

CONSTRUCTION OF NATIONAL TRANSFER ACCOUNTS FOR INDIA, 1999-2000

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CONSTRUCTION OF NATIONAL TRANSFER ACCOUNTS FOR INDIA, 1999-2000

1. INTRODUCTION

National Transfer Accounts (NTA) is a systematic approach to introduce age into the analysis of national income and accounting. It provides with the analytical bases and empirical frameworks to estimate the impact of age structure transition on (a) dynamic macroeconomic growth through income, savings, and investments, and (b) inter-generational equity and poverty alleviation through asset reallocations and transfers. NTA recognizes individual as a basic analytical entity, but encompasses the working of the entire economy in term of public and private institutions, policies, and programmes. In general, the outcomes of construction and analysis of NTA are useful for design and implementation of long term economic growth and intergenerational equity with special reference to age structure transitions. In particular, the outcomes are of relevance and usefulness for India, because its economic policies and programmes have been aimed at long term economic growth with equity of all descriptions in the light of challenges of its population size and growth, and current and future age structure transitions. However, construction of NTA is new for Indian economics.

This discussion paper presents preliminary results in the construction of Flow Accounts of NTA for India in 1999-00. This construction involves four sequential stages: Estimation of aggregate controls; Age allocation of aggregate controls; Estimation of life cycle deficits; Estimation of age reallocations. Throughout, general NTA methodology is combined and adjusted with the institutional settings and data constraints in India.

Rest of this paper is organized as follows. Section 2 presents an overview India's macroeconomic economy in the context of construction of NTA. Frameworks, estimation results, and preliminary conclusions and implications of India's NTA 1999-00 are presented in section 3.

2. AN OVERVIEW OF INDIA'S MACRO ECONOMY

As a background for India's NTA, this section present an overview of India's macro economy by its economic structure, select performance indicators, age structure transitions, poverty alleviation programmes, and social security policies in 1999-2000. In addition, the relevance and applicability of India's social and economic structures for construction of NTA for India will be emphasized.

2.1. Economic structure

India's economic structure is characterized by federal form of government, mixed economic system, and open economy. Being a federal economy, (a) revenue and expenditure functions and (b) promotional and regulatory functions are divided between the Central/Union/Federal Government, and sub-national governments at the State level and Local (i.e. District, Sub-district, and Village) levels. As per the Indian Constitution, governments' activities are divided under the Union List, State List, and Concurrent List. Social sectors, such as, education, health, and social security are included in the Concurrent List. Hence, both the national and sub-national governments have promotional and regulatory functions in these social sectors, and their combined consumption and investment are relevant for NTA purposes. Mixed economic system shows co-existence of public and private sectors in production and consumption of goods and services. Ownership, management, and financing of social and economic activities are distinguishable by public and private sector (comprising households and institutions). This implies that NTA's estimation framework by public and private sector are relevant for India. As an open economy, India's borders are open for international trade in goods and services as well as for international mobility of factors of production (e.g. labour and capital). This implies that NTA's open economy approach to NTA estimations through rest-of-world account is applicable for India.

2.2. Macroeconomic performance

Table 1 presents the state of India's macroeconomic by select national income, savings, investment and stabilization indicators in 1999-00. First, India's annual growth of national income (i.e. NNP at factor cost) recorded 10.5 percent, less than the compound annual growth rate during 1993-94 to 1998-99 (15.59 percent) and during 2000-01 to 2004-05 (12.06 percent). Ratios of (a) NNP at constant to current prices, (b) NNP at factor cost to market prices, and (b) NNP to net disposable income at market prices being less than unity indicate for importance of inflation, net indirect taxes, and other current transfers from the rest of the world respectively. Annual per capita income is about US\$361 which qualifies India as a low income country. Share of GDP indicate its important sources: tertiary sector (49 percent), urban areas (52 percent), and private sector (75 percent). Composition of GDP by expenditure shows the importance of consumption (78 percent) in general and private consumption in particular (65 percent). Households are the major source for national savings rate (21 percent). Indicators of stabilization are summarized by annual price inflation (3.3 percent), current account deficit (1.34 percent of GDP), and fiscal deficit (9.46 percent of GDP).

It should be mentioned that India's macro economy underwent major changes due to the introduction of national economic reforms in July 1991. The Reforms were introduced in both domestic and external sectors. Domestic reforms were focused on industrial, public and fiscal sectors. External sector reforms included trade, foreign investment, and foreign exchange. Over the years, the Reforms have resulted in bigger role for the private sector, and higher degree of economic globalization in terms of internationalization of trade and capital. Thus, the Reforms are relevant for analysis of policy implications from the construction of NTA for India during the post-reform period, such as, 1993-94, 1999-00 and 2004-05. However, construction of NTA for 1999-00 may serve as a useful benchmark for future studies and comparisons before and after 1999-00.

Table 1: Indicators of India's macroeconomic performance: 1999-00

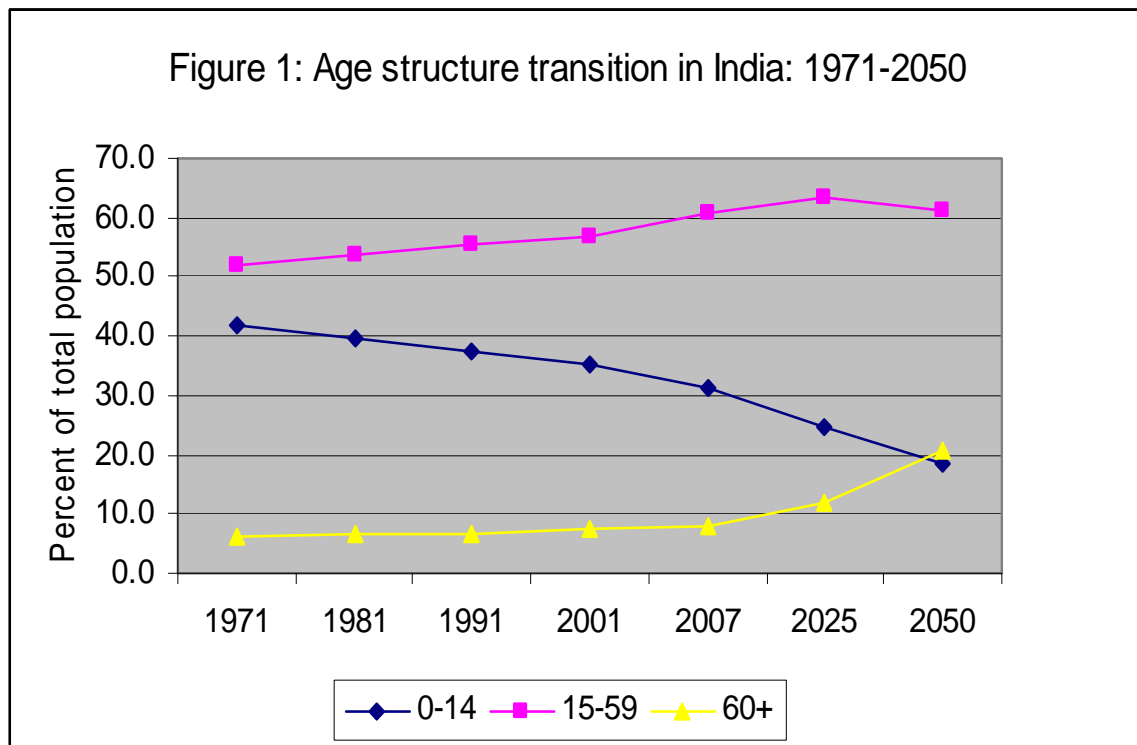
Indicators	1999-00
1. National income or NNP at factor cost and current prices: Rs. (US\$) in billions	15902.12 (360.96)
• Annual growth (%)	10.5
• Compound annual growth rate (%)	
➤ 1993-94 to 1998-99	15.59
➤ 2000-01 to 2004-05	12.06
• Ratio of NNP at factor cost at constant (1993-94 prices) to current prices (%)	64.46
• Ratio of Net National Product at factor cost to market prices (%)	89.94
• Ratio of Net National Product to net national disposable income at market prices (%)	97.04
2. Per capita NNP	
➤ Rs. (US\$)	15625 (360.60)
➤ Annual growth (%)	8.5
2. GDP (at factor cost and current prices): Rs. (US\$) in billions	19368.31 (447)
• Annual growth (%)	10.2
• Sectors' share (%)	
➤ Primary	25.30
➤ Secondary	25.40
➤ Tertiary	49.20
• Share of urban areas	51.70
• Share of public sector	25.30
3. Select macroeconomic ratios to GDP (at current prices): %	
• Consumption	78.33
➤ Private final consumption expenditure	65.38
➤ Government final consumption expenditure	12.95
• Gross investment	23.63
• Net exports	1.96
• Gross domestic savings	24.20
➤ Household	20.90
• Combined fiscal deficit of the Central and State Governments	9.46
• Current account deficit	1.34
4. Rate (%) of inflation (based on Wholesale Price Index: 52 weeks average: Base: 1993-94)	3.3

@ Based on average annual exchange rate.

Source: National Accounts Statistics and Economic Survey, Government of India – Various years

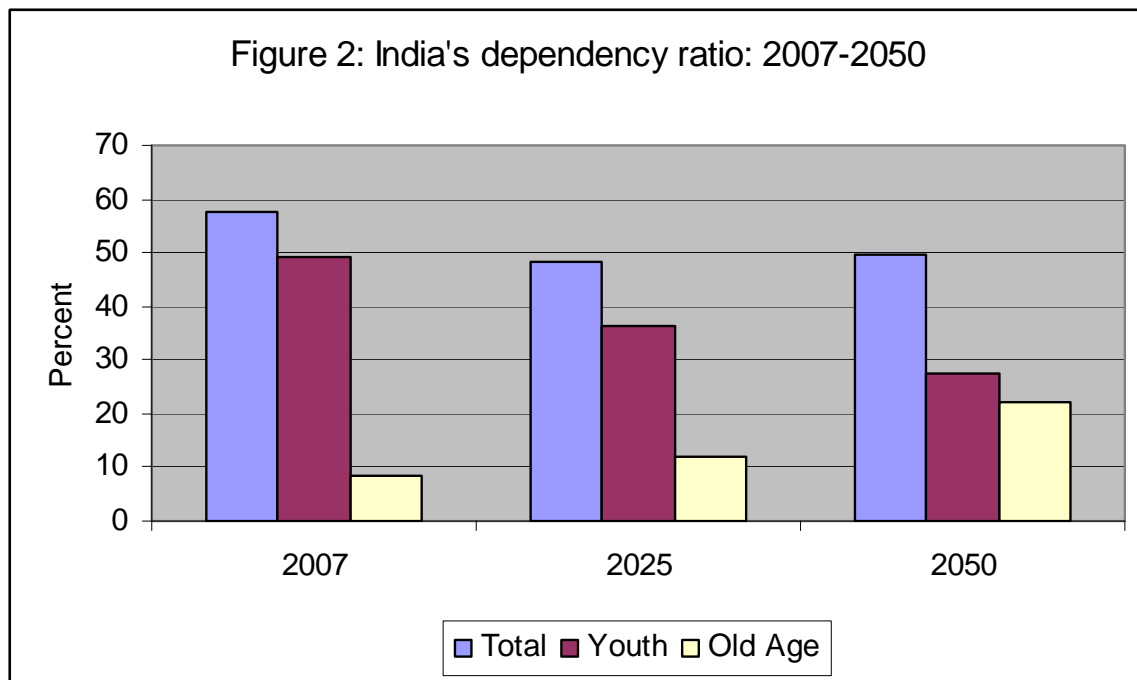
2.3. Age structure transition

Age structure of India's population has undergone considerable changes over last 30 years (1971-2001), as a consequence of interaction effects of declining fertility and declining mortality (or increasing life-expectancy at birth as well as at 60+), or demographic transition.¹ This is evident from the census data from 1971 to 2001, used in **Figure 1**. Major age structure transitions are evident for population under 15 years of age, as the share of total population under this age group largely reduced from 39.5 percent in 1971 to 35.3 percent in 2001. At the same time, the share of total population under the age 60 plus marginally increased from 6 percent in 1971 to 7.4 percent in 2001. The large decline (or marginal increase) in the share of population under 15 years (or 60 years) had been associated with substantial rise in the proportion of working age group 15-59 years from 53.9 percent to 56.9 percent during the period 1971-2001.



