Tikiri Nimal Herath (Ph.D)
Professor in Economics
Department of Economics
University of Sri Jayewardenepura
Nugegoda, Sri Lanka
E-mail: n-herath@sjp.ac.lk Tel: +94714478784

Impact of Population Ageing in Asia: Issues, Features and Solutions

Abstract

Population ageing is a complex problem in a number of economies today. It is an outcome of economic growth which is treated as a means to reach higher standard of living. However, it creates negative effects on growth (the solution). Growth increases the proportion of the old-age population which contributes to the increase in public spending on health which results in the expansion of the public sector. In the analysis of the population ageing, there are some important aspects that one needs to be familiar with. This paper examines and highlights some of such striking features of the population ageing by reviewing literature and examining relationships between variables in the light of secondary data. To avoid the expansion of the public sector, the paper proposes imposing a payment on children so that their old-age parents could lead better lives. Also, the paper recognizes the population ageing as a cost of growth and emphasizes the analytical tools to be used for countries where direct approach to welfare is adopted. Finally the study highlights a greater volatility in economic growth than in life expectancy as another issue and lower levels of labour force in developing Asian countries than in developed economies in the region which may create rigorous problems for these developing nations once their income increases in the future.

Key words: Payment on children; population ageing; volatility in growth
JEL classification: J1

Introduction

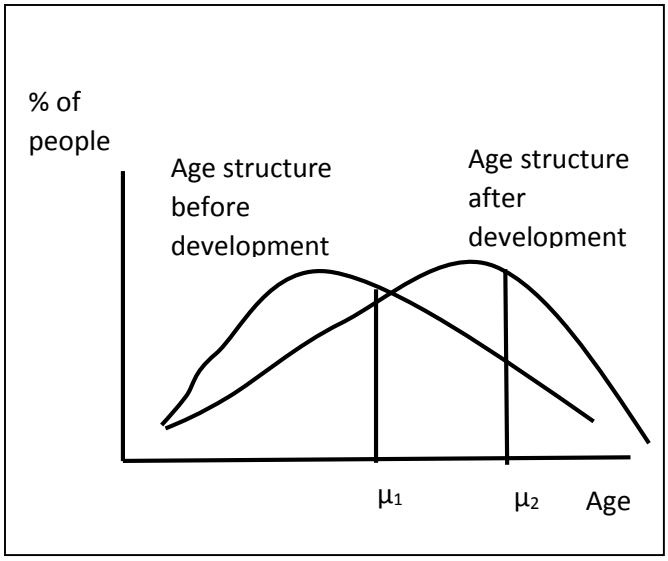
The Asian region includes close to 50 countries. As shown by UNDP (2016), Singapore, Hong Kong, South Korea, Israel, Japan, Brunei Darussalam, Cyprus, Qatar, Saudi Arabia, UAE, Bahrain and Kuwait demonstrates high levels of human development and many other states are developing at different speeds. Despite these statistics, it is well known fact that Asia is still a place for the poor. As such, growth is required for developing countries especially for the alleviation of poverty, upliftment of the standard of living and for the promotion of other human standards such as life expectancy. Thus, growth is known as a panacea for many economic ills. However, although growth alleviates poverty, and promotes the standard of living and life expectancy, it

brings about many other problems within these economies. Increase in proportion of old-age people is one such example. It creates more problems such as increase in public expenditure on health and demotion of growth etc. Therefore, solving the problem of the increase in old-age population is multifaceted and gives rise to extensive public health expenditure which leads to the expansion of the public sector. Given this background, this paper is to review some important features of the increasing in old-age population, to analyze the extent of its impact on the public sector. Finally the paper proposes a solution to avoid the expansion of the public sector as a result of the increase in public health expenditure. These objectives are achieved by reviewing literature and examination of relationships between variables related to population ageing in the light of secondary data. The paper firstly discusses related issues of old-age population, secondly proposes a solution to avoid expansion of the public sector and finally presents the conclusions arrived in the study.

