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ABSTRACTS

Compared to other Asia's most dynamic economies, currently Indonesia is still in the earlier stage of demographic transition, with 7.5 percent of the population aged 60 years or older in 2005. 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.

1. INTRODUCTION

A demographic transition is under way, accelerating with the declines 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 of the developed countries have been aging for a long time and currently reached the final stage of demographic transition, emerging economies are still early in the stage. This 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 theoretical views, 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 the 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. Subsequently the declining savings will put 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 starts to draw on their pension assets to finance their retirement.

From empirical perspectives, though the populations of most developed countries have been aging for a long time, Asian countries have just recently experienced a

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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 are those of Korea, Thailand, Chinese Taipei, Singapore, Malaysia and Indonesia. These economies will share certain demographic trends among them are the 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.¹ This demographic transition is reflected by an increasing trend in the number of aging population in the last three decades. The significant progress in its economic and human development has resulted in better health conditions for Indonesians and a longer life expectancy. The country's life expectancy has increased dramatically from 45 in 1970 to 69 in 2005. Consequently, the number of Indonesians aged 60 and older have increased from 4.5 percent of the population in 1971 to 7.5 percent of the population in 2005 (see Table 1).²

Table 1. Aging population in Asian emerging economies (2005)

	Population (Million)	Fertility Rate	Mortality Rate	Aging ^{*)} Pop (%)	Life Expect.
Indonesia	219.9	2.2	32.3	7.5	69
Malaysia	26.1	3.3	10.0	5.0	73
Singapore	4.3	1.3	1.9	8.0	79
Korea	48.3	1.2	5.0	9.0	77
Chinese Taipei	22.7	1.2	5.4	9.0	76
Thailand	65.0	1.7	20.0	7.0	71

Sources: World Bank and Bappenas (The National Development Planning Board)

^{*)} For Indonesia 60 years or older, for other countries 65 years or older

Compared to other Asia's most dynamic economies, Indonesia is still in the earlier stage of demographic transition. However, 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. In this regard, care for elderly citizens largely fall under the jurisdiction of their families, since it is assumed that productive citizens would take care of their aged and infirm parents. Very few government resources were 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 begun to occur in the way the Indonesian government viewed the problem of aging population. This is due to the changes in family structures and economic conditions, leading to an 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.

This paper is aimed at addressing issues of demographic transition and economic

¹ The National Population Census (Sensus Penduduk Nasional) is conducted in Indonesia on a ten year base. The first census was conducted in 1961, and followed by the next censuses in 1971, 1980, 1990, and 2000. Meanwhile, the Intracensal Population Surveys (Survei Penduduk Antar-Sensus) were also run in periods between population censuses, namely 1976, 1985 and 1995.

² According to the United Nations (UN), the term of "aging" or "elderly" refers to the group of population aged 65 years or older, whereas in Indonesia 60 years is commonly used as start of aging. This classification is in line with the average rate of the life expectancy in Indonesia during the last three decades (1970 – 2000), which reached the rate below 65 year.

growth potentials within the Indonesian macroeconomic policy context. It especially answers two questions. Firstly, can the impacts of aging population on economic growth potentials be explained well through labor force effect and the changes in national saving-investment behavior? Secondly, what is the impact of aging population on economic growth potentials in the medium-long run? After this introduction, the second section will review Indonesian population dynamics stressing on population policies and demographic changes or aging population in the economy from 1970 to 2025. The next section will describe macroeconomic consequences of a global aging population phenomenon, especially its impact on labor supply, national savings, and fiscal burden. Furthermore, the paper will present 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 last section will include several remarks.

2. POPULATION POLICIES AND DEMOGRAPHIC TRANSITION IN INDONESIA

2.1 POPULATION POLICIES

In the beginning, population policies were narrowly construed as the fertility control. This interpretation is incorrect because population policies are not only about fertility control – known as the Family Planning in Indonesia; it has a broader sense than that. In addition to the fertility issue, population policies also include the policies on population mobility (migration) and health directed towards reducing the mortality rate of mothers and children. Thus, population policies may be defined as the policies directed towards influencing three main variables of demography: fertility, mortality and mobility. 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, the protruding population policies in Indonesia are the policies in the fields of fertility control and population mobility.

(i) Fertility control policy

Indonesian Government policies on population for six decades after independence have brought about big changes in the demographic profile of Indonesia's population. During the first years of independence, the traditional thought adhered to by the majority of the people caused population explosion, with 5-6 children per family on average. Efforts to encourage people to be more aware to birth control was launched for the first time by the government by the establishment of the National Family Planning Institution (LKBN) in 1968. Further, 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 its course of journey, the Family Planning program is apparently successful and the number of children on average per family was reduced to 2-3 in the 1990s. In general, the success of the Family Planning program in Indonesia is phenomenal, a success story and becomes an example for other countries facing the problems in controlling their population growth. The success of the Family Planning program in reducing the population growth from 2.3 percent in the early 1970s to 1.3 percent in the early 2000s has positive impacts on several fields that become the

indicators for the level of the people's welfare. The success in the effort to reduce the birthrate also has 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), 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 (Dep. Ratio) declined from 74.9 percent to 60.8 percent, and the people tend to have a longer lifespan.

(ii) 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) were 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 (Family Planning), the success of the population mobility policy through transmigration is relatively insignificant. In the beginning, the transmigration program was conducted to distribute the population more evenly in the regions because of 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 live in Java, which is only 6.7 percent of the Indonesian territory.

(iii) Other population policies

In addition to the two main policies above, the government also indirectly improves the people's welfare by means of other policies in order to support the welfare and quality of the human resources. The policies are, among others, on 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 of health in a sustainable manner by empowering the human resources and the 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 the effort to expand and distribute evenly the opportunities to obtain high quality education for all the Indonesian people in order to create high quality Indonesians by increasing the education budget to a significant level. In addition, the government is also updating the education system, including the curriculum, 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 on the field of social welfare, including several efforts, among others, to: (i) Develop the manpower social security system for all the manpower 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 the veterans to maintain their dignity and make use of their experiences; and (iii) Improve the care of the handicapped, the poor, neglected children, and other socially vulnerable groups by providing intensive employment opportunities in the framework of improving the people's welfare.

Implementation of several population policies has generally been successful in improving the Indonesian people's welfare. In line with the achievements of the fertilization control policy, the result achieved by the policy on the field of health is the people's improved health as reflected by the 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 is still a lot of homework arising and should be done in the field of health as the consequence of the social and economic changes. Such homework includes, among others, 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 condition, and limited scope of healthcare services and personnel.

Meanwhile, the achievements of the policy on the field of education may be observed from the facts illustrated in 2004, such as APS (School Participation Rate) of the population aged 7-12 years reaching 99.1 percent, the population aged 13-15 years reaching 82.2 percent, and the population aged 16-18 years reaching 53.2 percent. The gross participation rate (APK) for the elementary school level reaches 114.9 percent, the junior high school level 80.4 percent the senior high school level 51.5 percent, and the university level 14.6 percent. Nevertheless, it is undeniable that the national education quality still has to be improved in order to meet the competency needs of the learning participants. The main factor that has to be considered is the uneven education quality and quantity, including the educators' welfare and the teaching and learning facilities.

