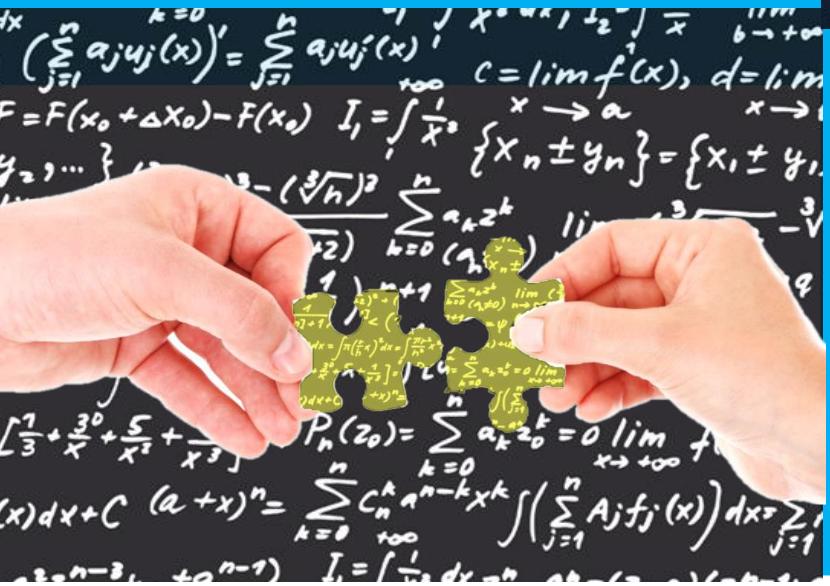
Ageing and consumer spending:

Some preliminary findings from India and China



Surajit Deb

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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE
WORKING PAPER

Ageing and consumer spending:
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Abstract

The health care for elderly population remains an important concern in the two populated economies of India and China. This paper provides an attempt to determine the extent of population aging in India and China and subsequently determine the ageing impacts on the aggregate as well as health care expenditures in these two countries, separately for the rural and urban areas. The respective state level (provincial) data from the most recent census information reveal wide regional differences in the levels of population aging in both India and China. The results of our cross-sectional regressions indicate statistically significant and positive impact of population ageing on the total as well as medical expenditures in both the rural and urban regions of India. In the case of China, the impact of old-age population turned out to be insignificant (statistically) on the total consumption expenditures for both the rural and urban areas. As concerns the impacts of ageing on the proportion of health care expenditure, only rural China reveals statistically significant and positive coefficients.

Keyword: Population Ageing, Life Cycle Model, Health Care Expenditures, Cross-Sectional Models, India, China.

JEL: J14, D91, I11, C21, O53

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1. Introduction

India and China with a projected median age of 26.9 and 36, and percentage of 65-plus population in the total population as 5.5% and 9.5%, respectively for the year 2015 are certainly not among the countries with a significant ageing population. In fact, both the countries - more so for India - are currently claimed to be benefiting from the window of demographic opportunities in attaining higher levels of economic growth. However, the aging process, although often predicted as a natural outcome of the demographic transition, may potentially turn vital for these two population giants due to some specific concerns. First, it is regarding the high population base in these two developing countries that together accounted for about 37 percent of the world's population in 2013. Second, the aging processes in India and China have confirmed signs of proceeding at a relatively faster rate due to the rapid decline in fertility and mortality rates over a short period of time. Finally, despite showing signs of achieving higher per capita GDP levels, both India and China are still among the developing economies and therefore would face the consequences of confronting old-age dependency at a much lower level of growth and economic development.

The demographic transition of ageing bears the potential to alter the economic growth and development process of both in India and China by affecting the size and composition of the workforce. Besides the economic aspects, there has also been focus on the wellbeing of older people and improve the quality of life of women and men as they age. The Global Age Watch Index that measures the economic and social wellbeing of older people globally by aggregating indicators chosen under four domains, viz., income security, health status, employment and education, and enabling environment has argued in its recent version that wealthy nations are in general better prepared for ageing than the poorer ones. It also argues that prosperity in itself does not guarantee protection for the old since the rising economic powers of BRICS nations rank lower in the index than some poorer countries such as Uruguay and Panama. It may be noted that India is ranked at a low 73rd position and remains at the second lowest-ranked among the five BRICS nations, with Brazil at 31st, China at 35th, South Africa at 65th and Russia at 78th position. The top four

positions on the global index have been attained by Sweden, Norway, Germany and Netherlands, respectively.

Health care issues are possibly the biggest obstacle in meeting the needs of the ageing population in these two populated economies, as both the Indian and Chinese governments are presently allocating less to health in comparison to other BRICS nations. Therefore, the expanding old-age population bears a straightforward implication for the health care expenditures due to growing needs of the elderly. It is maintained that although both the countries have made marked improvements in health measures, there exists a health disparity between the rural and urban areas of each country. Contemporary research examining the spending patterns of the elderly within the Life Cycle Hypothesis predicted a downward pressure on household saving and higher shares of consumer spending on health care expenditures. Studies based on survey data of household consumer expenditure show that the shares of housing-related services and health in total household expenditure seem to be steadily increasing with age in both the United States and European Union. If the spending pattern of the elderly indeed change and bear a negative impact on the consumer demand, then one can envisage a fall in the output growth of both the economies due to shrinking domestic demands.

In this background, the objective of this paper is set to examine the likely impacts of ageing on the aggregate consumer spending - individually for rural and urban areas - on the basis of using the regional (or provincial) data from India and China. Our analysis proceeds in the following sequences. We first examine the extent of population aging in India and China by analyzing the inherent characteristics of old-age and child dependency ratios. We also examine the regional patterns of ageing by using the Census (2011) data for 30 states and union territories from India and 31 provinces from China, respectively. Finally, we attempt to assess the ageing impacts on the aggregate as well as health expenditures, separately for the rural and urban areas of India and China. The rest of the paper is structured as follows. Our analysis on population ageing begins by examining the child dependency and old-age dependency ratios for both the economies in section 2. We analyze population pyramids by alternatively splitting the total population among male-female as well as

rural-urban groups to look at the underlying trends. The regional dimensions of ageing are examined for both India and China in section 3. Section 4 provides an analysis on the relationship between ageing and health care expenditures and also discusses results of the observed relationship from different countries. Section 5 describes the empirical model along with the variable relationships while the data base is discussed in section 6. The results of econometric estimation are provided in section 7. Finally, the inferences derived from the study and the policy recommendations are presented in section 8.

