

# Lifecycle Deficit and Public Age Reallocations for India's Elderly Population: Evidence and Implications Based on National Transfer Accounts

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Received: 25 May 2010 / Accepted: 7 June 2011 / Published online: 24 June 2011  
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**Abstract** Using the computational framework of National Transfer Accounts, this paper offers new results and explanations on the role of public support to India's elderly population in 2004–05. New results refer to computed (a) lifecycle deficit (LCD) based on age profiles of aggregate labour income and consumption and (b) public age reallocations based on age profiles of transfers and asset based reallocations. The results show that the LCD of elderly population is about 34% of the LCD of all ages, or 3.74% of GNP. Surprisingly, net public transfers to elderly individuals are strongly negative and asset-based allocations are financed by dis-saving, because the taxes paid by the elderly population substantially exceed the benefits they receive and they pay both interest on previously accumulated public debt and paying off that debt. Public age reallocations finance elderly individuals' consumption by less than 0.50% and the largest burden of financing public transfers falls on elderly for whom the net public transfers is  $-13.33\%$  of labour income. The heavy burden on the elderly population is attributable in part to India's tax system and partly on the absence of programs that provide support to elderly individuals. If the present private sector's support for elderly individuals is not sustainable due to changes in the social obligations and in the absence of a universal pension scheme, a reduction in the direct tax outflows for the elderly population may be a policy imperative in India's public age reallocations.

**Keywords** National transfer accounts · Lifecycle deficit · Public age reallocations · Net public transfers

**JEL** J14 · E01

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## Introduction

Population ageing is an important consequence of age structure transition with an increase in the ratio of elderly (age group 60+) to working age population. Socio-economic and political institutions, such as the family, government and markets are the sources of direct and indirect economic support systems for elderly individuals. Knowledge of these institutions and experience of different support systems are vital inputs for the design and implementation of public welfare policies for elderly individuals. At global level, the economic impacts of age structure transition with special reference to ageing are analyzed by Mason (2005) and the United Nations (2007a). Heller (2007) summarizes the macroeconomic strategies to meet with long run challenges of population ageing in the context of Asian economies including India. These strategies include increasing aggregate income, distributing income across generations, increasing the willingness of younger generations to support elderly individuals and creating political viability for institutional mechanisms chosen to intermediate intergenerational transfers.

Studies on India's age structure transition (e.g. Rajan and Aliyar 2008; Rajan and Mathew 2008; Rajan and Prasad 2008; Asher 2006 and 2008; Chakraborti 2004; and Rajan et al. 1999) have focused on description of (a) age structure and dependency transitions using descriptive statistics, such as median age, index of ageing, and dependency ratio and (b) living conditions and limited public policies and programmes for social security for elderly individuals. These descriptions lead to a conclusion that India's ageing population is a problem of future, public support of elderly individuals is negligible, and provision of universal social security is challenging. These studies have two important gaps in understanding the role of public sector for India's elderly population. First, public support for elderly individuals is narrowly confined to direct and limited benefits under the Social Assistance Programme. Second, the relationship between population ageing and public support is not explained and quantified in a framework of macroeconomic-fiscal policy. This paper aims to fill in these gaps to gain new insights into the broader role of public support for India's elderly population through public age reallocations.

This paper argues that the India's elderly population is part of the beneficiaries of the entire public sector programme and also bears the burden of funding the programmes through taxes and debt. This means that the benefits and burdens of fiscal policy in terms of taxation, expenditure and borrowings are relevant for elderly individuals, and require a framework that provides an economic basis for public policy interventions and separates the fiscal policy implications for elderly individuals. This paper finds such a framework in the newly developed National Transfer Accounts (NTA) by Mason et al. (2006). NTA introduces age into the National Income and Product Accounts (NIPA) and provides a Flow Account framework for computation of lifecycle deficit/surplus as a basis for age reallocations consistent with the NIPA. This consistency is the macro-economic basis of the NTA. NTA's lifecycle deficit equals to difference between the value of goods and services consumed and produced by members of an age group. Age groups with deficit (surplus) support their surplus (deficit) consumption by generating age reallocation inflows (outflows). NTA separates the public inflows and outflows and computes net public support by public transfers and public asset-

based reallocations by drawing age distribution of lifecycle and public age reallocation variables. Thus, application of NTA is useful to quantify and draw implications on the nature and magnitude of public support through different instruments of public age reallocations (or fiscal policy in general), especially in terms of financing elderly lifecycle deficit (LCD) or consumption. However, application of NTA is new for India's macro economics of population ageing.

Using the computational framework of NTA, this paper offers new results and explanations on the role of public support to India's elderly population in 2004–05. Age profiles of aggregate and per capita labour income and consumption, public transfer inflows and outflows, and public asset income and savings are derived to calculate the (a) LCD and (b) public age reallocations by transfers and public asset based reallocations for elderly individuals. Throughout, all quantifications are at national level of aggregation, using a combination of international methodology and Indian databases.

The results of this paper show that the LCD of elderly individuals is about 34% of total LCD of all ages, or 3% of GNP. Surprisingly, net public transfers to elderly individuals are strongly negative and asset allocations are financed by dis-saving, because the taxes paid by the elderly population substantially exceed the benefits they receive and the elderly population pays both interest on previously accumulated public debt and paying off that debt. Public age reallocations finance elderly individuals' consumption by less than 0.50% and the largest burden of financing public transfers falls on the elderly population for whom the net public transfers is -13.33% of labour income. The heavy burden on the elderly population is attributable in part to India's tax system, age distribution of asset ownership and partly on the absence of programs that provide universal support to the elderly population. In addition, the results and implications recognize the importance of labour income and private sector in supporting elderly individuals' consumption. A major conclusion of this paper is that if the private support for elderly individuals is not sustainable due to changing social obligations and the absence of a universal pension scheme; a reduction in the direct tax outflows may be a policy imperative for increasing the public age reallocation inflows to India's elderly.

The rest of the paper is organized as follows. Section "[Policy Relevance of Population Ageing for India](#)" presents a brief background on policy relevance of population ageing in India and public economic support for elderly individuals. Section "[Methodology of NTA](#)" outlines the NTA methodology. Application of NTA framework for India is described in Section "[Framework of NTA for India](#)". Results of lifecycle deficit and public sector age reallocations for India's elderly are analyzed in Section "[Results](#)". Section "[Select Implications](#)" includes select implications of the results. Section "[Conclusions](#)" concludes the paper and indicates future extensions.

## **Policy Relevance of Population Ageing for India**

### **Population Ageing**

India's total population size is projected to reach 1593 million in 2050, about 131 million more than China (1462 million). India's projected age structure transition

from 2007 through 2050 indicates a rising share of aged (about 21% of total population or 330 million in 2050), declining share of younger population from 31.2% to 18.3% and a stable working population of about 61% (Table 1). By percent of population aged 60+, India ranked 90th among 192 countries in 2007. This ranking was 94th in terms of Ageing Index (or number of persons aged 60 years and above per hundred persons under age 15). Ageing Index will be 1.88 times bigger in 2025 and more than 4 times bigger in 2050 as compared to 2007. Nevertheless, India's Ageing Index in 2050 will be lower than other BRIC countries, viz., Brazil (119), Russia (275) and China (183).

India's dependency ratios, consistent with age structure transitions, show increasing (or decreasing) Old Age (or Youth) Dependency Ratio or declining potential support ratio from 2007 through 2050 (Table 1). Decline in total dependency ratio during 2007 to 2050 will be largely due to a decline in youth dependency and the rise in total dependency ratio will be the effect of increase in old age dependency ratio, one of the indicators of population ageing.

All the three indicators of population ageing—percentage of older population in total population, Ageing Index and Old-age dependency ratio—mean that population ageing will be important for India, especially for the reforms aimed at social security and health care systems that create large scale public transfers to the elderly population. They may pose serious challenges to the management and sustainability of the transfers out of fiscal resources, once they have begun to mature. Thus, public age reallocations are relevant for India to understand the long term implications of population ageing for public finances and to implement appropriate policies at an early stage.

