 percent growth in capital stock is calculated based on the long-run share of national savings which ranges from 20–25 percent of national output and a depreciation rate of 5 percent. With the long-run growth of TFP that is estimated to remain on a slightly higher rate of 1.1 percent per year, conditional to government efforts to reexamine policies with regard to education, training and technology development, the potential economic growth rate is expected to reach approximately 6.4 percent per year. This rate is below the rate of the pre-crisis period (6.7 percent) and the same as the rate of full historical excluding prior-crisis data. It seems that the economic crisis of the late 1990s has affected the long-run growth potential, especially through its impact on capital formation.

The impact of an aging population on economic growth potential can be explained through two channels, namely, the labor force effect and changes in savings-investment behavior. In this study, we run a sensitivity analysis by estimating the impact of the aging population on labor supply and savings (capital stock), and thus output; all variables are considered as deviations from their respective long-run growth (trend) to measure economic growth potential loss. It worth noting that amid the success of the national Family Planning and various health care programs established by the Indonesian government, the aging phenomenon in Indonesia is predicted to accelerate over decades to come (Figure 5). From historical data, it can be seen that while the aging population only grew on average at a rate of 3 percent each year during 1971–2010, the number is predicted to jump to 4 percent in 2011–2025.

\[ \frac{\Delta K}{K} = s \frac{Y}{K} - \delta \]

12 Based on a famous simple accounting equation.
Furthermore, due to a less-statistically significant impact of aging population on savings behavior, for our econometric exercise, we set two scenarios: namely, conditions in which only the labor force channel is working, as well as a scenario where both the labor force and savings behavior channels are relevant. In the first scenario, based on an estimated elasticity of substitution parameter between labor supply and aging population of 0.8, the changes consequently shrink the growth of labor supply from its potential rate to 2.5 percent, and accordingly lead to slower economic growth than its potential rate, namely, 5.9 percent. Therefore, ceteris paribus, over the next two decades the decrease in labor supply will bring about a potential loss in economic growth potential of approximately 0.5 percent per year.

The second scenario assumes that, with a stable marginal propensity to consume, the aging phenomenon may depress potential savings at its lower share, 20 percent of national output, leading to a decrease in the growth of capital stock by 0.5 percent. Assuming that the depreciation rate is relatively stable at 5 percent, ceteris paribus, the decrease in the savings rate will bring about a potential loss in economic growth potential of approximately 0.2 percent per year. To conclude, based on these two scenarios, over the next two decades, the aging phenomenon will bring about an economic growth potential loss of approximately 0.5–0.7 percent per year (Table 7).
Table 7. Long Run Economic Growth Potentials 2025

<table>
<thead>
<tr>
<th></th>
<th>No Crisis</th>
<th>Baseline</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFP</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Labor Supply (%)</td>
<td>3.3</td>
<td>3.3</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Capital Stock (%)</td>
<td>11.6</td>
<td>10</td>
<td>10</td>
<td>9.5</td>
</tr>
<tr>
<td>Economic Growth (%)</td>
<td>6.9</td>
<td>6.4</td>
<td>5.9</td>
<td>5.7</td>
</tr>
<tr>
<td>Potential loss (%)</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Figure 6. Trajectory of Real GDP (Trillion Rp)

Figure 6 depicts the trajectory of the economy based on the pre-crisis historical trend (GDP no crisis), the trend including the crisis (GDP baseline), and the adjusted trend due to the aging phenomenon (GDP aging scenario 1 and scenario 2). The historical trend follows a compound growth rate of 6.9 percent per year and as opposed to the estimated baseline growth rate of 6.4 percent and the aging case growth rate of 5.7 and 5.9 percent, respectively, taking into account the impact of the crisis. Had there been no crisis, real GDP in 2025 would have been approximately Rp 2,800 trillion (in 1993 constant prices). Meanwhile, based on the estimated growth rate of 6.4 percent, real GDP in 2025 is expected to reach approximately Rp 1,680 trillion.

3.3 The impacts of an aging population on the fiscal burden

Vulnerability of an aging population: In line with economic advancement and improved people’s welfare, the rise in the aging population in the country will increase government
expenditures, particularly in connection with the costs of pension and health to guarantee welfare of this community group. Nonetheless, the government expenditures budgeted for the aging population in Indonesia are relatively lower than those of developed countries. This is due to the absence of social and health security schemes for Indonesian citizens. It should be noted that health insurance security and social security for each citizen (both in the productive age and in the aging population) are provided by the government of developed countries, originating from the imposition of a high income tax on working citizens. This is in contrast to developing countries, such as Indonesia, where financial support for the aging population comes from extended family members according to the social and cultural pattern. Even if there is any income source as a retired government/private employee, the amount is relatively small.