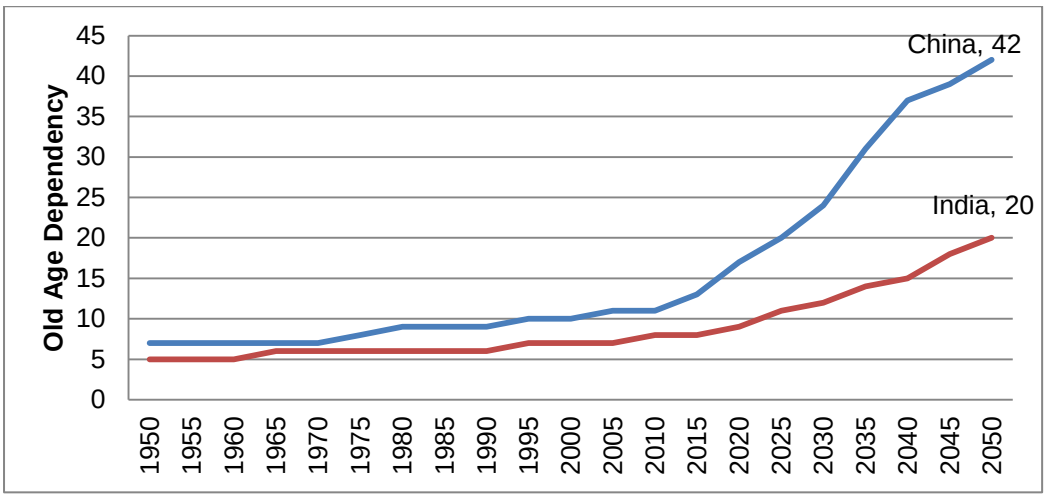
2. Ageing process of population giants

Information on the old-age dependency ratio, i.e., the ratio of older dependents - people older than 65 to the working-age population - those ages 15-64, as well as the child dependency ratio, i.e., the ratio of children aged up to 14 to the working-age population are shown in Figure 1 and 2, respectively. It can be observed that the old-age dependency of population is rising in both China and India, but the rate remains higher for China (Figure 1). The old-age dependency ratio in China is projected to climb from about 10 in 2010 to 42 in 2050, but the ratio can be seen to be climbing rapidly after 2015 and even more rapidly after 2030. During the same period, the old-age dependency ratio in India is expected to go up from about 6 in 2010 to 20 in 2050 by advancing at a more or less uniform rate. On the other hand, the child dependency seems to be falling in both China and India, but at a much faster rate in China (Figure 2). This element of a faster fertility rates decline during the eighties and nineties is widely considered as the direct result of the *one-child policy* or *family planning policy* that was introduced in China during 1979.

As the fertility levels declined in China, the child dependency ratio fell initially with an increase in the proportion of working age population. The occurrence of a decline in the child dependency ratio showed the way for a period of *'demographic dividend'*, which China is presently undergoing with a society that has a growing number of potential producers relative to the number of consumers. However, as the proportion of working age population starts entering into the old age along with the declining

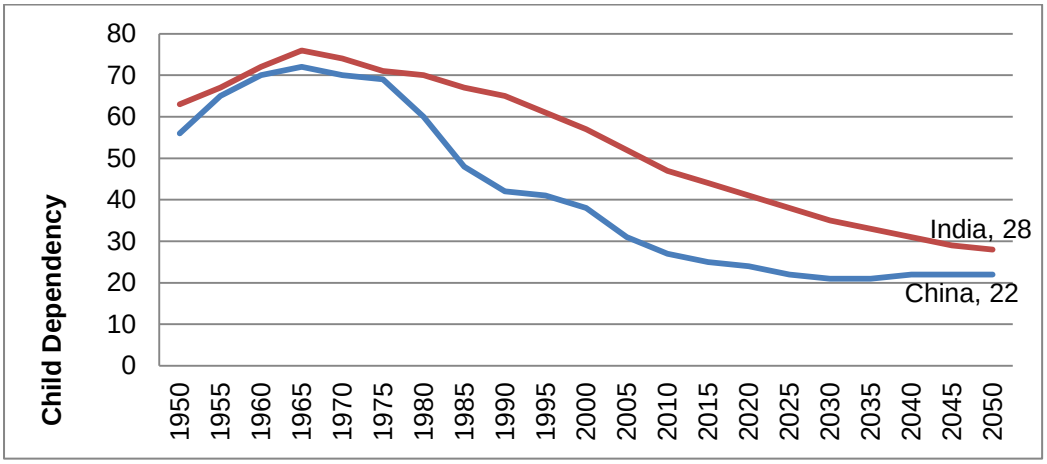
fertility levels, the old-age dependency ratios continues to increase. This possibility looks imminent for China in Figure 3, which is indicative of growing pressures that social security and public health demands of old-age dependency it has to withstand. It can be observed from Figure 3 that the total (child plus old-age) dependency is rising in China due to its low mortality and low fertility in comparison to declining population dependency in India. It is clear that India has remained a younger country with a median age of 26 years in comparison to 35 years for China in 2010. These particular ageing patterns in China and India could bring about divergent trends of labor force growth in these two countries. A high dependency ratio indicates that the economically active population and the overall economy face a greater burden to support and provide the social services needed by children and by older persons who are often economically dependent.

Figure 1: Old age dependency ratio in India and China



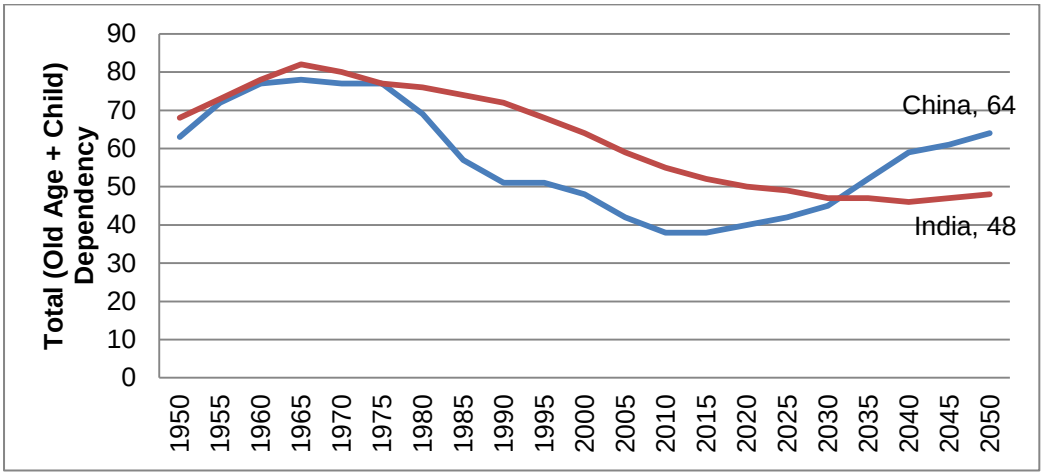
Source: Derived by using population census 2011 and 2010 data on India and China, as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi and National Bureau of Statistics of China, Beijing.

Figure 2: Child dependency ratio in India and China



Source: Same as figure 1.

Figure 3: Population dependency ratio in India and China

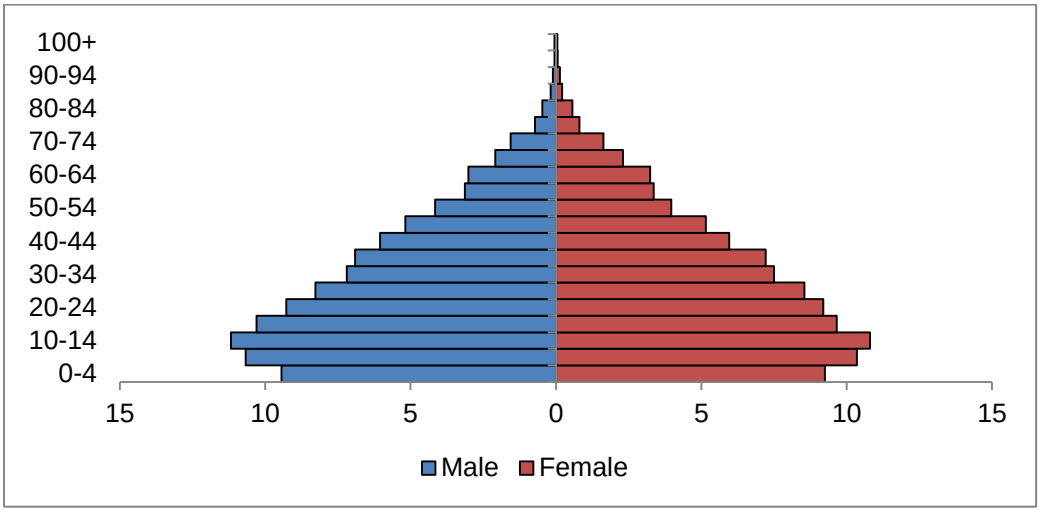


Source: Same as figure 1.