### Public Economic Support for Aged

In India's National Accounts Statistics (NAS), public sector includes administrative departments, departmental and non-departmental enterprises, and quasi-government bodies. Throughout this paper, by public sector we mean the general government comprising the administrative departments at national and sub-national levels and

**Table 1** Projected age structure transition and population ageing in India: 2007-2050

Indicators	2007	2025	2050
1. Total population (millions)	1134	1395	1593
2. Age structure	Percent of total population		
• 0–14	31.2	24.5	18.3
• 15–59	60.7	63.5	61.0
• 60+	8.1	12.0	20.7
3. Ageing Index	26.1	49.2	113.0
4. Dependency Ratio (%)			
• Total	57.8	48.2	49.6
• Youth	49.2	36.3	27.4
• Old Age	8.6	12.0	22.2

United Nations (2007b)

quasi-government bodies or Non-Profit Institutions Serving Households (NPISHs). This definition and composition of public sector is consistent with the National Transfer Account methodology as well as the IMF definition of public sector.

According to the Indian Constitution, public sector activities are divided under the Union List, State List, and Concurrent List. Social sectors, such as, education, health, and social security (including welfare programmes for elderly individuals) are included in the Concurrent List and the joint responsibility of the national and sub-national governments.

India's public support for elderly individuals takes several forms.<sup>1</sup> First, pension payments for retired government employees in the Central and state governments, including defense personnel.<sup>2</sup> Second, contribution to social security schemes of employees in the public sector enterprises and unorganized sector. Third, expenditure on social security and welfare which includes old age pension for civilians and programmes of affirmative action for socially backward and economically weaker sections of the society. For instance, Social Assistance Programme includes National Old Age Pension Scheme (NOAPS), National Family Benefit Scheme and National Maternity Benefit Scheme. The NOAPS was introduced in 1995 for destitute individuals of more than 65 years with no source for livelihood under the National Social Assistance Programme. At present, the extent of monetary assistance is equal to Rs.200 per month per beneficiary and extended to all below-the-poverty line persons and above the age of 60 years. Eligible older persons not covered by this pension scheme are provided with 10 kg of food grains, supplied free of cost, under the Annapurna Scheme since 1999. National Family Benefit Scheme provides insurance coverage against death of prime household earning member in the age group 18–65 and lumpsum family benefit is equal INR10000. National Maternity Benefit Scheme is for pregnant household women below the poverty line and above 19 years and the benefit is equal to lumpsum amount of INR500 per beneficiary. Fourth, non-age specific public expenditure programmes (e.g. poverty alleviation schemes, and affirmative actions) in which the beneficiaries include elderly individuals. Fifth, welfare programmes by specific departments for senior citizens (e.g. special income tax rebates, higher rates of interest on savings schemes, concessions in bus/train fares, and special interest rate on bank deposits).

Interestingly, the share of combined expenditure by Central and State Governments on National Social Assistance Programme was about 0.17% of combined revenue expenditure of the Central and State government in 2004–05. Total coverage of beneficiaries of the Programme was about 9.2 million with largest share of beneficiaries under the NOAPS (88%). These beneficiaries account for about 13% of total population in age group of 60–90 in 2004.<sup>3</sup> This indicates that the size and

<sup>1</sup> No detailed description of social security for India's aged is attempted here as they are well documented including for the unorganized sector workers. See, for instance, Asher (2006) for a summary or Chapter 2 in Rajan and Mathew (2008) or Part II in Central Statistical Organization (2006) for detailed descriptions.

<sup>2</sup> In India's NAS, pension for government employees is a part of compensation for employees. Hence, it cannot be included under civilian pensions. For an excellent recent description of India's pension schemes for workers in organized or formal sectors, see World Bank (2008).

<sup>3</sup> These indicators are computed by using the basic on Social Assistance Programme in the Ministry of Rural Development, Government of India, [http://rural.nic.in/nsap\\_1.htm](http://rural.nic.in/nsap_1.htm) and India Public Finance Statistics 2008–09, Ministry of Finance, Government of India, <http://www.finmin.nic.in/reports/IPFStat200809.pdf>, both accessed on 16 April 2011.

coverage of direct public expenditure on aged people is negligible in India. This is perhaps the main reason for considering a low public support to the aged in India. However, NTA methodology below aims at public support for elderly individuals beyond the social assistance in terms of broader public age reallocations.

### Methodology of NTA

NTA is a measure of reallocations or shift of resources from one age group to another, or inter-generational transfers at the national level of aggregation. Reallocations occur because consumption and production differ at different ages of individuals (e.g. production exceeds consumption in working age groups, and consumption exceeds production in childhood and old age dependent age groups). NTA documents the means by which those with lifecycle deficits (e.g. young and old who produce less through labour than what they consume) draw on those with lifecycle surplus (e.g. generated during working ages who consume less than what they produce through labour). The entire methodology of NTA is available in NTA (2011). Using this information, an overview of NTA methodology for this paper is presented below.

Construction of Flow Account is the basis for computation of lifecycle deficit and age reallocations in the NTA. Flow Account measures all income and consumption flows during the prescribed accounting period. Equation 1 defines the NTA's Flow Account identity (suffix "f" stands for private sector, "g" for public sector and "i" refers to individual or age group).

$$Y_{L,i} + Y_{A,i} + (T_{f,i}^+ + T_{g,i}^+), = (C_{f,i} + C_{g,i}) + S_i + (T_{f,i}^- + T_{g,i}^-), \quad (1)$$

where  $Y_{L,i}$  is labour income,  $Y_{A,i}$  is non-labour or asset income,  $T_{f,i}^+$  and  $T_{f,i}^-$  are private transfer inflows and outflows respectively;  $C_{f,i}$  is private consumption expenditure,  $C_{g,i}$  is public (government) consumption expenditure,  $S_i$  is savings,  $T_{g,i}^+$  and  $T_{g,i}^-$  are public transfer inflows and outflows respectively. The left hand side shows total inflows and right hand side shows total outflows. Rearranging terms in (1), we get:

$$(C_{f,i} + C_{g,i}) - Y_{L,i} = (Y_{A,i} - S_i) + (T_{f,i}^+ - T_{f,i}^-) + (T_{g,i}^+ - T_{g,i}^-), \quad (2)$$

The left hand side of (2) is defined as lifecycle deficit (LCD). On the right hand side,  $(Y_{A,i} - S_i)$  is asset reallocations,  $(T_{f,i}^+ - T_{f,i}^-)$  is net private transfers, and  $(T_{g,i}^+ - T_{g,i}^-)$  is net public transfers. Sum of assets reallocation, net private transfers and net public transfers is equal to total age reallocations and distinguishable between public and private sectors. Thus, in economic terms, LCD is a measure of total demand for age reallocations.

Net exports are indirectly introduced in (2) to take care of Rest-of-World (ROW) and equal to:

$$NX = Y_{L,ROW} + Y_{A,ROW} + (T_{ROW}^+ - T_{ROW}^-) + S_{ROW} \quad (3)$$

Where  $Y_{L,ROW}$  is net compensation of employees from ROW,  $Y_{A,ROW}$  is net property and entrepreneurial income from ROW,  $(T_{ROW}^+ - T_{ROW}^-)$  is net transfers

from ROW, and  $S_{ROW}$  is net borrowings from ROW (or net savings). Thus, the variables in (2) are consistent for an open-macro economy.

It should be emphasized that individual is the fundamental analytic unit in NTA. All transactions are treated as flowing to and from individuals and are classified on the basis of age of individuals. This assumes away pure public goods, economies of scale and other features of production and consumption, because all variables are assigned to individuals. Public and private (e.g. families) institutions mediate the individual transactions and distinguish all flows during the particular accounting period. As computational framework, NTA draws heavily from the survey and administrative data to calculate age profiles of flow account variables. These age profiles explain the age pattern of actual behaviour and no particular motives or behaviour is assumed for inter-generational transfers. Further, NTA introduces age into the National Income and Product Accounts (NIPA) because all variables in Eq. 1 through 3 are obtained or derived from NIPA and defined by age. In formal terms, the relationship between NTA and NIPA may be established as follows. To start with, the familiar National Income identity is as follows.  $[Y = C + I + G + (X - M)]$ , where  $Y$  is a measure of national income,  $C$  is aggregate private consumption expenditure;  $I$  is aggregate investment expenditure,  $G$  is aggregate government expenditure,  $X$  is total exports and  $M$  is total imports. Assuming that  $(S=I)$  and given that net aggregate public transfers,  $\sum (T_{f,i}^+ + T_{g,i}^+)$ , as well as net aggregate private transfers,  $\sum (T_{f,i}^- + T_{g,i}^-)$ , are equal to zero, and  $Y = (Y_L + Y_A)$ , Eq. 1 equals to the National income identity. This establishes macroeconomic relationships and consistency between NTA and NIPA.

