

CICRED'S SEMINAR

**Age structural transitions and its
implication, the case of Indonesia over a
century, 1950-2050**

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Age Structural Transitions and its Implication The case of Indonesia over a Century, 1950-2050¹

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1. Introduction

Indonesia is a country with the fourth biggest number of population, 206 million people in 2000 after China, India, and USA.

The aim of the study is to present a result of analysis on Age Structural Transitions in Indonesia - its determinants, its trajectories and its social and economic implication - over a century (1950-2050) using empirical data from 1950-2000 and simulation based on UN medium population projection from 2005 to 2050 (UN, 2002). It presents evidences of demographic changes leading to changes in the age structure, which reshapes the future of the Indonesian population.

Three phases of population momentum was observed to see the causes and impact of population dynamics on age structural transition. It covered the simple momentum covering the period before the 1960s and the 1971, the population waves caused by the demographic transition during 1980-2010, and the population aging following the past trends in declining birth and death rates, during 2020-2050².

2. The Data

The analysis was made for the period of 1950 – 2050. The first half of the period (1950 to 2000) was observed through empirical data, mainly the population censuses and some estimates based on indirect methods as well as from national surveys collected by the Central Bureau of Statistics. Observation on population dynamics and changes in age structure of the 2005-2050 was made based on the UN Population Projection, the revised format of the 2002 (UN, 2002).

Single age data on Indonesian population are not very reliable because they usually are suffered from digital preferences of 0 and 5. Therefore presentation of age structure is grouped by five years. Even though the census taking since 1961 is getting better and more reliable results, the single age data still shows age miss-statements. Further, the fielding of the 2000 census is not fully completed because of the ethnic conflicts with violence in some provinces leaving three out of 30 provinces was not being enumerated. As a result, the number and age structure of population in these provinces were estimated, therefore lacking in consistency if compared with the 1990 data. Nevertheless, in general the changes in proportion of population under certain ages, like the under-fives, 0-14 years, prime working age and the aging are still very useful in analyzing the age structural transition and its social and economic impact.

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3. Early phase: the simple momentum (1961-1971).

Age distribution of the 1961 population.

The age structure of the 1961 population of Indonesia is very much influenced by the fluctuation of birth and death rates during the World War, Japanese occupation and the War of Independence and back to normal high birth rate when Indonesia got its Independence in the early 1950s (Widjoyo, 1970).

(Figure 1 is here. Phase I, The Simple Momentum, Indonesia 1961,1971))

Figure 1 shows that the proportion of population aged 0-9 years (cohorts born in 1950) of the 1961 population was almost doubled as those aged 10-19 (cohorts born in the 1940s), reflecting the increase in births after the war, and the decrease in birth rates during the war. Later this argument was supported by the age structure of the 1971 population, in which the hollow in the population pyramid 1961 was shifted to higher age group, aged 20-29 years.

Although mortality has shown a tendency to decline, the rate in 1961 was still high reducing the probability of babies to survive to older ages. Beside adult mortality was still high making the proportion of population becoming smaller and smaller at older ages. This explains the 'inverted cone' shape of the population pyramid in 1961 with a small proportion of people reaching older ages, which were only 3.7 percent.

The entry of the larger birth cohorts of the fifties would be shown in the increase in the number of population aged 15-29 years in 1966-1980, and aged 30-44 in 1980-1991. This resulted in a '**radical rejuvenation**' of the working age population, meaning that the working-age population consists of high proportion of young people. It was also noticed that women entered reproductive period and working-age at the same time leading to a high birth rate around 1980s

The high birth rates in the past lead to high proportion of children below 15 years in 1961 compared to the working-age population. Taking into account the number of older person aged 65 and above, the dependency ratio in 1961 was 81.8 per 100 working age population. (Table 1).

Table 1 is here (Demographic Indicators)

The age structure of the 1971 population.

The estimated Crude Birth Rate for the 1971 census was 42.7 per 1000 population, while the death rate was 21.5 per 1000 population resulting an increase of population growth from 1.8% during 1950 to 1961 to 2.1% per annum during the period of 1961-1971. The Republic of Indonesia under Sukarno (1945-1965) was able to continue to improve the health status indicated by the declining Infant Mortality rate from 176 in the 1950s to 145 infant deaths per 1000 births in 1967 (Table 1). This leads to more babies survived to older ages, which is indicated in the same proportion of children 0-4 and 5-9 years in the 1971 population pyramid. While estimation of adult mortality

rate was still a problem due to the unreliability of information, policy makers were confident of declining mortality at all ages. This is true because of the improvement in medical technology especially in the spread of antibiotics which helped reduce the evidence of communicable diseases such as plague, smallpox and malaria (Hugo et al; 1987).

On the other hand, fertility level remained high with an average of 5 to 6 children per woman during 1967-1971 (CBS, 1976) or equivalent to 5.1 million births per year during 1961-1971. The steady high fertility and the rapid decline in mortality resulted in a higher proportion of children 0-14 years compared to the working age population or an increase in the dependency ratio from 81.8 in 1961 to 86.8 in 1971 (Table 1).

The period of early 1970th was marked by the increasing awareness about population explosion as an impact of the declining fertility and the steady high fertility. The Indonesian government was aware of increasing population pressure if population control was not adopted to halt population growth. A national family planning program was finally launched in 1971 and took into effect since 1972.

4. The population waves.

Family planning program, demographic transition and changes in age structure

The family planning program was launched in three phases, started in 1971 in Java and Bali only, expanded to Sumatra in 1975 and the rest of the islands started family planning program in 1979. The BKKBN (the Family Planning Coordinating Board) conducted strong advocacy on small family size and legitimating contraceptive use since early 1970s. The use of modern contraceptives among Javanese married women increased rapidly from virtually zero before the 1960s, to 26 percent in 1976. This prevalence becomes two-folds in 1987, afterwards increased to 53.4 percent, 58.4 percent and 71 percent for the year 1991, 1994 and 1997. While in the outer islands, the contraceptive prevalence was also increased up to 50 percent in 1997.