Change in age structure of population and related issues

There are some crucial properties and features of the population ageing. Understanding of these features is useful for further research and to find solutions for rise in the old-age population. During the early stages of development, in a country, mean lifetime of people is low ($\mu_1 < \mu_2$) and the proportion of the old-age population (64 years old or more) is less than that of young people. However, when development is acquired by a country the age structure of the population gradually changes; average lifetime of people goes up and the proportion of old-age people increases (Figure 1).

Figure 1
The changing way of age structure of people during and after development



This change in age structure is a result of increase in life expectancy which is a partial outcome of growth. An increase in old-age population discourages savings and has negative effects on

growth. In that sense, escalation of the old-age population is a cost of growth. In other words, solution for one problem creates another problem/s or decreases the strength of the effects of the solution. Economic growth which was recognized as a solution for higher standards of living but later increases old-age population which creates negative bubbles on growth itself. Moreover, increase in the proportion of old-age population leads to increase in public health expenditure (Tosun, 2003; Elmeskov, 2004; Appendix 1) and hence it finally expands the size of the public sector too.

When global development experience is reviewed, many countries acquired growth and reached higher development levels such as literacy, life expectancy, education etc by adopting indirect approach of promoting welfare. Consequently, their proportion of old-age population gradually increased. Japan and Korea are the best examples from Asia. However, some other Asian countries sometimes adhered (some may still adhere) to the direct approach of promoting welfare. For instance, Sri Lanka reached higher development levels without growth. (Bhalla and Glewwe 1986). China can also be included in the same category. Robert Barro's (1996) analysis which argues that increase in life expectancy leads to higher levels of growth is supportive of the above development model which is based on the direct approach. However, current ideas on the population ageing is mainly based on the indirect approach to development.

When the relationship between economic growth and the proportion of old-age population is analyzed, understanding of the nature of economic variables is thus an important issue. Growth is highly fluctuating than life expectancy. In other words, growth is more volatile than life expectancy. This is due to characteristics of determinants of these variables. Economic growth mainly depends on highly contingent variables such as natural disasters (tsunami, earthquakes, cyclones), wars (peace), change in government policies and economic situations and policies of other countries to which the country's economy is linked. However, life expectancy is a function of less volatile variables such as education and provision of health facilities. Therefore, in the analysis of the population ageing, how to make growth less volatile is the problem.

Next important issue is the decrease in the labour force as a result of the old-age population. Studies have shown that when the proportion of aged population goes up, labour force goes down (Carone et al 2005). However, in Asia when empirical data are examined, from 2011 to 2014 in developing countries labour force is much less than that in developed countries. For example, in Singapore, Japan, Israel and South Korea labour force participation rate is significantly greater than in India, Malaysia, and Sri Lanka (Table 1). Under the ceteris paribus assumption, once these three countries reaches higher status of development levels, decrease in labour force participation may be lower than the present levels.

Table 1
Asia: Labour force participation rate in selected countries (% of total population ages 15-64) (Modeled ILO estimate)

Country	2011	2014
Bahrain	72.1	71.6
Bangladesh	73.4	73.6
Bhutan	74.0	75.2
China	76.7	77.6
India	57.0	56.5
Indonesia	70.0	69.9
Iran, Islamic Rep.	46.5	47.5
Israel	64.9	71.0
Japan	73.9	75.1
Jordan	43.9	43.9
Korea, Dem. People's Rep.	82.7	82.7
Korea, Rep.	65.4	66.1
Kuwait	69.5	70.4
Lebanon	51.0	51.9
Malaysia	62.0	62.7
Myanmar	81.9	82.0
Nepal	85.8	85.7
Pakistan	56.1	56.6
Philippines	67.0	67.1
Qatar	87.3	87.2
Saudi Arabia	53.5	56.9
Singapore	73.0	73.7
Sri Lanka	59.2	59.5
Thailand	78.1	78.3