The population pyramids provided in Figures 4 and 5 convey information where the total population is disaggregated into proportions of male and female in each age group defined over five years of age interval. While both the pyramid shapes are triangular, the Indian pyramid is more broad-based at the bottom indicating high birth rates and more child population and also comprises a narrow-top signifying smaller proportion of the old-age population. One can further observe that the Chinese pyramid is not uniform as one goes up in the age-groups, due to constrictions in the middle age-group of 25-34 and also in the children age-group of 0-14. This age-group constriction coincides with the time when one child policy was introduced in

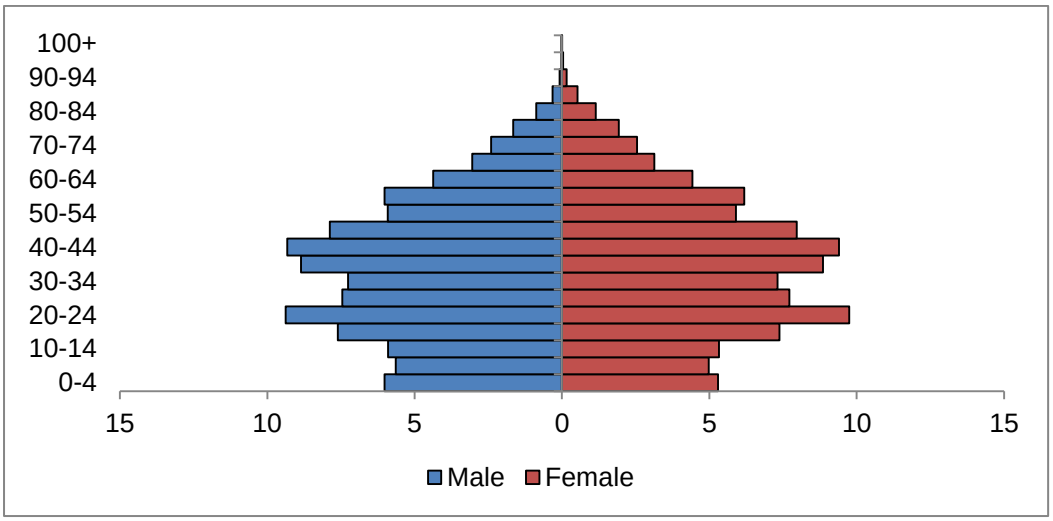
China in 1979 so that children born during the baby booming decade of seventies are moving into the 45 and older age category. Although the Indian pyramid is similarly constricted at the 0-9 age-group, it suggests of faster population growth in relation to China.

Figure 4: Total population pyramid, India, 2011



Source: Worked out from population census 2011 data as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi.

Figure 5: Total population pyramid, China, 2011

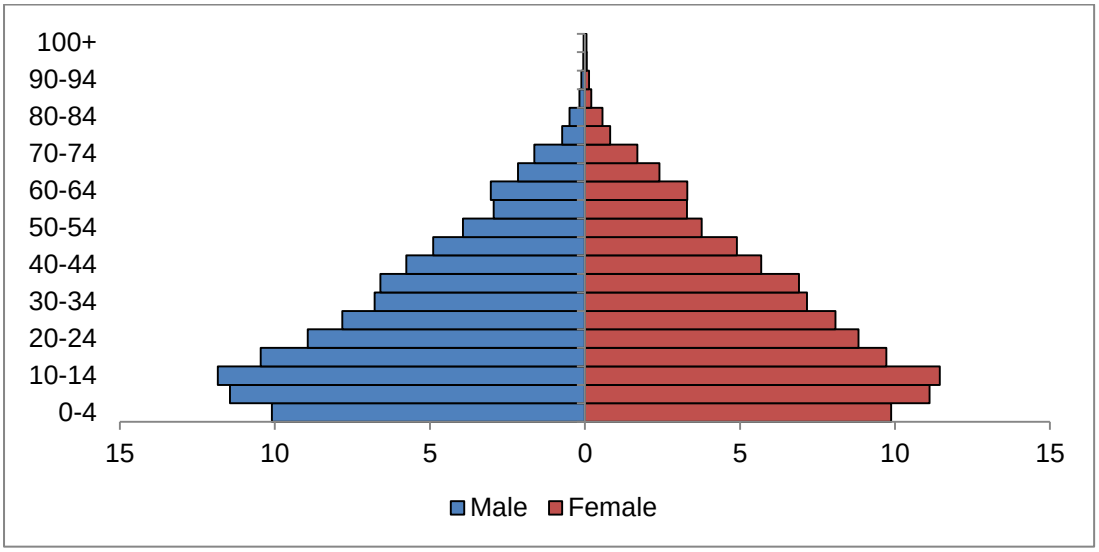


Source: Worked out from population census 2010 data as provided by the National Bureau of Statistics of China, Beijing.

Figures 6 to 9 subsequently provide the population pyramids separately for the rural and urban class of population that is disaggregated over males and females at different age- intervals. While there is no apparent difference between the rural and urban pictures of India, the rural population pyramid in China appears to be more rectangular in shape in comparison to the urban pyramid. Finally, to focus on the age-structure differences between the rural and urban areas, we depict the population pyramids where the total population (male and female) is disaggregated into proportions of rural and urban class of population in every age-group (Figures 10 and 11). It can be seen that both the pyramids reveal some non-uniformity indicating concentration of working age population in rural areas for India and the same in urban areas for China.

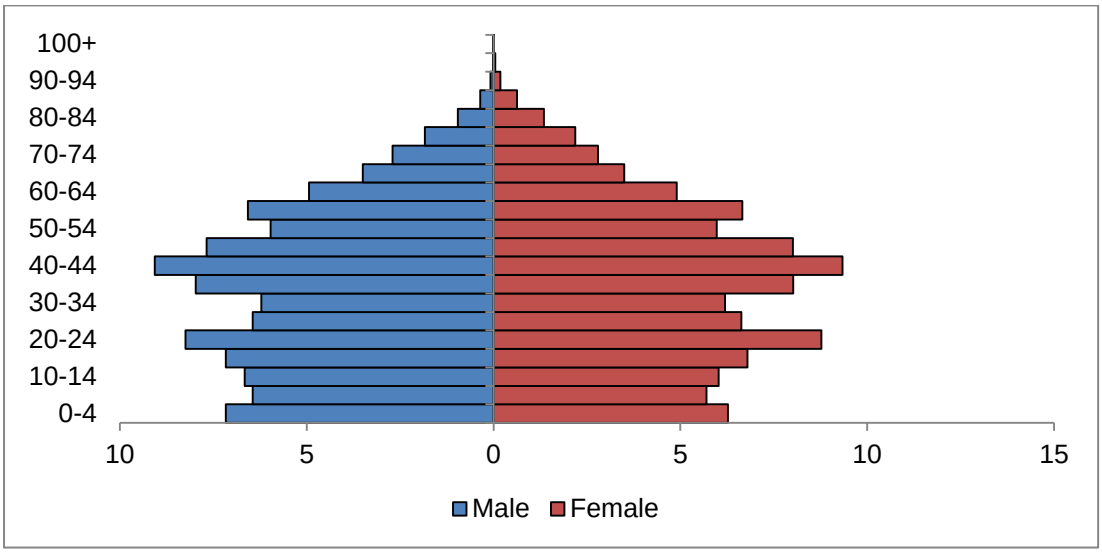
Overall, there is an indication that while the population in India would seem to be ageing from the bottom of the age pyramid, the Chinese populations appear to be achieving that from the middle of the pyramid. This is due to the fact that the working-age population in China can only be replaced by a much smaller cohort of children due to its faster decline in fertility rates. These pyramids also underlines the potential shifts in the dependency burden from a situation in which baby-booming was prevailing to one in which older persons outnumber children in the demographic transition from high mortality and high fertility to low mortality and low fertility. While the *one-child policy* was originally targeted towards controlling the population growth to alleviate social and economic problems, China now has to deal with opposite problem of fewer children to support a rapidly aging population as a result of the previous policy. It may be noted that China recently modified its decades-old one-child policy that was widely claimed to have contributed to the demographic woes that China now faces. Even though the moderation now allows families to have two children if either parent was a single child, experts believe that it is unlikely to change China’s demographic profile almost immediately.