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 the increased production/per capita income. Despite a declining tendency, the main problem still overwhelming the women up to the present 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 the government handling, as it is suspected that such violence is on the rise following the 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 is still very high, reaching 36.1 million or 16.6 percent in 2004. Incorrect handling of the problem would result in a 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 fast since the Five-Yearly Development Plan (Repelita) that began in 1969. Despite the upward trend of the 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 2000, the description of the population dynamics will use the figures of that year as the bases, and the figures of the following period (2001-2025) are projected figures (Table 2).

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, but the figure declined drastically to 2.3 in 2000. 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.

Table 2. Key demographic indicators

Year	Population		Age Structure (% of Pop)			Sex Ratio (F/M)	Dep.Ratio (%)	Life Expect.
	Level (1000)	Growth	<15	15 - 59	60+			
1971	118368	2.10	44.0	51.5	4.5	102.9	94.0	45.7
1976	132304	2.20	41.1	53.8	5.0	102.0	85.7	48.9
1980	146777	2.32	40.9	53.5	5.6	101.2	86.9	52.2
1985	164630	1.89	38.8	55.5	5.7	100.9	80.3	55.9
1990	179830	1.98	36.7	57.2	6.1	100.5	74.9	59.8
1995	195294	1.63	32.8	60.4	6.9	100.5	65.7	65.4
2000	205843	1.36	30.7	62.2	7.1	99.5	60.8	67.1
2005	219898	1.29	28.0	64.5	7.5	99.6	55.1	69.0
2010	234139	1.21	26.4	65.2	8.4	99.7	53.4	70.8
2015	238280	1.11	25.0	65.3	9.7	99.9	53.2	72.3
2020	261540	0.98	23.9	65.0	11.1	100.1	53.9	73.3
2025	273651	0.82	22.8	64.0	13.2	100.4	56.2	73.7

Sources: BPS (The Statistics Central Board) and Bappenas

Like the fertility rate, Indonesia has experienced significant changes in mortality rate since 1971. In this respect, the infant mortality rate declined from 145 in 1,000 births in 1971 to 41 in 2000. Compared to the emerging economies in Asia, the figure is still deemed to be very high. As to 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 inclined dramatically from 45.7 years in 1971 to 67.1 in 2000.

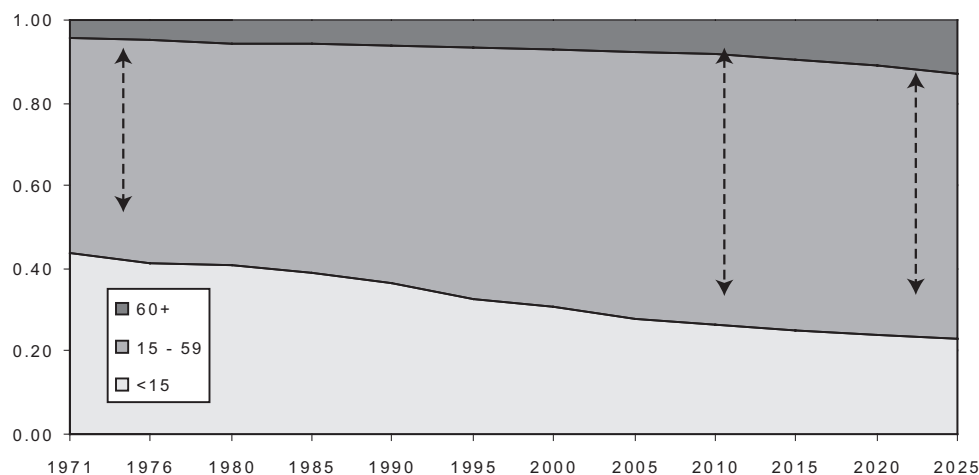
The fertility and mortality transition affects the population growth pattern eventually. In this respect, the population growth has declined gradually during the last

three decades, namely 2.34 percent per year in the periods of 1971-1980 to 1.96 percent per year in 1981-1990, and further to 1.36 percent per year in 1991-2000 on average. Meanwhile, during the next two decades, the population growth is estimated to be declining, reaching 0.82 percent in 2025. Given the high rate of population growth in the past among the young population, the absolute total of the population is also estimated to be growing. In 1971, the population stood at approximately 118.4 million and grew to 179.3 million in 1990, and to 205.8 million in 2000. It is estimated that in 2025 the Indonesian population will reach 273.7 million. This means, as estimated, that in 25 years from the last population census in 2000 there will be nearly 70 million 'new population' in Indonesia, approximately the same as the Thai population or fifteen times that of Singapore in 2005.

The extremely dynamic population growth affects the age structure. In this respect, the proportion of the population aged under 15 years declined fast from 44 percent in 1971 to 30.7 percent in 2000. 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 aging population proportion (60 and over) increased significantly, particularly since 2005, from 4.5 percent in 1971 to 7.1 percent in 2000, and it is estimated to reach 13.2 percent at the end of 2025.

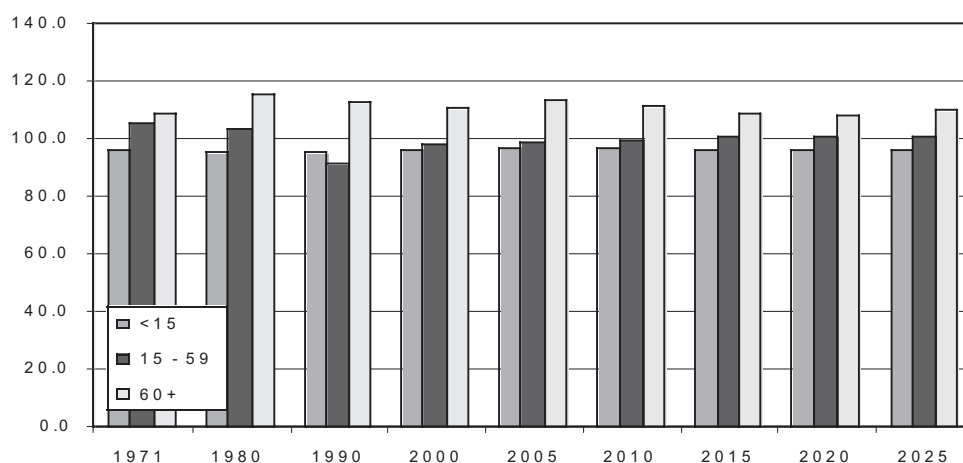
The changes in the age structures, where the young population declines by half and the aging population increases three times as many, reflect the demographic transition in Indonesia (Figures 1a and 1b). Before or in the beginning of the 1970s, the Indonesian population was considered as a 'young population', but in 2025 it will become an 'old population'. An interesting fact is that the proportion of the productive-age population (15-59) continues to increase gradually, from 51.55 percent in 1971 to 62.2 percent in 2000, and it is estimated to reach 64 percent in 2025. It can be seen also that the female population consistently predominates the male population within the aging population structure. This is in line with the fact that the average of life expectancy of the female population is higher than that of the male population.