In empirical terms, NTA is a computational framework to calculate the per capita age profiles of variables in Eq. 2. This calculation needs selective adjustment in aggregate controls (i.e. aggregated across all ages and held constant throughout the estimations) to derive aggregate and per capita age profiles. A general adjustment procedure is to derive age profiles to match the aggregate controls. Let  $x_i$  be the per capita age profile,  $N_i$  the population, and  $X$  the aggregate control. Then, per capita age profiles are adjusted using a factor,  $\theta$ , such that  $\theta = \sum (x_i N_i) / X$  and final per capita profile and aggregate profile are given, respectively, by:  $x_i^* = (x_i / \theta)$  and  $X_i^* = (x_i^* N_i)$ .

India's is a mixed, federal and open economy. These economic systems are consistent with the institutions in the NTA. Given that India's is and will be undergoing remarkable changes in its age structure and population ageing, computation of lifecycle deficit and its financing by public age reallocations assumes special importance for policy purposes. India has a good system of National Income Accounting, based on UN System of National Accounts (SNA). Thus, NTA is applicable and relevant methodology for analysis of lifecycle deficit and public age reallocations for India's elderly population.

### Framework of NTA for India

Application of NTA framework in Eq. 2 requires specific methods, assumptions and data for measurement of aggregate controls and drawing age profiles of aggregate controls. Table 3 summarizes the measurement and method of age allocation of all

the aggregate controls and databases to compute the aggregate controls and draw their age profiles in 2004–05. Throughout, all variables are measured at current prices. A brief discussion on the assumptions and approximations to obtain the aggregate controls and draw age profiles is given below.<sup>4</sup>

### Aggregate Controls

Column 1 and 2 in Table 2 lists the aggregate controls and their measurements in India's National Accounts Statistics. Aggregate labour income is constructed by sum of compensation of employees, labour share of mixed income and net compensation of employees from the ROW (rest of the world).<sup>5</sup> The key assumption is that two-thirds of mixed income goes to labour.<sup>6</sup> This share is generally assumed in the NTA methodology when no other sources of information on relative share of labour in mixed income are available. India is no exception because the National Accounts Statistics does not report this share. Available nationally representative sample surveys on unorganized sector or informal sector are not comprehensive in their coverage of all sectors (i.e. agriculture, manufacturing and services) in the national economy. These surveys include NSS 62<sup>nd</sup> Round on Unorganized Manufacturing Sector (2005–06), NSS 57<sup>th</sup> Round on Unorganized Services Sector (2001–02) and NSS 55<sup>th</sup> Round on Informal Sector in India (1999–00).

'General Government' (including national and sub-national governments and NPISHs) refers to the public sector. Private sector includes India's public enterprises. Both public and private consumption are disaggregated by education, health and other consumptions, because these consumptions are distinguishable by age. Private consumption is measured as pre-tax consumption and indirect taxes are netted out of it. Different components of private consumption are measured net of indirect taxes, assuming that each component's share of indirect taxes is proportional to its share in total private consumption.

Public transfer and asset reallocation variables are the bases for computation of public age reallocations. Public transfers are distinguished by inflows and outflows.

<sup>4</sup> In addition, all variables and age profiles are defined and measured without distinctions by sex (male and female), location (rural and urban) and social status (e.g. by religion or caste). In a country of India's socio-economic diversities, these distinctions may be important and their neglect is a limitation of the present methodology. Non-availability of data by these distinctions, especially for public age reallocation variables, is a major constraint to overcome these limitations.

<sup>5</sup> In NTA, labour income is measured as pre-tax income. If some indirect taxes are borne by workers by way of reduced compensation, then labour share of net indirect taxes should be added to the labour income. This paper assumes no indirect taxes are borne by workers. This implies that all net indirect taxes (capital share of indirect taxes minus business subsidies) are added to the private asset income. The aggregate control for private asset income is equal to: (operating surplus of non-household sector+(1/3)rd of mixed income of household sector+net property and entrepreneurial income from the rest of world+net indirect taxes). This aggregate control is used to derive age profile of private asset income, which is one of the variables in private-asset based reallocations. A strong assumption in this computation is that household head owns all assets. This paper does not compute the age profile of private asset income because the focus is not on private age reallocations.

<sup>6</sup> The relative share of different components of computed aggregate labour income is as follows. Compensation of employees: 58.33%, labour share of mixed income: 41.92% and net compensation of employees from rest of world: -0.25%.



**Table 2** Aggregate controls and age profiles for computation of lifecycle deficit and public age reallocations

Aggregate controls	Measurement of aggregate controls	Age allocation methods and data sources
1. Labour income	Compensation of employees+(2/3) of mixed income+net compensation of employees from ROW	Age profile is based on the combined age profile of income from salaries and self-employment, using the individual income from wage and salary and household income from self-employment (i.e. farm income and non-farm business income) in India Human Development Survey 2005 (Desai et al. 2008). Self-employment income of household is allocated to individual in a household who reported as self-employed, using the age profile of mean earnings of employees. Accordingly, self-employment income accruing to $i^{th}$ individual in household $j$ [ $YLS_{ij}(x)$ ] is equal to $YLS_j \cdot \gamma(x)$ and $\gamma(x) = w(x) \cdot SE_j(x) / \sum w(a) \cdot SE_j(a)$ , where $x$ is the age of $i^{th}$ household; $SE_j(a)$ is number of people in household $j$ who are self-employed or unpaid workers of age $a$ ; $w(a)$ is average earnings of employees. This means that $\gamma(x)$ is the share of total household self-employment labour income allocated to each self-employed who is at age $x$ . Summing across all households, total self-employment labour income is computed at age $x$ .
2. Public consumption	Government Final Consumption Expenditure (GFCE)	Age profile is derived by public formal and informal education. Public formal education age profile is based on computed per student public education consumption by levels of education. This computation is based on the following enrolment rates and public expenditure by level of education. First, using estimated attendance data from the 61 <sup>st</sup> Round of National Sample Survey Organization (July 2004–June 2005) on <i>Status of Education and Vocational Training in India 2004–05</i> , share of attendance in public institutions by levels of education is computed. This share is applied for total enrolment data in the Government of India's <i>Education Statistics 2004–05</i> to obtain attendance in public institutions (i.e. government and local body institutions). Second, using <i>Indian Public Finance Statistics 2006–07</i> (Government of India 2007), revenue expenditure on education by all levels of governments (including non-education departments) is obtained. Public education consumption is presumed to be proportional to revenue expenditure by levels of education. Per student public education consumption is obtained by using the computed enrolment data in public institutions. Public informal education consumption is equal to expenditure on adult education and training and allocated on per capita basis for age group 30–60.
2.2. Public health consumption	Expenditure on health and other services under GFCE	Age profile is drawn using the individual level data on utilization of public health facilities in the 60 <sup>th</sup> Round of National Sample Survey on Healthcare, Morbidity and Conditions of aged in India in 2004. 'Public health facilities' refers to health services provided by public hospitals and dispensaries (including Primary Health Centres, Sub-centres and Community Health Centres). Utilization is proxied by expenditure incurred on treatment for hospitalized or in-patient (during 365 days prior to the survey), non-hospitalized or out-patient (during

