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Analysis on Chinese Economy and Ageing Population: Emphasis on Effects of Labor Supply

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Abstract: The paper examines the impact of population ageing on the most important macroeconomic aggregates and internal economic growth of a country. The main target is to examine the impact of population growth rate and elderly poverty rate changes on these variables with respect to the population ageing. The population growth should lead to the increase in the available labour forces and successively to the growth of capital, consumption and GDP. Earlier researches strongly demonstrated that demographic changes do influence the economy. Therefore, increasing elderly population and its effect could in the future markedly influence economic development of ageing country especially developing economies. As a result of cost of labour goes up, profit will fall and cause domestic inflation and decrease in savings rate will slow down the capital formation and development in GDP. Short-supply of labour in cities and leads to increase the migration from rural to urban and scarcity of labour to support rural economic development and cause uneven economic development due to ageing population.

Keywords: Aging Population, Economic Development, Economic Growth, Government Expenditures, Gross Domestic Product, Labour Supply

1. Introduction

Population ageing is an increasing median age in the population of a region due to declining fertility rates and or rising life expectancy. Most countries have rising life expectancy and an ageing population trends that emerged first in more economically Developed Countries, but which are seen now in less economically Developed Countries. This is the case for every country in the world except the 18 countries designated as "demographic outliers" by the UN.

Population ageing is a shift in the distribution of a country's population towards older ages. This is usually reflected in an increase in the population's mean and median ages, a decline in the proportion of the population composed of children, and a rise in the proportion of the population that is elderly. Population ageing is widespread across the world. It is most advanced in the most highly developed countries, but it is growing faster in less developed regions, which means that older persons will be increasingly concentrated in the less developed regions of the world.

Population ageing arises from two demographic effects: increasing longevity and declining fertility. An

increase in longevity rises the average age of the population by increasing the numbers of surviving older people. A decline in fertility reduces the number of babies, and as the effect continues, the numbers of younger people in general also reduce. Of these two forces, it is declining fertility that is the largest contributor to population ageing in the world today. Morespecifically; it is the large decline in the overall fertility rate over the last half century that is primarily responsible for the population ageing in the world's most developed countries. Because many developing countries are going through faster fertility transitions, they will experience even faster population ageing than the currently developed countries in the future.

1.1 Factors influences of ageing population

1.1.1 Increase in the dependency ratio: If the retirement age remains fixed, and the life expectancy increases, there will be relatively more people claiming pension benefits and less people working and paying income taxes. The fear is that it will require high tax rates on the current, shrinking workforce.

1.1.2 Increased government spending on health care and pensions: Consumption and savings are the building pillars of each economy. Economic lifecycle theory explains individuals´ desire to smooth consumption over time to ensure stable and balanced life. The population age structure and the life expectancy ratio were found out to be crucial explanatory variables of aggregate consumption function and government spending function estimates. Also, those in retirement tend to pay lower income taxes because they are not working. This combination of higher spending commitments and lower tax revenue is a source of concern for Western governments especially those with existing debt issues and unfunded pension schemes.

1.1.3 Shortage of workers: An ageing population could lead to a shortage of workers and hence push up wages causing wage inflation. Alternatively, firms may have to respond by encouraging more people to enter the workforce, through offering flexible working practices.

1.1.4 Changing sectors within the economy: An increase in the numbers of retired people will create a bigger market for goods and services linked to older people.

1.1.5 Higher savings for pensions may reduce capital investment: Demographic ageing changes saving behaviour of individuals and households in the long run. Longer life expectancy leads to the necessary amendments in present but first of all future consumption distribution. Internal rate of return decreases due to longer time distribution of financial resources. If society is putting a higher % of income into pension funds, it could reduce the amount of savings available for more productive investment, leading to lower rates of economic growth.

1.1.6 Economic growth: A big factor in determining the impact of an ageing population is future rates of economic growth. There is a concern, western economies have entered a period of secular stagnation falling growth rates. This decline in economic growth will increase the pressure on public finances from an ageing population. Strong economic growth, increases tax revenues and makes it easier to fund pension commitments. But, in recent years we have seen stagnant wages and a decline in real incomes of young people. This places stress on redistribution of income from the young to retired. The problem is that an ageing population is one reason put forward for secular stagnation in a country like Japan.