Source: http://data.worldbank.org/indicator/SL.TLF.ACTI.ZS/countries

Taxation is known as the major source of income of a government. Rise in the old-age population decreases government tax revenue and increases government expenditure especially on health, pension payments and other old-age related payments (Tosun, 2003; Elmeskov, 2004). Increase in old-age population declines the size of the work force as older generations are replaced by less number of younger cohorts (Carone et al 2005). However, Bloom *et al*. (2010) show that the increase in the retiring age and immigration will help to overcome the decrease in the labour force. Other authors argue that countries can sustain economic growth despite the population ageing problem. Elgin and Tumen (2010) show that even in the presence of the decline in human capital, an economy can switch from traditional production (which uses young workers) to new human capital oriented production (which uses old-age workers). As such, old-aged population will not affect either the production or the growth. Moreover, Elgin and Tumen (2010) argue that modern economies rely more on machines than labour force. Therefore, a contraction in the labour force will have no effect on productivity. Labour can be replaced by machines. This situation can further be explained in terms of production function too. Simply, in the case of Cobb-Douglas production function, in the current year, if labour force has decreased by 20% than the previous year the function can be stated as,

$$Q = AK^{\beta}0.8L^{\alpha}$$

Where Q is output levels, K is capital, L is labour, A is technology and β and α are contribution of capital and labour. However, if technology or capital increases by 25% (or it becomes 1.25) in the current year, decrease in the labour input will be cancelled out. In such a situation, a decrease in the young working group does not make any effect on economic growth.

As stated earlier, increase in the old-age population increases government spending on health too. This is very clear in the case of Japan (Appendix 1). In such circumstances, if other expenditure items do not decrease expansion of size of the public sector is unavoidable (Appendix 2). In many developed countries from 1995 to 2014 public health spending has increased. In Japan, it is the highest out of the selected countries (Table 2). During two decades, in Japan, health expenditure alone has increased by three percent in its GDP (Figure 2). It is a significant contribution to government spending.

Enlargement of the public sector is known as harmful for an economy. Many studies show that the relationship between public expenditure (or performance of government) and economic growth is negative. (Landau 1983; Gwartney et al. 1998; Karras 1997; Pevcin 2004; Cooray 2008). Many other studies propose that government spending needs to be less than 30 percent of GDP (Chobanov and Mladenova 2009). However, in many developed economies when size of the public sector is measured as a proportion of public expenditure in GDP, it is clear that the public sector is growing especially in developed economies. Austria, Belgium, Finland, France, Greece, Italy, Latvia, Slovenia, Denmark, Japan, and Sweden are striking examples of which government

expenditure is greater than 50% of GDP in 2013. In the case of tax income, it's proportion in GDP is greater than 30% (the threshold level proposed by Chobanov and Mladenova in 2009) in Belgium, Finland, Italy, Denmark, Iceland, New Zealand, Norway, and Sweden in the same year (IMF 2015).

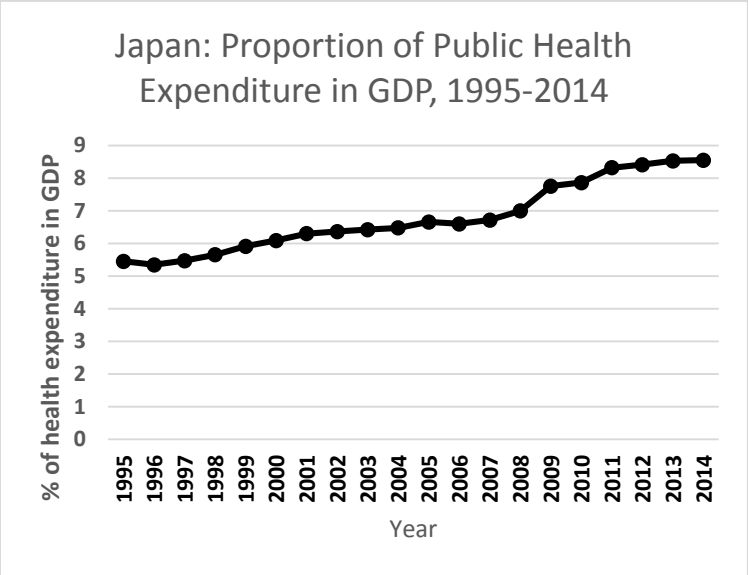
Table 2

Changing pattern of public health expenditure as a percentage of GDP in selected countries, 1995 and 2014

Country	1995	2014	Change
Australia	4.8	6.3	1.5
Austria	7.1	8.7	1.6
Canada	6.3	7.4	1.1
Denmark	6.7	9.2	2.5
Finland	5.6	7.3	1.7
Italy	5.0	7.0	2.0
Japan	5.5	8.6	3.1
China	1.8	3.1	1.3
India	1.1	1.4	0.3
High income countries	5.9	7.7	1.2
World	5.3	6.0	0.7

