Current and Projected Elderly Populations

in the Countries of East Asia:

Implications for Eldercare

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Introduction

For the past couple of centuries, the world has been experiencing the greatest demographic upheaval in recorded human history. The first fully modern human, *Homo sapiens sapiens,* emerged in northern Tanzania in sub-Saharan Africa around 190,000 years ago, where they reached anatomical modernity. But we hardly grew at all in size for the first 189,700 years. We only numbered around 250 million people at the time of Christ. We did not reach 1 billion until 1800 (see Figure 1). Now, in 2017, the population of the world numbers over 7.5 billion. What happened in the past 200 or so years that has resulted in our growing from 1 billion to 7.5 billion? Why was growth so slow for the first 189,800 years?

Figure 1 about here

If we go back in time to around 65,000 BC, the world population then was estimated to number between 400 thousand and 500 thousand people. For thousands of years, the world grew very slowly. About 35,000 BC, the world population numbered around 4 million. By about 8000 BC, it was around 6 million. About this time, give or take a thousand years, the first Agricultural Revolution got underway. With settled agriculture and the domestication of animals, it was possible to support a denser population. There were long periods of stationary growth, that is, no growth, until around the time of Christ, when the world's population numbered around 250 million (Biraben, 2003). The population did not double again until about the year 1600 AD. The annual rate of growth then was a mere 0.04 percent. To be sure, the growth patterns were uneven. The population would grow fairly rapidly for a few years, and this was followed by epidemics or plagues, and then the population would decline in size. Indeed, the size of the world population likely declined a little between 1300 and 1400 because of the Black Death. Overall, death rates were very high, and birth rates had to be at least as high if the population was to grow even very slowly.

These stationary conditions of near zero to very low population growth rates continued until the period of around 1650 or so, when the population of the world numbered around 650 million. During these many thousands of years, the world's population was kept small in size by various Malthusian checks. Death rates were high because of the positive checks of plagues, famines, and poor living conditions. Populations had to have high birth rates to compensate for the high death rates. If the birth rates were not high, the human population would have become extinct.

The world's population grew from around 650 million in 1650 to 1 billion by around 1800. It then took around 130 years to double again in around 1930 (Pison and Belloc, 2005). As the Agricultural Revolution resulted in more density, so too did the Industrial Revolution. People began to leave their farms and move to cities where factories and mills were humming. An urban revolution occurred along with the Industrial Revolution. This made it possible for density to increase as well.

Figure 2 charts the size of the population of the world from 1950 to 2015, with a projection to the year 2100. There were over 2.5 billion persons in the world in 1950, over 3.7 billion in 1970, over 6.1 billion in 2000, and over 7.4 billion in 2015. According to United Nations population projections, the world's population will likely "increase by slightly more than one billion people over the next 13 years, reaching 8.6 billion in 2030, … 9.8 billion in 2050, and likely 11 billion by 2100" (United Nations, 2017: xx).

Figure 2 about here

As I have already noted, there was very little growth in the population of the world up until around 1700. Birth rates and death rates were both very high, and there was little growth in the population. This was the first stage of the demographic transition. The current growth rate of the world's population of about 1.2 percent has not been constant in past years. Figure 3 presents data showing that the annual rate of world population growth started going up around 1700, reached a rate of around 0.25 percent by 1800, continued increasing to 1.5 percent in 1950, and then to a high rate of just slightly above 2 percent in the mid- to late-1960s. Then the rate started to decline around 1970, reaching 1.2 percent currently. By around 2100 the world population growth rate will

likely be back at about the same zero rate of increase that characterized the world prior to 1700.

Figure 3 about here

Some demographers, myself included, believe that the period in the late 1960s when the world started having a decreasing growth rate, dropping below 2 percent (see Figure 3), may well be the most important demographic date in human history. It marks the start of the movement to eventual no population growth in the world which will likely occur around 2100, maybe a little later.

As I show in Figures 2 and 3, the population of the world is continuing to grow, although it is much more slowly than in the past. "Ten years ago, the global population was growing by 1.24 per cent per year. Today, it is growing by 1.10 per cent per year," (United Nations, 2017: xx) which results in around 83 million people being added annually to the world's population. But the population growth rate will continue to decline until right after 2100, when it will be near zero. The demographic transition of the world will be over. The growth rate each year will be at an average of 0.0 or near 0.0, just like it was for the first 185,000 or so years of our history.

One consequence of populations transitioning from high birth and death rates to low birth and death rates is an aging of the population. As the fertility rate drops and life expectancy rises, the proportion of people in the population in the older ages also increases. "This phenomenon, known as population ageing, is occurring throughout the world" (United Nations, 2017: xxix). The greatest amount of population ageing, as measured by the percentage of the population of age 60 and greater, or of 65 or greater, is

occurring in the countries of Europe, where nearly one in four persons is of the age of 60 or greater. But the oldest country in the world today (2017) is not European; it is the East Asian country of Japan with over one-third of its population of age 60 or over (Table 1). The nine other oldest countries in the world today are all European countries, headed by Italy, Germany and Portugal.

Table 1 about here

But when we jump ahead to the year of 2050, we see some non-European countries among the ten oldest. Table 1 shows that Japan is projected to still be the oldest country in the world, with over 42 percent of its population over the age of 60. But South Korea will be the fifth oldest, and Taiwan the sixth oldest, with both countries projected to have over 41 percent of their populations of age 60 or over. Two more Asian countries will be in the top 10, namely Hong Kong and Singapore.

I summarize in Table 2 the patterns of ageing for the regions of the world. Specifically, I present data on the percentages of the populations of the regions of the World that are aged 60 and over in 2017, with projections to 2050. In 2017, 12.7 percent of the population of the World is aged 60 and above. Almost one-quarter of Europe is "old," and almost 22 percent of North America. However, only slightly more than 12 percent of all of Asia is classified in 2017 as "old." But within Asia, East Asia is considerably older, with 17.7 percent of East Asia classified as old in 2017. But by 2050, East Asia is projected to have the highest ageing percentage of any of the regions of the world, when almost 35 percent of East Asia will be "old," that is, of age 60 or over. In 2050, East Asia is projected to be older than all of Europe.