The portrait of vulnerability of the aging population has been in existence since the beginning of independence. In the past, policies affecting the aging population were not a high priority of the Indonesian government, due to the fact that the proportion of the aging population was still relatively small. Treatment of elderly people was regarded as the responsibility of their families, reflecting the belief that the productive-age population would take care of their parents. In other words, the government resources allocated for the aging population was very limited, particularly for elderly people who were poor and who had no families or relatives. Meanwhile, the switch in family structure and in economic conditions has continued, and these changes have made it difficult for families to take care of their elderly members. This has caused many elderly people to live their lives in misery or even below the poverty line.13

Although the handling of the elderly population in practice has not been as expected yet, Indonesia has already had a set of legislation, decrees, regulations and policies for improving the social welfare of elderly. These include: (i) Article 28 H of the 1945 Constitution, stating that every person has the right to social security to fully develop oneself as a dignified human being, (ii) Law No. 13/1998 on the Welfare of Elderly which mandates the government to provide social services and protection for the elderly so that they can realize and enjoy a reasonable

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13 Another fact of the aging population is that the majority are still active in the workforce, particularly in the informal and agricultural sectors. Nevertheless, the working elderly people generally have minimum income, namely Rp 500,000 on average per month, based on a survey in 1999 (Hatmadji et al. 1999). It is estimated that about 16.5 percent of the aging population over 65 years live below the poverty line. Due to income shortage, around 45 percent of them are dependent upon the assistance of their families and 31 percent are self-employed.

Consequences of increased aging population on fiscal expenses: The significant increase in the aging population over the last two or three decades has had numerous impacts on public policies in Indonesia. First, the increased aging population has resulted in an increase in the budget for treatment and other health supports. Experience in many developed countries with a significant aging population indicates that with an increase in welfare and life expectancy, government expenditures to maintain the health of the aging population will also increase (on things such as medication, medicare and elderly homes). The result is that the cost of health as a percentage of total GDP will also increase. In developed countries, where there is a high concentration of aged population, government expenditures for health are substantially higher than that in developing countries. In early 2000s the cost of health in Indonesia is mainly supported by private expenditures, whereby government expenditure only shares approximately 20 percent of the total cost, or less than the average level of East Asia and Pacific.

However, there have been several important changes in health financing over the last five years. Public funding for health has increased substantially, primarily not only from central budget, but also from district budgets. Recently government expenditure shares approximately 50 percent of the total cost. Despite the government’s recent increases in health spending, public health expenditure remains low in terms of GDP. The World Bank estimates that Indonesia spends less than 3 percent of GDP on health. This is less than the average for countries in the East Asia and Pacific region (6.1 percent) and the lowermiddle-income group of countries (5.9 percent) (USAID, 2009).

In the past, the elderly in Indonesia relied on the family for health treatment and financial assistance. Unfortunately, the aging population in Indonesia increased in coincidence with rapid modernization and the recovery process following the financial crisis in 1997/98. The success of the Family Planning program in reducing the number of children in most Indonesian families means declining total expenditures for raising children. However, this also means that the aging population will be supported by a smaller number of children when they enter the retirement period, or, in other words, the support for treatment and financial assistance they get from their
children will be smaller. Another change is that the family members who just enter the productive age tend to emigrate to big cities or other countries in search of employment. Although it is estimated that they will have a better income, they will live far from their parents, and it will be more difficult for their parents to obtain health/financial assistance when they need it.

Another development is the switch from personal and emotional treatment by close relatives to impersonal treatment that is more finance-oriented in the form of cash or hired personnel (nurses or maids). Even if close relatives are relied upon for treatment, they generally lack specific knowledge/ability to treat elderly people. The professional knowledge needed generally includes diet and nutrition, standard sanitation and hygiene, use of rehabilitation equipment and correct medication. It is clear that the main consequence of the aging population is the need for treatment services, facilities and equipment. The needs will automatically become an additional burden on the state/government budget as is the case in developed countries.