Source: http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS

Figure 2



Source: Basic data - http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS downloaded 07.07.2016

Solutions for population ageing

Pensions, insurance, savings like through provident fund are some existing solutions for the problem of the old-age population. These three measures can be implemented by both public and private sectors. Rise in old-age population increases public health expenditure. Therefore, such policies for population ageing implemented by the public sector expands the size of the public sector. However, intervention of the public sector is not an ideal and perfect solution because it leads to increase in taxes on the one hand and expands the size of the public sector which is harmful for economic performance, on the other. Therefore, policy makers have to look for alternative feasible solutions. Fixing a payment by the government for children of the old-age parents is one such solution.

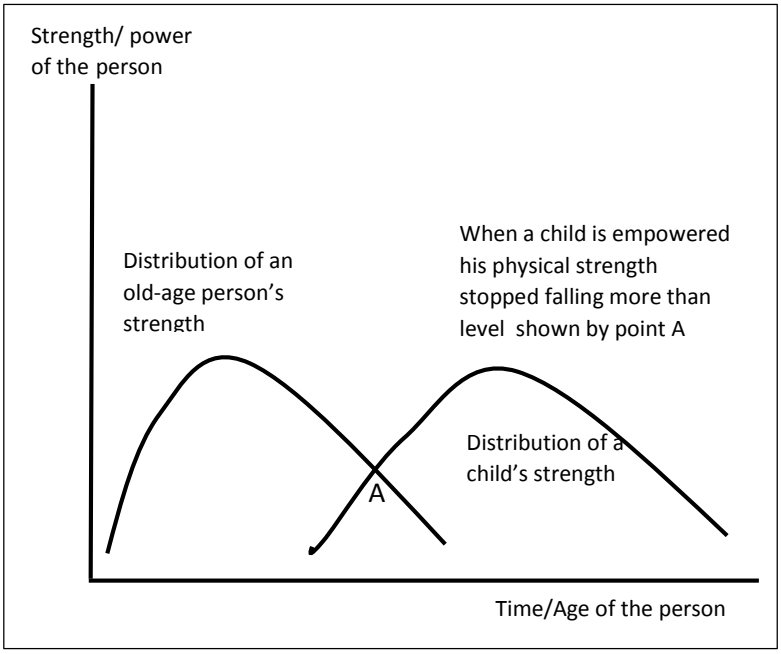
Human life starts as a child and later the child reaches adulthood and again becomes just like a child in his/her old age. It is just like many other natural phenomena. In statistical terms, life is just like a normal distribution. Many variables such as bodyweight and physical strength related to human life are positive but very low in their values during one's childhood. In the process of time values of those variables increase and reach a maxima at a certain age of a person and after that decrease during the old-age of people. In the case of economic variables related to human life also follow a similar pattern. Income and consumption and hence savings are such good examples. Labour income is zero during the very young age of a person. Later it gradually increases and reaches a maxima, and during the old-age it decreases by degrees. This is common and a major characteristic for many things. For example, let's take the volume of fruit borne in a tree during its lifetime. When the tree is a plant the volume of fruit borne is zero. Sometime later fruit production starts but at the beginning number of fruit or gross weight of fruits once borne in a tree is low. In the course of time, it increases and reaches to a maximum. After that it decreases by degrees.

Without parents, almost all children cannot think of maximization of their utility. Since the very beginning of a mother's conceiving, parents provide many things for their children. During the expecting period a mother has to undergo a lot of pains and there is an opportunity cost of conceiving. After the child birth, food, security, health facilities, clothing, and housing are provided for the child by his/her parents. Later education is also provided at least up to 18^{th} year of the child and sometimes up to a later age. If parents calculate the money they spend on a child for the whole period from his/her mother's conceiving to 18^{th} year of the baby, and if these monies are saved by parents in a bank, by the time of retirement of parents, initial savings will be accumulated to a big amount. Parents can use this saved money after their retirement.