¹ This process of demographic transition is best described by Lee (2003a): *The classic demographic transition starts with mortality decline, followed after a time by reduced fertility, leading to an interval of first increased and then decreased population growth and, finally population aging* (p.170).

The United Nations World Population Ageing 2007 [United Nations (2007)] provides with insights into the projected age structure transition from 2007 up to 2050. These projections are also shown in **Figure 1**. Total population is projected to increase from 1134 millions in 2007 to 1395 million in 2025 and to 1593 million in 2050. Population under 15 (or over 60) is projected to decline (or increase) from 31.2 (or 8.1) percent in 2007 to 24.5 (or 12) percent in 2025 and to 18.3 (or 20.7) percent in 2050. Consequently, throughout, India's working population is projected to remain around 60 percent. Hence, ageing index (or potential support ratio) is projected to increase (or decline) from 26.1 (or 11.7) in 2007 to 49.2 (or 8.4) in 2025 and to 113 (or 4.5) in 2050. In particular, as figure 2 shows, decline in total and youth dependency ratio, and rise in old age dependency ratio will be the most obvious implications of current and future age structure transitions in India. Thus, dependency transition has been evident in the process of India's population growth since 1961.² This transition is most relevant for inter-generation equity analysis under the framework of the NTA.



² According to Lee (2003a), *increasing longevity leads to a rapid increase in the elderly population while low fertility slows the growth of the working-age population. The old-age dependency ratio rises rapidly, as does the total dependency ratio. In India, this phase occurs roughly between 2015 and 2060* (p.182).

Studies on India's age structure transition [e.g., Chakraborti (2004), and Rajan et al (1999)] have focused on description of dependency transition using descriptive statistics, such as, median age, index of ageing, and dependency ratio. In general, the descriptions lead to a major conclusion that India's ageing phenomenon is a problem of future. Further, these studies focus on living conditions, and limited public policies and programmes for social security, for elderly population. In general, the descriptions of living conditions draw heavily from the results of the above mentioned National Sample Survey of aged in India. In addition, these studies note the relationship between ageing and economic development, but no economic effects of ageing on development, and effects of development on ageing, are quantified.³ This quantification, based on the NTA framework, is one of the main objectives of this report.

India's advantages and challenges of age structure transition are highlighted in recent public documents and research papers. For instance, the Approach Paper to 11th Five Year Plan [Planning Commission (2006)] highlights the advantages of the transition on economic growth. *"Our dependency rate (ratio of dependent to working age population) is falling..... Properly handled, with an emphasis on human resource development and an economy capable of absorbing them in productive employment, the presence of a skilled young population in an environment where investment is expanding.... would be a major advantage."* (p.4). On the other hand, the challenges of the transition on the social security programme are emphasized by Asher (2006): *India's social security system will face huge challenges due to the level and speed of ageing. The life expectancy at age 60 (16 years for male and 17 years for female in 2001) is expected to rise rapidly, requiring a longer period of retirement support for each elderly. As consumption of healthcare resources increases disproportionately with age, retirement financing will need to factor in the healthcare needs. By 2030, the population of over 60 years of age (which is the current retirement age) will approach 200 million* (p.4638). Thus, the policy

³ An and Jeon (2006) offer evidence on the U-shape relationship between demographic changes (measured by variables relating to age structure transitions) and economic growth (measured by per capita growth rate of GDP) from 25 OECD countries for 41 years (1960-2000). This evidence (non-NTA based, however) shows that demographic changes appear to first increase and then decrease economic growth and is called the Demographic U Hypothesis (Curve).

implications of NTA are highly relevant for India's current and future development policy formulations and implementations.

2.4. Living conditions of the aged

Up to 2006, four national sample surveys on socio-economic profile of the aged (60+ years) have been conducted (1987-88, 1993-94, 1995-96, and 2004) in India. The major results from the latest (or 60th) Round of the National Sample Survey in 2004 is summarized in **Table 2**, in comparison with corresponding data in 52nd Round of the National Sample Survey in 1995-96 and by rural and urban distinctions.⁴ First, aged population and old age dependency ratio have increased in both rural and urban areas, but more in rural than urban India. Second, large number of aged is economically dependent, especially given the prevalence of locomotor disability (unable to move physically) being dominant among the old-old (80+years). Family members (or family as a social institution) are the major supporters of age population, in terms of (a) living arrangements with family members (e.g. spouse and children), (b) increasing number of aged living with a large number of surviving children than with a single surviving son/daughter, and (c) own family members being the major supporters of economically dependent aged persons. This signifies the role of familial transfers as a social instrument of inter-generational exchange of economic resources. Third, work participation rate among the aged is remarkable. This is unsurprising due to the absence of any public retirement benefits (as a form of social security) for majority of the aged. This is evident in the following analysis of social security programmes, including old age social security, in India.

⁴ Further decomposition by male and female categories is available in the surveys, but not reported to limit the scope of our analysis. We are aware of the implications of feminization of sex composition of elderly and ageing of elderly (mainly due to longer life expectancy) in terms of widowhood, destitute, and poverty. Importance for focusing social security programme for this vulnerable group among the elderly is highlighted by Hurd (1990) for USA, Knodel (1999) in the larger Asian context, and by Meena Gopal (2006) in the Indian context.

Table 2: Select socio-economic background of aged persons in India: 1995-96 and 2004

Variable (Unit of measurement: Per 1000 population)	52 nd Round of National Sample Survey, 1995-96		60 th Round of National Sample Survey, 2004	
	Rural	Urban	Rural	Urban
1. Share of the aged in total population	57	50	70	66
2. Old age dependency ratio	92	74	125	103
3. Living arrangements				
• Alone	43	45	53	43
• With spouse only	107	80	125	104
• With spouse and other members	462	469	442	468
• With children	331	349	320	322
• With other relations and non-relations	48	51	42	49
4. Proportion of aged persons by number of surviving children				
• Zero	58	59	55	58
• One	71	79	81	85
• Two	113	112	126	155
• One or more	942	941	945	942
5. Economic dependence of aged				
• Not dependent on others	301	311	327	359
• Partially dependent on others	163	139	138	114
• Fully dependent on others	511	532	519	516
6. Sources of support for economically dependent aged				
• Spouse	142	156	127	148
• Own children	735	728	784	762
• Grand children	52	55	28	26
• Others	71	61	61	64
7. Proportion of locomotor disability among the aged persons				
• 60-64 years	NR	NR	31	33
• 80+ years	NR	NR	269	283
• All aged	111	87	77	84
8. Employment status among the aged persons (according to usual principal status)				
• Work participation rate (per 1000)	386	214	NR	NR
• Self-employed in agriculture	627	182	NR	NR
• Self-employment in non-agriculture	106	523	NR	NR
• Regular employees	16	150	NR	NR
• Casual labour	251	145	NR	NR
9. Distribution of aged persons by types of retirement benefits				
• Pension only	67	151	NR	NR
• Pension with other benefits	93	328	NR	NR
• No pension with other benefits	50	171	NR	NR
• No benefits	790	350	NR	NR

Notes: NR refers to not reported.

Source: Compiled from NSSO (1998) and NSSO (2004).

2.5. Social security programmes

Social security programme has implications for entire Flow Account analysis in the NTA. Thus, as a background for this analysis, an overview of India's social security system and its current policy agenda is given below. At the outset, it should be emphasized that India's social security measures are many, and divided under Central and State Governments, and private sectors; separated by organised workers in public and private sectors, and by organised and unorganised workers in private sector. Thus, beneficiaries differ by these measures. The following description is limited to national level public social security programme.⁵

First, social security programme is a form of in-kind transfer of public goods' consumption. In this case, three approaches are distinguishable. (a) Universal programmes (such as, education and literacy, healthcare services, water and sanitation facilities, vocational training), which are available for consumption by entire population. (b) Targeted programmes for consumption by specified: Income categories [e.g. Public Distribution of System and Universal Health Insurance Scheme for households Below the Poverty Line (BPL)]; Age groups (e.g. Mid-day Meal Programme for elementary education students, Integrated Child Development Scheme for pre-school children). Spatial and social categories (e.g. special housing and employment generation programmes for rural, scheduled caste and scheduled tribes, and BPL households).

Second, the National Social Assistance Programme, 1995. This is a cash transfer programme, and sponsored by Central Government and partly supplemented by respective State Governments. It is targeted for poor and destitute and aims at providing social security for old age, death of breadwinner, and maternity. The Programme has three components: (a) National Old Age Pension Scheme for destitute individuals of

⁵ This restricted scope excludes the role of State Governments' and private sector's social security programmes. Major State Governments' social security initiatives include: old age pension, maternity benefits, pension for agricultural landless labourers and physically handicapped and destitute women, employment, and housing subsidy. Private sector's contributions initiatives include voluntary organizations, such as, Self Employed Women Association (SEWA) in Gujarat.

more than 65 years with no source for livelihood. The extent of assistance is equal to Rs.200 per month per beneficiary. (b) National Family Benefit Scheme for 18 to 65 years households below the poverty line in case of death of prime household breadwinner. The extent of benefit is equal to a lumpsum amount of Rs.10000 to a family. (c) National Maternity Benefit Scheme for pregnant household women below the poverty line and above 19 years. The extent of benefit is equal to a lumpsum amount of Rs.500 per beneficiary.

Indian Constitution (Article 41) underlines the role of the government (within the limits of its economic capacity and development, however) in providing with old age social security. The Code of Criminal Procedure 1973 includes a provision for ordering a monthly allowance for dependent parents from children having sufficient means, in case the children neglect or refuses to maintain their parents. The National Policy on Older Persons 1999 provides with a framework for inter-sectoral collaboration and coordination, within the government as well as between the government and non-governmental organizations, for welfare of elderly.⁶ In addition, the most recent Maintenance and Welfare of Parents and Senior Citizens Bill, 2007 seeks to make it a legal obligation for children and heirs to provide sufficient maintenance to senior citizens, and proposes to make provisions for state governments to establish old age homes in every district.⁷

In the past, social convention dictated that the eldest son in a Hindu family should be responsible (or obliged) to take care of parents in their old ages. In return, he inherited parent's property and other assets. Thus, a son was considered a form of old age social security. This was the strongest reason for son's preference in the Indian fertility behaviour. At present, inheritance laws have changed. For instance, property inherited by parents from their ancestors must be equally divided among all children including

⁶ A detailed description of the national and sub-national policies and programmes on the aged in India are available in Appendix 2 of Chakraborti (2004).