1.1.7 Inequality: Another problem with an ageing population is that it could exacerbate inequality. With increased reliance on private sector savings, there could be a division between those with a good private sector pension, and those who rely on a diminishing state pension. Also, inequality could be exacerbated by the state of

the housing market, with homeowners in a much better position than those who have to continue to rent into their retirement.

1.2 Population Ageing of China

Nowadays, Chinese growth of economy is slowing down (Cai Fang and Lu Yang, 2013). In other words, as one-child policy was implemented in 1979 (Yuanting Zhang, Franklin W. Goza, 2006) and the improvement of disease prevention, people's life expectancy is longer than before (Gonghuan Yang, Lingzhi Kong, Wenhua Zhao, et al, 2008). All these factors leaded to an ageing society which decreases the labor supply and limits the development of Chinese economy (Judith Banister, David E. Bloom, and Larry Rosenberg, 2010). Since the open trade policy in 1987, China's GDP increased sharply which outperformed any other countries in the world and it's economy plays the most dynamic and important role in the economy world during these few decades (Ross Garnaut and Yiping Huang, 2001). Therefore, as the importance of China's economy to the world, it is necessary to investigate how China's future economy performs under the background of ageing population.

In the past, as the China's large working-age population which has kept China's labor costs low, China's economic boom and the large working-age population helped China maintain its advantage in manufacturing (Muqun Li, 2011).However, the Chinese working-age population decreased and ageing population leads to declining economic growth as labor supply shrinks (XiujianPeng, 2008). Therefore, the aim for this paper is looking for the consequences for the current situation of China's labor supply, and find out how future economy will perform with these consequences. In addition, it will look for a small comparison with Japanese's aging population, and after that it wants to predict future performance for Chinese ageing population and whether Chinese ageing population will turn to be as severe as Japan's.

In order to assist this review, it's first going to look at the Chinese ageing population, then how ageing population affect the labor supply in China. The second is to look for in what ways the changes of labor supply will affect Chinese economy growth. The last one is to compare ageing population between Japan and China, and find out what is the current situation and prediction for China's ageing population.

Population ageing results in lesser inflow of labour force on labour market as well as in increase in average age of workforce. This phenomenon influences all members of labour market regardless they are old works or young generation. Supply site of labour market focus on decreasing quantities of young workforce and rising labour costs. Young population wages experienced a significant shifts due to drop in young labour force supply and increased requirements for the quality of human capital on demand site. Each new generation pushes wage rate higher. Wages have tendency to grow faster for workers age 20-45 than for workers in pre-retirement age. Rationale can be found in lifecycle models, which indicate relationship of earnings and age. While young individuals tend to have lower wages, as they become more experienced their earnings grow as well. The juvenile wages can be influenced by other factors such as minimum wages regulations, form of education or restrictions on hours an type of work. Individual productivity reaches its peak for workers age 30–40. Productivity declines with the approaching retirement age 45-55.

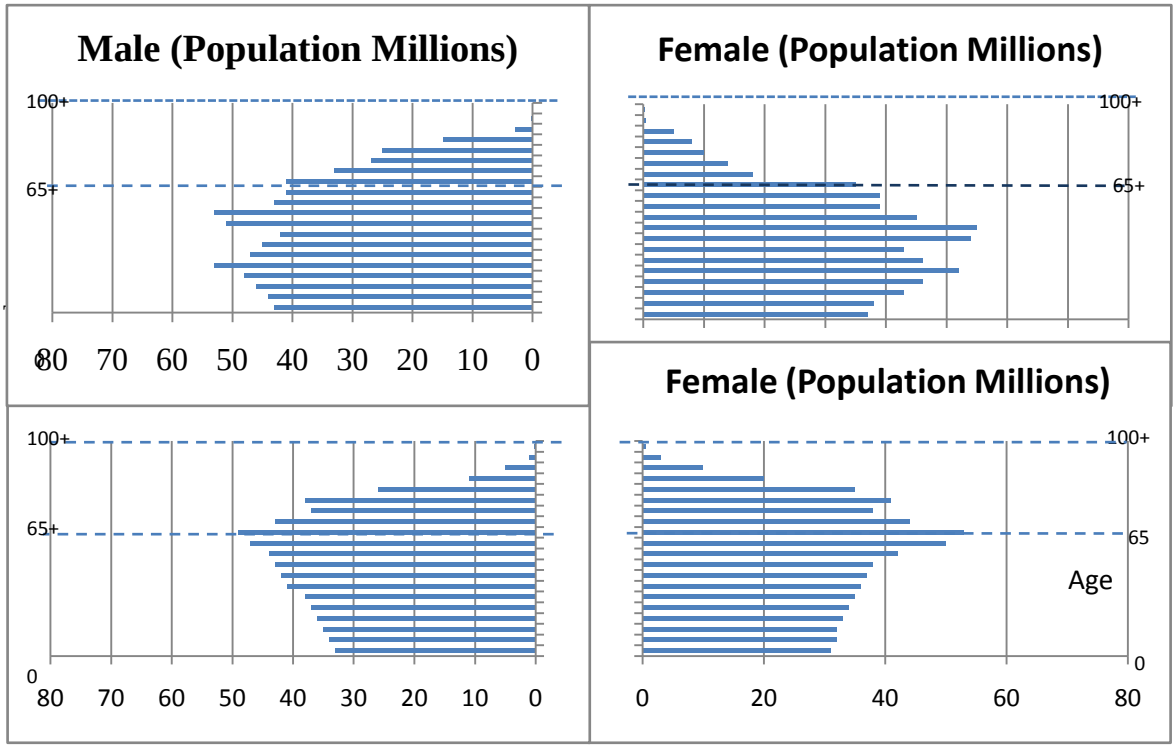
1.3 The background of aging population and labor supply in China