The motivation to use contraception was not disturbed by the prolonged economic crisis since 1997, which led to upsurge in prices of basic needs and reduced the affordability of most Indonesian to meet basic needs. On the other hand, the ability of Government to provide subsidized contraceptive devices and services for the poor was also decreasing. Thus, for the poor, the decision to obtain contraceptive services has to compete with decisions to meet other basic needs. However, data showed that the contraceptive prevalence was stable, indicating that small family size norm was institutionalized among Indonesian women (Table 2). The changes in childbearing behaviour has resulted in the decline in Total Fertility Rate from 5.6 children in late 1950s to 2.3 children in late 1990s. (Table 3)

Table 2. Trends in contraceptive use is here

Table 3 Trends in Total Fertility Rate and Age Specific Fertility Rates is here

The demographic transition.

The population dynamics during the last fifty years changes the Indonesian age structure enormously. The birth of the large cohort in the fifties and grew up into

adulthood, entered the working-age and the women were in child-bearing period and entering retirement age in 2015 onward. Even when it is proven that fertility rate has been falling rapidly, the impact of the cohorts of baby boom of the fifties on the population age structure is noticeable since the late of the 70th until the new millennium, indicated by high proportion of children aged 0-14 years. The large number of births turned into a large number of mothers when they entered reproductive period, and therefore larger number of births born from them. This process kept on going until the impact of fertility decline came into effect in 1980.

The impact of large cohorts is shown by the evidence that during the later half of the fifties the annual number of babies born increased significantly from 4.1 million babies between 1955-1960 to 4.8 million during 1965-1970, increased further to 5 million a year for the period of 1975-1985. After which it started to show a slow decline in the number of annual birth rates showing the effect of smaller age group on the fertility rate. The **period of 1980-1990 marked the swing in the shape** of the Indonesian population indicated by declining annual births to less than 5 millions. The annual rate of population growth decreased from 2.1 to 1.8 per cent a year. The average number of children the women have during that period was 3.3 children, of which one or two girls will replace her/their mother to give births (Table 1).

Currently, during the 2000-2005 period, Indonesia enjoys slower population growth rate of 1.26 per cent per year. The Crude Birth Rate fell to only half of the 1950s' rate with TFR of 2.3 and Net Reproduction Rate of 1.07. The Crude Death Rate decreased further to 7 per 1000 population. But although Infant Mortality Rate have declined severely, there are still about 200 000 babies out of 400 000 babies born die a year. Indonesians now live almost thirty years longer than fifty years ago, with 65.8 years of life expectancy compared to only 38.1 years in the fifties (Table 4).

Table 4 is here. (The Demographic Indicators, UN Population Projection, 2005-2050)

The result of these demographic changes is accompanied by significant changes in age structure of the Indonesian population. The proportion of children aged 0-14 years increased to 40 percent in 1980 while the proportion of older persons aged 65+ was quite stable about 4 percent during 1950-1980 indicating that Indonesia was a young population for thirty years. Family planning program, which was initiated in the early 70th, began to show its effect through the decline in birth rates reducing the proportion of young children. **From this point onward the proportion of young population decline severely further reshaping Indonesia into an older population.** The proportion of population under fifteen years old declined rapidly to 30 percent in 2000, while the proportion of older persons started to increase reaching 4.8 percent or 10 million people. The presence of high proportion of children under fifteen years during the 50th to the 80th gives high burden to the working population. But it declines from 80 in 1980 to 68 in 1990 and further to only 54.7 per 100 working age population in 2000. (Table 1)

The second phase of the age structural transition in Indonesia is shown as an effect of this demographic transition. In this phase the proportion of older people is increasing

but at a slower pace with small contribution to the dependency ratio. On the other hand the size of the working population is becoming larger and larger because of the increasing survivors of the large birth cohorts, increasing the responsibilities of the government and the private sectors to increase employment (Figure 2, Phase II, The population waves, 1980-2010)

Figure 2 is here (Phase II, The population waves, 1980-2010)

Figure 3 is here (Phase III, The population Aging, 2020-2050)

5. The population aging.

What will be the Indonesian population within the next fifty years to come?

If fertility and mortality decline further, age structure of the Indonesian population will be further reshaped, until fertility reached a point where women has only one daughter to replace her to continue the generation. Also, if mortality continued to fall at some point close to the level of fertility, and both rates remain constant for a longer period, Indonesian population will reach a stable condition. A stable population is a population with structure characterized by low fertility and low mortality and therefore low rate of population increase. This is an ideal condition in which population still grows but at a manageable rate. With a continuing fertility decline of TFR from 2.34 in late 1990s Indonesia will reach a replacement level (when one woman is being replaced by one daughter) between 2010 and 2015 and finally reach the stable population in 2050.

Table 4 shows that within the next fifty years the total number of population will reach 300 million. This is still a huge number of population, even though the family planning program has been successfully halt the population growth. By the year 2050, the demographic indicators and age structure of the population will be entirely different from now, very much away from those of a century before.

By that time, average number of children a woman has (Total Fertility Rate) will be less than two children, leading to a much lower births of 3,5 million babies per annum. The number of death will increase due to the increasing number of older persons, resulting a lower increment of 300 000 people per annum during 2045-2050. During these years, 10 infants out of 1000 births will die before reaching their first birthday. If this is the case this will be a remarkable achievement because these days, we still experience 4.5 million births and 1.5 million deaths per year, resulting an additional population of 2.7 million each year. The estimated Crude Birth Rate and Crude Death Rates will be 11.9 and 10.1 per 1000 population respectively making the population increases annually at a rate of 0.11 percent only by the year 2050 (Table 4).