⁷An excellent summary of the Bill, and international comparisons of legal protection and social security for elderly, see, for instance, Centre for Policy Research (2007).

daughters. Self-made property can be passed to any one or all children according to the wishes of the parents. Implicitly, children are obliged to take care of parents if they receive their property share. In the present day society, however, this is not practiced everywhere and by everyone. Thus, a legislation, such as, the Maintenance and Welfare of Parents and Senior Citizens Bill, 2007 is considered necessary for social protection of elderly within the institution of family.

Third, social security schemes for organised workers in public and private sectors. Public includes government and quasi-government, and private sector includes registered factories and companies. The schemes are implemented through Labour Laws, such as, Employees State Insurance, Maternity Act, and Workmen Relief Act. The benefits include: medical care, sickness and maternity leave with pay, retrenchment benefit, old age benefits (e.g. pension or provident fund with gratuity⁸), and compensation for injury. In addition, for specified industrial workers (e.g. mine workers), benefits of housing, medical care, and education for children are extended by Welfare Funds, financed by cess on exported items (e.g. iron ore). Further, organized workers benefit from the voluntary tax advantaged schemes, such as, small savings schemes and pension products of life insurance companies.

Estimates of distribution of employment show that 91 percent of workers belonged to the unorganized or informal sector [Government of India (2006a)]⁹ Social security for unorganised workers is introduced under the Unorganised Sector Workers Social Security Scheme 2004 for providing workers with Old Age Pension Scheme, Personal Accidental Insurance, and Medical Insurance. The Scheme is voluntary and open for unorganized and self-employed workers with income from salary or wages up to Rs.6500 per month.

⁸ Under the national provident fund scheme, Employees Pension Scheme is a Defined Benefit scheme, and Employees Provident Fund is a Defined Contribution scheme.

⁹ Informal sector is defined as follows: *All unincorporated private enterprises owned by individuals or households in the production and sale of goods and services and operated on a proprietorship or partnership basis and employing less than 10 persons* [Government of India (2006a): p.7]. The following occupational heterogeneity of unorganized workers is recently quoted in Asher and Vasudeavn (2006: p.8): Self employed farmers and wage labour (60 percent), self-employed business owners (13.8 percent), salaried and/or contractual employees in the informal sector (5.4 percent), self-employed professionals (below 1 percent), and other (8.9 percent).

Contribution from the worker, employers, and the Government is defined for financing the Scheme. For instance, workers contribution is equal to Rs.50 (or Rs.100) in the age group of 18-35 years (or 36-50 years), and that of employers is equal to Rs.100 and the Government is 1.16 percent of monthly wages of workers. The Old-Age Pension Scheme provides with a minimum of Rs.500 per month at the age of 60 years or permanent or total disability and family pension in case of death of the workers. Personal Accident Insurance covers accidental insurance of Rs.0.1 million. Medical insurance includes reimbursement of hospitalisation expenses up to Rs.30000 in a year and Rs.25000 for accidental death.

Most recently, Government of India (2006b) has recognized the magnanimity of the social security problem in the following words: *“With some exceptions like the National Old Age Pension Scheme, social protection is practically non-existent for a large majority of population. Pension benefits are not available to about 87 percent of the population and 74 percent of the work force, the bulk of whom are in the unorganized sector. With the absence of a choice to individuals and lack of portability, there is a limitation on the mobility of labour”* (p.42). Nevertheless, provision of better working conditions, and social security for unorganized labour has assumed special significance in view of its global experiences and for wider sharing of benefits of economic development. This is evident in a recent recommendation for a comprehensive legislation for minimum conditions for work and social security for unorganized workers in July 2007 by the National Commission for Enterprises in the Unorganized Sector [Government of India (2007)].

Pension reforms to reduce long run liabilities of the Government towards terminal benefits to its employees (under the Defined Benefit Schemes, however) are the most important current policy agenda. The National Pension Scheme, introduced for civil servants who entered the service since 1 January 2004, is the most recent pension reform measure. This is a Defined Contribution scheme (for Tier-I account) in which mandatory contribution by the employee, matching contribution of employer, investment returns are deposited. No withdrawal is permitted before the retirement age (at present,

60 years). Accumulated amounts are divided between compulsory annuity component and a lumpsum withdrawal component at age 60. Thus, the NPS is a scalable and portable measure.

2.6. Poverty and its alleviation programmes

Official estimates of poverty by the Planning Commission are based on consumption poverty – Per capita per month consumption expenditure needed to meet with calorie norms (2400 calories for rural areas and 2100 calories for urban areas). This expenditure defines the official poverty line in rural and urban areas. Accordingly, persons below poverty line by rural and urban areas are estimated, using the National Sample Survey data on consumer expenditure. **Table 3** shows a decline in population the poverty line between 1993-94 and 1999-00, and between 1999-00 to 2004-05.

Table 3: Poverty in India: 1983-94 to 2004-05

Indicators	1993-94	1999-00	2004-05
1. Poverty Line (Rupees per capita per month consumption expenditure)			
• Rural	205.84	327.56	356.30
• Urban	281.35	454.11	538.60
2. Estimates of poverty (Percent of population below poverty line)			
• Rural	37.27*	27.09**	28.30* 21.80**
• Urban	32.36*	23.62**	25.70* 21.70**

Notes: * (or **) indicates (or indicate) the estimates based on Uniform Recall Period (or Mixed Recall Period). Uniform recall period refers to consumption expenditure data collected using 30-day recall or reference period. Mixed recall period refers to the consumption expenditure data collected using one year recall period for five non-food items (i.e. clothing, footwear, durable goods, education, and institutional medical expenses) and 30 days recall period for the rest of items[(Planning Commission (2007)].

Sources: Planning Commission (2007 and 2002a).

It might be added here that India's poverty alleviation measures are focused on the following. (a) Affirmative action by way of reservation for scheduled castes and tribes in elected bodies, public sector jobs and educational institutions, and supplemented by sectors' specific welfare programmes with earmarked allocation. (b) Implementation of employment generation and asset creation programmes with special reference to rural areas.¹⁰ (c) Provision of minimum needs, such as, education, health, drinking water, sanitation, and roads. (d) Subsidised distribution of food under school children feeding and nutritional programmes, and distribution of foodgrains for poor families through public distribution system. Thus, in general, poverty alleviation measures coincide with the social security programme in the form of in-kind transfer of public goods' consumption.

2.7. Institutional arrangements for provisioning of social sectors' services

Institutional arrangements for provisioning of education and health services are important for estimation and analysis of public and private education consumption and its age allocation in India's NTA. These arrangements are briefly described below.

¹⁰ (i) National Rural Employment Guarantee Scheme (with effect from 2 February 2006) aims at enhancing livelihood security for rural people through generation of a minimum 100 days of wage employment per year for unskilled manual workers in local infrastructure development works. Other programmes merged with this programme include *National food for work programme* (launched in 2004) in 150 most backward districts to intensify the generation of supplementary wage employment, and *Sampoorna Grameen Rozgar Yojana* (launched in 2001) to provide additional wage employment in rural areas and, thereby, food security and improve nutritional levels. (ii) *Valmiki Ambedkar Awas Yojana* (launched in 2001) to construct and upgrade dwelling units and community toiled facilities for slum dwellers. (iii) *Pradhan Mantri Gramodaya Yojana* (launched in 2000-01) for providing basic services, such as, primary health, primary education, rural shelter, rural drinking, nutrition and rural electrification. (iv) *Pradhan Mantri Gram Sakak Yojana* (launched in 2000) to provide rural connectivity (e.g. roads) to unconnected habitations with population of 500 persons and above. (v) *Antyodaya Anna Yojana* (launched in 2000) to provide food gains at a highly subsidized rate of Rs.2 per kg for wheat and Rs.3 per kg for rice to the poor families under the Targeted Public Distribution System. (vi) *Swaranjayanti Gram Swarozgar Yojana* (launched in 1999) to assist below the poverty line families by organizing them into self help groups through a mix of bank credit and government subsidy. (vii) *Indira Awaas Yojana* (launched in 1999-00) for construction of houses for the poor at free of cost. (f) *Rural employment generation programme* (launched in 1995) to create self-employment opportunities in rural areas and small towns. (viii) *Swarna Jayanti Shahari Rozgar Yojana* (launched in 1997) to create opportunities for urban self employment and urban wage employment. (ix) *Prime Minister's Rozgar Yojana* (launched in 1993) to make available self-employment opportunities to the educated unemployed youth by assisting them in setting up any economically viable activity.

Provisioning of education services

- Formal education comprises primary/elementary education, secondary education, and tertiary/higher education. Vocational education and training, and special education services are separately provided.
- Before (or after) 2001-02, duration of primary education covered 7 years (or covers 8 years) of schooling, and lower and higher secondary education covered 5 years (or covers 4 years) of schooling. Official age for admission to primary education is equal to completed 5 years.
- In general, duration of higher education varies according to its types (i.e. general, technical, medical, and agricultural education); levels (i.e. university and affiliated collegiate education, and institutes of higher learning and research); and by modes, i.e. by regular education (i.e. college and university based) and distance education (i.e. correspondence courses and Open University).
- In terms of ownership and management, education institutions (e.g. universities, institutes, schools and colleges) are distinguishable by Government, private-aided, and private-unaided institutions (includes institutions by linguistic and religious minorities and voluntary organizations). Resource cost of provisioning of higher education services is dependent on the nature and extent of ownership and management of institutions. The Central and/or State governments finance government institutions and universities. Both the private management and/or the Central and State governments' finance the aided private institutions. Private management finances private unaided institutions. In terms of cost-recovery criterion, the Government subsidizes all types of education. Student or education loans are provided through commercial banks at concessional rate of interest. These loans are aimed at self-financing of educational expenditure by students or parents and, thereby, reducing the Government's subsidies for education.

- Education is in the Concurrent List of the Indian Constitution. Expenditure by the Central Government, State governments, and local governments are essential for analysis of total (i.e. sum of primary, secondary, and tertiary) public education expenditure/financing. Unlike the primary and secondary education, higher education is outside the purview of India's Local Governments' (e.g. district and village level governments) activities.
- Students incur private expenditure to accessing education services. This expenditure includes payment of institutional fees, private tuitions, purchase of instructional materials, transport, food and lodging expenses, and donations.

Provisioning of health services

- Health services include curative and preventive services. They are provided through public health programmes and family welfare programmes (comprising maternal and child health services, and family planning services) by both modern system and Indian system of medicine. About 95 (or 85) percent of total health by the Central (or State) Government was on modern system of medicine in 2001-02.
- Health is in the Concurrent List of the Indian Constitution. Expenditure by the Central Government, State governments, and local governments expenditure are essential for analysis of total public health expenditure/financing. An excellent analysis of health expenditure in the context of India's macro economy is given in the Report of the National Commission on Macroeconomics and Health Government of India (2005a).
- Private sector is contributory for provisioning of health services. This includes commercial/firms and voluntary health agencies (e.g. non-government organizations).