1.3.1 Situation of ageing population in China: Due to the increased life expectancy and decreased fertility,

there has a very rapid rate of population ageing in China since one-child policy in 1970s (XiujianPeng and Dietrich Fausten, 2006), and in turn China has the largest population of old persons which exceeding 165 million (Thomas R. Klassen, Yunjeong Yang. 2014). The ageing population becomes more serious than before, and there are more old people instead the young people. For example, the people above 65 years old in 2050 are about 3 times bigger than in 2010 (Figure 1).

Figure 1: Ageing population in China from 2010 to 2050 by male and female

Total population in 2010: 1.34 billion Aged 65+: 110 million



Source: United Nations, Department of Economic and Social Affairs, Population Division (2010).

Dominic Bailey, Mick Ruddy, Marina Shchukina (2010).

1.3.2 Situation of China's labor supply

China now faces a problem of the diminishing of labor supply. Ageing population is leading to a significant decline trend in the growth of the working-age population (David E. Bloom, David Canning, and Günther Fink, 2011), and the number of Chinese working-age is turning to see negative growth after reach the peak in 2016 (Muqun Li, 2011). This change in the age structure of the population will suggest that there will have lower labor participation rate (the number of people who are either employed or are actively looking for work), and this can be expected to decrease labor supply and in turn slow the economic growth (World Bank Group, 2016, p79-104). Labor is the main source for economic development, therefore, there will have some effects on economic development as the labor supply decrease.

2. Review of Previous Studies

Stover (2012) studyshows that the level of consumption differs greatly between consumption purposes. Food

and beverages tend to exhibit positive effect of rising share of young. The health care goods are affected positively by increasing elder share of population. Further implication of individual consumption outcomes on aggregate level proved the young and elder share of population has negative impact on consumption. The shifts in consumption structure influence aggregate demand and production in the end.

Estrada, Park and Ramayandi (2011) presented empirical paper that studied on influence of population ageing on aggregate consumption in countries of developing Asia. They found out old age dependency ratio and consumption is positively correlated even though certain amount of countries show also a negative relationship. It implies Asian older population tent to reduce the consumption in national income. Authors explained the result so that Asian countries are relatively young and are not affected by population ageing as strong as European developed countries. They also mentioned the threshold, under which age does not influence consumption. Old age dependency ratio impacts could be dominated by lower consumption level and increasing saving rate of active labour force share of population.

Burner (1992) verified the positive relationship between demographic changes and health care expenditures on the national health care system in USA over the period 1990 to 2030. However, the research shows the population ageing represents minimal part in the annual expenditure growth rate.

Boersch-Supan - Winter(2001)the need for private savings increases with prolonged life expectancy and growing demands for pension system. Individuals have to adapt original consumption and savings to the lower pension benefits caused by lower base of younger labour force, which funds the older generation at retirement age.

Boersch-Supan, Stahl (1991) and **Boersch-Supan (2001)** mentioned assumption of flat age-saving profile, their research shows the individuals after retirement tend to lower consumption while the saving rate remains positive. They do not fail to emphasize the generosity of retirement benefits which reduce the importance of private savings for individuals.