Pattterns of Ageing in East Asia

I now begin my discussion of ageing in the five major major countries of East
Asia, namely, China, Taiwan, Japan, South Korea and North Korea. I will present a series
of demographic accounts of the older populations of these countries with projections to
2050 and to 2100. I will show that these five countries of China, Taiwan, Japan, South
Korea and North Korea will become older and older as the years go by. In the decades
ahead they are projected to be among the oldest countries in the world. I will also show
that the major factor responsible for the very large projected increases in their proportions
of old people is the rapid fertility transition experienced in the countries since the 1960s
and the 1970s. I will then examine the dependency ratios for these five countries and will
show that the dependency burdens on their producing populations will become very
heavy in coming decades. The aging and dependency burdens in the next several decades
that will be faced by these countries are huge, and will be more profound than almost
anywhere else in the world. In the last part of my paper I will draw out some the
implications of these demographic trends for the provision of eldercare in these countries.

I first present for the five East Asian countries some basic data on the distribution
of the population by three major age groups, under 15 years age, ages 15 to 64, and age
65 and over. I begin with data for Japan, the oldest country in the world (see Figure 4). In
1950, only 4.9 percent of Japan's population was "old," i.e., of age 65 or older. But by
2015, Japan's old population represented 26 percent of its population. By 2050, old
people in Japan will comprise over 36 percent of the population. Japan. In 1950, the old
population of Japan numbered just over 4 million people, of a total population in the

country of just under 83 million. By 2015, the old population had increased to a size of almost 33 million, from 4 million in 1950. The old population of Japan is projected, under the medium variant model to have increased by 2050 to almost 40 million, and is projected to drop back to just over 30 million by the year of 2100. The absolute change between 1950 and 2050 is phenomenal, from 4 million old people in 1950 to almost 40 million in 2050. Japan is not alone, however, with its dramatic increase in the nu,mber of elderly. The other East Asian countries show similar patterns.

Figure 4 About Here

I show similar data in Figures 5 through 8 for the other four East Asian countries of China, Taiwan, South Korea and North Korea. In 1950 the old population of China (see Figure 5) comprised only 4.4 percent of its total population, or almost 24 million people. By 2015 the old population had increased to 9.7 percent of the population, or over 134 million residents. By 2050, the percentage of elderly is projected to be 26.3 percent, or over 352 million people. In 100 years time, the elderly in China will have increased from 24 million to over 352 million.

Figure 5 About Here

Taiwan's elderly population comprised just over 2 percent of its population in 1950, or just under 168 thousand people. By 2015 it had increased to 12.3 percent of the population, and is projected to increase to over 34 percent of Taiwan's population in 2015. The number of elders will have increased from 168 thousand in 1950, to almost 2.9 million in 2015 to more than 7.8 million in 2050.

Figure 6 About Here

In 1950 less than 3 percent of South Korea's population or just about 557

thousand people, was aged 65 or over. The percentage increased to 13.0 in 2015 and is

projected to grow to 35.3 in 2050, reflecting absolute numbers of elders in 2015 of almost

6.6 million in 2015 and nearly 17.8 million in 2050.

Figure 7 About Here

Finally, in 1950 in North Korea, just over 3 percent of the country's population

was elderly, or around 327 thousand people. The shares of the elderly in North Korea

increased to 9.7 percent in 2015, and to 19.8 percent in 2050, representing numerical

counts of over 2.4 million and 5.3 million, respectively.

Figure 8 About Here

All five East Asian countries, not only Japan, have experienced very large

percentage and absolute increases in their elderly populations in the years between 1950

and 2050. Why has this occurred? What is the main factor responsible for these

phenomenal increases in old people in these five countries?

The major factor is declining fertility. I show in Figure 9 total fertility rates

(TFRs) for the five countries for the years 1950 to 2015. Except for Japan, in the other

four countries, it has been the dramatic declines in the TFRs in the 1970s and 1980s that

have produced in the 1990s and the early years of the 21st century the very large numbers

of elderly people. The fertility decline in Japan began earlier, in the 1920s, when the TFR

was as high as 5.1 (National Institute of Population and Social Security Research 2014:

2). By 1950, it had fallen to just under 3.0. By the 1990s, the TFRs in all five countries

had fallen below the replacement level of 2.1. Birth cohorts are considerably smaller

these days in the five countries than they were a few decades ago. This much lower

fertility coupled with significant gains in longevity, have produced in China, Taiwan, Japan, South Korea and North Korea the largest absolute and percentage numbers of elderly ever witnessed in these five countries in human history.

Figure 9 About Here

All five countries have experienced dramatic reductions in their birth rates. The reductions experienced in Japan, Taiwan and South Korea were more a result of voluntary factors than was the case in China and in North Korea, where the early reductions were also influenced by a draconian family planning program in the case of China, and by food shortages and resulting subfecundity in North Korea. So, despite the differences causing these reductions, all five countries now have very low fertility rates. And it is these rapid declines in the fertility rates in the 1970s and the 1980s, and earlier for Japan, that will produce in the decades of this new century the large numbers of elderly people.

Since at least by the the early 1990s, fertility has been at or below replacement levels in all five countries. Birth cohorts are considerably smaller now than they were a few decades ago. If the below replacement fertility continues, coupled with current and projected gains in longevity, in the coming decades there will be comparably larger percentages of the elderly with lesser percentages in the younger age cohorts.

I turn now to a consideration of the projected aged dependency burden on the producing populations of the five East Asian countries of China, Taiwan, Japan, South Korea and North Korea, which will become quite heavy in the decades ahead.

<u>Dependency and Aged Dependency</u>

Dependency ratios and aged dependency ratios are important when considering the economic, social and physical care of the aging population. I will show below the current and projected aged dependency burdens in the five East Asian countries, and how these will increase in the years ahead.

A large number of elderly persons in a population, as we saw previously in Figures 4 through 8, is not problematic if there exists at the same time in the population a large number of producers. It is only when the ratio of elderly to producers becomes high that a host of economic, social and related problems occur. In this section of the paper I will show empirically the degree currently of the dependency burden in each of the five countries, and how these burdens will increase in the years ahead.

Total dependency refers to the ratio of persons aged 0-14 plus persons aged 65 and over to persons aged 15-64. The numerator consists of persons who typically are not employed, and hence not serving actively as producers of goods, material resources and sustenance. The denominator, persons aged 15-64, contains the age group considered to be the productive members of the population. This age group includes many in the labor force who in varying ways, are producing foodstuffs, and related goods and services for the population; this ratio is multiplied by 100 and refers to the number of dependents in the population per 100 producers.