Figure 6: Rural population pyramid, India, 2011



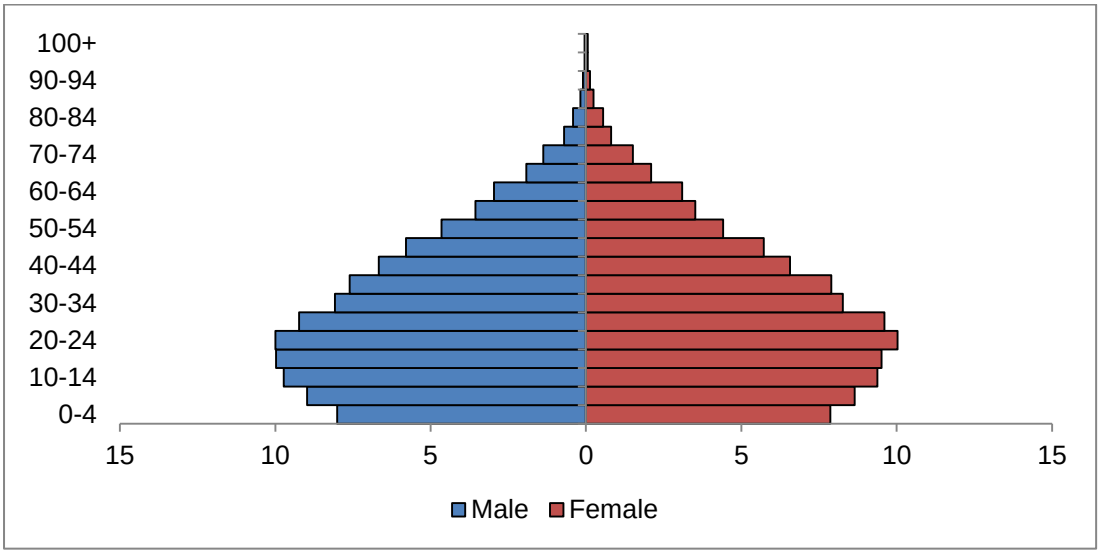
Source: Worked out from population census 2011 data as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi.

Figure 7: Rural population pyramid, China, 2011



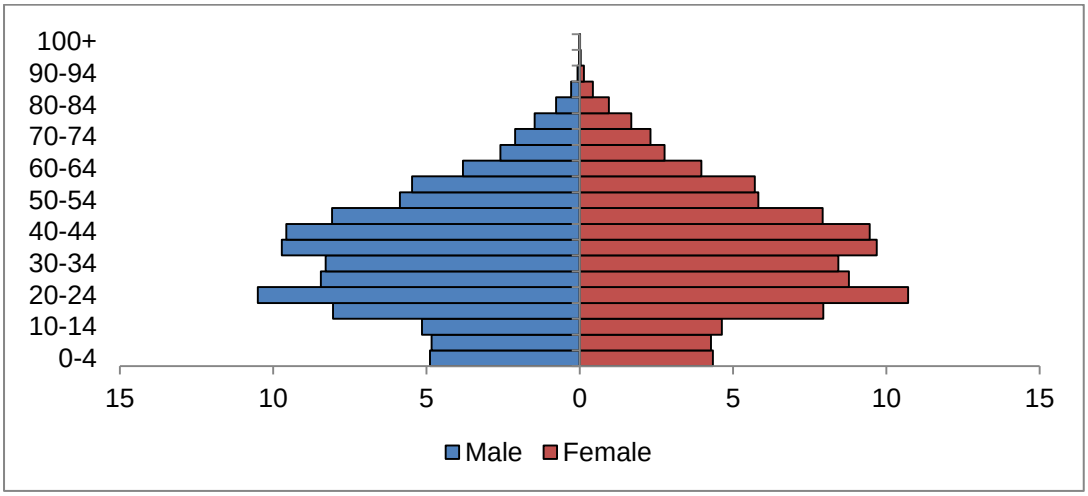
Source: Worked out from population census 2010 data as provided by the National Bureau of Statistics of China, Beijing.

Figure 8: Urban population pyramid, India, 2011



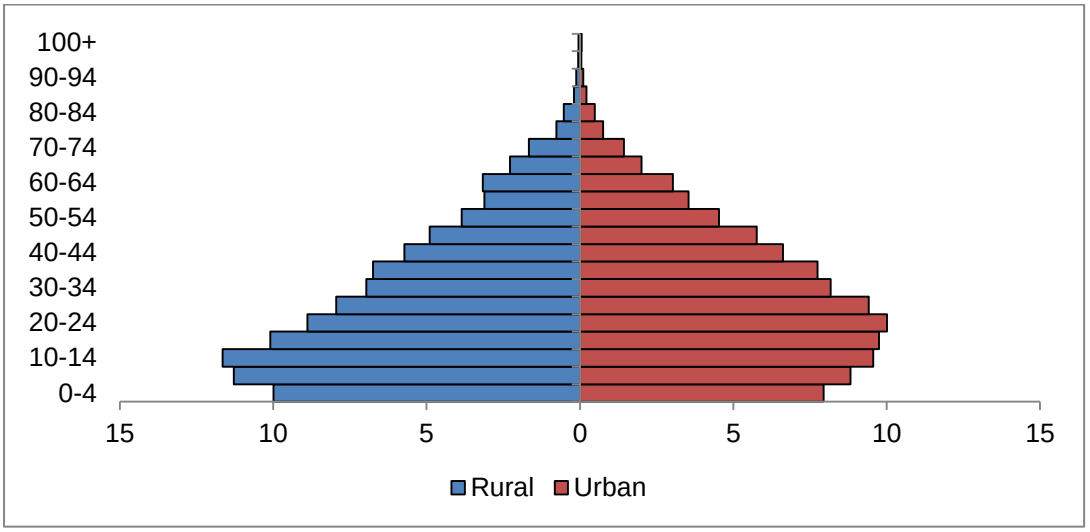
Source: Worked out from population census 2011 data as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi.

Figure 9: Urban population pyramid, China, 2011



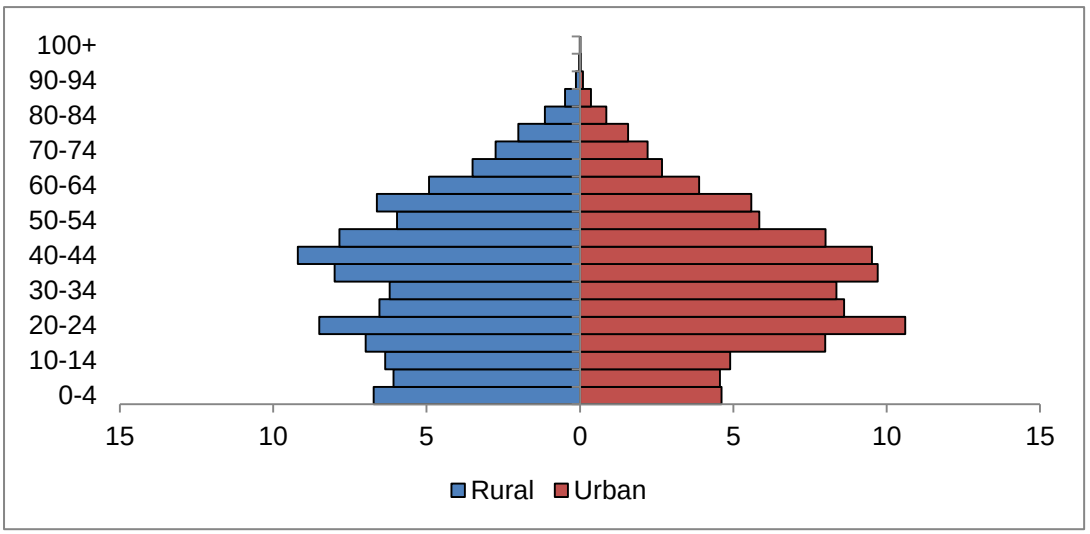
Source: Worked out from population census 2010 data as provided by the National Bureau of Statistics of China, Beijing.