Second, in line with the increased costs of health care, financial support is also increasingly needed for the aging population as the factors of age and health will encourage them to leave the workforce. In order to have an adequate income after retirement, the aging population should be able to accumulate savings in an adequate amount during the time when they are still actively working, or, if not, they will be forced to be dependent on the incomes of other parties (families, government and/or foundations/charity institutions). Therefore, the government should provide additional funds to support a social/health security scheme for the aging population. The government should carefully consider relevant funding sources in support of the additional funds, particularly because the expenditures do not reflect investments that produce financial returns in the future.

For Indonesia, a social/health security system has not been properly provided for by the government due to limited budget and scale of priorities, which, up to the present, has not placed a high priority on the welfare of the aging population. This is in line with the fact that a health insurance system is not widely known in Indonesia. Not every family has a specific health insurance, except those required by work and their employer. The current socioeconomic status of Indonesians is one reason why health insurance is not yet common in this country. Other contributing factors include a lack of supporting infrastructure (Griffin 1989, Gertler and Melnic 1992) and lack of societies’ perception about health insurance (Wirakartakusmah and Priyono 1992).
In 2004, the situation changed significantly. First, the Government of Indonesia passed Law 40, which committed itself to achieving universal health insurance coverage. The Government also established a health insurance program for the poor, Jamkesmas (initially called Askeskin), and this now covers 76.4 million people. With the establishment of the Jamkesmas scheme, nearly half of all Indonesians (109 million out of 237 million or 47 percent) are now covered by some form of health insurance provided either by both the public and private sectors. Specifically, around 42 percent are covered by a public health insurance scheme; namely, Askes\textsuperscript{14} for civil servants, Jamsostek\textsuperscript{15} for private formal sector workers, community health maintenance schemes (JPKM), and Jamkesmas. The remaining 5 percent have private health insurance coverage (USAID, 2009).

Although the government is committed to development of a national security scheme (Jamsosnas)\textsuperscript{16}—with possible implications for a more comprehensive system with benefit provisions that are harmonized between the public and private sectors in the future—it is estimated that the impact of the proposed Jamsosnas old-age pension scheme on the current Indonesian aging population would be minimal. This is because the system could suffer financial

\textsuperscript{14} One of the well-known health insurance is Askes, provided by PT (Persero) Indonesia Health Insurance (PT Askes), which was institutionally promoted by the government since 1968. Membership in PT Askes health insurance for public officers is compulsory: government employees must become a member of PT Askes. The members of PT Askes in 1997 are estimated to represent about 9 percent of the population. In principle, the membership of PT Askes for public employee is lifetime, and coverage continues even after retirement when members do not have to pay monthly fees.

\textsuperscript{15} The Law No. 3/1992 on Workers’ Social Security (UU Jamsostek) creates several social security benefits for workers which include: (i) worker injury benefits; (ii) death benefits; (iii) retirement benefits; and (iv) health care benefits. To participate, each employer must make a contribution equal to about one month of a worker’s annual salary. In addition, workers must contribute 2 percent of their wages to the retirement benefits program. The workers’ retirement fund is invested as a provident fund managed entirely by a state-owned company, PT Jamsostek. While theoretically, this law applies to all Indonesian workers, regardless of whether they work in the formal or informal sector, in practice, only some formal sector workers are covered by this scheme, specifically, those that work in medium and large-sized enterprises (those that employed more than ten employees). This means that the vast majority of Indonesian workers (i.e., 80 percent of the total workforce) are not covered by this scheme.

\textsuperscript{16} The most recent legislation related to public policy toward the elderly in Indonesia is The National Social Security System Act of 2004, which was enacted on September 28, 2004. Among the key features of the new law is the creation of several social security schemes (Jamsosnas) for citizens: old-age pension, old-age savings, national health insurance, work-injury insurance, and death benefits. The law also mandates that, within the next decade or so, social security coverage should be expanded to cover all citizens, including the informal sector, the unemployed, and the poor. The schemes would be largely financed by payroll taxes imposed on employers and workers, mostly in the formal sector. In addition, the government will subsidize the contributions of the poorest citizens.
unsustainability since it would place significant liabilities on government and employers, making the program less attractive to participants.

In sum, the Indonesian government should realize that the aging population will have significant impacts on its fiscal and social policies in the future, as the government continues its efforts to improve the welfare of its people. Since the problem of the `aging population will become more complex in the years to come, a commitment or political decision must be made and implemented.