The total dependency ratio (TDR) may be subdivided into a youth dependency ratio (YDR), i.e., persons 0-14 divided by persons 15-64; and an aged dependency ratio (ADR), i.e., persons 65+ divided by persons 15-64. Given the very low fertility rates in the five countries (Figure 9), the levels of youth dependency are very low in all five countries and will remain low for the decades ahead. It is the issue of aged dependency

that is of major concern for the countries of China, Taiwan, Japan, South Korea and North Korea.

Figure 10 provides some overall perspective for an evaluation of current and future trends in aged dependency. The figure shows aged dependency ratios (APRs) for East Asia, as well as for the World, all of Asia and the USA. In East Asia (green) in 2015 the APR was 15.5. This means that for every 100 persons aged 15-64, i.e., the "producers" in the population, there were 15.5 persons aged 65+, the so-called elderly dependents. By 2050 and 2100 the East Asia APRs are projected to be 47.5 and 70.9. These are major increases from their APR of 15.5 in 2015. By comparison, the APRs for 2015, 2050 and 2100 for the World (blue) are 12.6, 23.9 and 19.5, respectively. And the U.S. (gold) APRs for 2015, 2050 and 2100 are 22.1, 36.7, and 51.3, respectively. Whereas the U.S. in 2015 had a much higher APR than East Asia, 22.1 versus 15.5, by 2100 East Asia is projected to have a much higher APR than the U.S., namely, 70.9 versus 51.3.

Figure 10 About Here

Figure 10 presents aged dependency ratios for China, Taiwan and Japan. I noted earlier that Japan is presently, and has been for more than a decade, the oldest country in the world. In 2015 Japan (green) also has the highest APR of all the countries of the world, an APR of 42.7; this means that in 2015 there are almost 43 old people for every 100 producers. Japan's APRs are projected to increase to 73.8 in 2050 and to 89.2 in 2100. China's (blue) APR in 2015 is much lower than Japan's in 2015, 13.3 versus 42.7. But China is projected to experience a major increase in its aged dependency ratio to 45.1 in 2050 and to almost 70 in 2100. The projected increases in aged dependency for Taiwan

are even more dramatic. Taiwan (red) has a low ADR in 2015 of 16.6; for every 100 producers in 2015 in Taiwan, there are almost 17 elder dependents. By 2050 Taiwan's ADR is projected to increase to 68.7, and by 2100 it is projected to be 106.8, the highest ADR in 2100 of all the countries in the world. As just noted, in 2015 in Taiwan there are nearly 17 elders per 100 producers; by 2100 there are projected to be 107 elders per 100 producers; the number of elders per 100 producers will have increased from 17 to 107, which is an increase in Taiwan's ADR over the 85 years of almost 530 percent.

Figure 11 About Here

In Figure 12, I present aged dependency ratios for South Korea and North Korea, and for comparison, the U.S. Of the three countries, the U.S. (gold) in 2015 has a higher ADR that that of either South Korea (blue) or North Korea (red). But South Korea's 2015 aged dependency ratio of 17.7 increases dramatically to 70 by 2050 and to 100.3 by 2100; the number of elders per 100 producers will have increased from almost 18 to over 100, which is an increase in South Korea's ADR over the 85 years of almost 456 percent. The pattern of increase in the ADR for North Korea is similar to that of the U.S.

Figure 12 About Here

By 2050 and then by 2100, the East Asian countries of China, Japan, Taiwan, Taiwan, South Korea and North Korea will have made the transition to becoming demographically very old with heavy age dependency burdens. In the 85 years following 2015, these populations will have become demographically top-heavy. In 2100, for every 100 producers in Taiwan, South Korea, Japan, China and North Korea, there are projected to be 107, 100, 89, 70 and 45 elders. These are astounding high increases in

aged dependency. What are some of the implications of these ADR trends and patterns in the five East Asian countries?

Implications

In this paper I have examined the current and projected levels of ageing and aged dependency in the five East Asian countries of China, Japan, Taiwan, South Korea and North Korea. By the mid-point of this century, and then by the end of this century, South Korea and Taiwan and Japan will the three oldest countries in Asia, and among the oldest countries in the world. China will not be far behind. These four countries are projected to have among the heavier, if not the heaviest, old age dependency burdens of any country in the world. The situation for North Korea is not projected to be as striking as that for South Korea, Taiwan, China and Japan. Nevertheless, given these projected levels of the elderly population, there are several implications that should be addressed. I will discuss what is perhaps the most important, namely, the provision of eldercare.

Traditionally in all five countries, the support of one's elder parents has been the responsibility of the sons. Often, the parents lived with the oldest son and either with or nearby the other sons. The eldest son and his brothers tended to be responsible for providing the parents with economic support. The sons would rely on one of their sisters, or sometimes on one or more of their wives, to provide their parents with emotional support. These norms have been adjusted or modified in past decades, especially in Taiwan, China, Japan and South Korea owing to their increasing levels of modernization and urbanization. In traditional Korea, for instance, researchers (De Vos and Lee,1993; Watari and Gatz, 2004; Poston and Davis, 2009) have noted that these norms have been

adjusted or modified in past decades, especially in South Korea, since the 1960s when the proportion of aged living in family households changed dramatically with urbanization.

Nevertheless, the provision of economic and emotional support to one's parents has seldom been a major burden in these countries. As one might expect in a population with modestly high levels of fertility, there have usually been many more producers in the populations than aged dependents. However, all five countries now have very low levels of fertility (see Figure 9), all with TFRs below replacement levels. Also, three of the countries, China, Taiwan and South Korea, have had in recent years severely unbalanced sex ratios at birth. I have estimated that there are already born in China over 40 million boys who will not be able to find Chinese girls to marry; I have estimated that the number of bachelors in South Korea is over one million, and in Taiwan over 400 thousand. These issues are raising serious problems with regard to the provision of eldercare. Its provision could well be a problematic concern in the years ahead.

For one thing, as I have already shown in this paper, in China, Taiwan, Japan and South Korea in the decades ahead, there will be many more aged dependents per producers. In 2100 there are projected to be 107 elders per 100 producers in Taiwan, 100 elders per100 producers in South Korea, 89 elders per 100 producers in Japan, and 70 elders per 100 producers in China. These are astonishingly high number of old persons per 100 producing members in the populations of these four East Asian countries.