Figure 1a. The changes of age structure



Source: BPS and Bappenas

Figure 1b. The changes of age structure by sex ratio (female/male)



Source: BPS and Bappenas

By the demographic transition process, the dependency ratio of the young and aging population against the productive-age population continuously declined from 94 percent in 1971 to 60.8 percent in 2000. The ratio is estimated to decline to 51.9 percent in 2010, and thereafter it 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 dependency ratio will experience a fundamental change. In this respect, the ‘young population dependency ratio’ (the ratio of the young population against the productive-age population) declined consistently from 95.3 percent in 1971 to 35.7 percent in 2025, while the ‘old population dependency ratio’ (the ratio of the aging population against the productive-age population) increased consistently from 8.7 percent in 1971 to 20.5 percent in 2025.

In line with the demographic transition, one of the phenomena that should be seen is the potential to obtain an ‘economic benefit’ referred to as demographic dividend (demographic bonus). Demographic dividend means 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 too. A smaller ‘young population dependency ratio’ will reduce significantly 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, conducive policies to make use of the potentials play an essential role.³

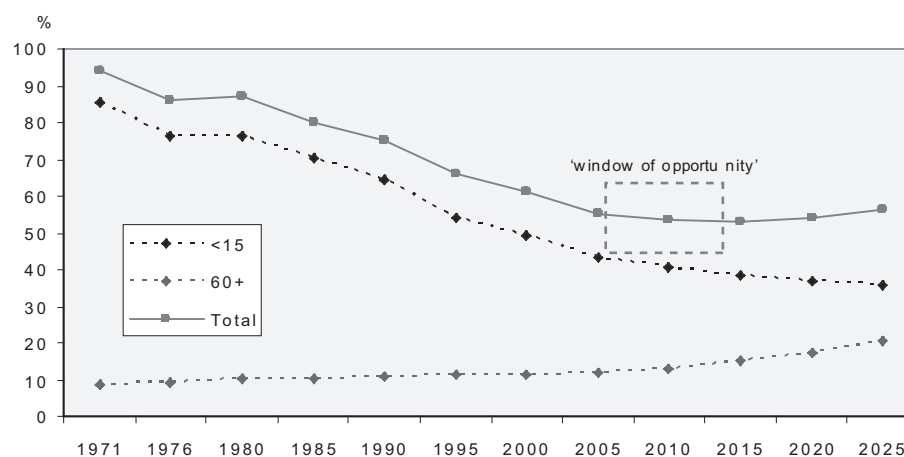
Also, the demographic dividend phenomenon cannot exist forever. In line with the passing of the time, the opportunity for the government investment to increase, due to the switch of the population composition, will disappear. This is because the population composition will finally be changed by the declining child-age popula-

³ The example often cited is what happened in South Korea. When the birthrate declined in mid 1960s, the number of children enrolled in elementary schools declined. Then, the South Korean Government switched the 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 bigger 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).

tion 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 by the 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 2 indicates that, following the success of national family planning program, since 1980's 'young population dependency ratio' decreases consistently along with the increase of 'old population dependency ratio'. These developments lead to the significant decrease of total dependency ratio which reach the minimum level throughout the period of 2010-2020, and start increasing afterward. From this behavior then we can conclude that the 'window of opportunity' for the demographic dividend will be occurred during the period 2010-2020. This estimate is slightly different from that of the UN (Bappenas/Unsfir, 2002), predicting that 'window of opportunity' for the demographic dividend will be open since 2015. The difference is mainly due to different 'aging' definition, whereby according the UN, the term of "aging" refers to the group of population aged 65 years or older, whereas in Indonesia 60 years is commonly use as start of aging.

Figure 2. Dependency ratio by age structure



Source: BPS and Bappenas

3. MACROECONOMIC CONSEQUENCES OF AGING POPULATION IN INDONESIA

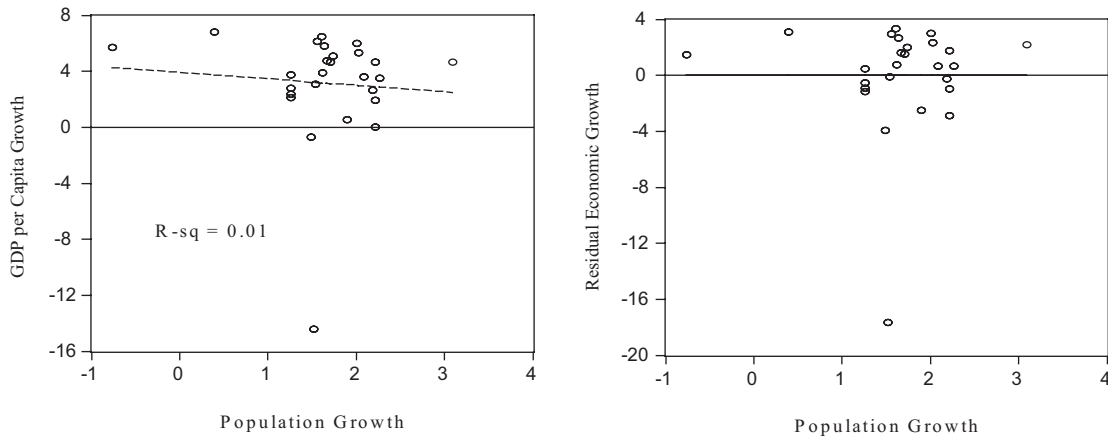
Empirical facts about population growth and economic growth in Indonesia

The debates on the effects of population growth on economic growth up to the present are inconclusive; does population promote, hamper, independent of economic growth? Several empirical observation results are all in support of the three hypotheses (United Nations, 2001; Sachs et al., 2001; Simon, 1981; Kelley, 2001). As a 'neutralist theory', observation of the case of Indonesia indicates less significance of statistic correlation between population growth and economic (per-capita) growth. From observation of the development during the period 1970-2005 in Figure 3a panel on the left, it may be seen that although population growth is accompanied by slowing economic growth, the correlation level taking place is very small (-0.08). The panel on the right shows that the correlation of the 'residual'

growth proportion with population growth is weak. Thus, if these ‘unexplained’ factors (other fundamental economic conditions, including capital stock, technological levels and human capital) are controlled, there will be no significant evidence on the relatedness between population growth and economic growth.

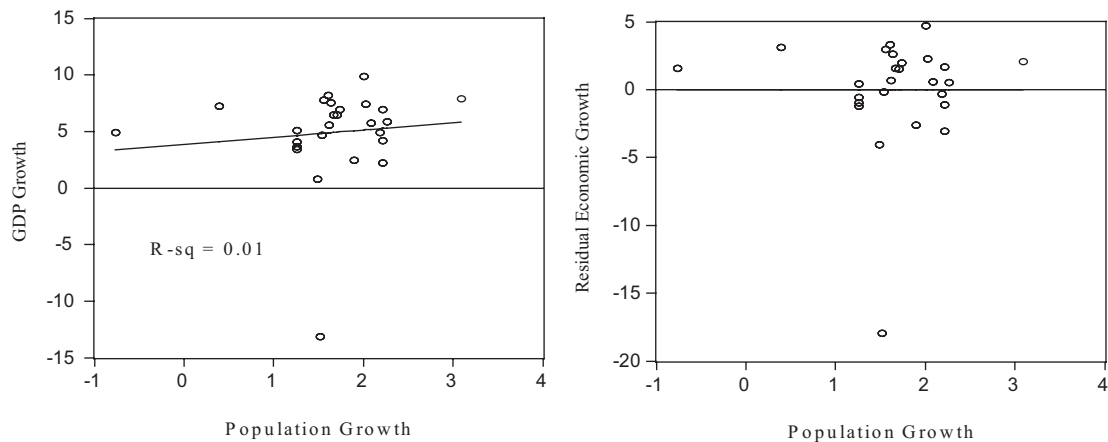
Meanwhile, an observation of the relationship between population growth and economic growth in the same sample also shows that there is no significant positive correlation between them as a whole (Figure 3b). It can also be seen that individual observation’s deviations from the overall trend (regression) line are relatively large, suggesting that although a population increase may potentially expand an economic capacity through increased labor input, the other fundamental economic conditions, including capital stock, technological levels and human capital are still predominant.