- India's first National Health Account is prepared for 2001-02 by the Government of India [Government of India (2005b)]. It provides with a valuable information on the share of health by providers and users of health services. Select information on these expenditure in 2001-02 shares are presented below.
 - India's total health expenditure in 2001-02 was equal to Rs.1057.341 billion. This accounted for 4.63 percent of GDP, and Rs.1021 per capita expenditure.
 - Total health expenditure comprised, 20.3 percent of public expenditure [6.4 percent by Central Government, 12.6 percent by State Government, and 1.3 percent by Local Government]; 77.4 percent of private expenditure [72 percent by households, 5.3 percent by firms, and 0.1 percent by voluntary agencies] and 2.3 percent of external support. External support included grants to Central and State governments, and voluntary agencies.
 - Of the total public expenditure, 96 percent comprised revenue or current expenditure, and the rest comprised capital expenditure.
 - Of the total household health expenditure, out-of-pocket payments for medical care comprised 98.4 percent, health insurance premiums comprised 1.5 percent, and the rest comprised donations from voluntary agencies.
 - Alternatively, total household health expenditure comprised 66.2 percent of out-patient care, 17.8 percent of in-patient care, 8 percent for delivery, and rest for abortion, immunization, health insurance premium etc.

In the light of the above descriptions of the Indian macroeconomy, construction of NTA in 1999-00 is attempted below.

3. CONSTRUCTION OF INDIA'S NTA 1999-00

Construction of India's first NTA is attempted for the accounting period 1999-00 and at the national level of aggregation. This construction is limited to the Flow Account. This Account measures all flows during the prescribed accounting period. Estimation of lifecycle deficit (LCD) and age allocations is essential for construction of the Flow Account. This estimation involves four sequential steps: (a) Estimation of aggregate control variables (aggregate income and consumption); (b) Estimation of age allocation of aggregate control variables; (c) Estimation of lifecycle deficit (LCD) by age groups and overall age groups, as a basis for estimation of age allocations; and (d) Estimation of age allocations by public and private asset allocations and transfers.

3.1. Estimation of aggregate control variables

The variable and measurement descriptions of India's aggregate controls for income and consumption are summarized in **Table 4**. This is based on the NTA's general methodology. India's National Accounts Statistics (NAS) is the official source of basic data for all aggregate control variables.

Table 5 presents the estimation results of aggregate labour and asset income. To gain further insights, the estimated incomes are disaggregated by their components. Of the total labour income, the share of compensation of employees is the highest (53.81). Labour share of mixed income accounts for 46.14 percent in the total labour income. Thus, net compensation from the rest of the world (ROW) is negligible. On the other hand, noteworthy components of assets income include (a) almost equal share of household and non-household operating surplus (about 45 percent) and (b) subsidies (10.70 percent).

Table 4: Definition and measurement of aggregate control variables

Aggregate control variable	Measurement of aggregate control variable
1. Aggregate income	
1.1. Labour income	Compensation of employees + (2/3) of mixed income + net compensation of employees from the rest of world (ROW)
1.2. Asset income	Operating surplus of non-household sector + (1/3) of mixed income of household sector + net property and entrepreneurial income from ROW - subsidies
2. Aggregate consumption	
Public	Government Final Consumption Expenditure (GFCE)
Private	Private Final Consumption Expenditure (PFCE)
2.1. Education consumption	
Public	Expenditure on education under GFCE
Private	Expenditure on education under PFCE
2.2. Health consumption	
Public	Expenditure on health under GFCE
Private	Expenditure on medical care and health services under PFCE
2.3. Consumption Other	
Public	Expenditure on non-education and non-health under GFCE
Private	Expenditure on non-education and non-medical care and health services under PFCE

Notes: (1) Private other consumption includes general public services; defense; social security and welfare services; housing and other community amenities; cultural, recreational, and religious services; economic services (e.g. agriculture, mining, transport, and communication). (2) Public other consumption includes food and beverages, clothing and footwear; fuel and power; furniture, furnishing, appliances, and services; transport and communication; and recreation and cultural services. (3) All private consumption is defined net of consumption (indirect) taxes.

Table 5: Estimated aggregate labour and asset income variables in India's NTA, 1999-00

Aggregate control for income variable	Estimated value [Rs. in crore at current prices]
1. Labour income	1082291 (100.00)
• Compensation of employees	582357 (53.81)
• (2/3) of mixed income	499345 (46.14)
• Net compensation of employees from ROW	589 (0.05)
2. Total asset income	435172 (100.00)
• Operating surplus of non-household sector	248105 (57.01)
• (1/3) of operating surplus of household sector	249672 (57.37)
• Net property and entrepreneurial income from ROW	-16020 (-3.8)
• Subsidies	46585 (10.70)

Note: (a) One crore is equal to 10 million. (b) Figures in parentheses are percent to total labour or asset income.

Source: National Accounts Statistics 2005, Central Statistical Organization, Government of India (New Delhi).

Table 6 presents the estimation results of aggregate consumption by public and private education consumption, health consumption, and consumption other. The results reveal three insights. First, within public (or private) consumption, share of education (or health) consumption is higher than the consumption of health (or education). Second, consumption other is highest within public and private consumption. In particular, the share of consumption other within private consumption is higher than within public consumption. Third, within total education (or health) consumption, public (or private) consumption is higher than the private (or public) consumption. Fourth, within total consumption other, private consumption is remarkably higher (83.11 percent) than the public consumption (16.84 percent).

Table 6: Estimated aggregate consumption variables in India's NTA, 1999-00

Variable	Estimated public consumption [Rs. in crore at current prices]	Estimated private consumption [Rs. in crore at current prices]	Estimated total consumption [Rs. in crore at current prices]
Education	41189 (16.40) [19.36]	22209 (2.12) [80.64]	63398 (4.89) [100.00]
Health	15924 (6.34) [64.97]	69400 (6.63) [35.03]	85324 (6.58) [100.00]
Others	193995 (77.26) [16.84]	954471 (91.24) [83.11]	1148466 (88.54) [100.00]
Total consumption	251108 (100.00) [18.66]	1046080 (100.00) [81.34]	1297188 (100.00) [100.00]

Note: (a) One crore is equal to 10 million. (b) Private consumption is net of indirect/consumption taxes. (c) Figures in parentheses are percent to column's total. (d) Figures in square brackets are percent to row's total.

Source: National Accounts Statistics 2005, Central Statistical Organization, Government of India (New Delhi).

3.2. Estimation of age profiles of aggregate control variables

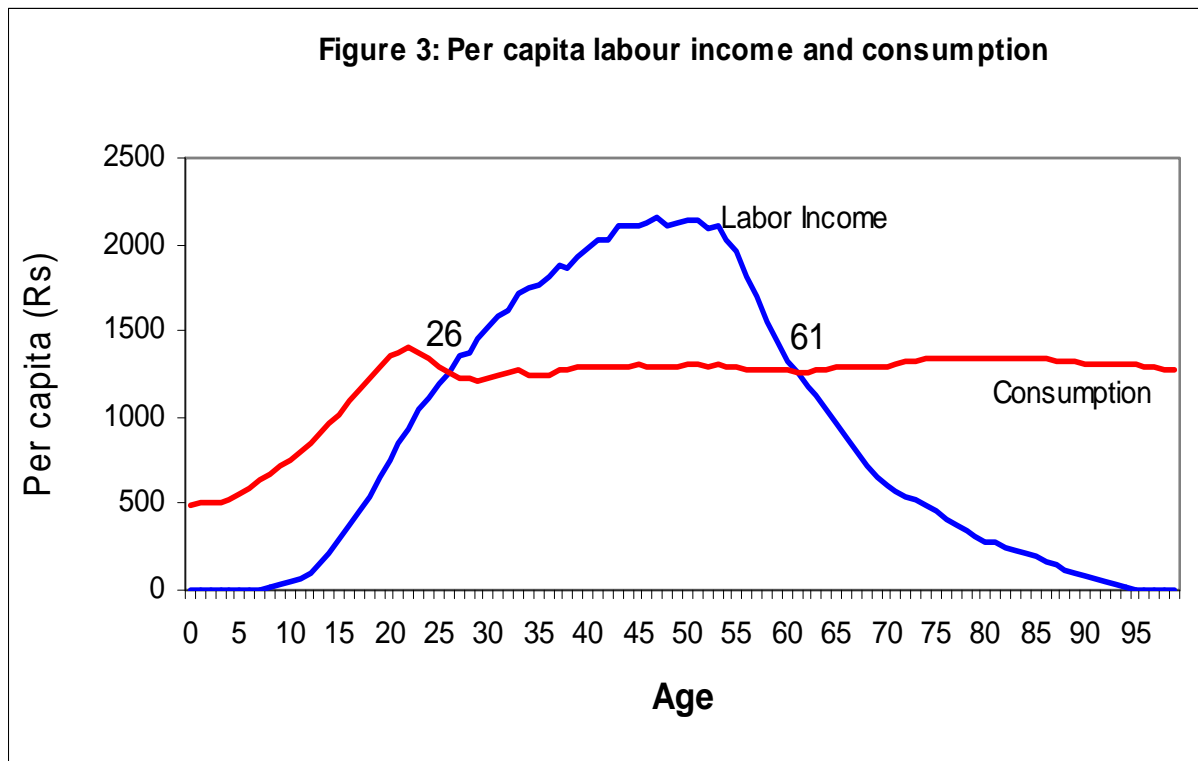
Contributors and beneficiaries of income and consumption are different by their age groups. This implies that the methodology for age allocation should be distinguished by components of income and by public and private consumption, conditional upon the institutional arrangements and availability of data.

Methods and database for age allocation of aggregate controls are described in **Annexure 1** and **Annexure 2**. In essence, India's NTA applies the NTA's general methodology and develops specific methods due to unique institutional arrangements and data limitations. For instance, NTA's regression technique is applied for age allocation of private education and health consumption (regression approach), and consumption other (equivalence scale); and to scale up age allocation of consumption to national level.

Age allocation of public consumption of health and education, and consumption other are based on the rules developed specifically in the context of India's NTA. This specificity may account for an essential difference in age allocation of aggregate control variables between the Indian NTA and other countries' NTA.