Figure 10: Rural-urban population pyramid, India, 2011



Source: Worked out from population census 2011 data as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi.

Figure 11: Rural-urban population pyramid, China, 2011



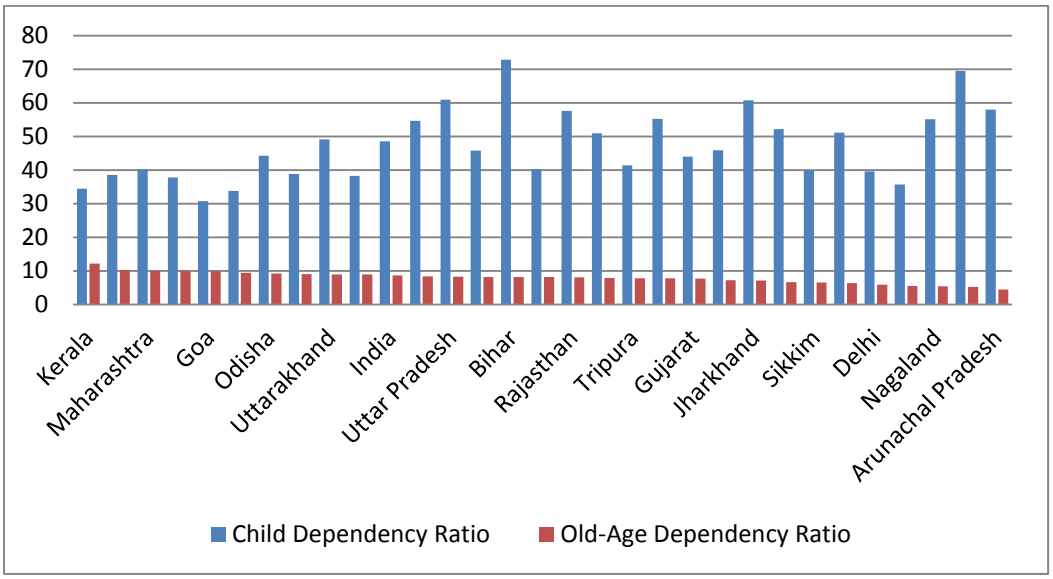
Source: Worked out from population census 2010 data as provided by the National Bureau of Statistics of China, Beijing.

3. Regional ageing dimensions

Figures 12 and 13 provide the extent of old-age and child dependency in the disaggregated states and provinces of India and China based on the population estimates of 2011. The child dependency ratio in India remained very high in the

states of Bihar, Meghalaya, Uttar Pradesh, Jharkhand, Arunachal Pradesh, Rajasthan, Jammu and Kashmir and Nagaland, whereas Kerala, Himachal Pradesh, Maharashtra, Punjab, Goa, Tamil Nadu, Odisha, Karnataka, Uttarakhand and Andhra Pradesh are the states where the old-age dependency ratio stayed at relatively high levels. Among the Chinese provinces, child dependency ratio remain high at about 30% in Guizhou, Guangxi, Tibet, Jiangxi, Henan, Ningxia, Qinghai, Hainan and Xinjiang. On the other hand, Chongqing, Sichuan, Anhui, Hunan, Shandong, Jiangsu, Guangxi, Liaoning, Guizhou, Hubei and Henan are the provinces, where the old-age dependency ratio remained high at about 13% of the working-age population.

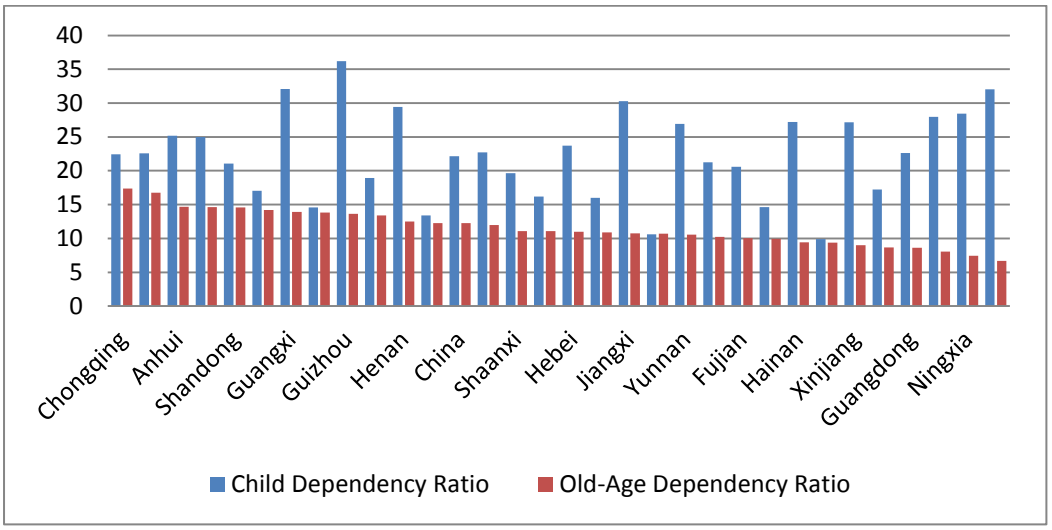
Figure 12: Child & old age dependency in Indian states



Source: Worked out from population census 2011 data as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi.

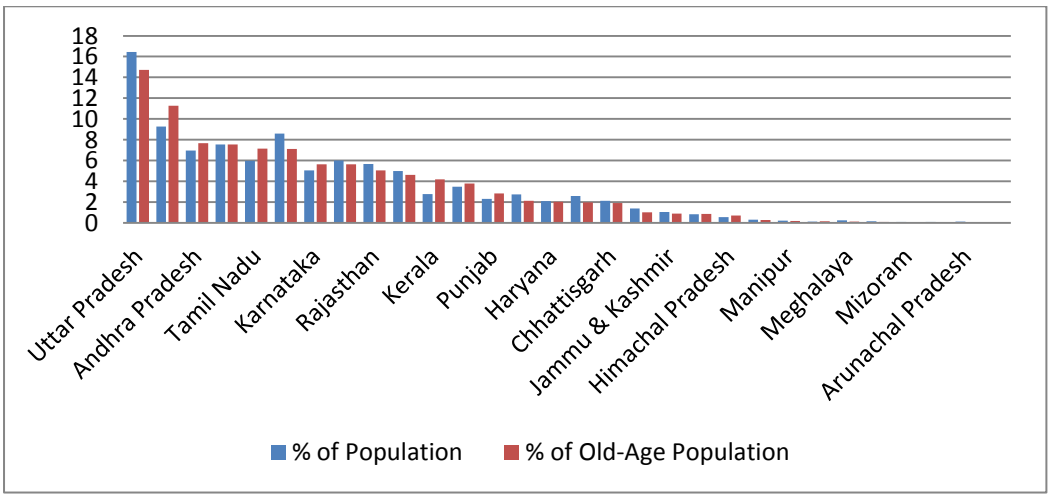
Given wide regional disparities in the population distributions among the states and provinces in both India and China, Figures 14 and 15 focus on the concentration of old-age population by working out the regional shares in old-age population along with regional shares in population. It can be noticed that the provincial shares in old-age population exceeded that of total population in Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Odisha, Punjab, Uttarakhand, Himachal Pradesh and Goa in India, and Shandong, Sichuan, Jiangsu, Hunan, Anhui, Hubei, Liaoning, Guangxi, Chongqing and Tianjin provinces in China.