This level of very low population growth rates may reflect a similar level of population growth centuries ago, but which was resulted from a high birth and death rates because of a very poor social and economic conditions long before the demographic transition occurred. The future population will be characterized by similar level of population increase but resulted from low birth rates and death rates typical of developed country's situation. Other demographic indicators also show compatible level to those of wealthy nations. Considering the current level of welfare of Indonesian people, it is not clear yet whether the welfare of the Indonesians will be

able to increase to the same level with those of the people's in the developed countries. However, the demographic situation is ideal to support human development with consistent efforts devoted to increase the quality of human resources to meet the ever increasing aspirations and higher lifestyle, and to meet the increasing demand for quality of workers in the forthcoming high technology and globalization in economic and industry.

Age structure and Dependency ratio

As fertility continues to decline, the percentage of population under 15 years declines further until dependency ratio reach their lowest points. This will occur between 2010-2040 with dependency ratios below 50 per 100 working people, and reached its lowest points during 2020-2030 when the ratios are under 45 per 100 (Table 4). Thus the demographic bonus will be reached during 2020-2030, only 10 years. In the meantime more and more people live longer with life expectancy reaching 77 years in 2050. Starting in 2040 dependency ratio increases again to reach 80 per 100 working population in 2050, half of it contributed by older persons of 65 years and older, because the number of young population is equal to those of the older persons. Each age group will reach 50 million people in 2050.

With almost every one working age population has one dependent, either a child or an older person, and if the pattern of living arrangement does not change significantly, it can be illustrated that the future household of four will consist of parents with one child and one older person. Household with three generations in one roof will be common. However, looking at the changes in characteristics and life styles of young people nowadays, who will be parents in the next decades, it is highly unlikely that they will respect the same values in taking responsibilities on their parents' welfare as well as accommodating them in their homes. Because the portion of population 0-4 declined rapidly leading to an increase in the number of children aged 5-14, the average age of children living with parents will be older than decades before. This in turn creates difficulties to combine three different values, ways of lives and life styles of each of the three generations in one home.

Nowadays young people are facing too many challenges. Beside globalization and rapid increase in information technology, in the domestic sphere they have problems with low quality of human resources and shortages in employment opportunity. On the other hand, modernization and rapid information technology increases aspiration for higher level of living. Meanwhile level of income is hardly moving upward. Thus, it is also highly unlikely that young adult will have the opportunity to continue transferring some of their incomes to their parents. Meanwhile, daughters who usually take care of their parents will be more mobile, migrating to cities or working elsewhere in other countries. With two children on the average, it seems that elderly care will be a problem and a new system has to be developed.

As experienced by developed countries, higher expectation of life will increase the number of disability due to older age. It is suspected that older persons born in the sixties and seventies suffered from impairment due to diseases they carried when they were infants but survived to older ages because of improvement in health care and medical technology. It is expected that the 'cohort of the controlled fertility' who

were born since 1980s onward will have a better longevity because their parents were more educated and more knowledgeable in taking care of their infant's health. For the parents, having only few children helped this happened and this cohort will be aging in 2045.

With the increasing number of aged people in the coming decades, it is important to pay attention on the public health consequences. Therefore, young people and those in their prime age should prepare to target successful aging with healthy lifestyle, good and balanced nutrition and regular exercise. The explosion of older persons open ample opportunities to provide them with basic need services, retirement centers, degenerative healthcare, comprehensive reproductive health care including menopausal disorders, cervical cancer and prostate cancer for men.

The working age population.

From today, there will be an additional 60 million population of the working age, to finally reach 190 million in 2050. They will consist of young adult 15-24 years, adult 25-59 years. Historically more than 70 percent of population 15 years and over is in the labor force, partly because of the value that it is men who are responsible of the household's welfare. But as education for women increases, there has been a growing tendency that such value began to deteriorate and more and more women enter the labor market. In 2000 the percentage of female labor force participation was doubled to that of forty years ago while the percentage of women working in the domestic spheres decreases significantly. The female labor participation increases significantly at a pace faster than that of men's. Therefore, the working age population will include this increasing labor force participation of women which is expected to rise to more than 40 percent in the future.

As education enrolment increases, boys and girls stay longer in schools, not only finishing 9 years of schooling, but achieving higher level. Meanwhile, those already finished tertiary education strive for further achievement beyond tertiary education. These will delay entry into the labor market. Further, there is a growing tendency that women delay marriage and enter the labor market before building family, and only a small portion of them prefer to work in the domestic spheres looking after the family. For those who married, having only few children releases them from barrier to participate outside the domestic spheres

Thus there will be a shift in the composition of population in the labor market. The number of young workers below 25 years old will decrease significantly, and the number of workers aged 25 years and higher increased due to the influx of young adult population, male, female, and housewives into the labor market.

The remarkable increase in education attainment among the population of Indonesia is highly valued. But, improvement in quality of human resources is highly important to meet the requirement of the future labor market, which will be characterized by industrialization, high technology and information-communication-technology (ICT) affected by globalization in trade, industry, finance and services. With the current

level of quality of human resources, the majority of the Indonesian will not be able to compete among each other, and particularly among their peer from the neighborhood.

The low education cohort between 1950-1975 who are in the labor market nowadays, will eventually exit labor market because of aging process, replaced by younger cohort with more education, started in 1990s when the 'fertility controlled' cohort enter the labor market. This will be followed by the influx of the next cohort with higher education. Thus there is a greater opportunity for better quality of the labor force. The working age population of the 2050 will consist of cohorts born between 1986 and 2035. They are cohorts of the 'small family size' era and therefore their education is better. Analysis made by Hull, Hull, Utomo and Adioetomo, (forthcoming) found that almost all persons born in the 1980s have achieved primary school, among those, 60 percent continued to have junior school, or 40 percent continued to finish high school and the chance of continuing to tertiary education is high. Although girls still have to compete boys' to obtain equal education attainment; gender gap in education higher than primary school will soon disappears. Better education and quality of human resources will increase the pace in economic growth and better living conditions. Thus there is a hope that the future advance stage of demographic transition, indicated by lower birth rates, death rate and population increase will be, hopefully in a better living condition, indicated by wealth and health, longevity, and high knowledge.