The numbers of aged dependents per 100 producers in Taiwan in 2100 will be 6.4 times larger than its ratio in 2015, the ADR in South Korea in 2100 will be 5.7 times larger than its 2015 ADR, and the ARD in China in 2100 is projected to be 5.2 times larger than its 2015 ADR. When we couple these very high ADRs for 2100 for Taiwan,

China and South Korea with the abnormally high sex ratios at birth that they have experienced in recent decades, and that is still very high in China, the issue of eldercare provision in the coming decades becomes even more complex.

Right now in China, South Korea and Taiwan, there are not enough marriage-age females for males to marry. The numbers of bachelors in these countries have been increasing and will continue to do so, with young men in these three countries finding it increasingly more difficult, if not impossible, to meet women to marry. Look for example in Figure 13 at the sex imbalances in China as of 2010. We can see in the figure where in the age distribution, as of 2010, the 40 million bachelors are located. Move the curves over for 15, 25 and 35 years to get an idea what the sex imbalances will look like in the next few decades.

Figure 13 About Here

Many single men in China, South Korea and Taiwan will thus have the responsibility of providing for both the economic and the emotional support for their parents. What might one expect in such a situation? Anthropological research conducted in rural Ireland provides a possible answer. In rural Ireland, Scheper-Hughes (1979) noted that the last-born male has the responsibility for remaining with his parents, taking over the responsibility of the family farm, and caring for the elderly parents. His older male siblings typically move to the cities, immigrate abroad, or enter the priesthood. His female siblings move away when they marry. The last-born male, sometimes referred to as the "scraping of the pot" (Scheper-Hughes,1979: 163) and often called the "boy-o" is preordained by his sex and birth order to remain unmarried, to care for the family plot, and to take care of his parents. This is an economic strategy in the society involving the

selection of a male heir, one not that uncommon in other societies. The situation in rural Ireland, however, also involves a related psychological strategy in which the rural families "create a scapegoat, a vulnerable member" (Scheper-Hughes, 1979: 165) who is the last-born male; he knows from his earliest years that he will never marry and will forever live at home with his parents until their death. Those finding themselves in the social position of "boy-o" are much more likely than their older siblings, male or female, to be alcoholics and/or to be suffering from mental disease, especially schizophrenia (Poston and Duan, 2000: 727).

According to Scheper-Hughes (1979), "the dynamics of rural Irish socialization … is weighted in favor of the mental health of daughters and earlier-born sons, and against the healthy ego integration of later-born sons in large and traditional farm families" (1979: 166).These last-born males never grow up; they "get stuck by default with the land and [are] saddled with a life of almost certain celibacy and self-negating service to the old people"(1979: 179). The last-born son is "forever a 'boy-o,' and never a man" (1979: 185). In China, Taiwan and South Korea in the decades between now and 2100, there will be a very large number of unmarried sons caring both economically and emotionally for their aged parents; as many as 1 in 10 sons in China, will be in this position. The numbers will be slightly less in South Korea and Taiwan, but will nonetheless be high. If the situation in rural Ireland is relevant at all for China, South Korea and Taiwan, one would expect to find much higher levels of mental illness among these East Asian boy-os than among the sons whose wives are assisting them in the care of their elder parents (see related discussions by Fry [2000] and by Climo [2000]).

The situations in China, Taiwan, Japan, South Korea and North Korea in the coming decades will be ones with many more elderly—parents and aunts and uncles—requiring care than there are today. Moreover, in China, South Korea, and Taiwan, many of the providers will be sons, perhaps only-born sons without wives. Alcoholism and mental illness, especially schizophrenia, could well become much more prevalent among these bachelor sons than they are today, with similar difficulties for the married sons.

The analyses of ageing that I have presented here of the demographic determinants in China, Taiwan, Japan, South Korea, and North Korea, portray situations that ring with irony. These countries solved burgeoning fertility problems with fertility transitions among the most successful reductions experienced by any country in the world. But it is the very success of these transitions that have exacerbated the problem. The transitions have resulted in fertility behaviors that now result in decidedly smaller birth cohorts relative to their elders to a degree unprecedented in the less developed countries. And the very speed of the fertility transitions have given the populations precious little time to evolve nonfamilial old age support systems to replace the traditional family.There is a growing awareness of such problems these days in China. Although they were not foreseen at the inception of the fertility policies in the 1970s, debates about and discussions of them are now underway. Indeed in many important ways, an awareness of some of these issues resulted in 2015 in the Chinese government abandoning its so-called one-child policy (really a 1½ child policy) in favor of a countrywide two-plus fertility policy. Such a strategy will most likely reduce somewhat the magnitude of the elderly projections I presented earlier in this article and the severity of the concomitant social problems.

I have shown in this paper that dramatic reductions in but a few decades to below replacement fertility have produced, and will continue to produce, unprecedented growth in the proportion old in their populations. This is especially the situation for China, Taiwan, Japan and South Korea. In the decades of this new century, there will be very heavy aged dependency burdens on the producing populations of South Korea, China, Japan and Taiwan, with slightly less of a burden for North Korea. The burdens will become even heavier in later decades. Policy leaders in South Korea, Taiwan, Japan and China have only recently become cognizant of the current numbers of elderly, and especially the future numbers of elderly. I have no evidence that North Korean leaders are as aware. In any event, it is my opinion that these issues and their implications require even more attention than they have received to date.

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Table 1: Ten Countries of the World with Largest Shares of Persons aged 60+: 1980, 2017, 2050

	1980		2017		2050	
Rank	Country or area	Percentage aged 60 years or over	Country or area	Percentage aged 60 years or over	Country or area	Percentage aged 60 years or over
1	Sweden	22.0	Japan	33.4	Japan	42.4
2	Norway	20.2	Italy	29.4	Spain	41.9
3	Channel Islands	20.1	Germany	28.0	Portugal	41.7
4	United Kingdom	20.0	Portugal	27.9	Greece	41.6
5	Denmark	19.5	Finland	27.8	Republic of Korea	41.6
6	Germany	19.3	Bulgaria	27.7	China, Taiwan Province of China	41.3
7	Austria	19.0	Croatia	26.8	China, Hong Kong SAR	40.6
8	Belgium	18.4	Greece	26.5	Italy	40.3
9	Switzerland	18.2	Slovenia	26.3	Singapore	40.1
10	Luxembourg	17.8	Latvia	26.2	Poland	39.5

Source: United Nations, *World Population Ageing, 2017, Highlights*. New York, United Nations, 2017.