Figure 3a. GDP per cap growth and population growth (%)



Source: BPS and Bappenas

Figure 3b. GDP growth and population growth (%)



Source: BPS and Bappenas

The above facts indicate that either per-capita GDP growth or GDP growth has no significant correlation with population growth. Such a condition supports the view

of 'population neutralism'. The observation results are fairly reasonable, at least for two reasons. First, the observation focused more on the population size than the age structure of the population. Second, the control of other variables that affect economic growth, such as structure maturity and economic openness, education level, quality of civil society, and institutional structure maturity, is not calculated. This may be seen in the very small (0.01) 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 research purpose has been described in the introduction, and the next section will look into the implication of the increased total (or distribution) of the aging population in economic growth potentials.

3.1 IMPACT OF AGING POPULATION ON LABOR SUPPLY AND SAVING-INVESTMENT BEHAVIOR

A great deal of attention has seriously been paid to the increased portion of the aging population in numerous countries nowadays because it is predicted that such a condition may increase pressure on economic growth, unless it is anticipated early. Developed countries are beginning to feel the pressure of the aging population issue at present. Rogers et. al. (2000), for instance, pointed out that in the U.S. there are fears that the "baby boomers" generation – born between 1946 and 1964 – is going to enter the retirement age in the second decade of the 21st century. This demographic condition, if not accompanied by the change in the household behavior and the government fiscal policies, will reduce the workforce that can support the whole population (its increasing dependency ratio) and reduce the growth of the national savings. This will, in turn, slow down the growth of the national revenues and consumption after 2010. Further, Bosworth and Burtless (1997) estimated that prior to 2030 the old dependency ratio (ratio of population aged over 64 years against 15-64 years) will be around 30 percent in the US, and 40 percent in the UK, and nearly 50 percent in Germany and Japan. For these countries, the government expenditures to provide pension benefits will increase significantly and can be burdensome on their 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 previously, based on the projection figures, the age group above 60 years in Indonesia in 2025 will reach 13.2 percent, which indicates a substantial increase from around 7.5 percent in 2005. The next section will describe the implication of the increasing aging population on economic growth potentials in Indonesia, particularly through its impacts on the labor supply as well as the behavior of the national savings and investment.⁴

⁴ Conceptually, economic growth potentials can be considered as 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 (national savings) is one of the sources for investments, and hence the accumulation of capital stock.

3.1.1 IMPACTS OF AGING POPULATION ON LABOR SUPPLY

Projection of the population of the productive-age group (aged 15-60 years) in Indonesia in 2025 will absolutely increase by about 47.2 million from the position in 2000. Nevertheless, if viewed from its portion against the total population in the relevant year, it does not change significantly, namely from 62.2 percent in 2000 to 64 percent in 2005. This indicates that the increased composition of the aging population is more off-set by the reduction in the young age population group. By such a composition, the aging index (ratio of the population over 60 years against that of under 15 years) increased quite sharply in 20 years ahead, namely from 26 percent in 2005 to 58 percent in 2025. In fact, the development is in line with the increased composition of the aging population from 7.5 percent in 2005 to 13.2 percent in 2025.

The impacts of the increased aging population on the labor supply and economic growth potentials 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 and the total aging population to indicate the potential burden that should be shouldered by the workforce.⁵ Meanwhile, the labor supply adequacy, which is simply the ratio of the total workforce against the total population, is an indicator to view the manpower burden against the population, and it is one of the important factors that affect the living standard of the population as a whole.

Table 3. Aging population and labor supply

Period	Aging Pop	PSR	%Δ Labor Force	LSA (LF/Pop)	LF Part Rate	UnRate	%Δ Y/Cap
1981-1985	5.6	9.6	3.3	37.8	54.3	1.63	2.4
1986-1990	6.0	9.3	4.1	42.3	57.3	2.7	4.4
1991-1995	6.3	9.4	2.1	43.6	57.2	3.4	5.4
1996-2000	7.2	8.6	2.1	45.7	63.7	5.5	-0.02
2001-2005	7.3	8.7	1.8	47.5	67.3	9.4	3.0

Sources: BPS

As indicated by Table 3, the increased aging population implicates the increased burden that should be shouldered by the productive-age population, where the effects of the increased aging population is clear in the potential support ratio (PSR) that has continued to decline. During the last 25 years, the PSR figure will decline from 9.6 people in period 1981-1985 to 8.7 people in period 2001-2005 of the workforce shouldering each person aged over 60 years. This tendency seems to continue to take place, estimated to reach 5 people in 2021-2025, in line with the increasing composition of the aging population. The PSR implicates the provision of the people's social security facilities, such as the pension and health contributions, particularly in the traditional system, where the currently working people pay for the benefits for the pensioners at present.

In line with the increased total population and aging population, the total labor force increased, although on an average that appeared to slow down, from 3.3 percent in period 1981-1985 to 1.8 percent in period 2001-2005, particularly following the economic crisis in 1997. Such a condition also caused the labor supply adequacy

⁵ The Potential Support Ratio (PSR) is an indicator to measure the dependency of an age group against another. Technically, this indicator is another version, or an inverse, of the 'old population dependency ratio'.

cy (LSA) to slow down. During the last 25 years, the LSA changed from 37.8 percent in period 1981-1985 to 47.5 percent in period 2001-2005, or only increased by approximately 1 percent on average per year. Compared to the population growth that reaches 1.6 percent on average per year, the slowing LSA growth implicates the relatively heavy burden of the workforce for the population it supports.

Meanwhile, the labor force participation rate (LF Part Rate) continued to increase from 54 percent in period 1981-1985 to 67 percent in period 2001-2005. Nevertheless, the labor force participation rate of the aging population appeared to decline. According to the 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 2010.⁶ This fact indicates that although according to the demographic criteria the aging population is considered as part of the burden that should be shouldered by the productive-age population, in fact, some of them 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 bigger 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 2005, the unemployment rate in Indonesia was estimated to surpass 10 percent. This is a quite sharp increase compared to that of the previous 10 and 20 years that stood at only 3.4 percent and 1.6 percent. The unfavorable consequences of the economic crisis are indeed some of the causes of the high unemployment rate during the last 9 years. The economic crisis has caused many companies to reduce the number of their employees, and even a significant number of them have closed their businesses, resulting in numerous cases of work relation severance (PHK). In such a condition, 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 more and more 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 getting obsolete (Drury, 1994; Taylor and Walker, 1996; in UN, 2001).