Here young adult population is defined as the population aged 15 to 24 years old. Although the percentage of these young people is constant at about 20 percent in 1950th to 2005 and then declined to 12 percent in 2050, the absolute number is growing from 15.9 million in 1950 to reach its peak in 2000-2010 of about 40 million for 40 years which by then start to decline reaching 36 million in 2050. This young adult population will become parents very soon, and when they are not given education about sexuality, impact of high risk behavior: smoking, drug abuse and alcohol, with knowledge about reproductive health especially for the girls to enter a safer mother hood, they will live unproductive lives.

The number of women at reproductive age is also increasing significantly from 57 million women in 2000 to 66 million in 2050. While basic services including primary health care and reproductive health services remained to be very important, there will be ample opportunity for the private sector to provide services for middle class at an affordable cost. By that time women will prefer quality than quantity of services, beside the public sector has to provide services of different age groups including those of older persons, the participation of the private sector in providing the services will support women to achieve a better reproductive health status.

6. The demographic dividend and the window of opportunity.

The evaluation on estimates and projection of the Indonesian population dynamics over a century since 1950 has produced a conclusion that Indonesian population was reshaped through a demographic transition sine the 1980s, processed further to achieve a stage of a stable population with low births and death rates and low population increase with below replacement level.

Based on the past trend, there is a hope that the working population of the future will be better educated. The older cohorts with lower education will exit from the labor force and replaced by young labor force with better education. But, a commitment to consistently put efforts focused on improving the quality of human resources, especially the young people to meet labor demand in the future, is given the highest priority.

Observation on the trend in dependency ratio over a century highlights a period in which efforts in improving quality of human resources is highly effective in terms of resources and priority setting. As was stated in the earlier section, the dependency ratios will reached their lowest level during the century between 2010 and 2040, with the lowest peak during 2020-2030 when the dependency ratios are under 45 per 100 working age population (Table 1, Table 4). At this time investment to provide basic need services for the non-productive population is the least compared to the period before when young dependent is still bigger. Further, this is the ideal time before the highest age structure of the working population become dependent, increasing the number of the older persons. But, this opportunity is very slight, only a decade in a century. Otherwise the dependency ratio increase again.

Thus it is highly important for the leaders, now and the following decade, to really prepare to get the benefit from the 'window of opportunity' to improve the quality of human resources for the future. High investment in human capital including education, health and other social services should be planned carefully and implemented consistently. Failing to do this, the demographic dividend from the optimum ratio between the working population and the dependent will be unconsummated and this means a big lost for the nation, and we have to wait for another century to be able to escape from the Malthusian trap.

7. Challenges ahead

The lesson learned for the process of age structural transition in Indonesia is that once a country has experienced an influx of a large birth cohort, the population will be continuously growing. Further with the declining mortality, which is highly expected, while the pace of fertility decline could not catch up with the declining mortality the population explosion is unavoidable until a strong effort to halt population growth is seriously being conducted.

The process of demographic transition that Indonesia is experiencing will still continue to reach an advanced stage of demographic transition that is when the rate of fertility and mortality resembles those of the developed nations. This optimistic view is based on the potential of continuing fertility and mortality decline, and the declining number of annual birth was already underway. On the other side, the implication of this demographic transition on the new age structure of the population will give another challenges which differ from the implication of the past age structure. The Indonesian population is heading toward an old population, with a declining proportion of children, and increasing young adult people and the prime age population. After the 2020th the rate of aging population is increasing faster rising the dependency burden to the working population.

The next problem is how to create employment opportunities for the 190 millions working age population in 2050. More importantly how to provide them with decent employment so that they will be able to accumulate public savings to optimize the period of window of opportunity when the dependency ratio is the lowest, before it rises again because of the increase in number of older population.

Besides, there is an issue on whether Indonesia will be able to continue the effort to lower fertility until every woman has only two children during their entire life? In other word, family planning must have to go on, contraceptive security must be maintained, especially for the poor, and reproductive health services should be readily available to the women in need.

First this family planning issue will be discussed. After three decades of centralized Government Structure with heavily top down policy and planning, Indonesia is now undergoing a democratization and decentralization of the government administration. This involved a shift in policy making from the central office to local government. But the quality and the paradigm of the new policy makers at the local level are not always the same with those at the central level that used to make commitment at the national as well as international level, such as MDG, Dakar, ICPD Cairo etc. Thus it need another advocacy to motivate these local policy maker to continue the success of the family planning program which was already achieved so far. They also have to understand that continuing the effort to halt population growth in their own area will benefited the area in preventing population pressure, in preventing social unrest due to high unemployment and large numbers of school drop outs.

Another issue is that, whether each of the local government have the resources to be able to provide low cost contraceptive and services for the poor people? Advocacy about the need for resources and funding to continue fertility decline has also to be focused to the local parliament, who has the right to make decision about government local budget.

On the other hand, the increasing education and the improvement of women's status have led to a wide acceptance of small family size values, and thus increasing the need for fertility control. This will ease the task of the government, especially when the community and private sectors are also participate in providing the people with contraceptive services with orientation to the client's need. Meanwhile, strong commitment to continue fertility decline should be continued at the central level, as well as the local level if we want to achieve the Stable Population in 2050. This is such a long period, but if Indonesia is not aware of this problem nowadays, it will never come to that stage.

Second, if the Stable Population is finally achieved in 2050, the number of population will still continue to grow. With different needs and problems for each age group of population. The number of children under 15 years old will have to compete with the older population to obtain the resources for providing their basic needs. The number of the working population increases enormously, which caused for concerns to the policy makers and all the stakeholders.

The picture of employment creation is not very rosy in Indonesia, especially after the economic crisis in 1997. The economic crisis in 1997 has brought an economic

contraction by 16 percent from the earlier period, when the average economic growth reached 5-7 percent during the 1980-1995. In the last couple of years, there was a sign of economic recovery, with 4 per cent of growth but this is still far below the rate before the economic crisis. Beside, the crisis has spread into political and social disturbance threatening national security and political stability of Indonesia. Foreign direct investment has been the lowest in the last 5 years, while existing multinational companies have moved their factories to other places safer and cheaper labor cost. Therefore, unemployment rose very sharply.