4. **Global aging phenomenon: Opportunity and challenges for Indonesia**

   The demographic transition in industrialized countries will lead to an aging population being dominant within the population distribution, and this will alter the way the population utilizes their income. In terms of aggregate demand, the preference for consumption of goods and services will be shifted, whereby the increasing number of elderly will tend to raise the need for services in the health and care sectors. Likewise, investment and savings behaviors are also susceptible to change since the elderly tend to increase their savings in anticipation of retirement. The elderly may also become more cautious and less tolerant to high risk in their investment portfolios, which, in turn, would inclined them to more fixed-return assets, such as bonds.

   For Indonesia, a number of opportunities arise from the aging phenomenon in the industrialized economies. The first would be employment opportunity. The declining productive-age population in the aging industrialized economies opens up opportunities for the young Indonesian young labor force, particularly in filling the gap in various sectors such as health, manufacture, etc. Furthermore, the income from those migrant workers will help the Indonesian economy through rising capital inflows in the form of workers remittances, which tend to be long term and less volatile nature. To fully take advantage of this opportunity, however, Indonesia needs to improve its education environment to provide skilled workers. Indonesia is a quintessential labor surplus nation and is considered to be one of the world’s major sources of unskilled international migrant workers. In fact, this movement of laborers, many in response to the economic crisis, has become the most significant aspect of Indonesia’s migration patterns and policies.

   Capital inflows to Indonesia are also expected in the form of foreign direct investment (FDI), in line with the declining productive-age labor force in the aging economies. An
alternative policy to lengthen the working age in those economies would entail higher labor costs. This may induce the phenomenon of relocating factories/production facilities to developing countries with ample productive-age labor and relatively lower salaries. To facilitate this possible future outcome, Indonesia needs to enhance its efforts to improve its investment climate, regulatory framework and infrastructure. In sum, there are opportunities for the Indonesian economy to encourage growth from investment, savings and consumption.

The impact of the global aging phenomenon would also pass its way to the financial markets, i.e., financial assets prices, through the influence of age-cohort behavior in terms of both savings and the portfolio and savings decision.\(^\text{17}\) For Indonesia, in particular, the current opportunities in the financial market are twofold, i.e., to invest in the financial assets of the aging countries and to offer resident domestic financial assets for foreign investors. Investing in the aging countries, however, would push up prices even more, thus increasing the returns for those assets. However, the effect of asset meltdown would then be more severe in the soon-to-come retiring period as declining prices will drive nonretiring investors to also draw down their investment before the point of losses. For the investors from the non-aging economies, the asset meltdown effect should be well anticipated to avoid losses.

On the other hand, with liberalized capital inflows, Indonesia is mostly open to foreign investment not only in the form of direct investment, but also portfolio investment. Indonesia’s

\(^{17}\) On the issue of the savings decision, during the 1990s financial markets in general and equity markets in particular may have benefited from large inflows into pension funds and other institutionalized forms of savings. These inflows reflected, to a considerable extent, savings for retirement by baby boom generations in the industrialized countries. Accordingly, channeling these savings to investment in assets is one of the main factors that induce financial asset prices to rise. Nonetheless, it is argued that when baby boomers start entering retirement they will become net sellers of financial assets to finance retirement consumption, and this will place downward pressure on financial asset prices (the meltdown hypothesis). However, a study by Martins et al. gives little support to the hypothesis that asset prices would decline due to massive pension withdrawals along with the aging process. Among the factors challenging the notion is that the hypothesis does not reflect changes in economic agents’ behavior spurred by interest rates movements. Another consideration is the effect of economic growth, and thus rising income, in increasing the capacity of economic agents’ to save and invest.
stable domestic macroeconomy, prudent macroeconomic policies and improved regulations, supervision and governance have helped to provide a conducive environment for investment. Portfolio investment, including those of foreign investors, has been increasing in recent years after the 1997/98 crisis. While high short-term investment bears its own risks for Indonesia, the opportunities remain open for pension funds or individuals from the aging economies to expand its investment portfolio internationally to Indonesia. In addition, there are beneficial aspects as this would help to deepen the domestic financial market and encourage financial innovations.