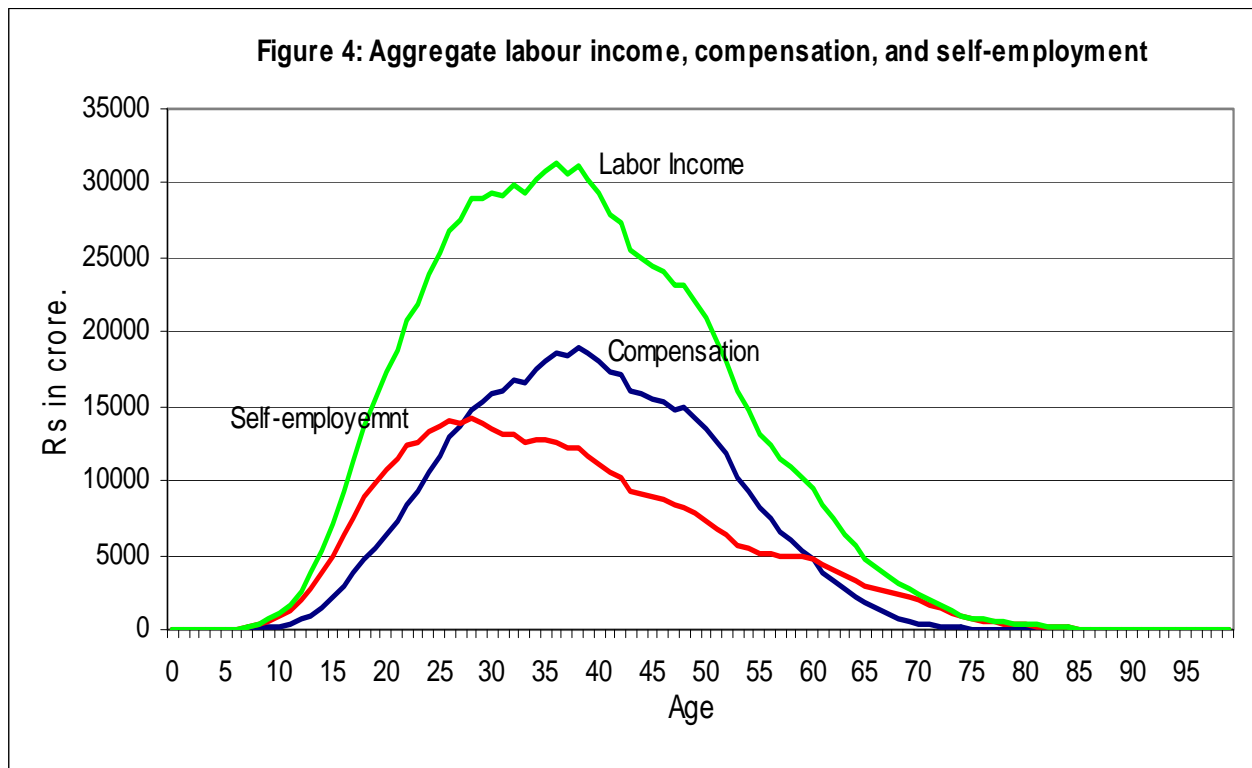
Age profiles of labour income and consumption per capita are presented below. To gain further insights, age profiles of public and private consumption are decomposed by education, health, and consumption other below.

Figure 3 presents the age profile of per capita labour income and consumption. Labour income increases rapidly and then slowly, peaking in the early or mid 40's. People aged 60 and over account for a substantial portion of aggregate labour income. Thus, India's age profile of aggregate labour income shares the characteristics of both Type II (e.g. France, Australia, and Taiwan) and Type III (e.g. Japan) earning profiles in Lee et al (2003b).



Labour income profile in **Figure 3** captures two special features of India's labour market. First, there is prevalence of child labour. This is evident by labour income below the age of 15. Second, due to prevalence of self-employment, especially in agriculture and service sectors, labour profile extends beyond 60 years. People continue to work in self-employment as long as they can, since there is no compulsion to retire from work. Poverty and lack of social security are the main reasons for old age workers in India.

Figure 4 separate out the labour income from self-employment income and compensation. Self-employed people belong to unorganized and informal sectors, mainly characterized by social security arrangements. In spite of excluding self-employed, substantial labour income is earned by people beyond the age of 60. This is due to the prevalence of agricultural workers and casual labourers, who are hired without age limit.



According to the United Nations World Population Ageing 2007 [United Nations (2007)], India's labour force participation rate at 65+ is equal to 29.6 percent (11.7 percent for females, and 50.1 percent for males) in 2007. This is projected to marginally decline in 2020 to 27.3 percent (11.6 percent for females and 45.1 percent for males). Thus, India's elderly may be expected to continue to have an appreciable share in total labour income in future.

Per capita consumption in **Figure 3** rises very fast up to the age 20 and then stabilizes throughout. The rise in consumption is contributed by both public and private consumption. This is evident in **Figure 5**. In addition, it is apparent that the size of per capita private consumption is remarkably higher than that of per capita public consumption.

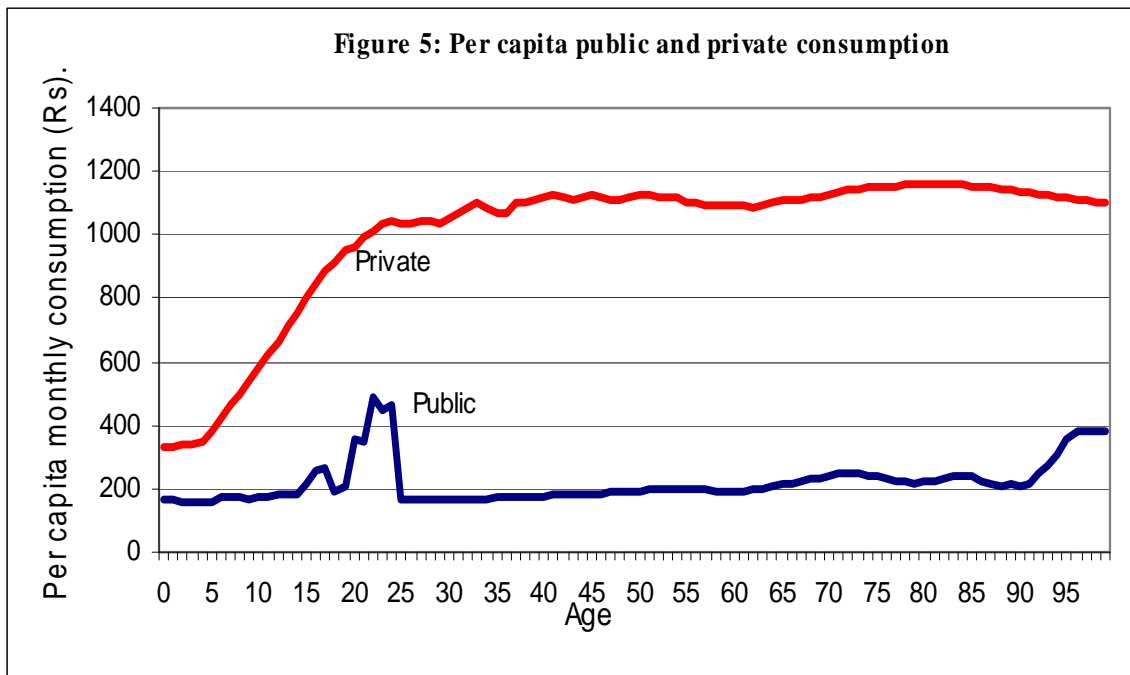
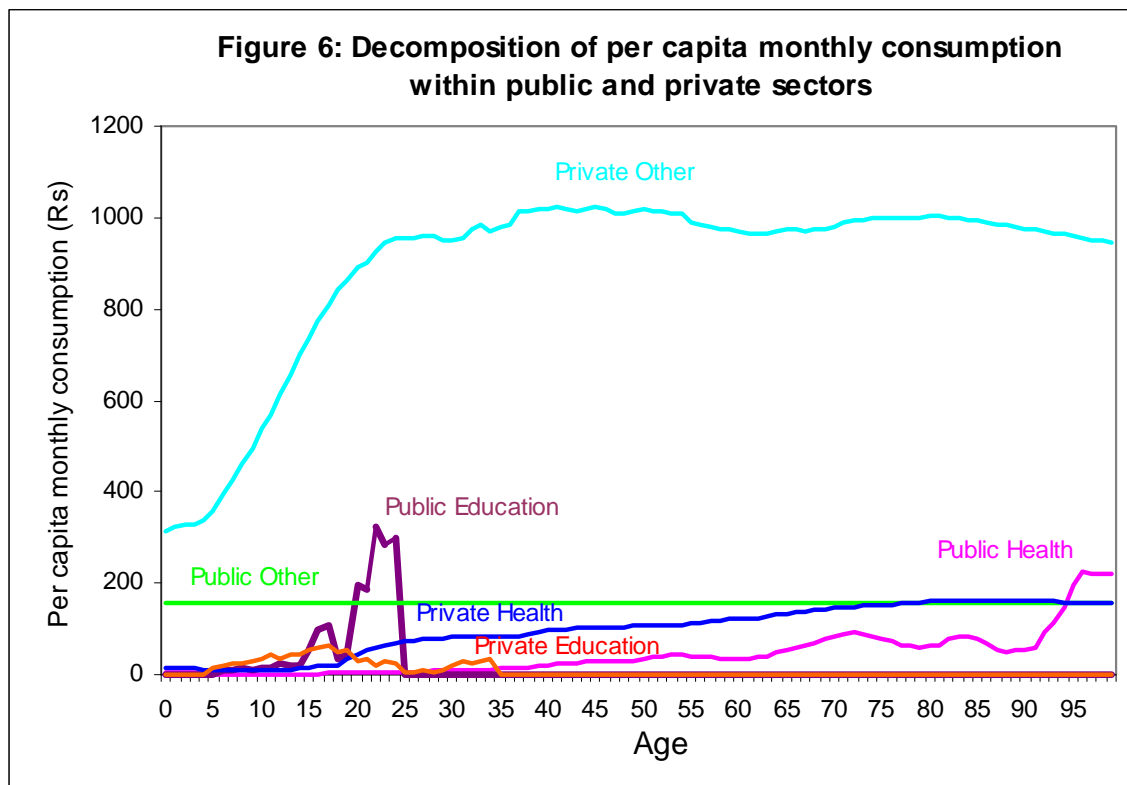


Figure 6 presents the age profiles of per capita consumption by education, health and consumption other. Age profile of public education consumption has a steep rise as well as a decline, mainly due to presumed uniformity of consumption within each levels of education. This is in contrast with the age profile of private consumption which has a flatter shape. Age profile of health consumption, throughout, remains higher than the public consumption. Both public and private health consumption rises for the old age groups. These health profiles are in contrast with the age profile of education consumption. Age profile of public consumption other is horizontal line, reflecting uniform per capital consumption in all age groups. This is because public consumption other is allocated on equal per capita basis. This profile is in contrast with private consumption other which used equivalent scales for allocation of consumption. In short, the above decompositions show remarkable variations in age profile of aggregate public and private consumption due to different allocation rules for public and private education consumption, health consumption, and consumption other.



3.3. Estimation of lifecycle deficit (LCD)

Table 7 presents the estimated LCD in India's NTA 1999-00, disaggregated by 6 age groups and by public and private consumptions.