From the description above, it can be concluded in general that the effects of the increased aging population on economic growth potentials 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. By the increased unemployment rate and the non-established environmental policy in support of the aging population, the increased aging population will reduce economic growth potentials in the future.

⁶ According to the UN projection (2001) until 2010, the countries with a high per capita income tend to have a lower old-age labor force participation rate than the countries with a low per capita income. In more developed countries, only 21 percent of men aged 60 years or more are still actively working compared to around 50 percent of the same population group in less developed countries.

3.1.2 IMPACTS OF AGING POPULATION ON SAVING-INVESTMENT BEHAVIOR

In theory, it may be said that saving is a person's effort to improve his ability to produce and consume in the future by sacrificing his consumption level at present. The tendency of a longer life span of the population and a longer pension age established in a country will implicate the amount of savings needed to maintain the growth of the living standard (Rogers, et al, 2000). Nevertheless, the life-cycle model theory points out that age is a factor that determines the people's saving behavior. A bigger 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 bigger, 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 the saving sources domestically or invite foreign investors in the framework of bridging the disparity of savings and investment.

How is the condition in Indonesia? In order to study this behavior, we need the data on the savings/investment per age group of the population. Unfortunately, however, the data are unavailable in Indonesia. In addition, the development of the national savings/investment is still determined by the economic policies as a whole. Therefore, observation is conducted on the effects of demographic changes on the 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 timeframe.

Table 4a. Demographic changes and saving-investment

Period	% of Population			Saving - Investment		
	Age 60+	Dep Ratio	Old Dep Ratio	S/GDP	I/GDP	S-I Gap
1981-1985	5.6	82.8	10.3	21.8	25.0	-3.2
1986-1990	6.0	77.3	10.7	30.5	33.7	-3.2
1991-1995	6.3	69.7	10.7	24.2	27.3	-3.0
1996-2000	7.2	61.5	11.6	26.7	25.2	1.5
2001-2005	7.3	57.6	11.5	22.7	19.9	2.7

Sources: BPS

Table 4a indicates that in line with the declining dependency ratio, the savings/GDP ratio increased until 2000, and appeared to decline during the last five years. Meanwhile, during the last ten years, since the second half of the 1960s, particularly during the economic crisis of 1997-98, the investment/GDP ratio has indicated a declining tendency. Such a development has caused the S-I gap to become smaller, and even indicated a positive tendency (surplus) during the last ten years. The aggregate data indicate that there is a negative correlation between demographic changes and the people's savings/investment behavior. From the viewpoint of the age groups, this phenomenon is also reflected by positive correlation between 'old population dependency ratio' and the savings/GDP ratio and the S-I gap. From a narrow dimension, these findings support the life cycle view that life-cycle savers help to highlight the role of current saving for retirement.⁷

⁷ The role of savings is well recognized in the economic literature on demographic change. Most researchers employ models with overlapping generations of life-cycle savers. The models range from stylized 2-3 period representations of the life cycle 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).

Nevertheless, as indicated on Table 4b, the strong correlations between aging population and potential saving are not clearly supported by private and public data classification showing that the increased 'old 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 the aggregate data, the conclusion of the aging population positive impacts on savings/investment appears to be ambiguous and should be investigated further.

Table 4b. Demographic changes and saving-investment

Period	% of Population			Private Saving - Investment			Public Saving - Investment		
	Age 60+	Dep Ratio	Old Dep Ratio	S/GDP	I/GDP	S-I Gap	S/GDP	I/GDP	S-I Gap
1981-1985	5.6	82.8	10.3	17.6	18.6	-1	4.5	6.6	-2.2
1986-1990	6	77.3	10.7	25.5	27.1	-1.6	5	6.6	-1.6
1991-1995	6.3	69.7	10.7	17.2	21.6	-4.4	7	5.7	1.4
1996-2000	7.2	61.5	11.6	21.3	20.5	0.9	5.4	4.8	0.6
2001-2005	7.3	57.6	11.5	19	14.8	4.2	3.6	5.1	-1.5

Sources: BPS

3.1.3 SOME ECONOMETRIC EXERCISES

Discussions on the impacts of aging population on economic growth can be conducted not only in qualitative terms, but also in quantitative terms. In this section, it is instructive to explore econometric exercises to what extent the aging population will lower the economic growth potentials, through labor force effect and the changes in saving-investment behavior. Several approaches can be utilized in addressing the issue, ranging from varying from a simple statistical approach to a complicated macro-econometric modeling. In this research, based on logical frameworks developed on previous sections, we propose an alternative parsimonious set-up in the context of multiple regression analysis. The results of preliminary exercises can be summarized as follows.

Table 5. Estimation results 1: Aging population and labor supply

Independent variables	Dependent variable	
	(Changes)	
	PSR	LSA
Growth of GDP	0.001 (0.004)	0.062 (0.081)
Growth of Population	-0.028 (0.022)	-0.337 (0.518)
<i>Aging Population (Changes)</i>	<i>-1.001</i> <i>(0.114)</i>	<i>-0.27</i> <i>(2.640)</i>
Constant	0.080 (0.039)	0.362 (0.909)
R-Sq	0.831	0.050

Note: figures in the brackets are Standard Error.

Table 6. Estimation results 2: Aging population and saving

	Dependent variable			
	Private saving	Public saving	Total saving	S-I gap
Independent variables				
Growth of GDP	-0.378 (0.245)	-0.016 (0.084)	-0.409 (0.253)	-0.052 (0.067)
<i>Aging Population (Changes)</i>	-8.104 (6.252)	2.204 (2.154)	-6.368 (6.607)	-1.395 (1.701)
Dummy 1983 Financial Deregulation	6.351 (4.995)	2.034 (1.529)	8.983 (4.660)	6.440 (1.536)
Dummy 1997 Financial Crisis	-1.699 (3.517)	-1.928 (1.018)	-3.889 (3.055)	5.769 (0.939)
Constant	16.984 (5.056)	3.815 (1.461)	20.571 (4.476)	-8.892 (1.685)
R-Sq	0.418	0.493	0.397	0.919

Note: figures in the brackets are Standard Error. Due to violation on a classical assumption (no autocorrelation), models are estimated by incorporating an autoregressive component [AR(1)].

Table 5 shows that, in addition to negative impacts of the growth of GDP and the growth of population, demographic changes (aging population) appear to have a negative impact on labor supply. Utilizing PSR indicator, model behavior can be explained better, not only in terms of the coefficients' sign which are very significant and 'theoretically' correct, but also in terms of the determinacy coefficient (R-sq) and t-statistics. Meanwhile, using LSA indicator, the coefficients are less significant. These results show that in general that the effects of the increased aging population on economic growth potentials may be explained by the labor force effect.

From Table 6 it can be seen that saving behavior, in general can be explained relatively well by main independent variables, namely economic growth, demographic changes, the dummy 1983 financial deregulation, and the dummy 1997 financial crisis. An interesting result emerges since aging population effects saving groups differently, namely a negative impact on private saving and a positive impact on public saving. The results show that in aging society, while households and private sectors reduce their potential to save, the government increases its initiative to save more. Further estimation on behaviour of total saving and saving-investment gap also confirm that there is no ambiguity in the impacts of demographic changes on saving and saving-investment behavior, that is negative. It is worth noting that someone may be on the alert of the above results due to some less-statistically significant coefficients.