Staehle(1989) older workers are replaced by more effective workers with higher rates of productivity and human capital. The lower growth rate of wages logically follows. This assumption would also lead to drop in average labour productivity as the workforce grows older.

Johnson-Zimmerman (1993) The main negative impact of ageing is reflected in drop of labour forces volume, lower tax revenues needed to support wider age-retired base of population, higher expenditures for health and social care associated with older workforce and pressure on education system due to higher demands to the quality of human capital. The elderly dependency ratio is going to rise with growing demographic changes.

Serban(2012)the side effect of population ageing causes postponement of retirement and political and economic incentives of 55-65 age groups to participate longer in the work process. It results in higher labour supply and tougher competition among generations. On the other hand, older structure of workforce could negatively influence productivity because of the poorer health condition of older workers.

Ashenfelter(1982)and**Carone (2005)**describe two categories of effects. The direct effect influences the size of quality on employment, technological progress and capital-labour ratio. Amendments to the state budget deficit and, thus, to the whole economy are caused indirectly through individual economical channels. Altered needs of new demographic structure can cause change in demand of some economic structures as well as shifts in consumption structure, such as social services and health care.

Hagemann, Nicoletti (1989)in their study investments and new technologies are a channel through which the

population ageing affects demand site of labour market. Better technological innovation request more skilled, better educated workers. Older workforce has often problems with embracing new technologies which results in higher unemployment and lower productivity growth.

According to Braun et al. (2009) a decline in the households' savings rate due to the ageing problem is associated to a concurrent decline in the after-tax real return on capital or after-tax real interest rate, which is believed to negatively affect economic growth. Although in a considerably lower proportion (11% of the corresponding total), some empirical studies centred on the impact of ageing on economic growth through consumption and savings have found a positive relation between these variables. An anecdotal example can be found in the Chinese case. Chinese economic growth has been occurring along with a rise in the old age dependency ratio.

Li et al. (2012) report that China's increasing old age group is required to take measures to ensure their own welfare, which means this group will continue to be pressured to engage in savingsbehaviour. Such behaviour in turn positively contributes to China's economic growth.

Hock and Weil (2012) argue that a rise in the ageing population will increase the burden on the working age group, i.e., working age individuals will have to expend a larger share of their income on the elderly. Thus, in order to maximize consumption at the steady state, the working may opt to have fewer children. Consequently, the aging population will have a greater influence on the fertility rate than consumption and saving patterns.

Mitsuru Katagiri, Hideki Konishi and **Kozo Ueda (2014)**Economists argued in a recent study that aging of the population, depending on the cause, has contrasting effects on inflation. The authors said that aging is deflationary when caused by an increase in longevity but inflationary when caused by a decline in birth rates. A falling birth rate implies a smaller tax base, which might prompt the government to allow the inflation rate to rise in order to erode its debt and stay solvent. In contrast, increased longevity causes the ranks of pensioners to swell and their political power to increase, leading to tighter monetary policy to prevent inflation from eroding savings. Using a model, the authors concluded that the deflationary effect of higher longevity dominates.

James Bullard, Carlos Garriga and Christopher Waller (2012)looked at the effect of demographics on the optimal inflation rate. The authors noted that young cohorts, because they have no assets and wages are their main source of income, prefer relatively high inflation. Older workers, instead, work less and depend on the return of their assets; therefore, they prefer low inflation rates. When older cohorts have more influence on redistributive policy, the economy has relatively low inflation.

Derek Anderson, Dennis Botman and Ben Hunt (2014)found that the increased number of pensioners in Japan led to a sell-off of financial assets by retirees, who needed the money to cover expenses. The assets were mostly invested in foreign bonds and stocks. The sell-off, in turn, fueled appreciation of the yen, lowering costs of imports and leading to deflation.

Shigeru Fujita and Ippei Fujiwara (2014) looked for a causal link between an aging of the working-age population and inflation. The authors developed a model with human capital depreciation; as workers separate from their jobs, they lose their human capital and become less productive. The authors examined the effect of a decline in fertility. Initially, the increase in the share of older and, thus, more-experienced workers in the labor force led to increased output and inflation. However, as the share of older workers increased, the decline in fertility eventually reduced the entry into the labor force of younger workers, leading to negative labor force growth.