Figure 13: Child & old age dependency in Chinese provinces



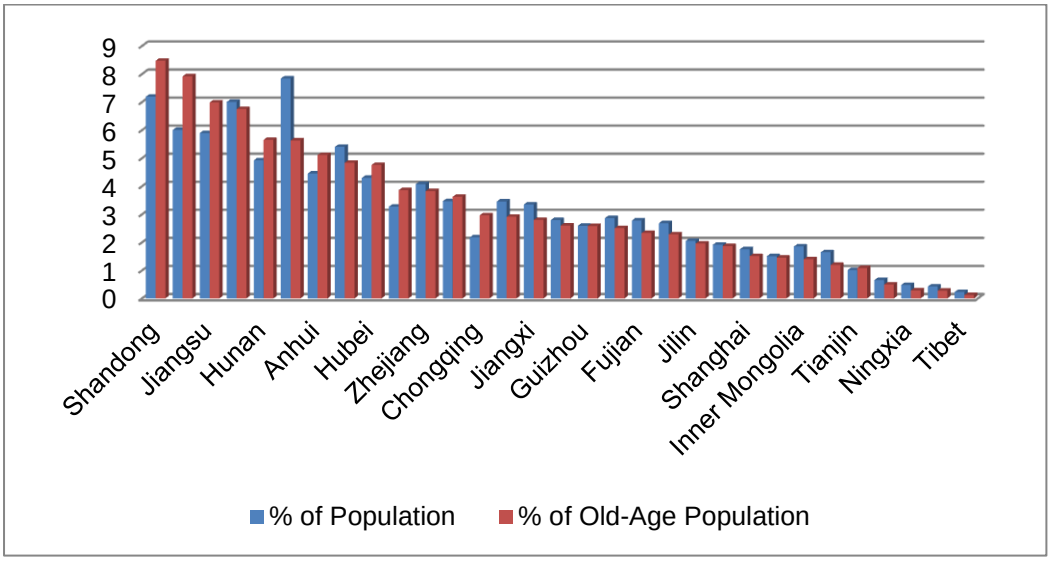
Source: Worked out from population census 2010 data as provided by the National Bureau of Statistics of China, Beijing.

Figure 14: Population and ageing in Indian states



Source: Worked out from population census 2011 data as provided by the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, New Delhi.

Figure 15: Population and ageing in Chinese provinces



Source: Worked out from population census 2010 data as provided by the National Bureau of Statistics of China, Beijing.

4. Consumption expenditures of elderly population

The variations in consumption expenditure and saving behavior in relation to ageing are basically derived from the life-cycle model that is based on the consumption-smoothing hypothesis, according to which individuals save while young and the accumulations are converted into consumption with progressing age. The elderly group of population with no or low income flows is particularly affected by this trend when faced with the prospects of high health care expenditures. There are several studies that have tried to determine as to what extent changes in demographic structure could influence the health expenditures by using econometric analyses on health care expenditure data from developed countries, viz., Australia, Canada, Japan, US and UK (Gerdtham et al 1998, Anderson & Hussy, 2000, Seshamani and Gray 2002, 2003, Gray 2005, Liu et al 2007, Breyer et al 2010, OECD 2013). The results of these studies more or less indicate that the demographic structure of the population to be a non-significant explanatory variable for health care expenditures. This has come to be known as the *'red herring*' hypothesis, which puts forward that population ageing has a small or almost negligible impact on health-care expenditure. The estimates of the impact of ageing however varied across country samples, for instance, the changes in demographic structure were estimated to be

responsible for only 2% of the observed increases in health care expenditures in England and Wales over the years from 1985/87 to 1996/99, compared to 6%, 14% and 56% for Australia, Canada and Japan respectively, during similar time periods (Gray 2005).

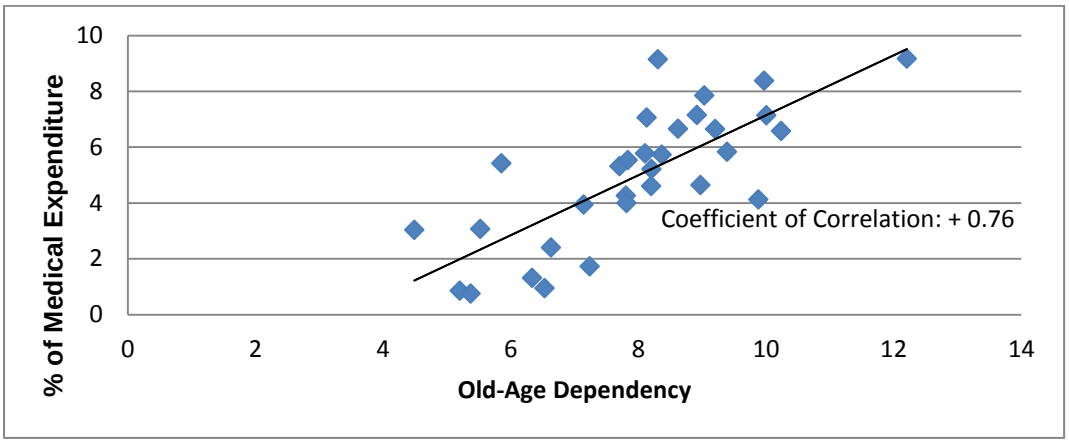
There is however little knowledge about how the relationship between aging and health care costs operates in the developing world. This is mainly due to the reason that reliable data on the prevalence and incidence of various diseases are largely missing in these countries. Recently, OECD [2013] provided projections of public spending on health and long-term care for OECD as well as BRIICS countries and found that health expenditures would drive up public spending in all the countries. The total health and long-term care expenditure is projected to increase by 3.3 to 7.7 percentage points of GDP between 2010 and 2060 in OECD countries and by 2.8 to 7.3 percentage points for the countries in the BRIICS region.

An examination of the similarities and differences in health experience between India and China has highlighted that while the death rates and infant mortality rates are lower in China in comparison to India, both countries demonstrate striking regional and rural-urban inequalities and continuing health problems associated with income inequalities (Dummer and Cook 2008). It is specifically noted in the Indian context that health care has largely been rural biased so that there exists severe rural–urban disparities particularly in respect of the access to health and nutrition services (Agarwal, 2009). Further, the availability of safe drinking water and sanitation facilities remained inadequate to the urban poor and in particular the slum dwelling population in India. Ma and Sood [2008] have argued that although India and China achieved progresses in life expectancy and disease prevention, with better performances in China, the health care system in both the countries provided inadequate protection against financial risk and provide little patient satisfaction. A study by UNFPA [2011] based on the primary survey on seven states, viz., Himachal Pradesh, Kerala, Maharashtra, Odisha, Punjab, Tamil Nadu and West Bengal that have higher levels of old-age population in comparison to the national average, found the economic burden of illness for the elderly substantial and the out-of-pocket expenditure for hospitalization a cause of concern. A recent study has also observed that health expenditure in India accounts about 13% of total consumption

expenditure for elderly households, 7% for households with elderly and non-elderly members, and 5% only for non-elderly households (Mohanty et al 2012).

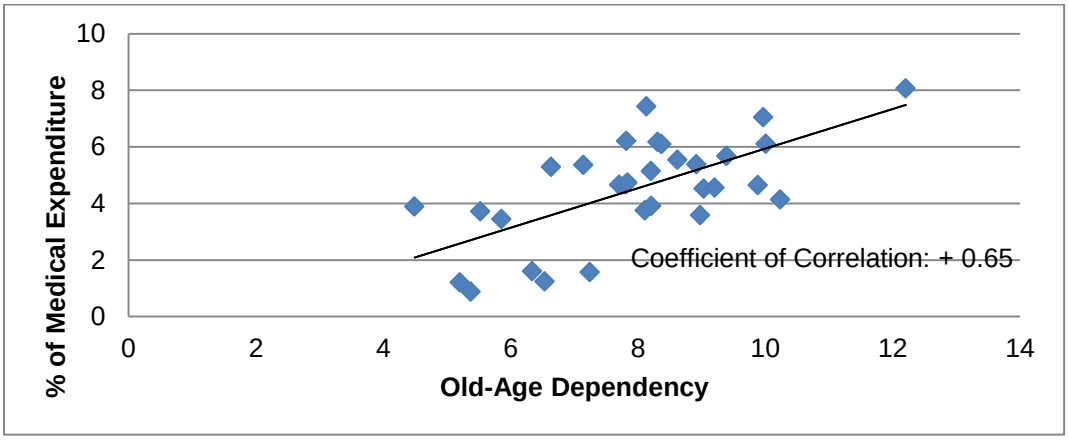
As the regional economies in both India and China are marked with different levels of ageing, the extent of medical expenditures also fluctuated widely across regions. However, an overall positive association between the old-age dependency and percentage of health-care expenditures is noticed for the Indian states but not in the case of Chinese provinces (Figures 16 to 19). In fact, there seems to be no association between the size of old-age population and health-care expenditures particularly among the urban areas of Chinese provinces, so that the fitted trend yielded a flat line instead of being positively sloped.