But, even, before the economic crisis, the employment situation was not that successful as the family planning program achievement. This is indicated by the fact that although the economic growth considerably exceeded the rate of population growth, the absorption of labor by industry is much lower than the increase of the share of industry to GDP. (Table 5).

Table 5 is here

(Share of labor by industry and the share of industry to GDP growth).

From this table it is seen that the increase in the share in industry, especially those requiring higher skills is not accompanied by the same increase in the absorption of labor in the same industry. This is also seen in trade and hotels and financial institutions. On the other hand, the high increase in the absorption of labor is industries, which no need for skilled labor such as construction, mining and quarrying. These industries have low share in the GDP growth.

This illustration showed that the quality of human resources in Indonesia is very low. Which is supported by the level of education, in which 60 percent of population above 10 years have primary education only. Thus, the Indonesian human resources are characterized with low education and lacking in skill. The compulsory of 6 years education has been very successful with almost universal enrolment for children at primary school age. And since 1996 this is expanded with 9 years of education. However, the hope of achieving universal 9 years of education in 2004 seemed to have wiped out by the economic crisis which lead to decreasing primary school enrolment rate, from 98% in 1998, to only 92% in 2002.

Further, during the high economic growth rates during the 1980th and the 1990th the government was not able to provide formal employment to the entire labor force. Although, by definition, open unemployment is very low, which is a reflection of the first job seeker, 60 percent of the workforce created his or her own employment. That is working in the informal economy, with uncertain income and lacking inn social protection. Many of these people will still be in the labor force in the coming several decades.

Thus, the demographic bonuses that were illustrated in the above section seem to be more of a concept rather than a reality. However, this is still an important message for the current and future policy makers in Indonesia to raise concern about human resource development to compete in the global market. What is more important is now, how to continue efforts for fertility to decline further to achieve the stable population in2050.

8. Conclusion.

Indonesia is a country with the fourth biggest number of population after China, India, and USA. The 2000 population census recorded 205.6 millions of people. But this number is a result of a very successful family planning program, which have been able to halt population growth rate from 2.3 percent for the period of 1971-1990 to only 1.26 during 2000-2004. The fertility rate has declined from 5 to 6 children per women in late 1960s to only 2 or 3 children in late 1990s. Life expectancy has increased from only 45 years in 1971 to 65 between 1995-2000.

This demographic transition has changed the population age structure enormously, decreasing the proportion of children but increasing rapidly the number of working age population. Bearing the social and economic consequences for the government and the private sector.

This paper has analyzed causes and impacts of ASTs over a century using empirical data from 1950-2000 and population projection from 2000 to 2050 (UN World Population Prospects, medium projection). Three phases of population momentum was observed:

Phase I:

Simple Momentum, when mortality already showed a declining status, before the 1950s, but fertility remained high. Large birth cohorts was shown in 1950, a resume to high fertility after the Second World War and the Indonesian struggle for independence. Average birth per year was around 4 million babies.

Phase II:

Population Waves, when fertility started to decline at a considerable speed as a result of a successful family planning program. This demographic transition occurred since 1975 and reached its peak in 1980-1990 resulting in the growth of young adult and a rejuvenation of the working age people. However, the number of babies born each year remain very big, reaching 5 million babies per year during 1975-1985 after which the number of birth per year started to decline, very slowly. The dependency ratio is declining but still heavy with young population less than 15 years old.

Phase III:

The Phase of Aging. The proportion of population aged 60 years started to increase to 6.2% in 1990 and to 7.6% in 2000. It is expected to increase again until it reached 50 million older persons in 2050. When the number of children less than 5 years old was also the same resulting in competition for resources of public services. The dependency ratio is shifting slowly to higher portion of old age dependency.

The window of opportunity is expected to occur between 2020-2030, only a decade, when the dependency rate is under 45 per 100 working age population. If only the government can create enough employment opportunity with decent income, Indonesia will enjoy this demographic bonus, because a high number of working age

population with decent living and big saving (because dependency burden is low) will induce high investment to increase the quality of human resources.

The analysis concluded that there are two major issues that Indonesia is facing:

1. How to achieve the expected/projected population in 2050, with low birth rate and low death rates resulting in 0.11 % annual rate of increase. Family planning will have to be maintained, with efforts to increase access in contraceptives services, high quality of care, and increase awareness in reproductive rights, targeted to the hard to reach and under-served people: the poor, uneducated and living in remote areas.
2. Even if the projected population with 0,11% of annual rate of increase is achieved (stable population in 2050), the size of the population and each age groups remain high. The number of total population will be 300 million in 2050, with 190 million working age people, and 50 million people aged 65 years and the same for those aged 5 years or less. The government will have to create massive productive employment to avoid poverty, and to provide basic needs services, especially for the poor. Private sector and social capital have to be mobilized because government alone will not be able to support social services.

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Figure 1. The simple Momentum: Changes in age structure, Indonesia 1961-1971