3. Objectives of the Study

[1] To describe the nature of the ageing population and identify its common factors.
[2] To identify the consequences of ageing population affect China's economy growth compare to Japan and
[3] To offer suggestions regarding why ageing population affects labour supply in china.

4. The Impact of Decreasing Labor Supply on Economic Growth

4.1 Rising labor cost will slow economic growth: As decline in proportion of working age population, China's labor supply will experience a significant trend of decline. As there is no enough working-age people available to satisfy increasing demands (Muqun Li, 2011), it is rational to expect that the labor shortage will cause a rise in wages (Judith Banister, David E. Bloom, and Larry Rosenberg, 2010). From 2005 to 2008, China's annual growth rates of manufacturing wages was 21.8% which were more than many other countries like Singapore (5.9%), and Korea (1.2%). So, as labor supply decrease, labor costs and average wages will continue rising (Mitali Das and Papa N'Diaye, 2013).

As labor cost increase, most of the companies will have to provide more benefits and welfare in order to hire or keep employees. Therefore, it may decrease companies' profit, and slow company's development. Chinese comparative advantage can attribute on labor-intensive commodities (Hongbin Li, Lei Li, Binzhen Wu, and YanyanXiong, 2012). However, as labor costs and average wages continue to rise, the economic development cannot depend on the cheap labor cost and China's export competitiveness will be weakened (Muqun Li, 2011).

In addition, the increasing labor cost will cause inflation. Due to the rising labor costs decrease enterprise profit, thus in the short time, enterprises can only improve product prices to pass on the cost pressures.For example, if the productions of the enterprise are living consumer goods, it will lead to the growth of consumer spending, and in turn the consumer price index will rise (Simon Zhang, 2012). It means that people will need to pay more money to buy same products due to the cost inflation, and it also means the individual purchase power will decrease. Thus people may consume less than before, and it will decrease companies' and domestic economic development.

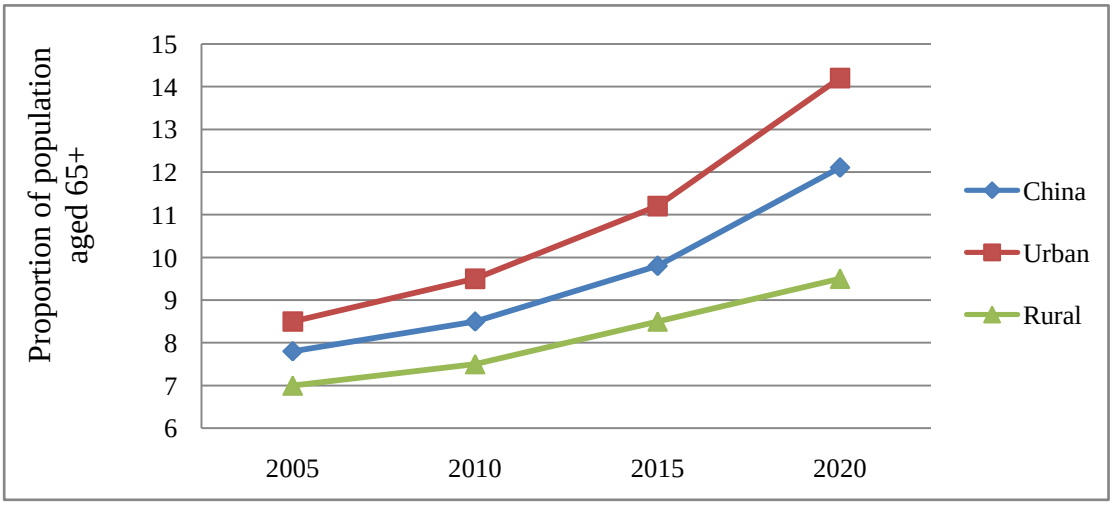
4.2 The effects of decreasing saving rate on economic development: Because of the personal ability and the motivation to save money for future retirement, working-aged people always save more money than the elderly who are not working and having little income to save. What's more, individual savings tend to show a downward trend with increasing age, and with the proportion of the elderly population increased, the national savings rate will be reduced (Judith Banister, David E. Bloom, and Larry Rosenberg, 2010).Nevertheless, the high savings rate is an important factor for capital formation and the development of GDP (XiujianPeng, 2008). Hence, as the decreasing saving rate, there will have fewer funds for capital formation to support economic development.