Moreover, parents endow the next generation to the society for its existence. It is a great service extended to the society of which people are interdependent. As such, it is the society's duty to protect old parents. At least in lieu of money spent by parents on their children they need to be paid something. People talk about empowerment of children because children are fragile (deficient in physical and other strengths). Children are empowered by their parents. If physical strength of the human being is taken, it is very low during the childhood. That is a reason to empower children. When they are empowered, they are given strength and they can lead fine lives. Their strength is kept at a higher level without falling. This situation is explained by the point *A* in Figure 3.

Similarly old-age people also need to be empowered. However, empowerment of old-age people for their safety lives has been given less attention. If an old-age person is empowered, his/her strength is also kept at point *A* without falling (Figure 3). There is another argument. Taxes are raised by the government to provide collectively consumed goods such as defense for people. However, in the case of old parents they do not get anything from their children even if parents spend a lot of money on the activities of their children whom will be active members of the society..

Figure 3
Diagrammatic representation of empowering a child and an old-age fellow



Natural theory is not valid for the human being who is interdependent. According to natural theory, an animal (or brute) does not look after its parents (or mother). A female bird lays and hatches eggs and feeds the baby bird/s until the baby bird/s can fly. When it is time for the baby birds to fly, they go away. But the same theory cannot be applied for the societies, because the human being is interdependent and if children do not respond to their parents, adult people may tend not to deliver babies since in absence of children, they can save money expected to spend on children for their old-age life. Parents are doing a good job and extending a good service to the society. They offer members to the society who can take over the future of the same. Only then can the continuity of the society be kept uninterrupted. This situation can further be explained in terms of ideas taught in religions like Buddhism. In *Mangala Sutta* Buddha has stated that looking after one's parents is also necessary like providing protection for children. Thus, as a solution for increasing old-age population, an old-age protection payment needs to be introduced and it shall be paid by children of the parents in question. Every income earning individual whose parents are living has to make this payment once his/her parents are retired. This payment can be used to provide protection for his/her parents.

If children contribute the living expenses of their old parents, then government does not need to spend on the same and it controls the expansion of the public sector. If income of kids is higher, only fixed amount to meet parents expenses is sufficient. In the case of taxes, there is a tax namely negative income tax. It means when the income of a citizen is too low that citizen gets a payment from the government. When income is higher, the same person has to pay a tax to the government. Like that if a payer's income is too low he can be exempted from the payment, but when his income is too high he still can pay a fixed payment which is sufficient to meet living expenses of his/her parents.

Conclusions

Economic growth promotes life expectancy which increases the proportion of the old-age population. Finally, population ageing makes negative effect on growth. As such, increase in the old-age population is a cost of growth. By increasing public health expenditure population ageing expands the public sector. Japan is a good example. In the future this may happen in fast developing countries like China. To avoid that, a payment on children of old-age parents can be imposed. This proposal is helpful to Japan also. In Japan, public debt is escalating according to its GDP. Hence it needs to decrease public spending. Research on old-age population poses other problems. One is if a country adopts a direct approach to welfare, then how can we analyze ageing problem? Moreover, economic growth is more volatile than life expectancy. How to make growth less volatile is another problem. In Asia, at present, labour force in developing economies is lower than in developed countries. In such a situation, with development these economies may face serious problems in the future because with population ageing labour force may decrease further. It cannot be stated how far advancement of technology can resolve this problem.

References

Barro, Robert (1996). Determinants of Economic Growth: A Cross-Country Empirical Analysis, NBER Working Paper 5698, NBER, Cambridge.

Bhalla, Surjit S. and Paul Glewwe (1986). "Growth and Equity in Developing Countries: A Reinterpretation of the Sri Lankan Experience", *The World Bank Economic Review*, 1(1): 35-63.

Bloom, D.E., D. Canning and G.Fink (2010), "Implications of population ageing for economic growth", *Oxford Review of Economic Policy* 26 (4): 583-612.