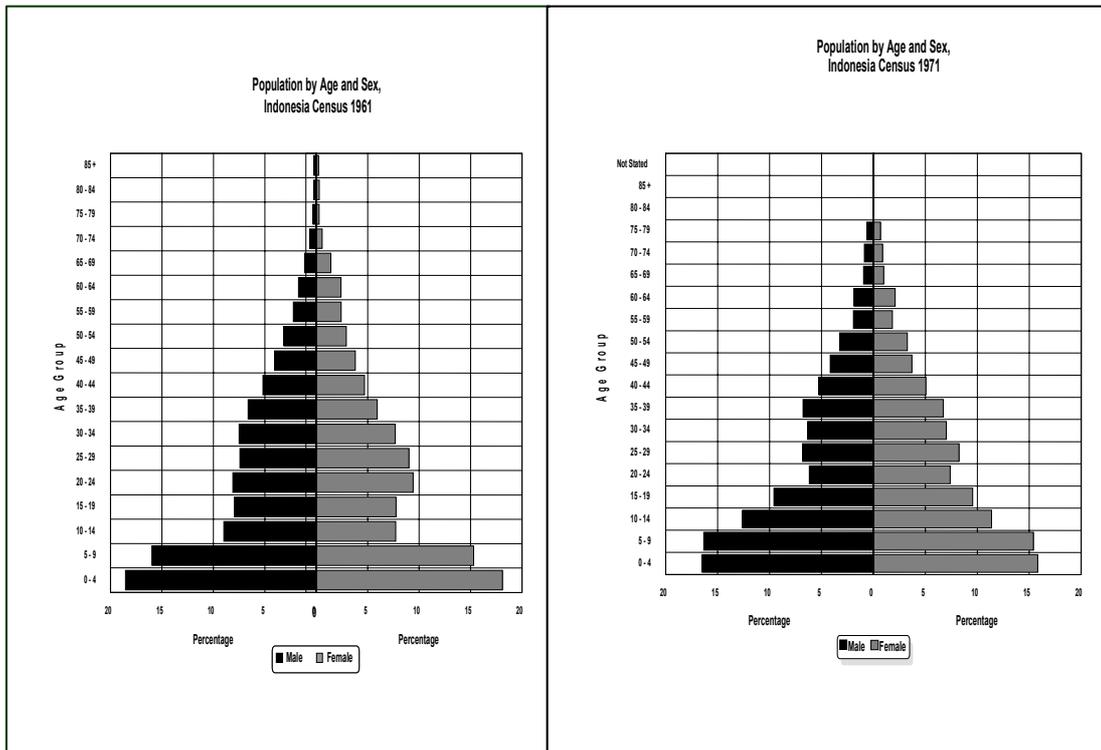


Figure 2. The Population Waves: Demographic Transition, Indonesia 1980-2010.