**Table 2** (continued)

Aggregate controls	Measurement of aggregate controls	Age allocation methods and data sources
2.3. Public consumption Other	Expenditure on non-education and non-health services under GFCE	15 days prior to the survey) and other expenditure (e.g. transport expenses to and from the hospital visits).
3. Private consumption	Private Final Consumption Expenditure (PFCE) net of total indirect taxes	*Public consumption Other' includes general public services; defense; housing and other community amenities; cultural, recreational, religious services; and economic services (e.g. agriculture, mining, transport, and communication). This variable is allocated on per capita basis.
3.1. Private education consumption	PFCE on education net of indirect taxes. Indirect taxes on private education consumption are assumed equal to share of PFCE on education in PFCE.	Age profile is drawn by using the individual level data on private education expenditure in the India Human Development Survey 2004–05 [Desai et al. (2008)]. Private education expenditure refers to expenditure incurred by currently enrolled students in elementary, secondary and tertiary level education on school/college fees, books uniform and other materials, transportation and private tuition.
3.2. Private health consumption	PFCE on medical care and health services net of indirect taxes. Indirect taxes on private health consumption are assumed equal to share of PFCE on medical care and health services in PFCE.	Age profile is drawn by using the individual level data on private health expenditure in the India Human Development Survey 2004–05 (Desai et al. 2008). Private health expenditure refers to sum of expenditure incurred for in-patient as well as out-patient treatment services for short term morbidity during last one month and major morbidity during 12 months. Treatment expenses included hospital surgery, medicine and tests and others (e.g. tips, bus/train/taxi fares or lodging while getting treatment).
3.3. Private consumption other	PFCE on non-education, and non-medical care and health services. This expenditure is net of indirect taxes where indirect taxes are assumed to equal to share of PFCE other in PFCE.	Private consumption other includes food and beverages, clothing and footwear, fuel and power; furniture, furnishing, appliances; transport and communication; and recreation and cultural services.
4. Public transfer variables	Sum of public in-kind and cash transfers	Age profile is derived by using Equivalence Scale. The equivalence scale is equal to 1 for adults aged twenty or older, declines linearly from age 20 to 0.4 at age 4, and is constant at 0.4 for those age 4 or younger. That is, $\lambda(a) = (1 - 0.6) \cdot (a \leq 4)$ ; $\lambda(a) = 1 - [0.6(20 - a)/16]$ , $(4 < a < 20)$ ; and $\lambda(a) = 1$ , $(a \geq 20)$ . Using the above formula, intra-household allocation of private other consumption is equal to: $CFX_{ij} = \frac{[CFX_j \lambda(x)]}{\sum \lambda(a) \cdot M_j(a)}$ , where $x$ is the age of the $i$ th household member.
Public transfer inflows	Same as public education consumption, public health consumption and public consumption other in 2.1, 2.2 and 2.3 above	Same age profile as derived in 2.1, 2.2 and 2.3 above.
4.1. In-kind transfers	Same as public education consumption, public health consumption and public consumption other in 2.1, 2.2 and 2.3 above	Same age profile as derived in 2.1, 2.2 and 2.3 above.

Aggregate controls	Measurement of aggregate controls	Age allocation methods and data sources
4.2. Cash transfers	Sum of other current transfers from the general government and social benefits not in-kind	In India's NAS and SNA, cash transfers are distinguishable between other current transfers from the general government and social benefits not in kind. Other current transfers from the general government include grants in aid to institutions in health and other social sectors. These transfers are considered non-age specific and allocated on per capita basis. Social benefits not in kind mainly include social assistance programmes, such as, National Old Age Pension Scheme, Widow Pension Scheme, National Maternity Benefit Scheme, National Disability Pension Scheme and Annapurna Scheme. These programmes, among others, are age-specific cash transfers. Using the age profile of beneficiaries of all the programmes together in the India Human Development Survey 2004–05 (Desai et al. 2008), age profile of cash transfers is derived.
Public transfer outflows	Sum of direct and indirect taxes	Separate age profiles are derived by individual/personal income tax (based on proportion of total labour income of individuals) and corporate income and other taxes [based on proportion of total asset income (e.g. rent and dividends) of individuals]. Source: India Human Development Survey 2005 (Desai et al. 2008).
4.3. Direct taxes	Sum of personal income tax, corporation tax and other direct taxes	Age profile is derived by applying the age profile of private other consumption in 3.3. above.
4.4. Indirect taxes	Total indirect taxes	Age profile is derived by applying the age profile of private other consumption in 3.3. above.
5. Public asset-based reallocations	Difference between public transfer outflows and inflows=Public asset income minus public savings	Capital income is equal to operating surplus. Net public interest is equal to the difference between interest inflows and outflows. Net (inflows minus outflows) property income is the sum of distributed income of corporations, reinvested earnings of direct foreign investment and other property income from ROW and rent and other property income. These data are sourced from the India's SNA 2008 (General Government Account by Resources and Uses).
5.1. Public asset income	Sum of operating surplus and property income of the Administrative Departments and Quasi-government Bodies	Age profile is based on general tax profile or combined tax profiles of direct and indirect taxes.
5.2. Public saving	Net domestic savings (Gross domestic savings minus depreciation) of the Administrative Departments and Quasi-government Bodies	Same age profile as in 5.1. above.

All aggregate controls are derived and measured by using the data in the India's National Accounts Statistics 2008 (Central Statistical Organization 2008)

Inflows are equal to in-kind transfers and cash transfers. In-kind transfers are the same as public consumption (i.e. sum of public education, health and other consumptions). Benefits from the various Social Assistance Programme are measures of cash transfers. Aggregate control for cash transfers is other current transfers from the general government and social benefits not in kind. Other current transfers include the grants-in-aid to private institutions, especially in health and formal and informal education. Public sector outflows are distinguished by direct and indirect taxes and transfer surplus/deficit. Direct taxes are disaggregated by personal income tax and corporate income tax (includes other minor direct taxes).

Aggregate controls for public asset-based reallocations are asset income and net public savings. Asset income refers to net operating surplus plus property income. Property income includes interest, rent and distributed income of corporations. Further, as per the UN System of National Accounts 1993, public capital, such as, public buildings and infrastructure, does not yield asset income.

### Age Profiles

Column 3 in Table 2 gives the methods and databases of deriving age profiles for all aggregate control variables. Throughout, UN-projected population by single years in 2004 is used to compute and draw the aggregate and per capita age profiles. The main database is the India Human Development Survey 2005 (Desai et al. 2008). This is micro data on households and individuals from a nationally representative sample of 41,554 households comprising 21,5754 individuals, spread over 1503 villages and 971 urban neighborhoods, and available in the public domain from the Inter-University Consortium for Political and Social Research. Main advantages of this database include the following. Both income and consumption data are available for the same households, and closely correspond with the National Sample Survey Organization's Consumer Expenditure Survey and Employment and Unemployment Survey except for a smaller sample size and coverage. Income data are useful to draw age profiles of labour income, asset income and all components of private consumption. Additional information, especially on beneficiaries of Social Assistance Programme and income from various assets are particularly useful to draw age profiles of public cash transfers and corporation taxes.

In the absence of data at individual level, specific assumptions are needed to assign income and consumption of household or families to an individual, because the individual is the fundamental entity in the NTA. The problem is important for India's elderly population as most of them live within a household and household data may not be useful to make simple statements about their individual income and public and private consumption.<sup>7</sup> Thus, the age profile rules make explicit the assignment of household variables to individuals. This is evident for labour income from self-employment and private consumption other.

<sup>7</sup> For instance, the living arrangements of the elderly in the National Sample Survey 60<sup>th</sup> Round (January–June 2004) showed that over 90% of the male and female elderly lived in households and supported by their own family members, such as, spouse, own children and grand children in both rural and urban areas.

Public consumption variables do not pose the problem of intra-household allocation as they are directly assigned to individuals. Of the public consumption variables, the simplest rule of per capita allocation is applied to public consumption other, because this consumption includes goods and services available to all persons, such as, defence and administrative services. Age profile of public education consumption is derived separately for (a) public formal education based on computed per student consumption by levels of education and (b) public informal education (e.g. adult literacy programme) on per capita basis for the age group 30–60. Public health consumption is allocated to individuals based on their expenditure for utilization of health services in public health institutions.

Using the private expenditure data on education and health at individual level in the India Human Development Survey 2004–05, age profile for private consumption of education and health is derived. An indirect approach is followed to assign household private consumption other to individual members by using the Equivalence Scale technique. This is in contrast with the age allocation rule for public consumption other on per capita basis.