Figure 16: Medical expenditure and ageing, Indian states, rural



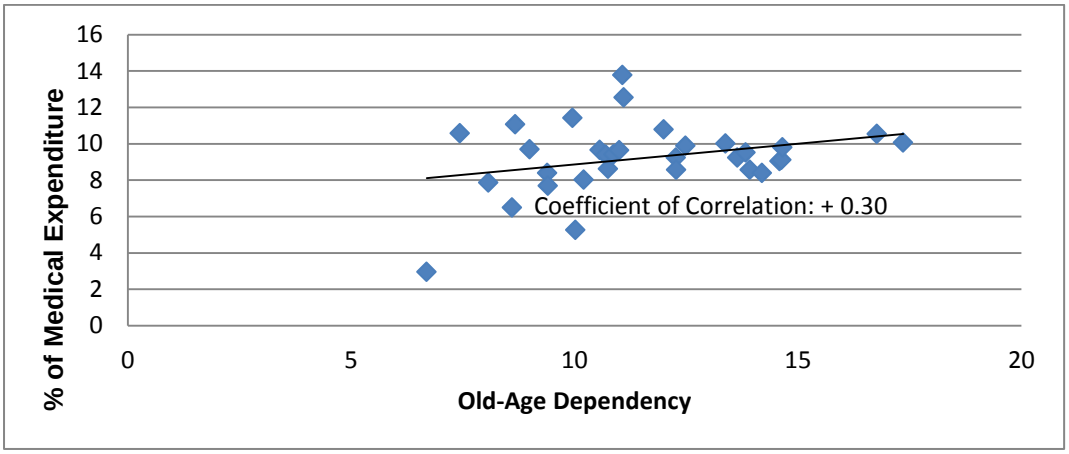
Source: Derived by using population census 2011 data and monthly consumption expenditure data. From National Sample Survey (NSS 68th Round, 2011-12), Ministry of Statistics and Programme Implementation, Government of India, New Delhi.

Figure 17: Medical expenditure and ageing, Indian states, urban



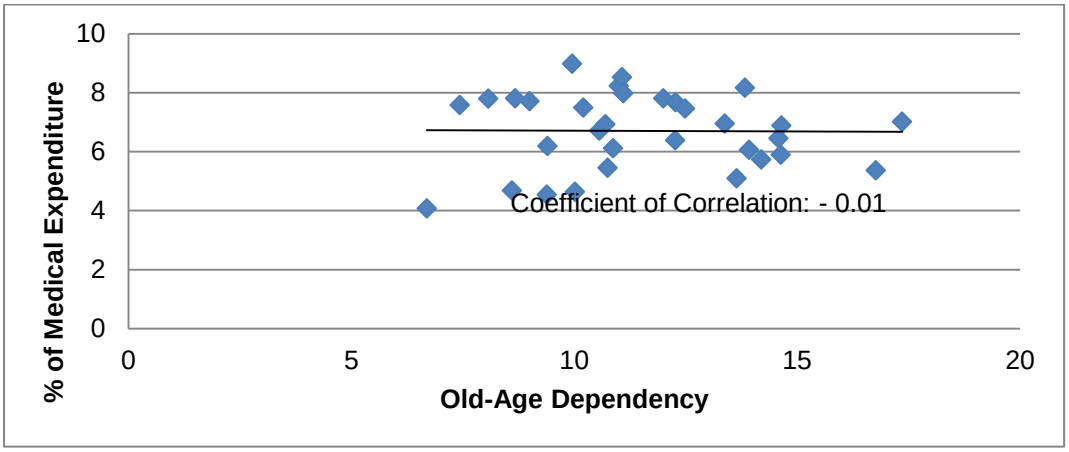
Source: Same as figure 16.

Figure 18: Medical expenditure and ageing, Chinese provinces, rural



Source: Derived by using population Census 2010 data and monthly consumption expenditure data from National Bureau of Statistics of China, Beijing.

Figure 19: Medical expenditure and ageing, Chinese provinces, urban



Source: Same as figure 18.

5. Methodology

A number of studies have examined the impacts of ageing on the consumer spending by utilizing the survey data on consumption expenditure for different age categories. The results seem to indicate that the consumption spending varies depending on the age-distribution of population and the consumption expenditures remains high for the of elderly. In view of the non-comparability of consumer expenditure survey data across age-categories between India and China, an attempt has been made in this paper to investigate the impacts of ageing on the total as well as health expenditures by using the aggregate consumer spending data. The changes in both total and health expenditures due to old-age dependency have been examined for both the economies, separately for the rural and urban areas.

We specify two single-equation econometric models to explain the total per-capita expenditures (TPCE) and share of per-capita health expenditures (SPCHE) in terms of per-capita income (PCY) and old-age dependency (OAD). We subsequently define the two regression equation as follows:

$$TPCE_i = f(PCY_i, OAD),\ i = \text{rural, urban} \qquad (1)$$

$$\text{with: } f'_{PCY} > 0,\ f'_{OAD} > 0,$$

$$SPCHE_i = f(PCY_i, OAD),\ i = \text{rural, urban} \qquad (2)$$

$$\text{with: } f'_{SPCHE} > 0,\ f'_{OAD} > 0,$$

We have constructed individual series on each of the variables, separately for the rural and urban areas for 30 states and union territories in India and 31 provinces of India referring to the time period 2011. The states and union territories that we consider for India are: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand and West Bengal, whereas the provinces in China are: Anhui, Beijing, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Inner Mongolia, Jiangsu, Jiangxi, Jilin, Liaoning, Ningxia, Qinghai, Shaanxi, Shandong, Shanghai, Shanxi, Sichuan, Tianjin, Tibet, Xinjiang, Yunnan and Zhejiang. Our regression exercises are undertaken by separately using cross-sectional data from the Indian and Chinese regions.

6. Data base

The basic data on regional age distribution of population are derived from the respective Census information of both the countries that are available with Registrar General of India and National Bureau of Statistics, China. The per capita income data for rural and urban areas are defined by dividing the gross state (or provincial) domestic product pertaining to agriculture and non-agriculture by the respective populations. For this we have utilized data from the Estimates of State Domestic Product provided by Central Statistical Organization (Government of India) and Estimates of Gross Regional Product provided for different provinces by the National Bureau of Statistics, China. Finally, the information on per capita total and health expenditures in rural and urban areas are extracted from the National Sample Survey's Household Consumer Expenditure in India (68^{th} Round, 2011-12), Ministry of Statistics and Programme Implementation, Government of India and National Bureau of Statistics, China.