From these estimation results, at least using aggregate data, it can be concluded that the impacts of aging population on economic growth potentials in general can be explained well through labor force effect and the changes in saving-investment behavior, whereby the increase in the proportion of aging population will hamper economic growth potentials.

3.2 THE AGING POPULATION, PRODUCTIVITY GROWTH AND ECONOMIC GROWTH POTENTIAL

To estimate the impact of aging population on the economic growth potential, we propose a two-step approach. The first step is to estimate in-sample (1971-2005) economic growth potential, and the second step is to estimate the impact of aging population on economic growth potential over out-sample period (2006-2025). 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 return to scale technology as follows:

$$Y = aK^\alpha L^{(1-\alpha)} e^\varepsilon \quad (1)$$

where Y is real output (GDP), L denotes labor, K capital, e error terms, ε the natural number, and a and α are parameters of the function.

In this study, we estimate the long run parameters of equation (1) using cointegration procedure with relevant sample data of period 1971-2005. Since the post crisis period (2000-2005) characterizes structural changes, the long run parameters are obtained by averaging parameter values generated from rolling estimation procedures within six different periods, in which the last observation for each estimation ranges from 2000 to 2005. Based on the estimated model, it was computed that the α , reflecting that the long run elasticity of capital input of output – for the period that covers various events including the crisis – is approximately 0.3001. 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 $\Delta\%TFP = \Delta\%Y - 0.3001 \Delta\%K - 0.6999 \Delta\%L$.

From historical data, it was computed that the average of long run growth of Indonesian GDP over the period 1971-2005 is approximately 5.5 percent per year. While the long run growth of capital stock and labor factors are approximately 9.2 percent and 2.9 percent, respectively, according to our estimates, the TFP growth rate is 0.8 percent. This means that economic growth in Indonesia has primarily been driven by factor accumulation, in particular, investment (Table 7). Our TFP estimate is consistent with the ones of other studies, such as Bosworth & Collins (1996), Sarel (1997), and Chowdhury et al (2002), showing that Indonesian TFP growth estimates ranges from 0.7 to 0.9.

Based on the estimate of TFP growth, representing productivity growth, it is worth to know further whether this productivity growth measure would account for the impact of aging population on economic growth potential. Table 8 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 in period-to-period base and long-run moving average base (LR-Movav). Even, the TFP growth tends to slowdown during the last ten years. These facts suggest also that the issue of productivity is indeed a complex issue, since there are other factors affecting productivity growth that should also be considered properly, such as education level, quality of civil society, and institutional structure maturity. This analysis excludes those factors.

Table 7. Economic growth and share of production factors (%)

Period (LR-Movav)	Growth of output (GDP)	Share of production factors		
		Capital	Labor	TFP
1971 - 1975	8.0	5.4	2.1	0.5
1971 - 1980	7.9	4.7	2.4	0.8
1971 - 1985	6.8	4.0	2.3	0.4
1971 - 1990	6.6	3.6	2.5	0.6
1971 - 1997	6.7	3.5	2.3	1.0
1971 - 2005	5.5	2.8	2.0	0.8
1971 - 2005 Excluding prior-crisis data	6.3	3.2	2.2	0.9

Table 8. Aging population and productivity growth

Period	Aging Pop (% of Pop)	TFP growth (%)	TFP growth LR-Movav (%)
1981-1985	5.6	-0.2	0.6
1986-1990	6.0	0.9	0.4
1991-1995	6.3	2.5	0.9
1996-2000	7.2	-1.8	0.7
2001-2005	7.3	2.5	0.7

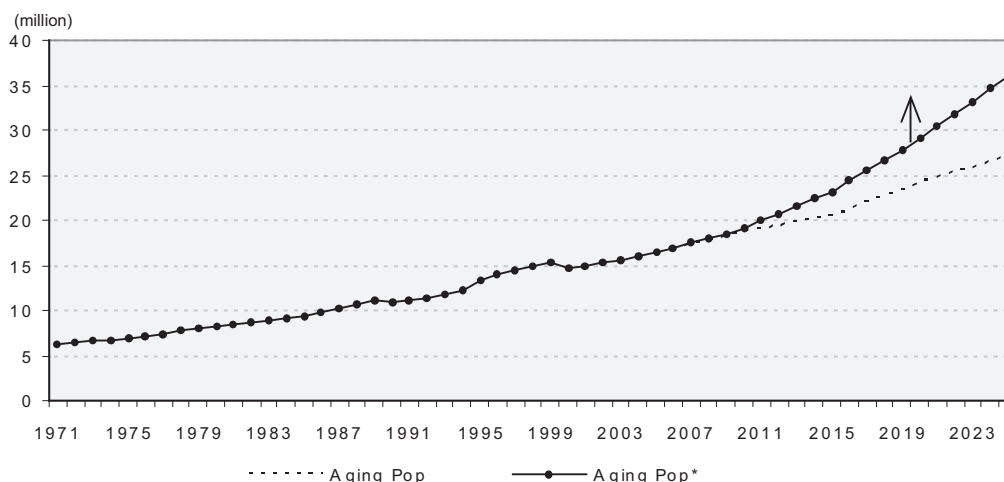
Furthermore, the model of long-run relationship involving gross domestic product (GDP), physical capital stock and labor force from 1971 to 2005 is used to derive potential growth rate over period 2006-2025. In this case, in order to estimate the impact of aging population on economic growth potential, we set prior strong assumptions for a base line scenario (no aging population impact) that the long run growth of capital stock and labor will approach their average levels, excluding prior-crisis data (1998-1999), namely 10 percent and 3.3 percent per year, respectively. The 10 percent growth of capital stock is calculated based on the long run share of national saving which ranges from 20 percent to 25 percent of national output and a depreciation rate of 5 percent.⁸ With the long run growth of TFP that is estimated to keep on a slightly higher rate of 0.9 percent per year, conditional to the Government efforts to re-examine the policies with regard to education and training and technology development, the potential economic growth rate is expected to reach approximately 6.2 percent per year. This rate is below the rate of the pre-crisis period, 6.7 percent, and the rate of full historical excluding prior-crisis data, 6.3 percent. 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 aging population economic growth potentials can be explained through two channels, namely labor force effect and the changes in saving-investment behavior. Here, we run a sensitivity analysis by estimating the impact of aging population on labor supply and saving (capital stock), thus output, all consider the deviation from their respective long run growth (trend). This indeed measures economic growth potential loss. It worth noting that amid the success of National Family Planning and various health care programs established by the Indonesian Government, aging phenomenon in Indonesia is predicted to accelerate over decades to come (Figure 4). From historical data, it can be seen that while aging

⁸ Based on a famous simple accounting $\Delta K/K = s Y/K - \delta$.

population only grew averagely 2.8 percent per year during period 1971-2005, the number is predicted to jump to 4 percent over period 2006-2025.