Public transfers are distinguished between inflows and outflows. Inflows are equal to in-kind transfers and cash transfers. Age profile of public in-kind transfers is the same as public consumption, because in-kind transfer and public consumption is treated equal in NTA. Cash transfers include other transfers from the general government and social benefits not in kind. Beneficiaries of different components of the other transfers are not separable and, hence, they are allocated on per capita basis. On the other hand, social benefits in kind mainly include Social Assistance Programme (SAP) and are age specific. The age profile for social benefits in kind is drawn by a combined age profile of beneficiaries of all the SAP. This approach closely conforms to the familiar benefit incidence of public expenditure, because the public sector inflows are assigned to the age groups of intended beneficiaries of the transfer programmes.<sup>8</sup>

Public transfer outflows are equal to direct and indirect taxes. Age profile of income tax is based on proportion of total labour income of individuals and corporate income tax is based on proportion of total asset income of the head of household. Hence, corporate tax burden is not shared with co-resident household members. In the India Human Development Survey 2004–05, asset income is a form of income from other sources and includes income from interests, dividends and/or capital gains. Combined age profile of income of these asset incomes is used to draw the age profile of corporation tax and other minor direct taxes. Further, all indirect taxes are allocated based on age profile of private other consumption. This implies that individuals pay indirect taxes in all ages including children. The above approach assumes that incidence of taxes depends on age of an individual who ultimately bears the burden of taxes. The age profile depends on the economic resource being taxed but not on age profile of tax rates. This implies that tax rates do not vary by age. This strong

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<sup>8</sup> Expenditure incidence and tax incidence is a familiar topic in theory and applied public finance. For an interesting empirical study on these incidence for a developing country, see, for instance, Devarajan and Hossain (1995).

assumption is made for lack of data on different taxes paid by individuals of different ages.<sup>9</sup>

Public asset-based reallocations are estimated by public asset income minus public savings. Asset income is equal to the sum of capital income (or operating surplus), net (inflows minus outflows) interest on public debts and net (inflows minus outflows) other property income (including distributed earnings of corporations, reinvested earnings of direct foreign investment and rent). Saving is measured by gross domestic saving minus depreciation. A positive public asset income is an inflow for taxpayers and a positive public savings is an outflow. For this reason, public asset based reallocations is equal to public asset income less public savings, and their age profiles are drawn by combining the age profiles of direct and indirect taxes. However, consistency in NTA requires that difference between public sector outflows in the form of taxes and inflows in the form of transfers must equal to the aggregate control of public asset-based reallocations.<sup>10</sup>

## Results

### Lifecycle Deficit (LCD)

Computed LCD of India's elderly population in 2004–05 is presented in Table 3. The numbers in second column are equal to estimated aggregate controls and refer to all ages. LCD for elderly population is restricted for age group 60+. Total LCD of all ages is equal to INR260265 crore or INR2602.65 billion. This equals to about 11% of India's GNP (factor cost and current prices) in 2004–05. The LCD of the elderly population is equal to INR88636 or 34.06% of LCD of all ages and 2.83% of the GNP. It should be emphasized that India's elderly population not only share the aggregate consumption by about 8.46% but contribute 4.26% of aggregate labour income. This is mainly due to prevalence of informal employment (e.g. self-employment), especially in agriculture and service sectors. In the absence of labour income, the LCD of elderly individuals would be equal to their total consumption (INR156132 crore) and about 48% of recomputed LCD of all ages (INR327761 crore). Thus, work participation of elderly individuals is a remarkable contributor to partial reduction in the LCD of all ages or self-financing their own LCD.

<sup>9</sup> For instance, India Human Development Survey 2004–05 (HDPI-II, Household Questionnaire, Section 12.28) includes data on combined consumer taxes, cesses and fees (including water charges) paid by households. Except this, no other data is available on taxes paid by sample households in the Survey. This data is not useful for drawing tax profiles for India for many reasons. First, the data does not distinguish between direct and indirect taxes. Or, the survey provides no data on direct taxes, if we presume that consumer taxes are indirect taxes. Second, cesses, fees and water charges are forms of user charges rather than taxes and there is no way these charges can be separated from consumer taxes in the Survey data. In the same way, NSS 61<sup>st</sup> Round Household Consumer Expenditure Survey (2004–05) includes one item of expenditure (item 549) on consumer taxes and cesses, which has the same limitations as in India Human Development Survey 2004–05 above. Further, Indian Public Finance Statistics 2004–05 reports data on income tax payable in India by range of income by number of returns but not by age. In fact, Permanent Account Number includes age of income tax payees. There is no access to this official data for research purposes.

<sup>10</sup> For a sophisticated and detailed theoretical analysis of asset-based reallocation, see, for instance, Mason and Lee (2007).

**Table 3** Aggregate consumption, labour income and lifecycle deficit of India's elderly, 2004–05

LCD, income and consumption indicators	Total—All ages (INR in crore)	Total for elderly (INR in crore)	Share of elderly in total of all ages (%)	Share within total consumption of elderly (%)
Lifecycle deficit (LCD)	260265	88636	34.06	
Consumption	1844800	156132	8.46	100.00
Public consumption	342542	21304	6.22	13.65
Education	58795	1	0.00	0.00
Health	22805	2031	8.90	1.30
Other	260942	19273	7.39	12.34
Private consumption	1502258	134828	8.97	86.35
Education	34507	0	0.00	0.00
Health	94156	13323	14.15	8.53
Other	1373595	121505	8.85	77.82
Less: Labour income	1584535	67496	4.26	

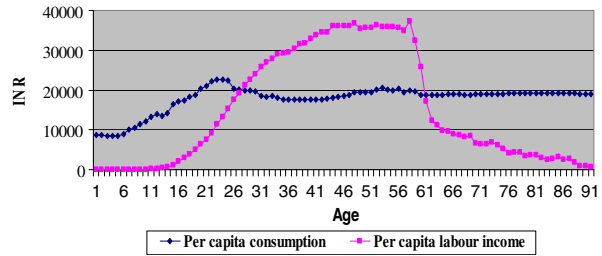
INR refers to Indian rupee. One crore is equal to 10 million

Health is a major source of public and private consumption of elderly individuals. In particular, as column 4 in Table 3 shows, the share of private health consumption (14.15%) is higher than public health consumption (8.90%). Elderly individuals share about 7 (9) percent in public (private) consumption other. Within total consumption of the elderly population, however, private consumption accounts for about 86% with a dominant share of private consumption other (77.82%). This underlines the relative importance food and non-food (e.g. housing) private consumption for the elderly population. These results are sensitive to age profile rules: per capita rule for public consumption other and equivalence scale technique for private consumption. For instance, the relative share of elderly population determines their share of consumption in public consumption other and non-separation between durables and food consumption may exaggerate the size of private consumption other.<sup>11</sup>

Figure 1 shows age profile of per capita labour income and consumption for India. Labour income increases rapidly and then slowly, peaking in the early or mid 40's. The crossing age from net consumers to net producers is at 27 and from net producers to net consumers is at 61 or the average duration of stay in the workforce is 34 years. This is closer to the crossing ages at which economic independence changes in select Asian countries in Ogawa et al. (2009). For instance, crossing age from net consumers (producers) to net producers (consumers) is at 27 (60) for

<sup>11</sup> To separate food and non-food consumption, an attempt was made to compute the private consumption of durables in terms of owner-occupied housing. Following the NTA methodology, aggregate control for owner-occupied housing was Net Domestic Product from dwellings and age allocation rule is equivalence scale technique. The computed aggregate control (adjusted for indirect taxes) was equal to INR94156 crore. The age profile for housing showed that elderly share in consumption was 8.91%. Excluding housing, elderly share of private consumption other was equal to 8.97%. This implied that elderly share of consumption from owner-occupied housing and non-housing private consumption others was comparable in 2004–05.