Another aspect of aging as mentioned above is the changing risk appetite as one enters into the aging period. While this is still debatable, it does make sense that a retired person would be more willing to hold a less risky portfolio as their capacity to make up for future losses are reduced. If this holds true, the increased number of retirees in the industrialized economy opens a good market for bond issuance by emerging countries. Indonesia’s sovereign bond issuance in the international market has experienced oversubscriptions, indicating strong market enthusiasm. Regionally, the East Asian economies have also launched the Asian Bond Market Initiative (ABMI) which is a concerted effort to develop the bond market in the region. This will be beneficial, as demand for bonds from the aging economies will meet supplies from the emerging market in East Asia.

Still another opportunity from the aging industrialized economies may be in the form of leisure. Foreign tourists may be willing to come to Indonesia to enjoy their retirement years. This calls for efforts to improve the tourism sector in Indonesia. Furthermore, the ability to anticipate and fill the typical needs of aging people is clearly important, such as security, proper health facilities, convenience, etc. Investment in this area will also help increase to Indonesian economic growth.

What is the policy implication for Indonesia? In facing these challenges and opportunities as well as considering that the Indonesia population will also be aging, it is important for the country to formulate integrative measures in several areas in order to reap advantages and benefits of the global aging population phenomenon. As an early-stage country in the demographic transition process, Indonesia could not only contribute in solving many of the global aging population problems, but it could also help in solving the employment problem in its own domestic economy. In this respect, the Indonesian government should consider broad policies areas such as pro-growth macroeconomic policy, labor and education policies, and
international cooperation.

A pro-growth macroeconomic policy, through implementation sound macroeconomic policies, is needed to ensure sustainable economic growth. As a developing country, sustainable economic growth is a prerequisite for higher prosperity as well as quality of life. This condition is crucial and should be gained before population become aging. In this regard, a pro-growth orientation should also be supported by sustainable fiscal policy providing stimulus to the economy. Furthermore, considering the fact that the problem of the aging population is inseparable from the problem of human resource quality, efforts to enhance productivity in parallel with economic growth are very critical. In this respect, among some policies could be considered are to increase labor force participation, especially for women, as well as to impose education reform. Life-long learning and better education are prerequisites to improving productivity and growth, maintaining global competitiveness, and raising individual welfare. International cooperation should be taken as well. Those areas, among others, include cooperation in sharing of experiences of countries that have already gone through the process of an aging population. The experience that can be shared includes designing of a sustainable pension system, reforming the public pension system, and fostering the asset management industry.

5. Concluding remarks

Because Indonesia is still in the early stage of demographic transition, it is difficult to comprehensively investigate the impacts of the aging population on the country’s economic growth potential. Economic growth is determined by many factors, such as technological levels, human capital and policy environment, and not only demographic changes. In this research, in addition to a qualitative investigation, we propose an alternative parsimonious setup in the context of regression analysis. The results of the exercises conclude that the impacts of the aging population on economic growth potential can be explained well through the labor force effect and changes in savings behavior. In this regard, based on a preliminary exercise, the increase in the proportion of aging population over the next two decades will lead to a potential loss in economic growth of approximately 0.5–0.7 percent each year.

Beyond that, the challenges of Indonesia’s demography is inseparable from the problem of relatively high population growth, problem in fostering a higher quality of life and promoting
a balance between population dynamics, natural resources and socioeconomic development. Since the 1970s, the Indonesian government has taken some policies to address those challenges. The policies focused on lowering fertility and addressing the persistently high rate of maternal mortality. Although the policies have significantly slowed population growth and improved quality of life, some problems remain.

It seems also that future economic growth must come from growth in productivity or technological progress and skill upgrading. The fact that productivity growth has tended to slow down during the last ten years implies that the government needs to reexamine its policies with regard to education and training and technology development. This is not only a very critical step but also one that is in line with the predicted occurrence of the “window of opportunity” for the demographic dividend within the next two decades.

In tandem with these efforts, as the number of Indonesian elderly grows, a comprehensive aging policy becomes more important in the country’s policy agenda and legislation. There is increasing recognition on the government’s part that caring for the elderly should not be the sole responsibility of the government, but also of the community, the private sector, and most importantly, the elderly and their families themselves. With a real partnership among all stakeholders, along with a firm political will to improve living standards of all elderly Indonesians, along with a credible mechanism to ensure that all stakeholders will follow through with the above commitments, it is hoped that Indonesia will be successful in developing a comprehensive aging policy.
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