Table 7: Estimated life cycle deficit in India's NTA, 1999-00

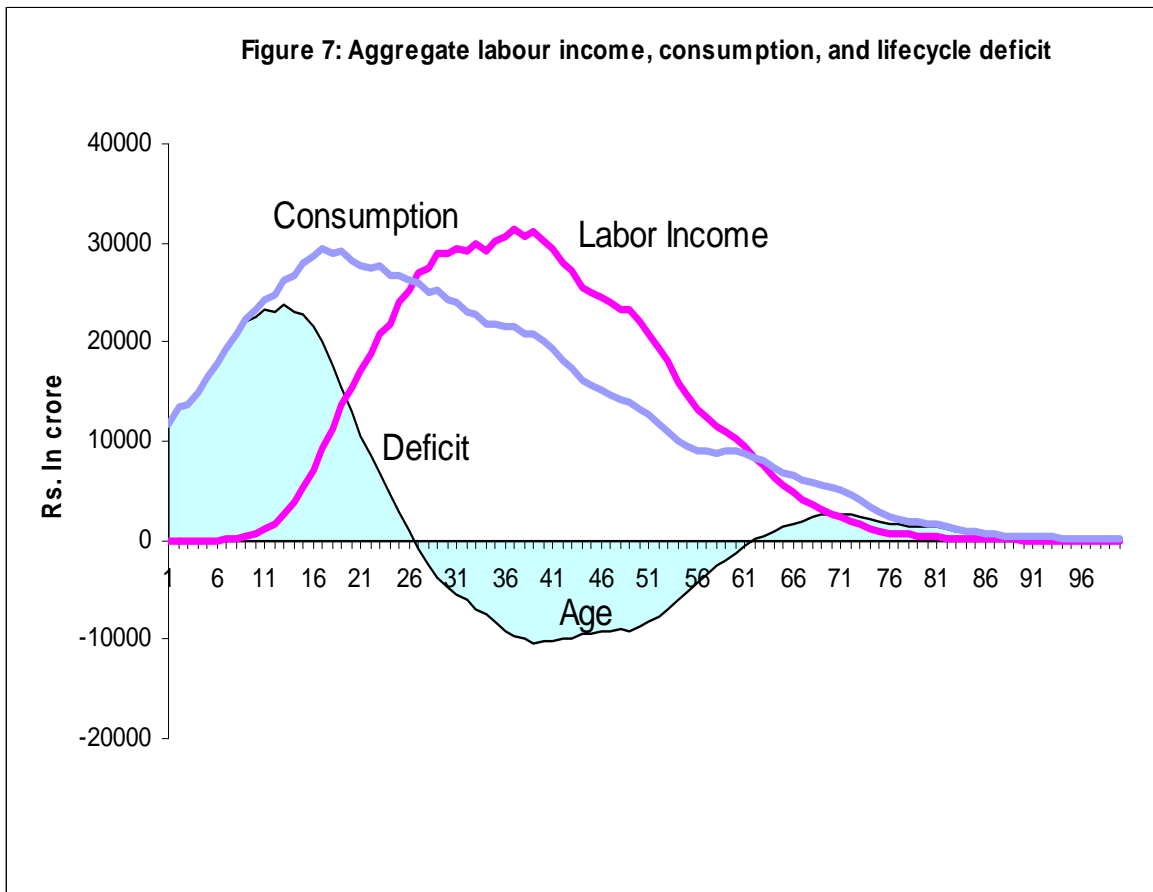
LCD indicators (Rs.in crore at current prices)	Age groups of population (years)					
	Total	0-19	20-29	30-49	50-64	65+
Lifecycle deficit (LCD)	214898	371439	21172	-176502	-43223	42014
Consumption	1297188	444064	261537	377390	141448	72751
Private consumption	1046080	323868	218495	323611	119773	60333
• Education	22209	15808	4457	1944	0	0
• Health	69400	8147	13826	27076	12536	7815
• Other	954471	299914	200212	294591	107237	52518
Public consumption	251108	120196	43042	53779	21675	12418
• Education	41189	30750	8008	1929	503	0
• Health	15924	1208	1326	5309	4125	3956
• Other	193995	88238	33708	46541	17047	8462
Less: Labour income	1082290	72625	240365	553892	184671	30737

One crore is equal to 10 million.

Source: Authors.

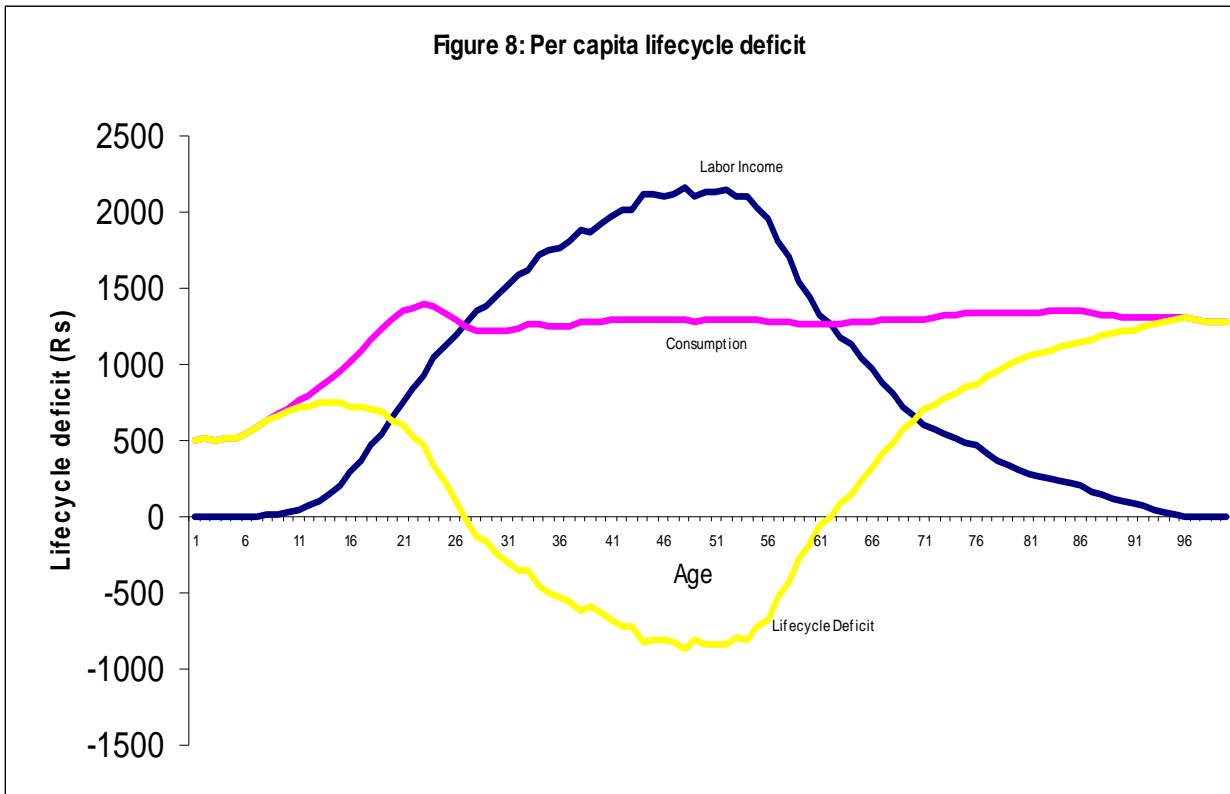
The estimation results offer the following evidence. First, the LCD is evident for all age groups except for working population in the age group of 30-49 years and 50-64 years. Second, the highest LCD is evident for young age dependents (age group 0-19 years) rather than for old age dependents (age group 65+ years). In fact, the LCD in age group 0-19 years is about 9 times higher than for the old age group (65+ years). Third, the deficit age groups call for age reallocations from the surplus age groups to finance their excess consumption over labour income.

Figure 7 presents the age profile of aggregate LCD in India's NTA 1999-00 in terms of the NTA's '*most famous graph in the world*'. In essence, labour income shares increase rapidly and then slowly, peaking in the early or mid 40's. People aged 60 and over account for substantial portion of aggregate labour income. Thus, India's age profile of aggregate labour income shares the characteristics of both Type II (e.g. France, Australia, and Taiwan) and Type III (e.g. Japan) earning profiles in Lee et al (2003b).



Note: One crore is equal to 10 million.
Source: Authors.

Figure 8 presents the per capita age profile of the estimated LCD in India's NTA for 1999-00. India's surplus generating age group is between 26 and 61 years.



Note: One crore is equal to 10 million.

Source: Authors.

3.4. Estimation of age reallocations

Age reallocations aim at determining the nature and magnitude of allocation of resources from surplus age groups to deficit age groups, based on the estimated lifecycle deficit estimations.

Age reallocations in the NTA are distinguished between public sector reallocations and private sector reallocations. Public sector (or general government) age reallocations are divided under public asset-based reallocations and public transfers. In the same way, private sector age reallocations are divided under private asset-based reallocations, private transfers by intra and inter-household transfers, and bequests.

The rules for age reallocations are different between public and private age reallocations as well as within different components of public and private sectors age reallocations. Thus, these age reallocations are separately discussed below.

3.4.1. Public sector age reallocations

Public sector uses different instruments to effect inter-generational allocation of resources. These instruments include revenue instruments (e.g. explicit and implicit taxes, and borrowing or debt) and expenditure instruments (e.g. expenditures on provisioning of services and production of goods, subsidies, cash payments, and investment or creation of capital). Under the NTA, these instruments are reclassified under public asset reallocations and public transfers. Aggregate controls and age allocation rules differ between these two public age reallocation methods. Hence, the nature and magnitude of age reallocations differ between the methods. These results are presented below.

Aggregate controls and age allocations rules for public asset based reallocations in India's NTA are presented in Annexure 3 and for public transfers in **Annexure 4**. **Table 8** presents the estimation results for public sector age reallocations in India's NTA 1999-00.

Table 8: Public age reallocations in India, 1999-00

Public age reallocations (Rs. in crore at current prices)	Age groups					
	Total	0-19	20-29	30-49	50-64	65+
Asset-based reallocations	-21334	-1134	-6932	-13445	-1382	1559
• Income on Assets	-2707	-19233	-9537	7788	11279	6996
• Less: Saving (including net public bequests)	18627	-18099	-2604	21233	12660	5437
Public transfers (inflows - outflows)	0	37448	5475	-51500	-4277	12853
Inflows	303989	110568	61661	56568	40601	34590
• In-kind transfers	251109	110515	60615	51363	19202	9413
• Cash transfers	52880	53	1046	5205	21399	25177
Outflows	303989	73121	56186	108068	44878	21737
• Direct and indirect taxes	231340	55646	42758	82241	34153	16542
• Other revenues	72649	17475	13428	25827	10725	5195