Due to the decreasing savings rate, there is less probability for generating the capital (Cai Fang and Lu Yang, 2013). Capital is the main source for the growth of the GDP in a developing country. Therefore, a decline in the savings rate will not support the fast growth of capital formation and it leads to decreasing of the return on capital, and it will slow the growth of GDP (Cai Fang and Lu Yang, 2013).

4.3 The effects of changes of labor migration on economic development: In the urban areas, the aging population is severer than rural areas (Figure 2), which means that there is less labor supply in urban areas. As

ageing population, there is unprecedented flow of labor from rural areas to the urban areas (Gabriel Wildau, 2015), and labor migration is common in areas where there are high-level income and rich employment opportunities (Bingtao Qin. 2015, p76-82). Thus, there will be less labor supply to support rural areas' economic growth while most of them go to cities and work there.

Figure 2: Proportion of population aged 65+, by rural and urban classification (%)



Due to large-scale migration of workers shift from rural to urban areas, the number of workers in agriculture has fallen dramatically and with fewer young workers in the rural areas (Judith Banister, David E. Bloom, and Larry Rosenberg, 2010). This will drag the economic development of the local rural areas. As there is no enough labor supply in rural areas, the local economy cannot develop and it will become poorer.

On the other hands, migrant workers can improve labor productivity of industry and services sectors in cities (Judith Banister, David E. Bloom, and Larry Rosenberg, 2010). As the number of labor migration shift to cities is large, it can meet the demand of labor supply in industrial sector (Bingtao Qin. 2015). Hence, it can not only develop economy of industrial sector, it also can enhance cities' economic development.

Therefore, one the one hand, the labor migration can improve economic development in cities. However, it will also slow development in rural areas. Finally, it will increase the gap between poor and rich from urban and rural.

4. 4 Comparison of ageing population with Japan: As the population of the world's developed economies grows older, the causal effect of aging on the macro economy is bound to land at the top of academic and policy research agendas.This effect can be seen most clearly through the lens of labor markets. In the U.S., aging features prominently in the debate on causes of the declining labor force participation rate. Also, labor market "fluidity," or the flows of jobs and workers across employers, has decreased partly in response to an aging population.[2] Similarly, the decline in the business startup rate in the U.S. over the past 30 years has been largely attributed to an aging workforce.Some have also questioned whether aging of the population is a cause of the low inflation in the U.S. since the 2007-09 recession.

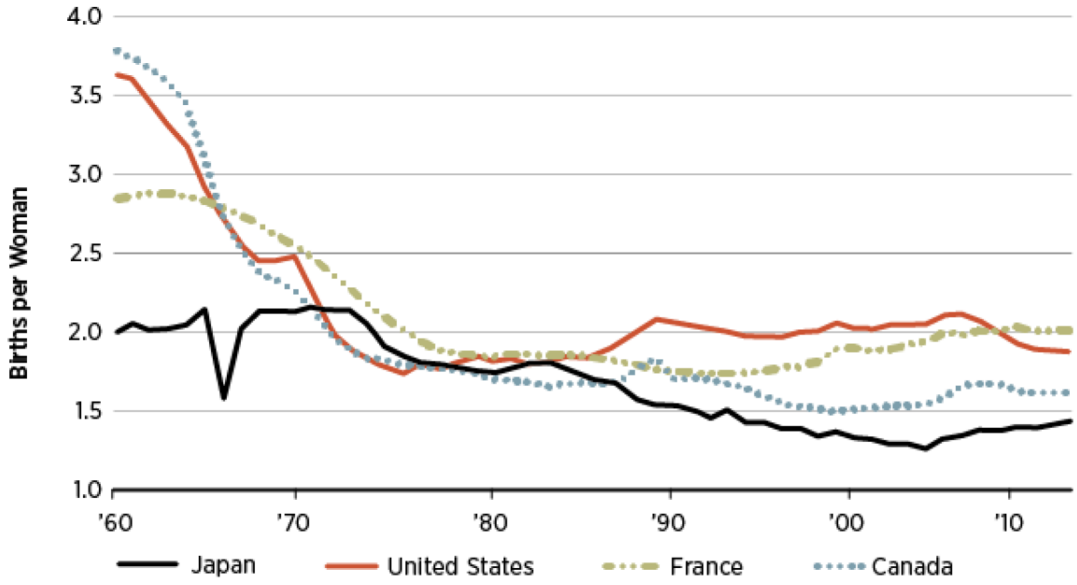
Since the average age of Japan's population is older than that of most other developed countries, Japan provides a laboratory for studying the causal effects of aging. In Japan, the ratio of the population older than 64 to the population between 15 and 64 has increased since 1990 at a steady pace, while inflation and output have fallen

over the same time.Because of these demographics, a new wave of research papers has emerged on a potential causal effect of aging on the economy.