**Fig. 1** Age profile of per capita labour income and consumption, India, 2004–05



Philippines in 1999 and at 26 (58) for Thailand in 2004. More recently, Lee and Mason (2011) presented the international comparisons of labour income and aggregate consumption across developed, developing Asian and developing African countries. Their interesting findings include (1) children in poor countries begin productive economic activity at younger age and, hence, have higher labour income than in developed countries, (b) labour income drops after age 60 in developed countries for various reasons including the incentives and opportunities provided by public sector pension programmes, (c) greater labour income at the extremes of age distribution is a characteristic feature of the poor countries, (d) heavy human capital investment per child in developed countries as aggregate consumption shows a characteristics bulge for children and youth, and (e) population ageing in developed countries is particularly costly relative to developing countries because elderly individuals consume more and produce less. The LCD for India in Fig. 1 conforms to the above findings of Lee and Mason (2011) for the developing countries in Asia and Africa.

Further, computed LCD across other age groups (not reported in Table 1) has two important results. First, deficit age group (0–26) or young age dependents have the highest LCD (INR685172 crore), about 8 times higher than the elderly population. Second, within the surplus generating age group (26–60), age group 50–59 has 1.43 times bigger surplus than age group 26–49. This is consistent with the seniority or years of experience based labour earnings, especially in the organized sector employment in both public and private sectors.

### Public Age Reallocations

The computed LCD of the elderly population in Table 3 is the total demand for age reallocations. As shown in Eq. 2, these reallocations are equal to transfers and asset-based reallocations in public and private sector. However, the scope of this paper is limited to public age reallocations with a focus on elderly individuals. In this analysis, public age reallocations are computed for all the ages and the results on nature, magnitude and implications are separated for the elderly population. These computations are useful to draw implications on three major instruments of fiscal policy on elderly individuals: taxation (transfer outflows), expenditure (transfer inflows) and debt (included in asset-based allocations).

### Public Transfers

Computed results of the aggregate public transfer inflows and outflows are given in Table 4. Net transfers are equal to transfer inflows minus outflows. By definition, net



**Table 4** Aggregate public transfers for elderly in India, 2004–05

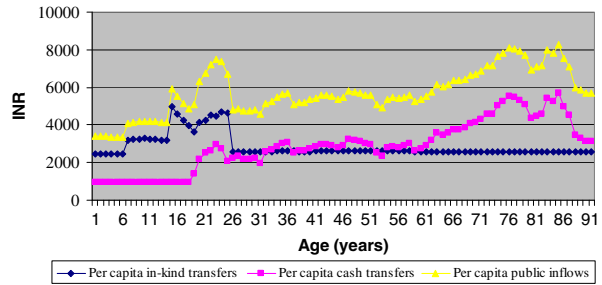
Public age reallocations	Total—All ages (INR in crore)	Total for elderly population (INR in crore)	Share of elderly (%)
Public net transfers	0	-8999	
Inflows	580553	56745	9.77
In-kind transfers	342542	21304	6.22
Cash transfers	238001	35440	14.89
Outflows	-580553	-56745	9.77
(1) Taxes	-504622	-65744	13.03
> Direct taxes	-141235	-33383	23.64
▪ Income tax	-49268	-2099	4.26
▪ Corporation tax	-91967	-31284	34.02
> Indirect taxes	-363387	-32361	8.91
(b) Transfer deficit (-)/surplus (+)	-75931		

aggregate public transfers are zero to maintain consistency between the National Income and Product Account identity and NTA Flow Account identity (Eq. 2). However, net public transfers may vary across ages as shown by the computed value for elderly individuals (INR -8999 crore). This means that public transfer outflows (or taxes) exceed the transfer inflow for the elderly population. This surprising result may be explained by the nature and size of different components of transfer inflows and outflows for the elderly population.

Total transfer inflows of the elderly population are equal to INR56745 crore or about 10% of total inflows of all ages. Of the total inflows to the elderly population, share of cash transfers is relatively higher (about 64%) than in-kind transfers. Two explanations for this result are as follows. First, of the in-kind transfers to the elderly population (column 4 in Table 3), share of education-based transfers is zero for elderly and public consumption other is lesser than other age groups because it is allocated on per capita. Health based transfers are smallest in size as compared other transfers not only for elderly individuals but for all ages and possess the lowest inter-age variations. Further, the standard deviation of the aggregate public health transfer inflows by age is lowest (152) as compared to the standard deviation of public education transfer inflows (1382) and public other transfer inflows (3145).<sup>12</sup> Thus, share of elderly individuals in total in-kind transfer inflows is 6.22% of all ages. Second, cash transfer inflows as they are related to Social Assistance Programmes

<sup>12</sup> Health consumption of elderly may be influenced by many socio-economic factors. For instance, Moneer Alam (2006) estimated the socio-economic determinants of health status of elderly for accessing and utilization of hospitalization services by aged. These econometric estimations were based on the household level data in the 52<sup>nd</sup> Round of National Sample Survey of the *Aged in India: A Socio-Economic Profile* in 1995–96. Determinants of health status of elderly (measured by number of diseases suffered by an elderly person) were estimated by rural and urban distinctions and in the framework of Count models (i.e. Poisson model and Negative Binomial model). In general, results showed that health status was susceptible up to a certain critical age and then taper off; and higher consumption expenditure, literacy, better water and sanitation facilities lowered health risks.

**Fig. 2** Per capita public transfer inflows, India, 2004–05

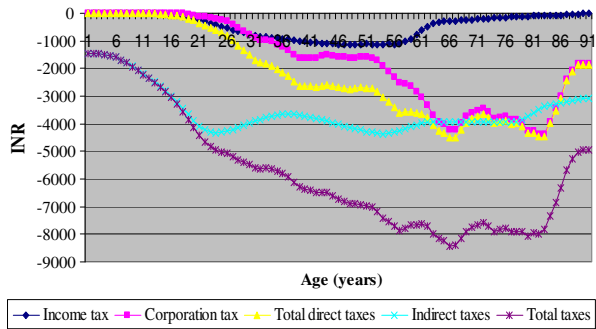


are mainly directed to elderly population. For instance, except for National Maternity Benefit Scheme and National Disability Pension, a large number of sample beneficiaries in the India Human Development Survey 2004–05 included elderly individuals and highest number of sample beneficiaries belonged to NOAPS. This is consistent with the fact that highest proportion of beneficiaries of Social Assistance Programme belongs to the NOAPS as explained earlier in Section “Public Economic Support for Aged”. The other component of cash transfers (other current transfers from the general government) are considered non-age specific and allocated on per capita basis, which reduces the relative size of this cash transfers to elderly individuals as compared to other age groups. The combined effects of age-specific and non-age specific transfers result in about 15% share of elderly individuals in total cash transfers. The above features of India’s public transfer inflows are shown by per capita age profiles of public in-kind transfers, cash transfers and total inflows in Fig. 2. The shape of in-kind transfers is mainly determined by the age profile of education-based transfers up to the age of 26 and flattens for subsequent ages. Cash transfer inflows show variations across ages from age 18, which is the youngest age of beneficiaries of age-specific transfers. Thus, per capita age profile of public transfer inflows for elderly individuals coincides with the cash transfer inflows.

Transfer outflows comprise the direct taxes and indirect taxes. Direct taxes are separated by personal income tax and corporation tax and other minor direct taxes. The Central/Union/Federal government levies both personal income tax and corporation tax. Indirect taxes include excise duties, levied by the Central Government, and sales taxes, levied by the state governments. As explained in Section “Age Profiles”, the key assumption for the age profiles is that incidence of taxes falls on the individuals who pay them. Accordingly, age profile of economic resources being taxed is identical with age profile of taxes paid by individuals. Transfer deficit or surplus occurs when transfer inflows are higher or lower than taxes. Transfer deficit of all ages is equal to INR75931 crore. In the NTA methodology, the transfer deficit or surplus is met through public asset-based reallocations. These reallocations are discussed in the next section.

Computed results of public transfer outflows (Table 4) shows that elderly individuals pay both direct taxes and indirect taxes, but the aggregate amount of direct taxes (about 24% of all ages) exceeds the indirect taxes (about 9% of all ages). In particular, the amount of corporation tax or asset-based taxes is the biggest source of transfer outflows for elderly individuals as they pay about 34% of total corporation taxes of all ages. Overall, elderly individuals bear about 13% of tax outflows of all ages and a strong negative net public transfers.