Table 2

Percentage of the Population Aged 60 and over:

The World and Regions of the World, 2017 and 2050

Region	2017	2050
World	12.7	21.3
Africa	5.5	8.9
Eastern Africa	4.7	8.2
Middle Africa	4.6	6.6
Northern Africa	8.3	16.7
Southern Africa	8.1	15.3
Asia	12.2	24.2
East Asia	17.7	35.7
Central Asia	8.8	18.8
Southern Asia	8.8	18.9
Southeast Asia	9.9	21.0
Western Asia	8.3	18.2
Europe	24.7	34.5
Eastern Europe	22.5	32.8
Northern Europe	24.2	31.3
Southern Europe	26.9	40.1
Western Europe	26.4	34.8
Latin America & Caribbean	11.8	25.4
Caribbean	13.8	25.4
Central America	9.7	23.1
South America	12.4	26.5
North America	21.7	28.3
Oceania	17.0	23.3

SOURCE: United Nations, *World Population Ageing, 2017, Highlights*. New York: United Nations, 2017, Annex Table 1.

Figure 1. Number of Years for the Population of the World to Reach Its First through Its Eighth Billion

First Billion	All of Human History (ca. 1800)
Second	130 Years (1930)
Third	30 Years (1960)
Fourth	14 Years (1974)
Fifth	13 Years (1987)
Sixth	12 Years (1999)
Seventh	12 Years (2011)
Eighth	12 Years (2023) ?
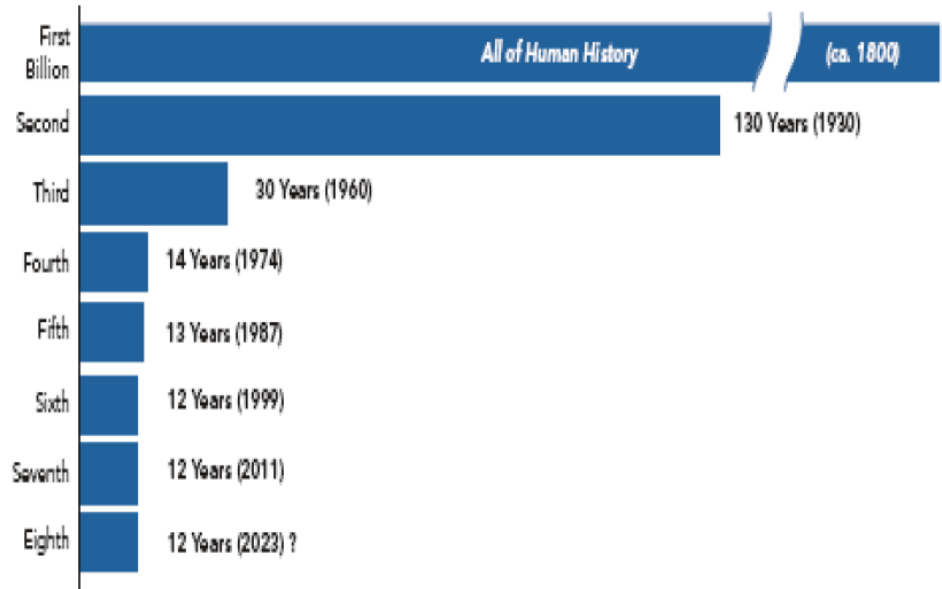
Figure 2. Population of the world: estimates, 1950-2015, and medium-variant projection with 95 per cent prediction intervals, 2015-2100
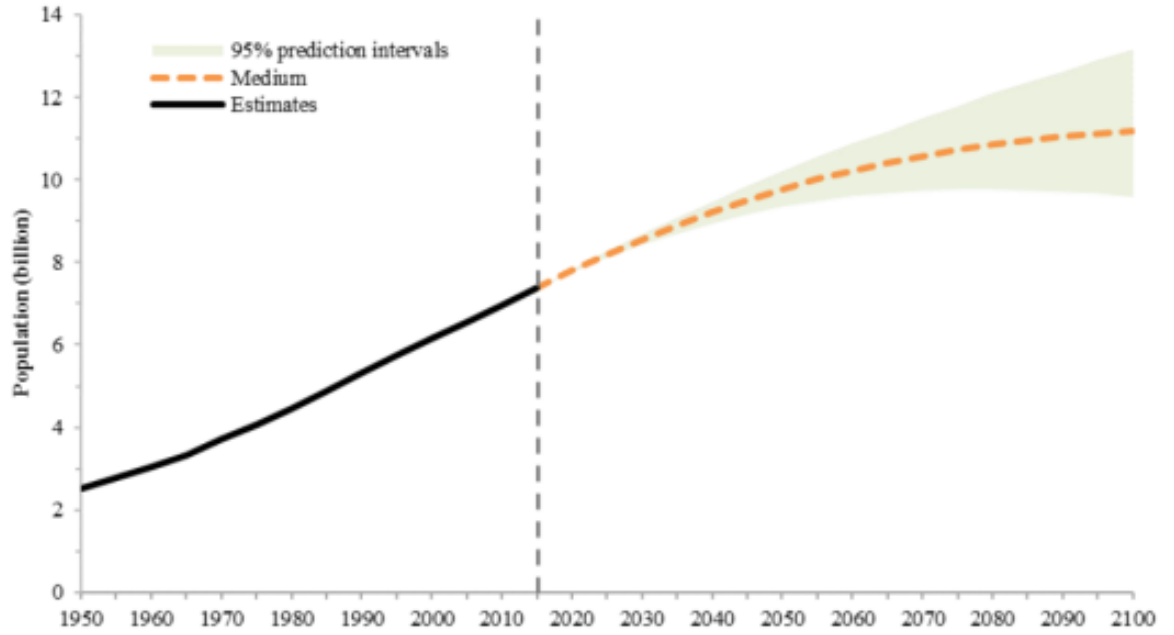
Figure 3.
World Population Growth Rates, 1700 to 2100
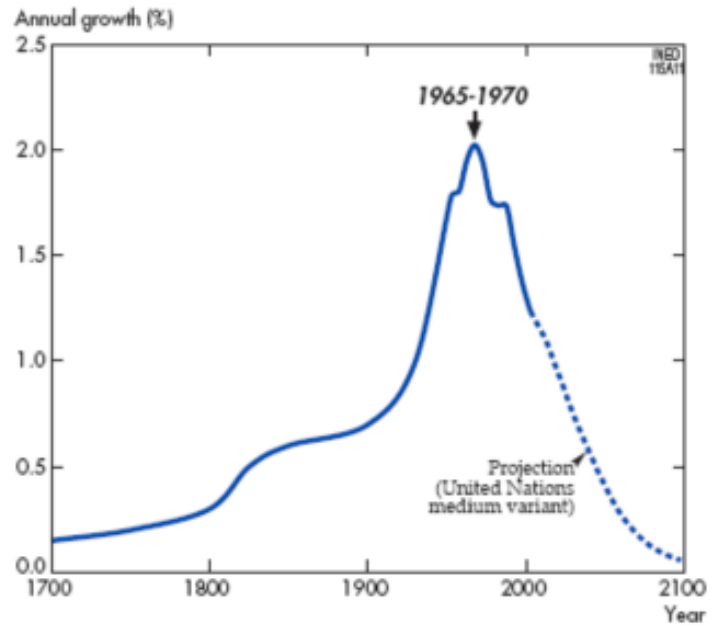
Figure 4
Japan, Population by Age, 1950 to 2100