4.4.1Aging and Deflation: Japan's Experience: A population's average age can be shifted upward by two mechanisms: a decline in fertility (which eventually decreases the number of those potentially entering the labor force) and an increase in longevity (which increases the share of older workers in the population). Japan has experienced a marked decline in fertility since 1950-1955, when the fertility rate was 2.75 births per woman; for the past 40 years, the rate has been below two births per woman.

Figure 1 Decline in Fertility Rates

Fertility Rates

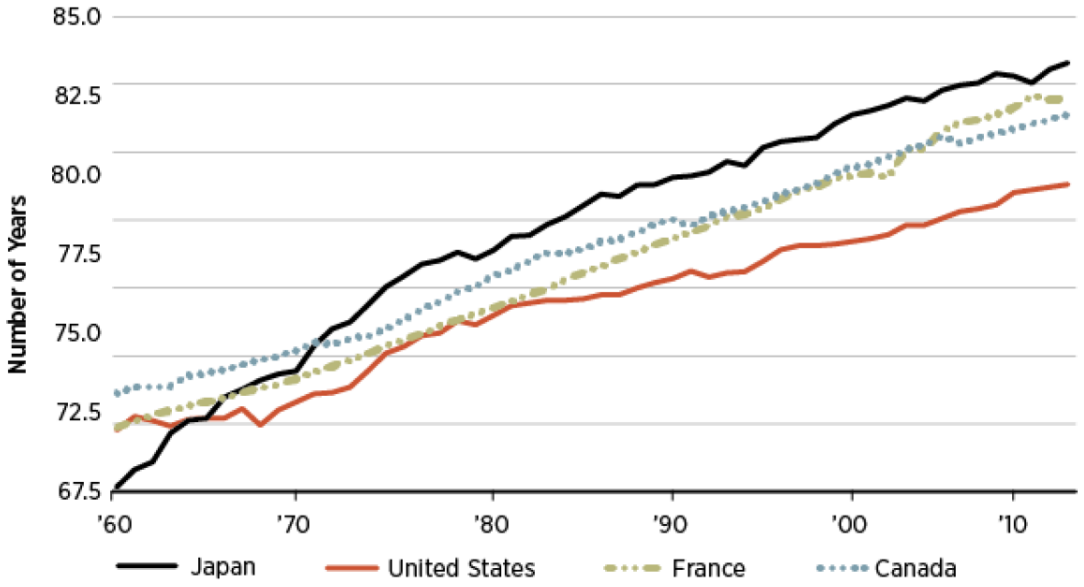


Source: Federal Reserve Economic Data (FRED)

Simultaneously, in figure 2 Japan has experienced increases in longevity, which have produced not only an older population but an older workforce, relative to other advanced economies, as older workers remain healthy and delay retirement.