Figure 4. Trajectory of aging population



Further, due to less-statistically significant impact of aging population on saving behavior -- econometric exercise, we set two scenarios namely conditions in which only labor force channel working as well as both labor force and saving behavior channels be relevant. On the first scenario, based on estimated 'elasticity of substitution' parameter between labor supply and aging population, 0.8, these 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 5.7 percent. Therefore, ceteris paribus, over the next two decades the decrease in labor supply will bring about economic growth potential loss approximately 0.5 percent per year.

The second scenario assumes that, with a stable marginal propensity to consume, aging phenomenon may depress potential saving at its lower share, 20 percent of national output, leading to decrease in the growth of capital stock by 0.5 percent. Assuming that depreciation rate is relatively stable at the rate of 5 percent, ceteris paribus, the decrease in saving rate will bring about economic growth potential loss approximately 0.2 percent per year. To conclude, based on these two scenarios, over the next two decades aging phenomenon will bring about economic growth potential loss approximately 0.5 percent to 0.7 percent per year (Table 9).

Table 9. Long run economic growth potentials 2025

	No Crisis	Baseline	Scenario 1	Scenario 2
TFP	0.9	0.9	0.9	0.9
Labor supply (%)	3.3	3.3	2.5	2.5
Capital stock (%)	11.6	10	10	9.5
Economic growth (%)	6.7	6.2	5.7	5.5
Potential loss (%)	-	-	0.5	0.7

Figure 5. Trajectory of real GDP

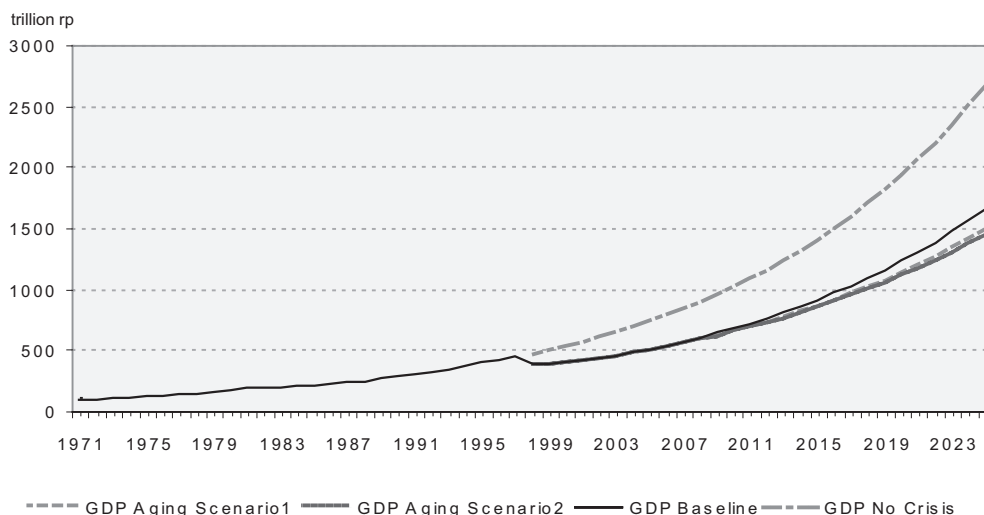


Figure 5 depicts the trajectory of the economy over 2005-2025 period based on the pre-crisis historical trend (GDP no crisis), the trend including the crisis (GDP baseline), and the adjusted trend due to aging phenomenon (GDP aging scenario 1 and scenario 2). The historical trend follows a compound growth rate of 6.7 percent per year and as opposed to the estimated baseline growth rate of 6.2 percent and aging case growth rate of 5.5 percent and 5.7 percent respectively, taking into account the impact of the crisis. Had there been no crisis, real GDP in 2025 would have been approximately Rp2, 663 trillion (in 1993 constant prices). Meanwhile, based on the estimated growth rate of 6.2 percent, real GDP in 2025 are expected to reach approximately Rp1, 646 trillion.

3.3 THE IMPACTS OF AGING POPULATION ON FISCAL BURDEN

Portrait of aging population vulnerability

In line with economic advancement and improved people's welfare, increased aging population in a country will increase the 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 the social and health security scheme for the citizens in Indonesia. 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. Whereas, in developing countries, such as Indonesia, the financial support for the aging population comes from extended family members according to the social and cultural pattern that rests with the extended family. Even if there is any income source as a retired government/private employee, its amount is relatively small.

The condition is inseparable from the portrait of the aging population vulnerability existing since the beginning of independence. In the past, the policies on aging

population were not prioritized by the Indonesian Government, due to the fact that the proportion of the aging population was still relatively small. The government still prioritized the provision of employment opportunities for the manpower-age population. Treatment of elderly people was still regarded as the responsibility of their families because of the consideration that the productive-age population will take care of their parents. In other words, the government resources allocated for the aging population was very limited, particularly for elderly people who are poor and have no families or relatives to take care of them. Meanwhile, the switch in the family structure and in the economic condition has continued and made it difficult for the families to take care of their elderly members. This has caused the elderly people to live their old lives in misery or even below the poverty line.

Another fact of the aging population is that the majority of them are still active in the workforce, particularly in the informal and agricultural sectors. Nevertheless, the working elderly people generally have a 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 of the aging population during the last two or three decades has caused numerous consequences on the public policies in Indonesia. *First*, the increased aging population has caused the budget for treatment and other health supports to increase. Experience in many developed countries with a significant aging population indicates that by the increase of welfare and life expectancy, the government expenditures in respect of the health of the aging population also increase, such as medication, medicare, and elderly homes. The result is that the percentage of the cost of health of the total GNP will also increase. In developed countries, where there is a high concentration of the aging population, the government expenditures for health in 1990 reached 9.2 percent of GNP, while in developing countries the figures were 4.7 percent and 8.1 percent worldwide (World Bank, 1993). In Indonesia, the cost of health is mainly supported by private expenditures, whereby government expenditure only shares approximately 20 percent of total cost, or less than the average level of East Asia and Pacific (Indonesia Human Development Report, 2004).

Previously, the aging population in Indonesia relied on the family assistance for health treatment and financial assistance. Unfortunately, however, the aging population in Indonesia increased in coincidence with rapid modernization and 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 growing up 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 get health/financial assistance when they need it.

The next 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 the more specific knowledge/ability to treat the 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 now that the main consequence of the aging population is the needs for treatment services, facilities and equipment for them. The needs will automatically become an additional burden on the state/government budget as customary in developed countries.

Second, in line with the increased costs of healthcare, the financial support scheme 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, or foundations/charity institutions). Therefore, the government should provide additional budgets to support the social/health security scheme for the aging population. The government should consider carefully the relevant funding sources in support of the additional budgets because the expenditures are not the investment that produces financial returns in later days.

For the case of Indonesia, the social/health security system has not been properly provided by the government due to limited budgets and scale of priorities, which, up to the present, has not prioritized the welfare of the aging population. This is in line with the fact that health insurance system is not widely known in Indonesia. Not every family has a specific health insurance, except required by their work and their company. Current socio-economic status of Indonesians is one reason why health insurance is not common yet in the country. Griffin (1989) and Gertler and Melnic (1992) stated some of the constraints come from lack of supporting infrastructure and lack of societies perception about health insurance (Wirakartakusmah and Priyono, 1992). Currently, only 15 percent of Indonesians are currently covered by some form of health insurance scheme provided either by both the public and the private sector. Specifically, 10 percent are covered by a public health insurance scheme, namely Askes⁹ for civil servants, Jamsostek¹⁰ for private formal sector workers, and community health maintenance schemes (JPKM). The rest of 5 percent have private health insurance coverage (ILO, 2003).