Total Population by broad age group

Legend: 0-14, 15-64, 65+

Y-axis: Population (millions)
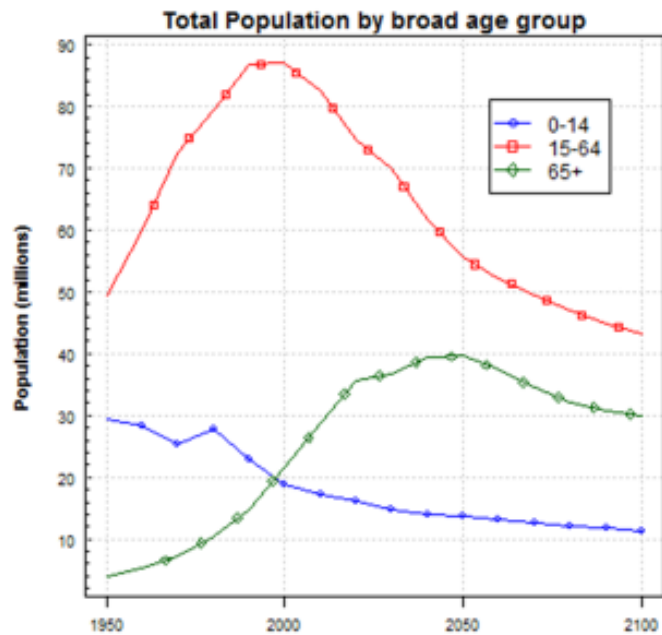
Percent Distributions by Broad Age Groups

Age Group	1950	2015	2050	2100
0-14	35.4	13.0	12.6	13.3
15-64	59.7	61.0	51.1	51.2
65+	4.9	26.0	36.4	35.5
TOTAL	100.0	100.0	100.0	100.0

Figure 5
China, Population by Age, 1950 to 2100

Total Population by broad age group

Legend:
- 0-14
- 15-64
- 65+
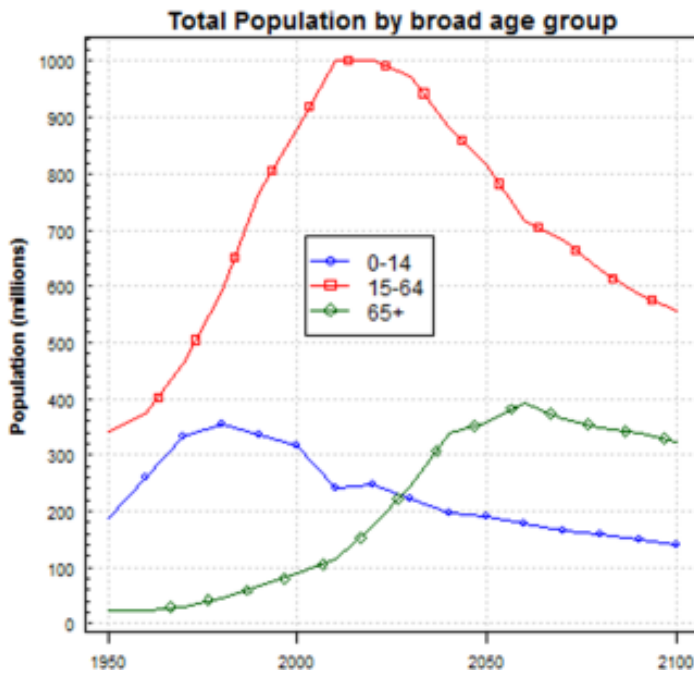
Percent Distributions by Broad Age Groups

Age Group	1950	2015	2050	2100
0-14	34.0	17.7	14.0	13.9
15-64	61.5	72.6	59.7	54.4
65+	4.4	9.7	26.3	31.7
TOTAL	100.0	100.0	100.0	100.0

Figure 6
Taiwan, Population by Age, 1950 to 2100

Total Population by broad age group

Legend:
- 0-14
- 15-64
- 65+
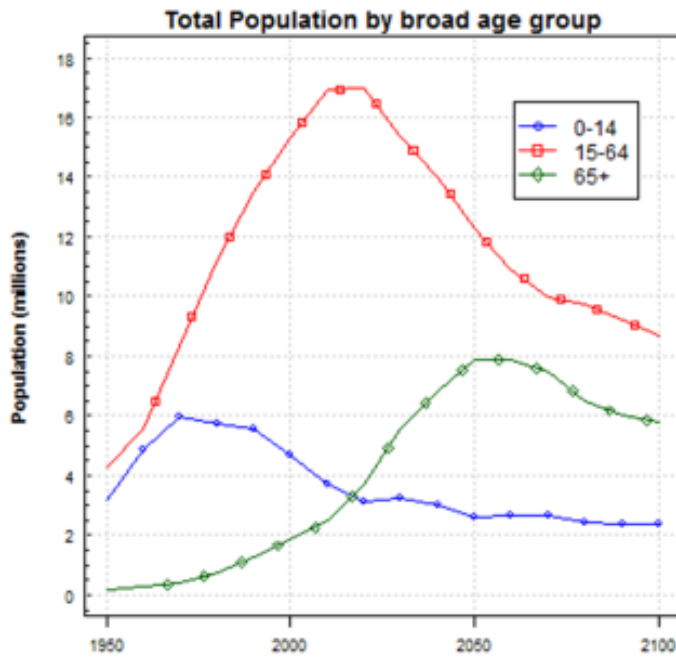
Percent Distributions by Broad Age Groups