Figure 2 Increase in longevity

Life Expectancy at Birth

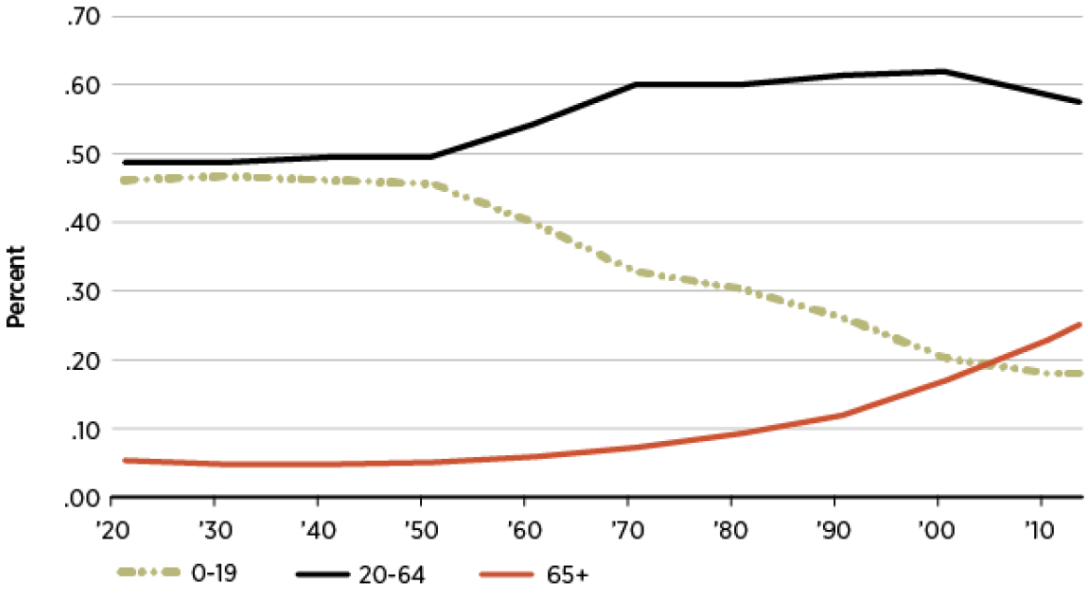


Source: Federal Reserve Economic Data (FRED)

In figure 3, Since Japan has experienced both types of shifts in recent decades; it has a growing population of older workers, as well as a shrinking population of younger workers due to the decrease in fertility.

Figure 3 Fertility rate and growing and shrinking population of old workers

Population Share in Japan, by Age



Source: Calculations, using data from Statistical Survey Department, Statistics Bureau, Ministry of International Affairs and communications, Japan, Seewww.stat.go.jp / english /data/nenkan/1431-02.htm.

4.4.2Situation of ageing population in Japan: Accordingly, with the highest longevity and the lowest fertility rates, Japan's population will have the largest proportion of old people in the world in 2050, and almost more than 40% of its total population will become over 65 years old (Nanako Tamiya, Haruko Noguchi, Akihiro Nishi, and et al, 2011). Thus it can be seen that ageing population plays an important role in Japan's economic growth. Japan's population ageing negatively affects real GDP (Mikiko Oliver, 2015), and this negative effects can be showed by that the annual GDP growth on average is lower by about 0.5 percentage points per year (Hamid Faruqee and Martin Mühleisen, 2003).

4.5 Comparison between China and Japan:

Japan's fertility decline in 1950s was two decades ahead of China's in the 1970s, and Japan has the advantage to faces the severe aging population because it is already a developed country (Judith Banister, David E. Bloom, and Larry Rosenberg, 2010), however, China is a developing country and some security system are not well prepared for the aging population. What's more, the China's annul economic growth rate will result in a decline of at least 0.5 percentage points which will not much better than Japan between 2013 and 2050 (Feng Wang, 2011). Therefore, China may face more obstacles and pressures to reduce the negative effects of ageing population.

5. Findings and Conclusion

The aim of this review is to find out the present consequences under the diminishing labor supply and how will these consequences affects China's economy growth. Based on this literature review, it can be found that as ageing population happen in China, the increasing labor cost, decreasing saving rate, and changes of labor migration will come along. As the cost of labor goes up, the industries' profits will decrease and it will cause the domestic inflation. The decreasing saving rate will slow down the capital formation and the development of GDP. In addition, as ageing population, there is a shortage of labor supply in cities. Thus, most of the people from rural areas will choose to work in cities for more salary. As there is no enough labor supply to support rural economic development, it will cause uneven development for economy between urban and rural. All these effects lead to the declining trend of overall economic development.

An additional analysis, as comparing with Japan, it can be found that China's economic growth will not be better than Japan's. China is a developing country and there are no enough economic sources for government to address this problem, thus, China will face more pressures and problems to reduce the negative effect from aging population. Compared to the situation with Japan, China should focus more on finding suitable solution to address this ageing population.

Accordingly, as ageing population, the competitive advantages as a global manufacturing center for China's economic development is fading away (Derek M. Thieme and John D. Connolly, 2014). However, if China's aged participation rates rise gradually through 2030 to approximate the rates currently observed in Japan, the same GDP growth performance might be achieved with continued low fertility, (Jane Golley and Rod Tyers, 2006). Therefore, the next 20 years will become a critical period for the adjustment in China's policies on industrial innovation, employment and proper treatment of population ageing as a coming challenge (Lijun Wang and Wenxiu Ma, 2013). In this review, it doesn't mention the solution for addressing ageing population. For a further review, it should contain some solutions for different outcomes under the ageing population.

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