**Fig. 3** Per capita public transfer outflows, India, 2004–05

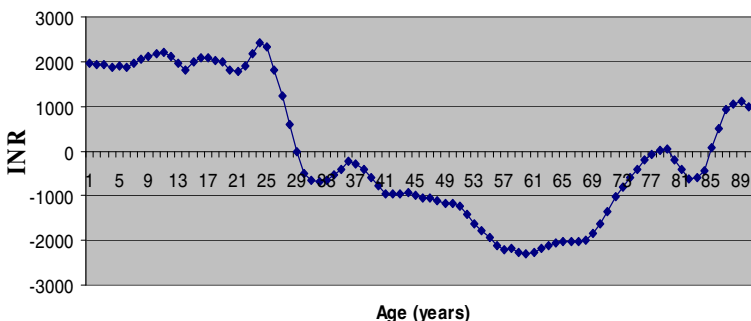


The nature and extent of per capita public sector transfer outflows are shown in Fig. 3. The strong transfer outflows are evident for elderly individuals by all taxes. It should be emphasized that the shape of per capita transfer outflows profile is particularly influenced by the shape of corporation taxes. This indicates a pattern of ownership of taxable assets to increase with age of household head (because all private assets are assumed to be owned by head of household) in India. Further, total public transfer outflows include all ages because indirect taxes are allocated based on private consumption other than that includes children.

Per capita net public transfers are shown in Fig. 4. In general, net public transfers to elderly individuals are strongly negative, because the taxes paid by the elderly substantially exceed the public benefits they receive. On the transfer account, the heavy burden on the elderly population is attributable in part to India's tax system, higher ownership of assets in older ages and partly on the absence of universal programmes that provide support to the elderly population.

*Public Asset-Based Reallocations*

India's public transfer accounts in Table 4 shows transfer deficit of INR-75931 crore. Public asset-based reallocations show how this transfer deficit is financed by public asset income and saving by age. As explained in Sections "Aggregate Controls" and "Age Profiles", public asset-based reallocation is the difference between public asset income and public savings under the assumption that all public assets are owned and



**Fig. 4** Per capita net public transfers, India, 2004–05

**Table 5** Aggregate public asset based reallocations for India's elderly, 2004-05

Public age reallocations	Total reallocations— All ages (INR in crore)	Reallocations for elderly (INR in crore)	Share of elderly (%)
Asset-based reallocations (Asset income minus savings)	75,931.40	9463	12.46
Public asset income	-39,400.60	-4910	
Capital income	9,605.00	1197	
Public interest, net	-157,734.60	-19657	
Other property income, net	108,729.00	13550	
Public savings	-115,332.00	-14373	

(a) One crore is equal to 10 million

savings are contributed by taxpayers. A justification for this assumption is that in the absence of public asset income and borrowings, taxes would have been higher or lower to the extent of financing the transfer deficit.

Computed results of public asset-based reallocations are given in Table 5. Public asset income is negative (INR-39401 crore), mainly determined by the huge negative net public interest (INR-157735 crore). Consequently, public dis-saving finances the transfer deficit to the extent of INR75931 crore. Share of elderly individuals in all inflows and outflows of public asset-based transfers is equal to 12.46% because age profile of all variables is based on age distribution of general taxes (or combined age profile of direct and indirect taxes). This is reflected in age profiles of per capita public asset based-reallocations in Fig. 5. Overall, outflows from the elderly population are greater than those required to fund transfer inflows because they pay both interest on previously accumulated public debt and paying off that debt.

### Select Implications

First, the results of public age reallocations for elderly individuals imply that their consumption can be financed by various sources of non-labour income. Table 6 summarizes the sources of financing elderly consumption by labor income and public age reallocations. At the outset, labour income and private sector age reallocations are the dominant sources of financing the elderly population's consumption (43.23%).<sup>13</sup> Most surprisingly, public age reallocations finance elderly consumption by less than 0.50%. This finding reveals the strong roles of public

<sup>13</sup> NSS 61<sup>st</sup> Round Employment and Unemployment Survey (2004–05) provide age specific labour force participation rate (per 1000) that includes elderly (age 60+) in India. The rates are separated by male and female in rural and urban areas. In general, the rates are higher in rural than in urban areas. For instance, the rates are: 645 for rural (male), 254 for rural (female), 366 for rural (male) and 100 (female) as reported in Table 2.2 by the Central Statistical Organization (2009). These rates are supportive for the income through labour for elderly, but do imply any proportionate relationship between labour force participation rate and share of labour income in consumption.

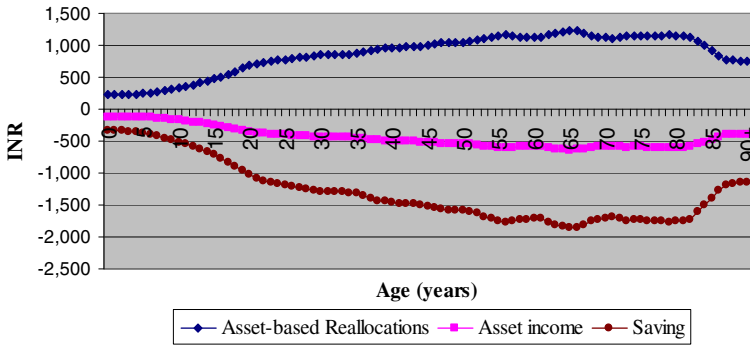


Fig. 5 Per capita public asset-based reallocations, India, 2004–05

sector outflows and dis-saving for India's elderly population. Or, net public transfers and asset income do not finance elderly individuals' consumption.<sup>14</sup>

Second, the largest burden of financing public transfers in India falls on the elderly population for whom the net public transfer is -13.33% of labour income. The burden on other age groups is as follows: -3.82% for 26–30; -1.21% for 31–40; -3.25% for 41–50; and -6.15% for 50–59. Thus, within the working age groups, the highest burden is on age group 50–59. Overall, the adult age group 26–59 bears the burden of -3.18%.

Third, the pattern of financing elderly individuals' consumption must recognize the role of private sector where family is a major source of economic support (57.26%). This has two important alternative implications. If the private sector age reallocations are not sustainable due to changes in the social obligations to support for elderly individuals and in the absence of a state-sponsored universal pension scheme for the elderly individuals, a reduction in the direct tax outflows may be inevitable in India's public support policy for the elderly. Or, if the above implications for 2004–05 are sustainable (including the private sector support for consumption of elderly individuals), population ageing may not negatively impact on India's public finances in future. This is contrary to the impact of population ageing on public sector in developed countries (such as, USA, Sweden, Austria and Finland) where consumption needs of elderly individuals are largely met by public pensions and health care (Lee and Mason 2011).

### Conclusions

Using the framework of NTA, this paper quantified the lifecycle deficit and public age reallocations for India's elderly population in 2004–05. The allocations are distinguished by transfers and asset-based reallocations. Major conclusions from the analysis of these results are as follows.

<sup>14</sup> India's on-going 11th Five Year Plan emphasizes on faster and inclusive growth. This growth strategy aims at widely spreading the benefits of growth, in terms of income, consumption and employment, by the poor, weaker and other vulnerable sections of our society. One of the recognized vulnerable groups is older people. This relates the inclusive growth to issues of elderly population. The NTA framework used in this paper does not address the problems of income and/or consumption distribution (e.g. poverty and inequality). This precludes the distributional implications of our results on India's elderly individuals.

**Table 6** Financing consumption for India's elderly, 2004-05

Sources of finance	Computed values for elderly (INR crore)	Extent of financing consumption (%)
1. Total consumption	156132	
2. Labour income	67496	43.23
3. Public sector age reallocations	464	0.30
• Net public transfers	-8999	-5.76
• Public asset-based reallocations	9463	6.06
4. Private sector age reallocations	88172	57.26

First, the magnitude of LCD of the elderly population is remarkable: about 34% of aggregate LCD for all ages or 2.83% of the GNP. Negative net public transfers and positive asset-based reallocations finance the deficit. This implies that the outflows from the elderly population are greater than those required to fund transfers because they pay both interest on previously accumulated public debt and paying off that debt. The heavy burden on the elderly population is attributable in part to India's direct tax system on assets and partly on the absence of universal programmes that provide public support to the elderly population. At the same time, this result finds a new role for the public transfer outflow of the elderly to reducing the LCD of non-elderly dependent age groups through intergenerational transfers. In terms of net public transfers, the burden of financing this intergenerational transfers is equal -13.33% of labour income of the elderly population as compared to -3.18% for surplus-generating adult working ages (27-59). These results are in contrast with the general presumption that elderly individuals are dependent on non-dependent adults in India.