Age Group	1950	2015	2050	2100
0-14	42.0	13.8	11.5	14.0
15-64	55.8	74.0	54.0	51.6
65+	2.2	12.3	34.5	34.4
TOTAL	100.0	100.0	100.0	100.0

Figure 7
South Korea, Population by Age, 1950 to 2100

Total Population by broad age group

Legend:
- 0-14
- 15-64
- 65+
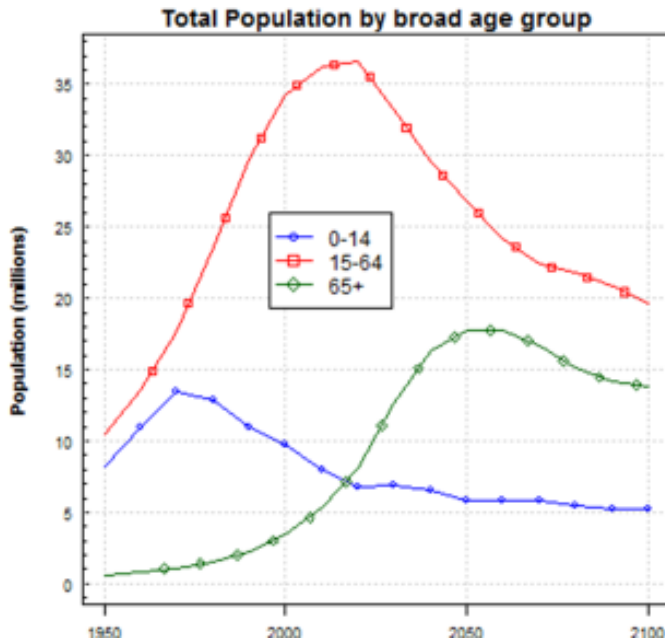
Percent Distributions by Broad Age Groups

Age Group	1950	2015	2050	2100
0-14	42.5	13.9	11.5	13.5
15-64	54.6	73.1	53.2	50.8
65+	2.9	13.0	35.3	35.7
TOTAL	100.0	100.0	100.0	100.0

Figure 8
North Korea, Population by Age, 1950 to 2100

Total Population by broad age group

Legend:
- 0-14
- 15-64
- 65+
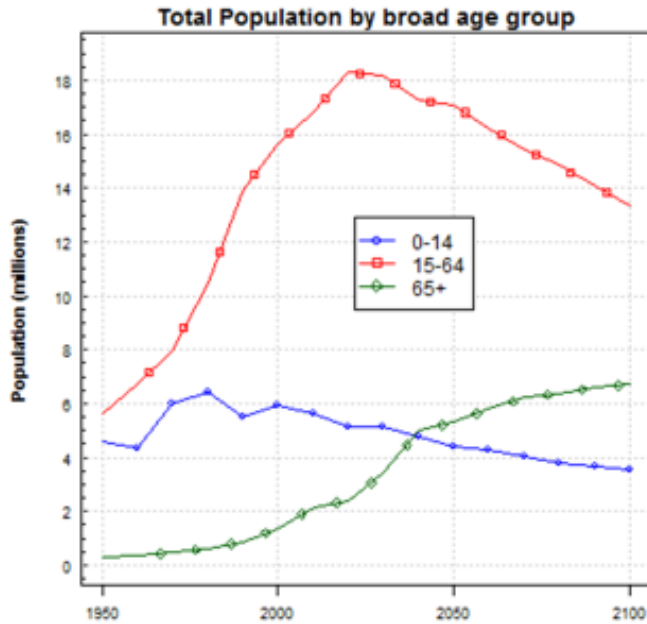
Percent Distributions,
Broad Age Groups

Age Group	1950	2015	2050	2100
0-14	43.4	21.1	16.5	14.9
15-64	53.5	69.2	63.7	56.5
65+	3.1	9.7	19.8	28.5
TOTAL	100.0	100.0	100.0	100.0

Figure 9. Total Fertility Rates, China, Japan, Taiwan, South Korea, North Korea, 1950 to 2015

Figure 10. Aged Dependency Ratios: World, Asia, East Asia, USA: 2015 to 2100, Under Assumption of Constant-Fertility

Figure 11. Aged Dependency Ratios: China, Taiwan, Japan, USA: 2015 to 2100, Under Assumption of Constant-Fertility