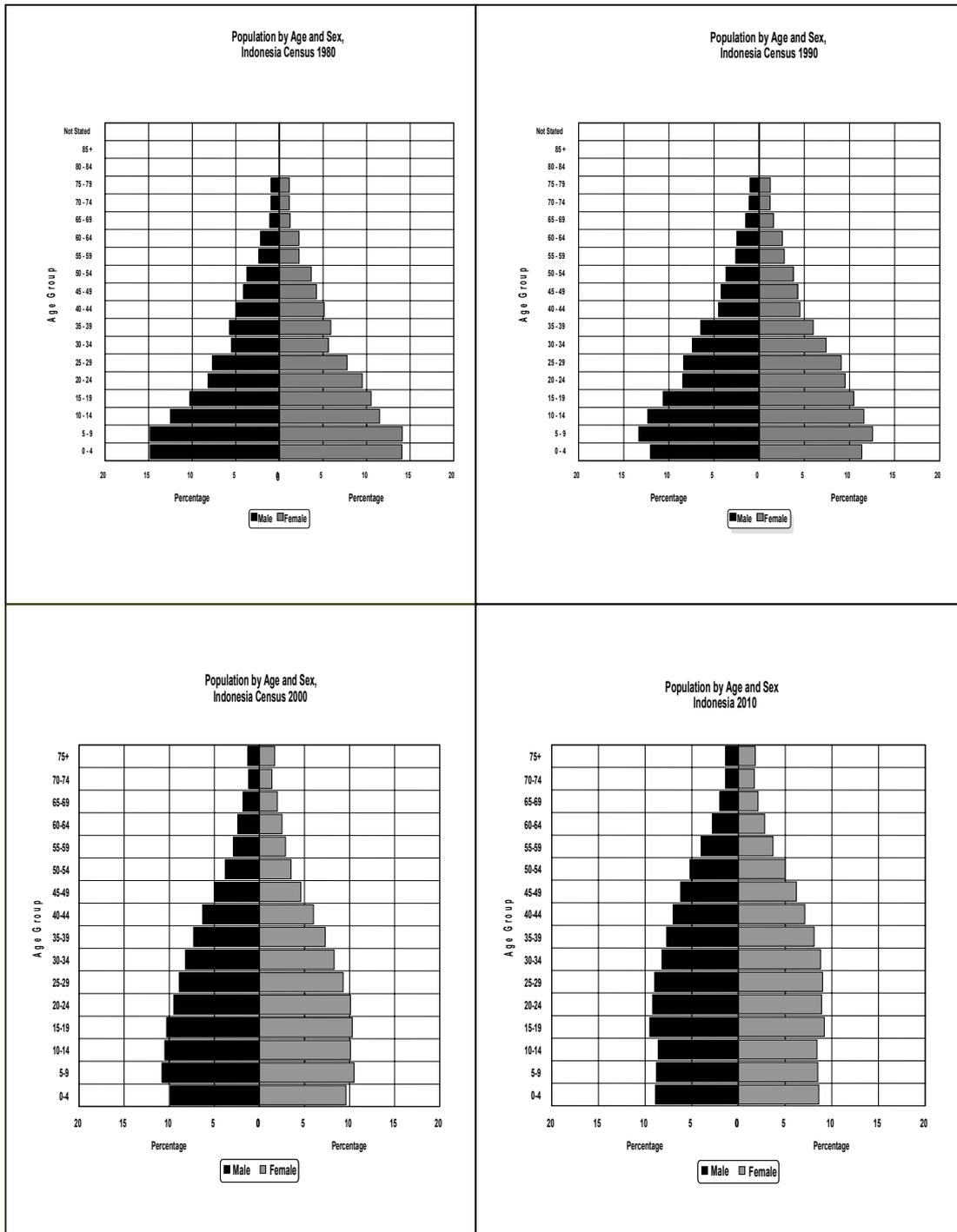


Figure 3. The Aging Population: Indonesia 2020-2050

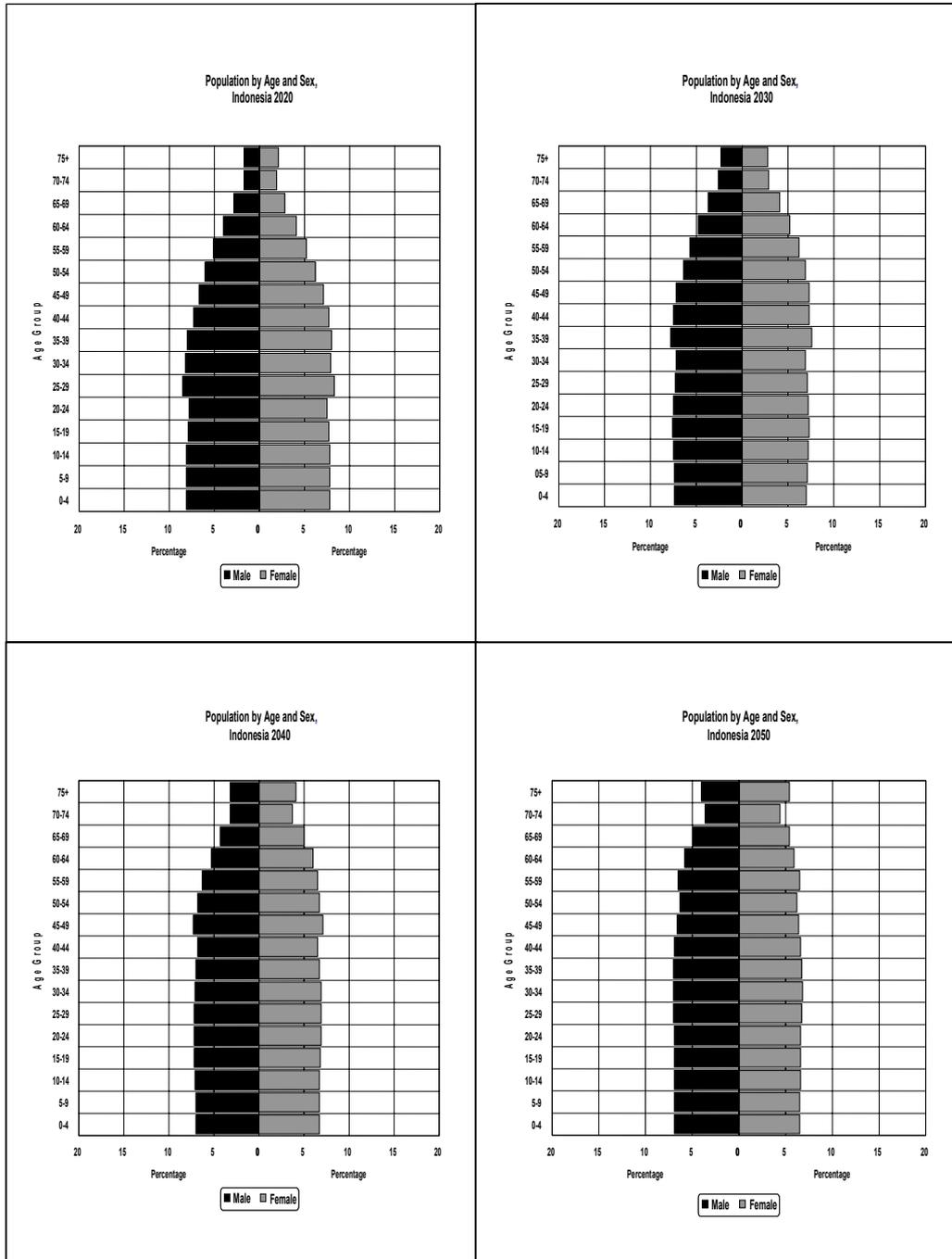


Table 1. Demographic Indicators, Indonesia, 1950-2000						
	1950	1961	1971	1980	1990	2000
Population (thousands)	79,538	97,019	119,208	147,490	179,380	206,300
Number of women 15-49 (thousands)	38,099	23,751	28,619	35,941	46,088	57,336
Number of population 0-14 (thousands)	31,099	41,035	52,040	60,041	65,690	63,206
Number of population 15-64 (thousands)	45,257	53,376	63,344	81,944	106,801	133,058
Number of population 65+ (thousands)	3,181	2,608	2,968	4,769	6,751	9,580
Dependency ratio (per 100)	75.75	81.77	86.84	79.09	67.83	54.70
		1950-1961	1961-1971	1971-1980	1980-1990	1990-2000
Annual rate of Increase (%)		1.8	2.1	2.32	1.98	1.39
Births per year (thousands)		3,827	5,100	5,332	4,984	4,118
Number of death(thousands)		2,186	2,143	1,965	1,704	1,568
Crude Birth Rate (per 1000 population)		43.8	42.7	39.9	29.9	20.7
Crude Death Rate (per 1000 population)		25.2	21.5	16.7	10.1	6.9
			1967-70	1976-79	1986-89	1996-99
Total Fertility Rate (children per woman)			5.61	4.68	3.33	2.34
			1967	1976	1986	1996
Infant Mortality Rate (per 1000 births)			145	109	71	47
Life expectancy (years)			45.7	52.2	59.8	65.4

Table 2. Contraceptive prevalence of married women 15-49 various IDHS and National Socio-Economic Survey.

Year	Pil	Injectables	IUD	Implant	Sterilization	Condom	Others	Percent
1976(1)	12.8	0.2	4.8	0	0.2	1.6	3.1	26
1987(2)	16.1	9.4	13.2	0.4	3.3	1.6	2.7	47.7
1991(*)	14.8	11.7	13.3	3.1	33.3	0.8	2.7	49.7
1994(*)	17.1	15.2	10.3	4.9	3.8	0.9	2.6	54.7
1997(*)	15.4	21.1	8.1	6.0	3.4	0.7	2.6	57.4
1998(+)	27.2	41.2	17.4	4.7	6.0	1.3	2.3	55.4
1999(+)	29.0	39.9	17.2	4.0	7.0	1.0	1.9	55.4
2000(+)	26.9	42.5	16.4	4.4	7.3	0.7	1.8	54.8

Notes:

- (1) Java Bali
- (2) Indonesia but sample too small for outer islands presentation
- (*) IDHS data
- (+) National Socio Economic Survey

Age of women	1961-1963	1964-1966	1967-1970	1971-1975	1976-1979	1981-1984	1986-1989	1991-1994	1996-1999
15 - 19	158	177	155	127	116	95	71	61	44
20 - 24	229	245	286	265	248	220	179	151	114
25 - 29	217	231	273	256	232	206	171	146	122
30 - 34	161	170	211	199	177	154	129	105	95
35 - 39	101	99	124	118	104	89	75	63	56
40 - 44	44	45	55	57	46	37	31	27	26
45 - 49	-	-	17	18	13	10	9	8	12
Total Fertility Rate	5.38	5.76	5.60	5.20	4.68	4.05	3.32	2.80	2.34

Notes: ASFR 1961-1966 was estimated based on Census 1971, 1967-1999 was estimated based on Census 2000.

Table 4. Indonesia Population Projection 2005-2050 Based on UN 'World Population Prospects, 2002'.										
	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Population (thousands)	225313	238374	250428	261053	270113	277567	283877	288831	292177	293797
Population change per year (thousands)	2 751	2 612	2 411	2 125	1 812	1 491	1 262	991	669	324
Number of women 15-49 (thousands)	124147	131344	136984	140185	141809	141559	139951	137484	134401	131327
Number of population 0-14 (thousands)	64665	64123	63609	62131	60235	58012	56492	55167	54053	52590
Number of population 15-64 (thousands)	148256	160187	170792	180388	187188	192631	194740	195250	193713	191556
Number of population 65+ (thousands)	12392	14064	16027	18535	22689	26924	32646	38415	44411	49652
Dependency Ratios/ 100 working age	51.98	48.81	46.63	44.72	44.30	44.09	45.77	47.93	50.83	53.37
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050
Annual Rate of Increase (%)	1.26	1.13	0.99	0.83	0.68	0.54	0.45	0.35	0.23	0.11
Births per years (thousands)	4 524	4 435	4 325	4 160	3 988	3 816	3 747	3 681	3 586	3 475
Number of death (thousands)	1 593	1 643	1 734	1 855	1 996	2 146	2 305	2 510	2 737	2 971
Crude Birth Rates (per 1000 population)	20.7	19.1	17.7	16.3	15	13.9	13.3	12.9	12.3	11.9
Crude Death Rates (per 1000 population)	7.3	7.1	7.1	7.3	7.5	7.8	8.2	8.8	9.4	10.1
Total fertility Rate/ per woman	2.35	2.2	2.1	2.01	1.94	1.86	1.85	1.85	1.85	1.85
Net Reproduction Rate/ per woman	1.07	1.01	0.98	0.94	0.91	0.89	0.88	0.88	0.89	0.89
Infant Mortality Rates (1000 births)	41.6	34.3	29.2	25.3	21.9	18.5	15.9	13.8	12.1	10.5
Life Expectancy Both Sexes (years)	66.8	68.5	69.9	71	72	73.1	74.2	75.2	76.1	76.9

<i>Table 5. Trends in Gross Domestic Product and Labor Force share by Industry</i> Indonesia 1980-1990						
GDP share by industry (1983 prices)				Percentage of persons working by industry		
Industry	1980	1990	% increase 1980-1990	1980	1990	% increase 1980-1990
Agriculture and forestry	25.8	19.4	-24.92	56.30	50.43	-10.44
Mining and quarrying	28.4	15.2	-46.45	0.75	1.01	33.71
Manufacturing industry	9.6	19.4	101.98	9.14	11.53	26.24
Electricity, gas and water	0.4	0.63	57.5	0.13	0.20	54.28
Construction	5.45	5.79	6.24	3.23	4.13	27.77
Trade, Hotels and Restaurants	13.2	16.2	22.23	13.04	14.86	13.98
Transport and Communication	4.1	5.5	9.26	2.87	3.69	28.78
Financial institutions	4.14	6.85	33.9	0.59	0.96	61.47
Community and public services	8.85	11.08	65.46	13.99	13.24	-5.34
Total	100.00	100.00		100.00	100.00	

Source: CBS, GDP and Population Censuses.

Table 6. Percentage of Population 15 years+ according to Status of Work

Status	1980	1990	2000
Formal	31.12	29.96	37.49
Informal	68.47	69.47	62.51
Total	99.59	99.43	100.00

Table 7. Population and Labor Force trends 1980-2000

	1980	1990	2000	% annual growth 1980-1990	% annual growth 1990-2000
Total Population	146,776,473	179,247,783	206,000,000	2.21	1.49
Labour Force	50,188,884	71,675,518	97,430,125	4.28	3.59

<i>Table 8. Number of persons in the labour force by age and annual rate of labour force increase</i>							
Age Group	1971	1980	1990	2000	% annual increase 1971-1980	% annual increase 1980-1990	% annual increase 1990-2000
15 - 19	5325,385	5975261	7697546	7507981	1.36	2.88	-0.25
20 - 24	6214658	7118407	9783721	12879951	1.62	3.74	3.16
25 - 29	6915101	7222546	10762917	14069867	0.49	4.90	3.07
30 - 34	5454033	5438638	9651767	12849598	-0.03	7.75	3.31
35 - 39	5661482	5842500	8445628	11925882	0.36	4.46	4.12
40 - 44	4809169	5177358	6094004	10122781	0.85	1.77	6.61
45 - 49	3822179	4282789	5675836	8065900	1.34	3.25	4.21
50 - 54	3279842	3622184	4852949	6057223	1.16	3.40	2.48
55 - 59	1889181	2126045	3281785	4502143	1.39	5.44	3.72
60 - 64	1626352	1735551	2715775	3946357	0.75	5.65	4.53
65 +	1339068	1647605	2713590	5502442	2.56	6.47	10.28
Not Stated	131626	6305	1246	3000	-10.58	-8.02	14.08
Total, 15+	32910729	50195189	71676764	97433125	5.84	4.28	3.59