Second, direct taxes in general and asset-based direct taxes in particular explain the largest public transfers outflows for elderly individuals. This indicates that ownership of taxable assets is held by elderly individuals. This result is surprising for a developing country like India where consumption-based, indirect taxes are presumed to be a major outflow because of its largest share in total tax revenue. However, if the private sector age reallocations are not sustainable due to changes social obligations to support for elderly individuals and in the absence of a universal pension scheme, a reduction in the direct tax outflows from elderly individuals may be a policy imperative for public age reallocation for India's elderly population. If sustainable, however, population ageing may not have a long term negative impact on public finances in India.

The above results above offer insights into the role of public support and financing consumption of the aged in India. These insights are missed by policy makers in the absence of estimates of lifecycle deficits and public age reallocations for elderly individuals, as provided by the NTA. Thus, NTA is a useful policy framework to single out the nature and magnitude of public economic support for the aged in India.

This paper is extendable in many ways. First, the results of this paper recognize the coexistence of the private and public intergenerational transfers in India and the importance of private sector in financing elderly individuals' consumption. Computation of different methods of private sector intergenerational allocations of

resources (e.g. inter-household and intra-household transfers and asset-based reallocations) is important to understand the nature and extent of implicit social contracts, intra-elderly distribution of resources and financing of elderly individuals' consumption. Second, the higher share of private sector may explain the long absence of a universal social security arrangement in the form of a public (civilian) pension system for India's elderly population. However, if changes in future social and economic conditions reduce the role of private transfers, will a state-sponsored, universal pension scheme for India's elderly population become a policy imperative? A plausible answer to this sustainability question may have important implications on future debates on universal social security and pension system of India's elderly population including for the New Pension Scheme since 2004 and co-contributory and other pension schemes, which have been introduced in recent years. This debate assumes special significance because India's total labour force is largely informal or unorganized by about 90% with no adequate coverage of social security including old age security. In this situation, sustainability of negative net public transfers of the elderly population depends on many social, economic and political factors. They need to be explored in future.

The results and implications of this paper must be qualified by the limitations on the available and used databases to drawing the age profiles of aggregate controls. Availability of new databases may be useful to draw refined age profiles.

**Acknowledgement** Grateful thanks are due to Professors Ronald Lee, Andrew Mason, Naohiro Ogawa, Sang-Hyop Lee and L. Ladusingh for technical help and guidance in the NTA workshops at Nihon University Population Research Institute (Tokyo) and East West Centre (Honolulu); two anonymous referees and the Managing Editor of this Journal for constructive suggestions; and Professors Carl Mosk, Merwan Engineer, David Scoones, Alok Kumar, Nilanjana Roy and other participants of the Economics Department Seminar in University of Victoria for critical comments. However, usual disclaimers apply.

## References

- Alam, M. (2006). *Ageing in India: Socio-Economic and Health Dimensions*. New Delhi: Academic Foundation.
- Asher, M. (2006). Pension Issue and Challenges Facing India. *Economic and Political Weekly*, 41(45), 4638–4641.
- Asher, M. (2008). Social Security Reform Perspectives in Developing Asia. *The Indian Economic Journal*, 56(1), 112–123.
- Central Statistical Organization. (2006). *Elderly in India —Profile and Programmes 2006*. New Delhi: Ministry of Statistics and Programme Implementation, Government of India
- Central Statistical Organization. (2008). *National Accounts Statistics 2008*. New Delhi: Ministry of Statistics and Programme Implementation, Government of India.
- Central Statistical Organization. (2009). *Selected Socio-economic Statistics 2008*, New Delhi: Ministry of Statistics and Programme Implementation, Government of India
- Chakraborti, R. D. (2004). *The Graying India: Population Ageing in the Context of Asia*. New Delhi: Sage Publications.
- Desai, S., Dubey, A., Shariff, A., & Venneman, R. (2008). *India Human Development Survey 2005*. New Delhi: National Council of Applied Economic Research (New Delhi) and Ann Arbor: Inter-university Consortium for Political and Social Research. Available on: <http://www.icpsr.umich.edu/ICPSR/access/index.html>
- Devarajan, S., & Hossain, S. I. (1995). *The Combined Incidence of Taxes and Public Expenditure in Philippines*, Policy Research Working Paper 1543, The World Bank (Washington).

- Government of India. (2007). *Indian Public Finance Statistics 2006–2007*. New Delhi: Department of Economic Affairs, Ministry of Finance.
- Heller, P. S. (2007). Is Asia prepared for an aging population? In Clark Robert, Naohiro Ogawa, & Andrew Mason (Eds.), *Population Aging, Intergenerational Transfers and the Macro economy* (pp. 270–294). Northampton: Edward Elgar.
- Lee, R., & Mason, A. (2011). “Population Ageing, intergenerational transfers, and economic growth: Asia in a global context”, *paper presented for Policy Research and Data Needs to Meet the Challenges and Opportunities of Population Aging in Asia*, National Academy of Sciences of India, 14–15 March, New Delhi.
- Mason, A. (2005). *Demographic Transition and Demographic Dividends in Developed and Developing Countries*. United Nations Expert Group Meeting on Social and Economic Implications of Changing Population Age Structure (31 August –2 September 2005, Mexico City). New York: Population Division, Department of Economic and Social Affairs, United Nations Secretariat.
- Mason, A., & Lee, R. (2007). Transfers, capital and consumption over the demographic transition. In Robert Clark, Naohiro Ogawa, & Andrew Mason (Eds.), *Population Aging, Intergenerational Transfers and the Macro economy* (pp. 128–162). Northampton: Edward Elgar.
- Mason, A., Lee, R., Tung, A-C., Lai, M-S., & Miller, T. (2006). *Population Aging and Intergenerational Transfers: Introducing Age into National Accounts*, Working Paper No.12770. Mass: National Bureau of Economic Research.
- NTA. (2011). <http://www.ntaccounts.org/web/nta/show/Documents/Methods>, accessed 4 April 2011.
- Ogawa, N., Chawla, A., & Matsukura, R. (2009). Some New Insights into the Demographic Transition and Changing Age Structure in the ESCAP Region. *Asia-Pacific Population Journal*, 24, 87–116.
- Rajan, I. S., & Mathew, E. T. (2008). India. In S. Rajan & E. T. Mathew (Eds.), *Social Security for the Elderly: Experiences from South Asia* (pp. 39–106). New Delhi: Routledge.
- Rajan, Irudaya S., & Prasad, Syam. (2008). Pension and social security in India. In Irudaya S. Rajan, Carla Risseeuw, & Myrtle Perera (Eds.), *Institutional Provisions and Care for the Aged* (pp. 115–133). Delhi: Anthem South Asian Studies.
- Rajan, Irudaya S., Mishra, U. S., & Sankara Sarma, P. (1999). *India’s Elderly: Burden or Challenge?* New Delhi: Sage Publications.
- Rajan, I. S., & Aliyar, S. (2008). Population Ageing in India. In I. S. Rajan, C. Risseeuw, & M. Perera (Eds.), *Institutional Provisions and Care for the Aged* (pp. 39–54). Delhi: Anthem South Asian Studies.
- United Nations. (2007a). *World population monitoring, focusing on the changing age structures of populations and their implications for development: Report of Secretary-General* (40th Session, 9–13 April). New York: Economic and Social Council, Commission on Population and Development.
- United Nations. (2007b). *World Population Ageing 2007*. New York: United Nations Publications.
- World Bank. (2008). *Pensions at a Glance: Asia/Pacific Edition*, The World Bank & OECD (Washington).