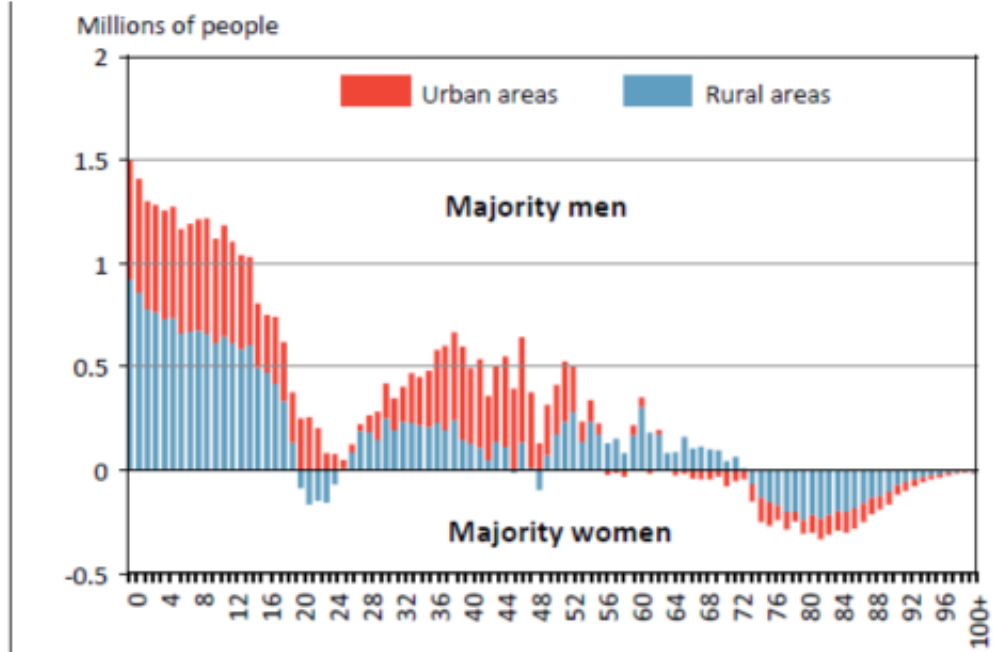## Figure 12. Aged Dependency Ratios: South Korea, North Korea, USA: 2015 to 2100, Under Assumption of Constant-Fertility
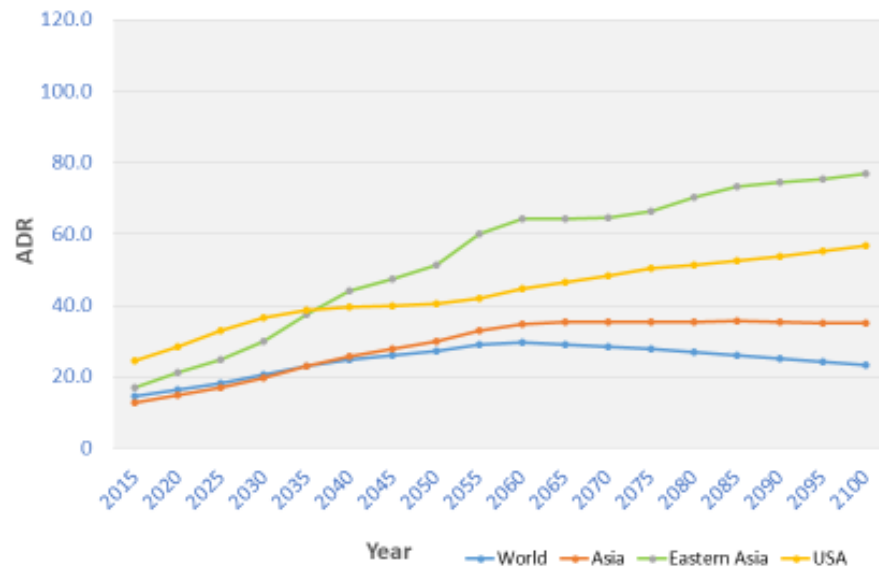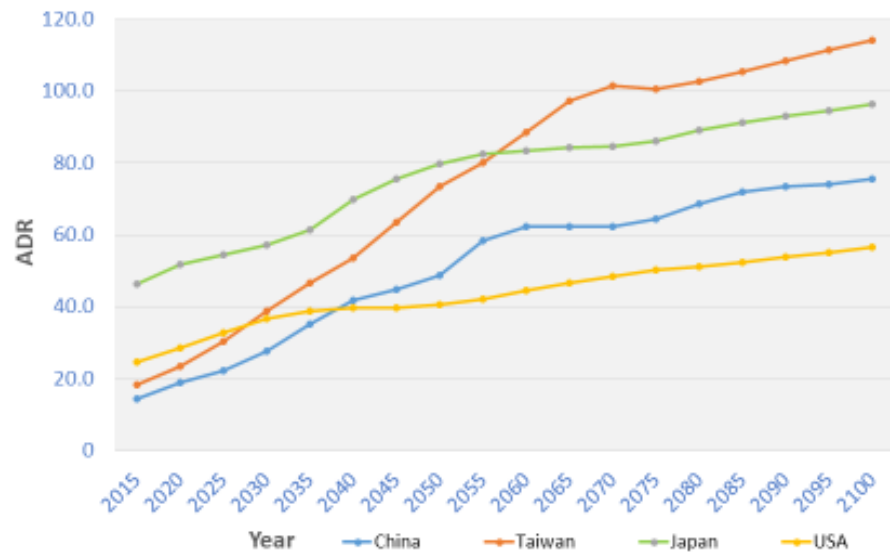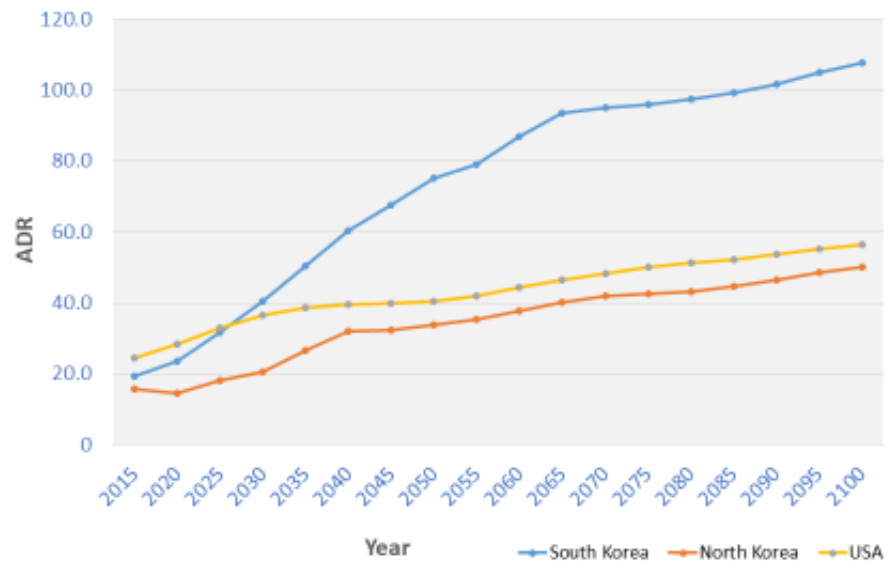
Source: United Nations, Department of Economic and Social Affairs, Population Division. 2017. *World Population Prospects: The 2017 Revision*. New York, NY: United Nations.

Figure 13. Surplus (in millions) of Men Over Women, by Age: China, 2010

Source: Isabelle Attane, *Population and Societies*, #557, July-August, 2018