⁹ 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 of 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 9 percent from all the population. In principle, the membership of PT Askes for public employee is lifetime. The coverage continues even after retirement when members do not have to pay any more monthly fee.

¹⁰ The Law No. 3/1992 on workers' Social Security (UU Jamsostek) creates several social security benefits for workers, which are: (1) worker injury benefits; (2) death benefits; (3) retirement benefits; and (4) healthcare benefits. To participate, each employer has to make a contribution which is equal to about one month of a worker's annual salary. In addition, workers have to contribute 2 percent of their wages to the retirement benefits program. 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 on whether they work in the formal or informal sector, in practice, only some formal sector workers were covered by this scheme, specifically, those that work in medium and large-sized enterprises (those that employed more than 10 employees). This means that the vast majority of Indonesian workers (80 percent of the total workforce) are not covered by this scheme.

Eventhough, the commitment being given currently to development of the national security scheme (Jamsosnas)¹¹ – with possible implications for a future comprehensive system with benefit provisions that are harmonized between the public and private sectors, it is estimated that the impact of proposed Jamsosnas old-age pension scheme on the current Indonesian aging population would be minimal. It is because the system could suffer financial unsustainability since it would place significant liabilities on government and employers, making the program less attractive to participants.

In sum, for the future the Indonesian government should realize that the potential fiscal issue in connection with the aging population will certainly be faced by the country as the consequence of the efforts in creating and improving the welfare of its people. Since the problem of aging population will become more and more complex in the years to come, a commitment or political decision has to be made and implemented consistently.

4. GLOBAL AGING PHENOMENON: OPPORTUNITY AND CHALLENGES FOR INDONESIA

Demographic transition in the industrialized countries will lead aging population to be dominant within the population distribution. This will alter the way the population utilize their income. In aggregate demand, the preference for consumption of goods and services will be shifted, whereby the increasing number of aging population will tend to raise the need for services, such as in the health and care sectors. Likewise, investment and saving behavior are also susceptible to change since aging population tend to increase their savings to anticipate retirement period. They would also become more cautious and may become less tolerance to high risk in their investment portfolios. This would in turn incline 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 economies opens up opportunity for Indonesian young labor force to fill in 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. Remittances are advantageous to Indonesian economy due to its long term and un-volatile nature. To fully grab this opportunity, however, Indonesia needs to improve education environment to provide skilled workers. As recognized, Indonesia is a quintessential labor surplus nation and is considered as one of the world's major sources of unskilled international migrant workers. In fact, this movement of laborers, many in responses to the economic crisis, has become the most significant aspect of Indonesia's migration patterns and policies.

Capital inflows to Indonesia are also expected to enter in the form of foreign direct investment (FDI), in line with the declining productive-age labor force in the aging economies. Alternative policy to lengthen the working age in those economies would entail higher labor costs. This may induce the phenomenon of relocating

¹¹ 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 key features of the new law is that it mandates 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 above 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.

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 the effort to improve investment climate, regulatory framework, and infrastructures. In sum, opportunities would arise for Indonesian economy to encourage growth from investment, savings and consumption.

The impact of global aging phenomenon would pass also its way to the financial markets, i.e financial assets prices, through the influence of age-cohort behavior in terms of both saving and *portfolio* and *savings decision*.¹² For Indonesia in particular, the current opportunities in the financial market is two folded, 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 increase 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 non-retiring investors to also draw their investment before the point of losses. For the investors from the non-aging economies then the asset meltdown effect should be well anticipated to avoid losses.

On the other hand, with quite a liberalized capital inflow, Indonesia is mostly open for foreign investment not only in the form of direct investment, but also *portfolio investment*. Stable domestic macro economy, prudent macroeconomic policies and improved regulations, supervision and governance have helped to provide conducive environment for investment. Portfolio investment, including those of foreign investors, has been increasing in recent years after the 1997 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. Also, there are beneficial aspects as this would help deepen domestic financial market and encourage financial innovations.

Another aspect of aging as mentioned above is the changing risk appetite as one enters into aging period. While this is still debatable, it does make sense that a retired person would be more willing to hold less risky portfolio as their capacity to make up for future losses have reduced. Considering that 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 comprises concerted efforts to develop 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.

The last one is the fact that the increasing need for services in the aging economies may also be in the form of leisure. This would encourage foreign tourists coming to Indonesia to enjoy their retirement age. This calls for efforts to improve the tourism sector in Indonesia. Furthermore, the ability to anticipate and

¹² On the issue of 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 would put downward pressure on financial asset prices ('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 because the hypothesis does not reflect the 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 .

fill the typical need of aging people is clearly important, such as security, proper health facilities, convenience, etc. Investment in this area will also help increase Indonesian economic growth.

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

Pro-growth macroeconomic policy, through implementation sound macroeconomic policies, is needed to ensure a sustainable economic growth. As a developing country, a sustainable economic growth is prerequisite in toward higher prosperity as well as quality of life. This condition is a crucial thing and should be gained before population become aging. In this regard, pro-growth orientation should also be supported by sustainable fiscal policy providing stimulus to the economy. Further, considering the fact that the problem in aging population is also inseparable with the problem in the 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 prerequisite to improve productivity and growth, maintain competitive globally, and thus raise individual welfare. International cooperation in many areas of cooperation should be taken as well. Those areas, among others, are cooperation in sharing experience of the countries that have already gone in the process of aging population. The experience that can be shared includes designing the pension system, reforming the public pension system, and fostering the asset management industry.

5. CONCLUDING REMARKS

With the early stage of transition demography currently in Indonesia, it is quite difficult to comprehensively investigate the impacts of aging population on economic growth potentials. It is because the economic growth is determined by many factors, not only demographic changes, but also other fundamental economic conditions, such as technological levels, human capital, and policy environment. In this research, in addition to a qualitative investigation, we propose an alternative parsimonious set-up in the context of regression analysis. The results of 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 saving behavior. In this regard, based on a preliminary exercise, the increase in the proportion of aging population over the next two decades will hamper economic growth potentials approximately 0.5 to 0.7 percent potential loss per year.

Beyond that, the challenges in Indonesia demography is also inseparable with 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 socio-economic development. Since 1970's Indonesia government has taken some policies addressing those challenges. The policies focused on policies in lowering fertility and increase attention to address the persistently high rate maternal mortality. Although those have succeeded significantly to slow population growth and improve quality of life, some problem remain exist.

It seems also that the future economic growth must come from the growth of productivity or technological progress and skill upgrading. 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. This is not only a very critical step but also the one that in line with the predicted occurrence of the 'window of opportunity' for the demographic dividend within the next two decades.

In tandem with those efforts, as the number of Indonesian elderly grows, comprehensive aging policy increasingly becomes more important in the country's policy agenda and more legislation. The 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 would follow through with the above commitments, it is hoped that Indonesia would be successful in developing a comprehensive aging policy.

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