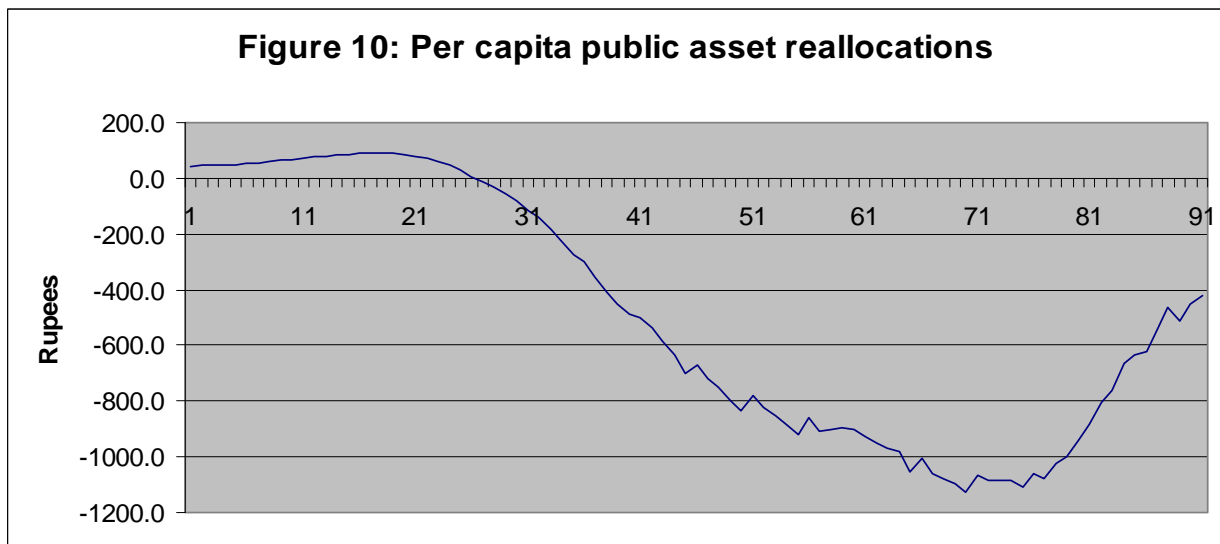
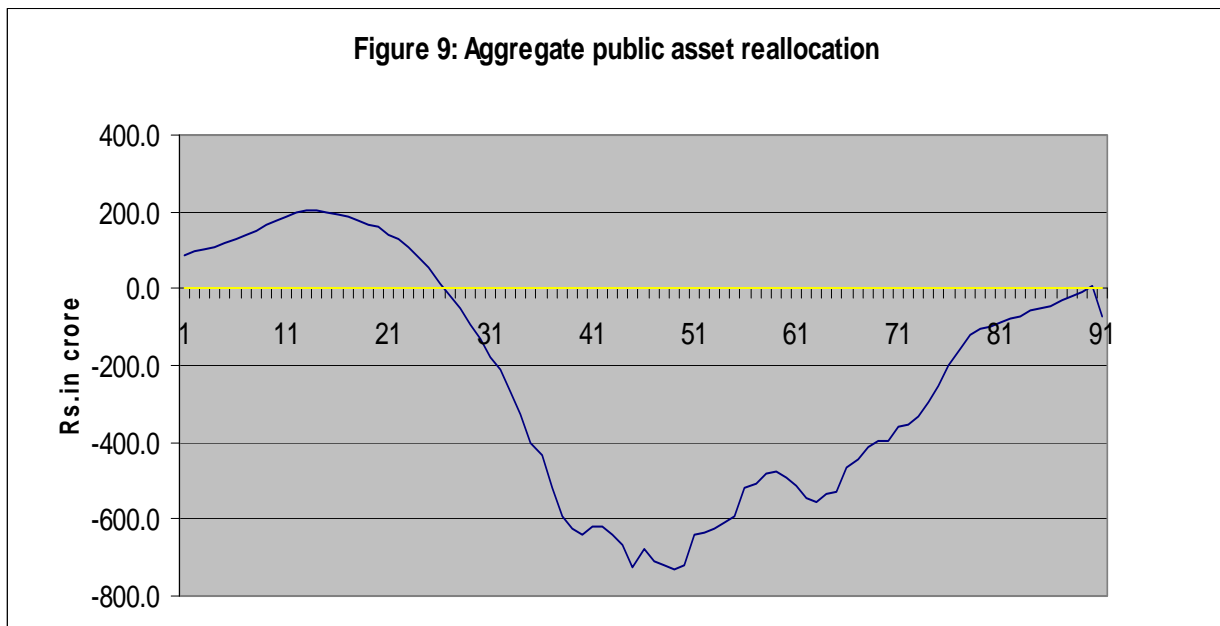
One crore is equal to 10 million.

Source: Authors.

Public asset-based reallocations are negative (i.e. savings exceed asset income) for all age groups except for old age group (65+). This result is mainly driven by the inclusion of public bequests into savings. For instance, if public bequests are deleted from the savings, public asset reallocation would equal to Rs.3163 crore for 0-19, Rs.227 for 20-29, -Rs.11029 crore for 30-49, -Rs.8249 crore for 50-64, and -Rs.4891 crore for 65+. Following the NTA methodology, public bequests (both public capital and credit) are age allocated based on the general tax profiles that includes direct and indirect taxes. As consumption taxes are paid by all age groups, public bequests are age allocated for all age groups in proportion of their share in total taxes. It should be emphasized that, excluding

the public bequests, the nature of public asset reallocations for India are the same as that of Taiwan for 1998 [see, for instance, Table 2 in Mason et al (2006)]. That is, larger outflows during the working ages (especially, surplus generating age groups) and larger inflows to younger deficit age groups.

The age profiles of aggregate and per capita public asset reallocation without bequests are presented in **Figure 9** and **Figure 10** below.



Public transfers show interesting patterns across age groups. Public transfers (i.e. inflows minus outflows) are positive for all lifecycle deficit age groups (0-19, 20-29, and 65+) and negative for lifecycle surplus age groups (30-49 and 50-64). Public transfers to younger age group are about 3 times higher than to the older age group. Public transfer inflows are highest for younger age group, and about 12 times higher than for old age group. As in the case of public asset-based reallocations, the nature of reallocations based on public transfers in India is similar to that Taiwan in 1998.

The largest burden of financing public transfers in India falls on the age group 30-49 (about 36 percent), for whom the net public transfers are -9.30 percent of labour income. On the other hand, the burden on age group 50-64 is 14.76 percent, but the share of net public transfers in labour income is only -2.32 percent. This is in contrast with both Taiwan and USA where the public transfers financing age groups have higher net public transfers to labour income. To quote Mason et al (2006): *“In Taiwan, the burden of financing public transfers falls a little more heavily on those aged 30-49, for whom net public transfers are -13.5% of labor income, than on those aged 50-64, for whom net public transfers are -11.4% of labor income. In the US, the opposite is true: the burden falls slightly more heavily on those aged 50-64, for whom net public transfers are -22.7% of labor income, than on those 30-49, for whom net public transfers are -21.6% of labor income”* (p.32).

The age profiles of aggregate and per capita public transfers are presented in **Figure 11** and **Figure 12** below.

Figure 11: Aggregate net public transfer

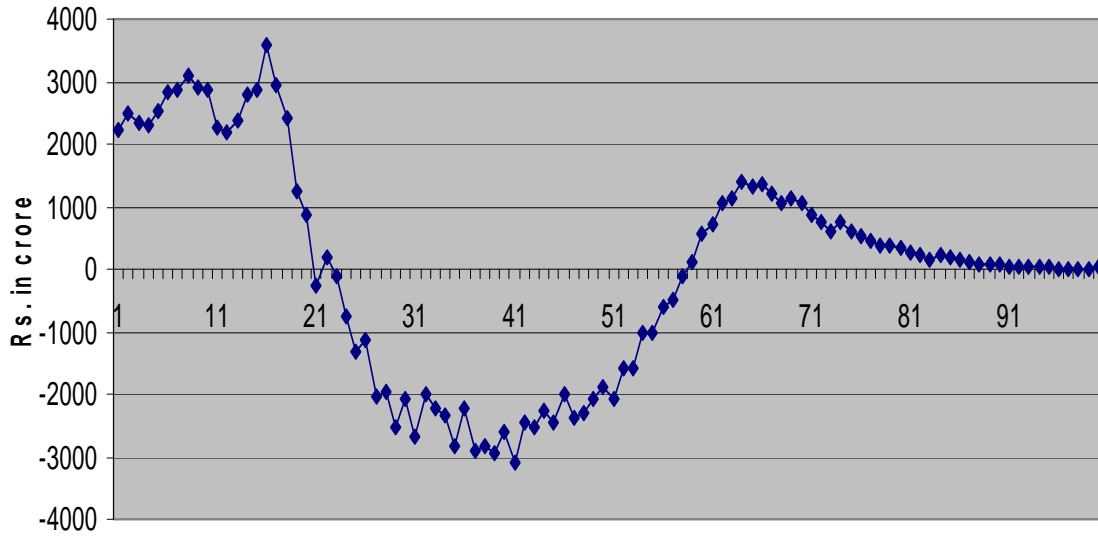
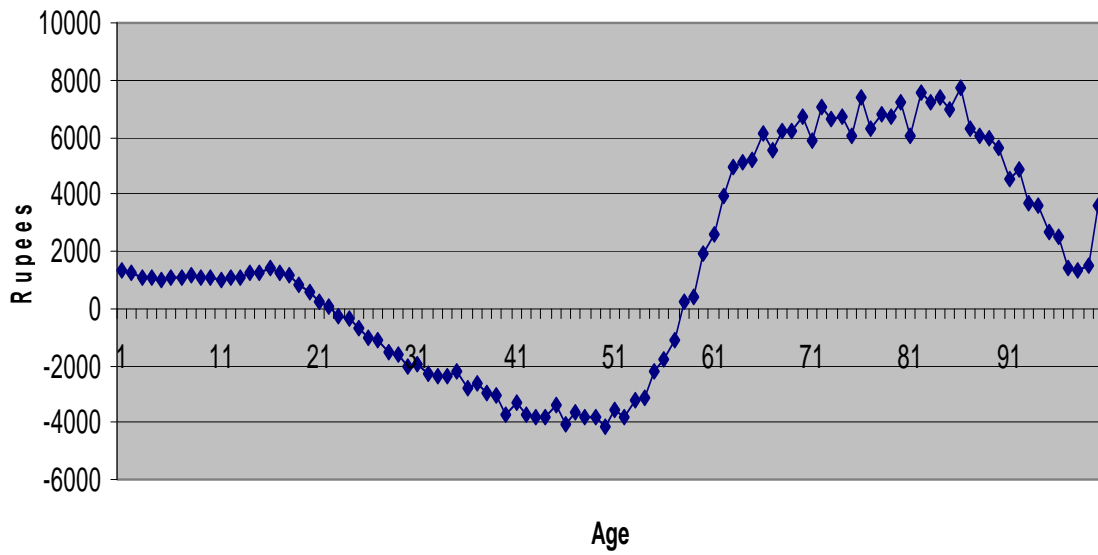


Figure 12: Per capita net public transfer



3.4.2. Private sector age reallocations

Aggregate controls and age allocations rules for private transfers by intra-household and inter-household transfers are presented in **Annexure 5**. **Table 9** presents the estimation results for private transfers in India's NTA 1999-00.

Table 9: Private age reallocation in India, 1999-00

Private age reallocations (Rs. in crore at current prices)	Age groups					
	Total	0-19	20-29	30-49	50-64	65+
Private transfers	203883	294291	23665	-143600	-29539	59065
• Intra-household	150751	294103	21463	-158079	-42597	35860
• Inter-household	53132	188	2202	14480	13058	23204
Asset reallocations	32349	40833	-1036	32043	-8026	-31463
• Income on Assets less saving	32349	40833	-1036	32043	-8026	-31463

One crore is equal to 10 million

Source: Authors

The largest private transfers are received by the younger dependents, mainly by the intra-household or familial transfers. Inter-household transfers account for substantial share in the total private transfers to older dependents. This is because the recipients of inter-household transfers are head of household, and older parents continue to be the head in rural parts of India.