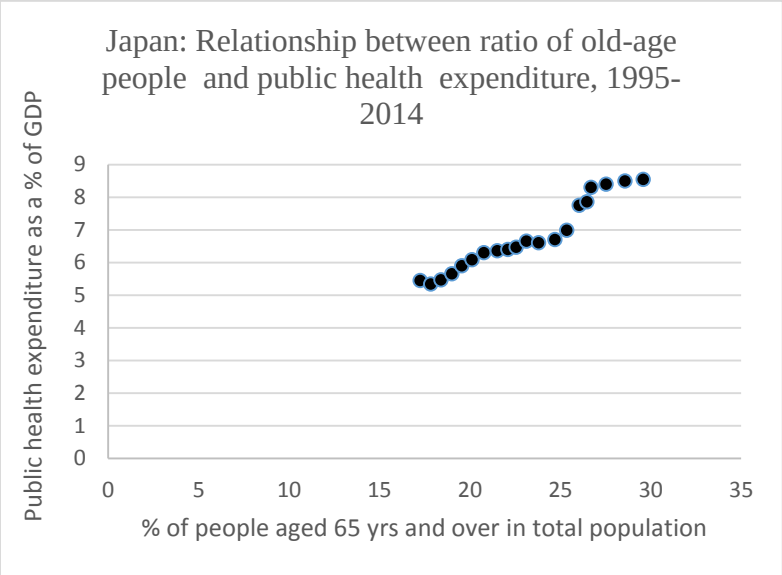
Carone, Giuseppe, Declan Costello, Nuria Diez Guardia, Gilles Mourre, Bartosz Przywara, Aino Salomaki (2005). "The economic impact of ageing populations in the EU25 Member States", European Commission, Economic papers, No. 236**.** http://europa.eu.int/comm/economy_finance, accessed on 07.07.2016.

Chobanov, Dimitar and Adriana Mladenova (2009). "What is the optimum size of government", Institute for Market Economics, Bulgaria, www.ime.bg, accessed on 25.07.2016.

Cooray, A. (2008). "Economic Growth and The Size And Quality Of The Government", University of Tasmania, https://www.researchgate.net/publication/237371751_ECONOMIC_GROWTH_AND_THE_SIZE_AND_QUALITY_OF_THE_GOVERNMENT, accessed on 07.07.2016.

Elgin, C. and S.Tumen (2010), "Can Sustained Economic Growth and Declining Population Coexist? Barro-Becker Children Meet Lucas" *Economic modeling*, 29: 1899-1908.
Elmeskov, J. (2004) "Aging, Public Budgets, and the Need for Policy Reform", *Review of International Economics*, 12: 233-242.
Gwartney, J., R.Lawson and R.Holcombe (1998). "The size and functions of government and economic growth," Joint Economic Committee, wttp://www.frihetspartiet.net/function.pdf, accessed on 07.07.2016.
IMF (2015). Government Financial Statistics Yearbook 2014, Washington, D.C.
Karras, G. (1997). "On the Optimal Government Size in Europe: Theory and Empirical Evidence," The Manchester School of Economic & Social Studies, Blackwell Publishing, vol. 65(3): 280-94.
Landau, D. (1983). "Government Expenditure and Economic Growth: A Cross-Country Study," Southern Economic Journal, Vol. 49(3): 783-792.
Pevcin, P. (2004). "Does Optimal Size of Government Spending Exist?," University of Ljubljana, http://soc.kuleuven.be/io/egpa/fin/paper/slov2004/pevcin.pdf, accessed on 07.07.2016.
Tosun, M. S. (2003) "Population aging and economic growth political economy and open economy effects", *Economics Letters* 81:291-296.
UNDP (2016). Human Development Report 2015: Work for Human Development, United Nations Development Program, New York.
http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS, accessed on 07.07.2016

Appendix 1



Basic data sources: http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS and http://www.stat.go.jp/english/data/roudou/lngindex.htm

Appendix 2
Japan: Changing pattern of old-age population (65 years or more) ratio and public spending

Year	Old age population (%)	Public expenditure (as a % of GDP)
2003	22.1	37.56
2004	22.5	36.94
2005	23.1	38.19
2006	23.8	36.08
2007	24.7	N.A
2008	25.3	N.A
2009	26.0	42.26
2010	26.5	N.A
2011	26.7	56.73
2012	27.5	56.84
2013	28.6	57.20

Basic data sources: http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS and IMF (Government Financial Statistics, Issues from 2004-2014)