Table 1: Regression of total and medical expenditures in India (Sample: 30 State/UT and all-India)

Explanatory Variables ↓	Rural				Urban			
	Total Expenditures		Medical Expenditures		Total Expenditures		Medical Expenditures	
	OLS	Cochrane-Orcutt	OLS	Cochrane-Orcutt	OLS	Cochrane-Orcutt	OLS	Cochrane-Orcutt
Constant	280.67 (1.98)*	264.76 (2.31) *	-2.14 (-2.8)*	-2.85 (-3.56) *	876.1 (3.87)*	599.6 (2.46)*	-0.31 (-0.5)	-0.62 (-0.93)
Per Capita Rural Income	48.15 (7.54)*	44.74 (8.63) *	0.04 (1.07)	0.04 (1.05)				
Per Capita Urban Income					3.86 (2.54)*	4.86 (3.35)*	-0.01 (-1.7)**	-0.01 (-2.25)*
Old-Age Dependency	48.81 (1.54)*	59.66 (2.41)*	1.09 (6.48)*	1.25 (6.97)*	39.05 (0.69)	91.31 (1.62)*	0.76 (5.14)*	0.86 (5.05)*
R-Squarred	0.67	0.76	0.60	0.63	0.23	0.36	0.48	0.57
R-Bar-Squarred	0.65	0.72	0.57	0.57	0.17	0.32	0.45	0.53
DW Statistic	2.58	1.99	2.19	1.96	2.72	1.90	1.51	1.97
F-Statistic	28.9	19.03	21.14	10.29	4.12	2.51	13.38	7.91

Note: * and ** indicate statistical significance at 5% and 10% level of significance, respectively.

Source: Author's calculation using data from 2011 population census, NSS consumption expenditure data (68th Round, 2011-12), and estimates of state domestic product provided by Central Statistical Organization, Government of India, New Delhi.

7. Results

The results of our regression exercise indicate that total consumption expenditure and the magnitude of old-age dependency are positively related for the rural areas of both the countries (Table 1 and 2). However, the impact of ageing turns out to be statistically significant for rural-India but not in the case of rural-China. The effects of old-age dependency on the per capita total consumer spending in urban areas bear the positive sign for both India and China but turns out to be statistically significant only in the case of urban India. The ageing impact turns out to be definitely positive

and statistically significant on the share of health care expenditure in total consumer expenditures for both rural and urban areas of India. In the case of China, the ageing impact on the proportion of health expenditure is significant only for the rural areas and not in the case of urban areas.

Table 2: Regression of total and medical expenditures in China (Sample: 31 Provinces and China)

Explanatory Variables ↓	Rural				Urban			
	Total Expenditures		Medical Expenditures		Total Expenditures		Medical Expenditures	
	OLS	Cochrane-Orcutt	OLS	Cochrane-Orcutt	OLS	Cochrane-Orcutt	OLS	Cochrane-Orcutt
Constant	2683.8 (2.64) *	2718.5 (3.28) *	2.95 (3.31) *	2.21 (2.13) *	1646.8 (1.17)	1908.4 (1.23)	3.72 (4.92) *	3.76 (5.39)
Per Capita Rural Income	54.26 (0.39)	-77.10 (-0.77)	0.09 (0.81)	0.11 (0.82)				
Per Capita Urban Income					150.8 (5.76) *	142.3 (4.66)*	-0.01 (-0.63)	-0.03 (-2.62)*
Old-Age Dependency	-0.63 (-0.4)*	6.66 (0.06)	0.22 (1.70) *	0.34 (2.34)*	108.4 (0.63)	102.86 (0.56)	-0.01 (-0.15)	0.10 (1.43)
R-Squarred	0.03	0.45	0.11	0.15	0.53	0.48	0.03	0.35
R-Bar-Squarred	0.01	0.39	0.07	0.12	0.50	0.40	0.01	0.34
DW Statistic	0.92	1.79	2.06	1.90	1.89	1.97	1.21	1.91
F-Statistic	0.16	3.73	1.80	2.82	16.73	5.79	0.20	3.37

Note: * and ** indicate statistical significance at 5% and 10% level of significance, respectively.

Source: Author's calculation using data from 2010 population census, consumption expenditure data, and estimates of gross regional product provided by the National Bureau of Statistics of China, Beijing.

We subsequently observe that the per capita income reveal a positive and statistically significant impact on the total consumer expenditure for both the rural or urban areas of India and only the urban areas of China. On the contrary, the impact of per capita income on the extent of health expenditures do not turn out to be significant for the rural areas in either of the countries. The impact of per capita

income on the share of health expenditure in total consumer expenditures for urban areas, however, indicates statistically significant impact in both India and China. However, the impact on the relative size of health expenditure turns out to be negative for the urban regions of both the economies.

8. Conclusions

It is claimed in the policy circles that the demographics of the Asian region would change beyond recognition over the next few decades, so that the rapid aging could turn out to be the single biggest economic and social obstacle for Asia in future. There has also been a great deal of academic interest to examine the implications of population ageing for the economic growth levels of two population giants in Asia, viz., India and China (Peng and Ping 2000, Woo et al 2003, Chandrasekhar et al 2006, Canning 2007, James 2008, Bloom et al 2010, Rajan 2010, De Vanzo et al 2011, Banister et al 2011, Bloom 2012, Kaneda 2012, Golley and Tyres 2013). The contemporary research analyses have mainly focused on the economic outcomes that could be generated due to the future transformation of Chinese and Indian demographics in three decades from now. A particular aspect of the research concern has been in respect of the ageing of workforce and running out of the cheap Asian labor. Some experts believe that the demographic dividend may turn into a demographic tax as fewer workers and higher wages would add to the cost of goods manufactured in Asia and thereby leading to a growth slowdown in the region. A recent study has maintained that the Chinese growth prospects may slow in view of the future demographic trend, while India could have an advantage provided it improves access to education, health care system, gender gaps and job creation (Devanjo, Dogo and Grammich 2011).

This paper provides an attempt to determine the extent of population aging in India and China and subsequently determine the ageing impacts on the aggregate as well as health care expenditures in these two countries, separately for the rural and urban areas. We have examined population pyramids for the two countries by alternatively splitting the total population into male-female as well as rural-urban categories. The

indications of rapid changes in the population dependency ratios of these two countries bear some crucial implications for the economic as well as social infrastructures by modifying the balances of net consumers and net producers in these two countries. Our results also indicate that regional differences can be found in the age structure of the population so that there are divergences in the levels of population aging among various regions in both China and India.

The element of population aging also bears a direct linkage to the health care needs of the elderly population. It may be noted that spending on health care has already become a major policy issue in governmental fund allocation decisions of developed countries due to the obvious reason of mounting pressures of these expenditures in the public budget. The developing countries are also not far behind the problem in view of their numerous requirements of social spending and human welfare programmes. One would therefore expect that the direct relation between costs of medical services and population ageing would hold true subject to the condition that health services are accessible to a majority of the population, as in the developed world. It has now been well-established that many developing countries including India and China generally lag behind in universal health care provisions due to deficiencies in the institutional, infrastructural and insurance arrangements of health care services. It therefore remains doubtful whether the linkage between old age and health care expenditures could be established in a system of inadequate health provisions. However, our results on the impacts of old-age population on the total as well as medical expenditure revealed a statistically significant and positive impact for both the rural and urban regions in India. In the case of China, the impact of old-age population turned out to be insignificant (statistically) on the total consumption expenditures for both the rural and urban regions of the country. As concerns the impacts of ageing on the proportion of health care expenditure in China, only the rural region reveals a statistically significant coefficient although both the rural and urban regions appropriately display positive coefficients.

Since the public costs of health care have generally been rising, the percentage of public health care expenditures in GDP has shown a rising trend in the developed

countries, and also in many developing countries to a lesser extent. However, the public and private spending on healthcare in India has been the lowest among the BRICS nations. Thus, India spends about 4 percent and China about 5.4 percent of their respective GDPs on healthcare in comparison to Brazil and South Africa, which spend in the range of 8 to 9 percent. It therefore appears that the population ageing is definitely going to play a much larger role in influencing the patterns of health care spending in both India and China in the decades to come. There is possibly no doubt about the immediate requirement of enhancing the public spending and access to health insurances to reduce the out-of-pocket health care expenditures in both the countries.

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