The National Sample Survey Organization collected data on the employment-unemployment and consumer expenditures from independently selected sample survey of households in 1999-00. This resulted in incompatibility between these two sources of survey data for estimation of asset reallocations and bequests. Thus, results for private asset reallocations in Table 9 are estimated as a residual.

The age profiles of aggregate and per capita intra-household transfers are presented in **Figure 13** and **Figure 14** below.

Figure 13: Aggregate net intra-household transfer

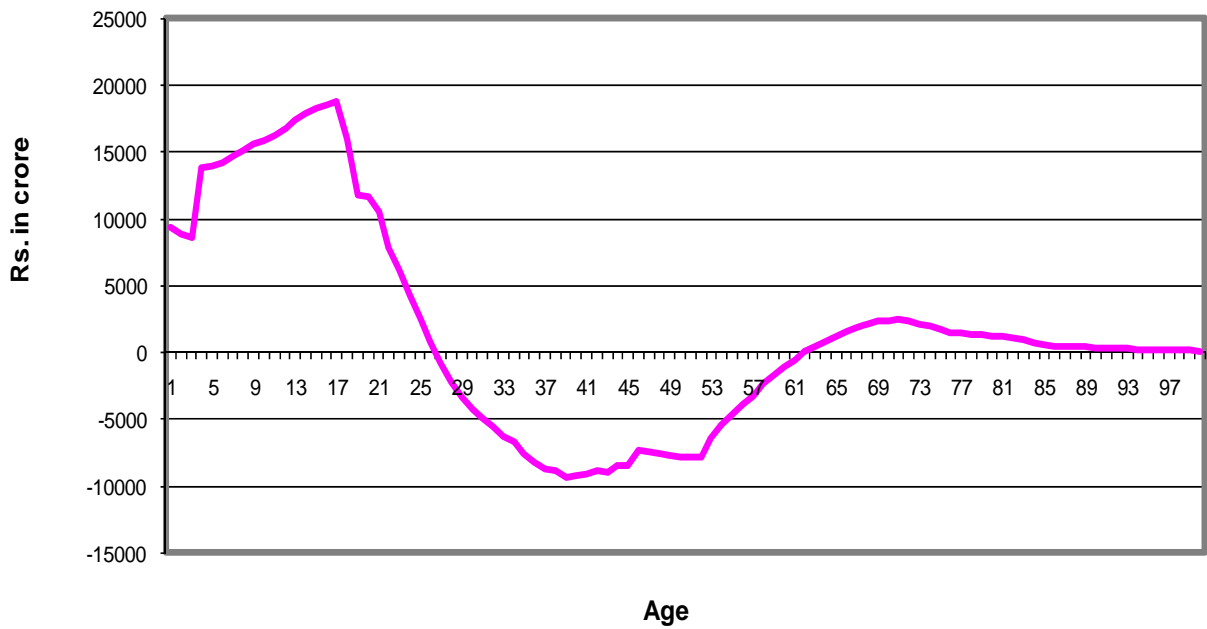
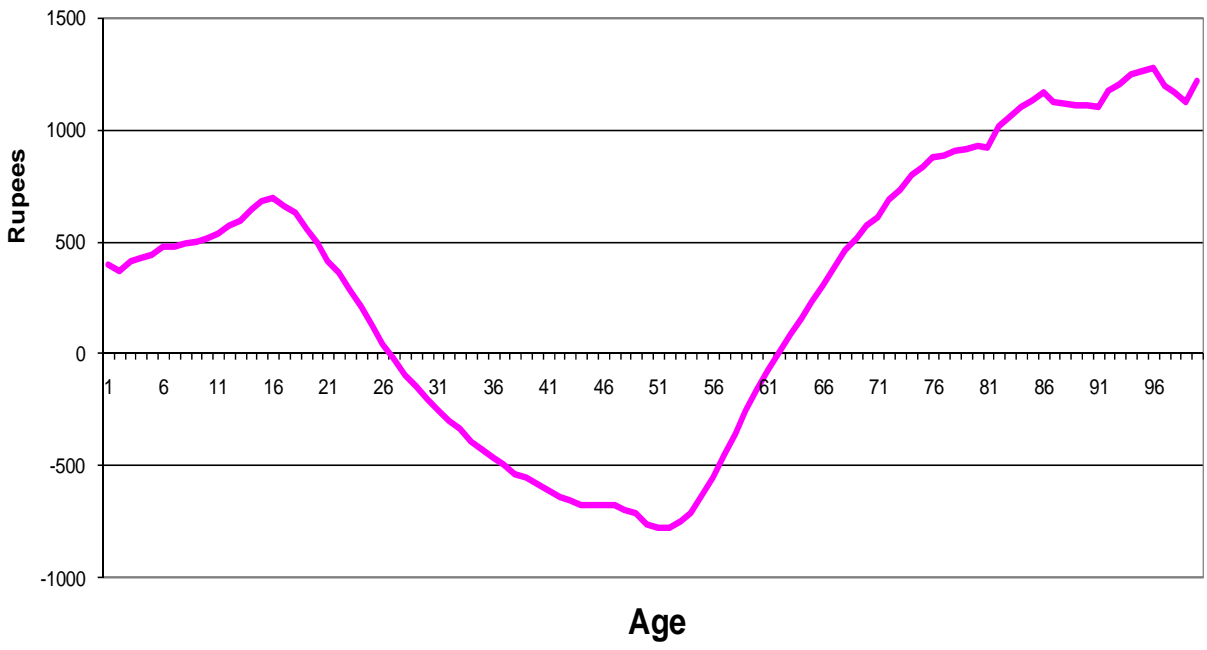


Figure 14: Per capita intra-household transfers



3.5. Financing consumption of deficit age groups

Table 10 presents the different methods of financing consumption by three lifecycle deficit age groups in India. Transfers are the most important source of consumption for the young deficit age group, especially the private transfers. Labour income and private asset reallocations finance are the largest sources of financing consumption of the age group 20-29. For the elderly, public sector reallocations, private transfers, and labour income are the major sources of consumption. Thus, all the instruments are of importance for inter-generational reallocation of resources in India, although specific instruments are relatively more important for particular age groups. The results in **Table 10** are useful in distinguishing the relative importance of different instruments for different deficit age groups. Accordingly, selective policy interventions are plausible for specific age groups.

Table 10: Financing consumption for deficit age groups in India's NTA 1999-00

Sources of finance	Percent of total consumption		
	0-19	20-29	65+
Labour income	16.35	91.90	42.25
Public sector age reallocations	8.18	-0.56	19.81
• Public asset reallocations	-0.26	-2.65	2.14
• Public transfers	8.43	2.09	17.67
Private sector age reallocations	75.47	8.65	37.94
• Private asset reallocations	9.20	-0.40	-43.25
• Private transfers	66.27	9.05	81.19

Source: Authors

As compared to financing of consumption of young and old dependent age groups in Taiwan and USA in Mason et al (2006), the results for India show interesting differences. First, higher share of labour income in both dependent age groups; lesser share of public transfers in both dependent age groups; higher inter vivos transfers for old dependents;

higher inter vivos transfers than in USA but less than in Taiwan for young dependents; and lesser asset based reallocations for both young and old dependents.

3.6. Complete India's NTA 1999-00

Table 11 summarizes the complete estimates of Flow Account of India's National Transfers Account 1999-00.

Table 11: Flow Account of National Transfers Account for India, 1999-00

LCD indicators (Rs.in crore at current prices)	Age groups of population (years)					
	Total	0-19	20-29	30-49	50-64	65+
Lifecycle deficit	214898	371439	21172	-176502	-43223	42014
Consumption	1297188	444064	261537	377390	141448	72751
• Public	251108	120196	43042	53779	21675	12418
• Private	1046080	323868	218495	323611	119773	60333
Less: Labour income	1082290	72625	240365	553892	184671	30737
Age Reallocations						
Asset-based Reallocations						
Public	-21334	-1134	-6932	-13445	-1382	1559
• Income on Assets	-2707	-19233	-9537	7788	11279	6996
• Less: Public Saving	18627	-18099	-2604	21233	12660	5437
Private	32349	40833	-1036	32043	-8026	-31463
• Income on Assets less saving	32349	40833	-1036	32043	-8026	-31463
Transfers						
Public	0	37448	5475	-51500	-4277	12853
Private	203883	294291	23665	-143600	-29539	59065
• Intra-household	150751	294103	21463	-158079	-42597	35860
• Inter-household	53132	188	2202	14480	13058	23204

One crore is equal to 10 million.

Source: Authors.

3.7. Conclusions, implications and extensions

India has both advantages and challenges of its age structure transition. Advantages may be in the form of demographic dividends with growth implications. Challenges are in the form of meeting with social security needs of both young and old age dependents with distributional implications. Indian policy makers are aware of these demographic advantages and challenges, although no quantitative estimates of their implications on macroeconomic growth and equity are available. In this context, construction of NTA for India is a policy imperative. Its results are useful to design and implement long run macroeconomic policies for economic growth, inter-generational equity, and poverty alleviation, as they are related to recent and projected age structure transitions.

Construction of NTA is new for India. This report made a beginning in this construction by estimation of Flow Account for 1999-00. The preliminary estimation results lead to the following preliminary conclusions and implications.

India's aggregate labour and asset income are remarkably contributed by the enterprises in the unorganized and informal sector in the form of labour and capital share of mixed income. This result shares the characteristics of a developing country. On the other hand, age profile of aggregate labour income resembles the characteristics of developed countries, such as, France and Japan.

India's health and education consumption contrasting shares in aggregate public and private consumption. Share of public education consumption (16.40 percent) exceeds the share of private education consumption (2.12 percent). In contrast, share of health consumption is comparable (about 6 percent) in both aggregate public and private consumption. Of the total consumption of education (or health), public (or private) consumption is higher than the private (or public) consumption. The institutional factors and limitations of databases lead to specific methods for age allocation of public consumption of health and education. This is contributory for the uniqueness of India's

age profiles of public consumptions in particular, and aggregate private consumption in general.

India's LCD is highest for young age dependents (age group 0-19 years) rather than for old age dependents (age group 65+ years). In fact, the LCD in age group 0-19 years is about 9 times higher than for the old age group (65+ years). Life cycle surplus is higher in the age group of 30-49 years than 50-64 years.

Age reallocation results offer evidence for transfers as the most important source of consumption for the young deficit age group, especially the private transfers. Labour income and private asset reallocations finance are the largest sources of financing consumption of the age group 20-29. For the elderly, public sector reallocations, private transfers, and labour income are the major sources of consumption. These results imply all the instruments are of importance for inter-generational reallocation of resources in India, although specific instruments are relatively more important for particular age groups. Nevertheless, from the viewpoint of designing inter-generational equity policies, the results imply for selective policy inventions by instruments.

India's NTA research has many possibilities for future extensions with potential policy implications. These extensions include the following research activities.

1. Construction of NTA for India for 1987-97 and/or 1993-94, and for 2004-05. These new constructions will provide with time-series estimates and temporal comparisons of life-cycle deficits and age reallocations with policy implications for long term intergenerational equity, and dynamics of economic growth.
2. Using the time series estimates above, economic-demographic effects of age-structure transitions on economic growth may be estimated by Demographic Dividends or Economic Support Ratios with a focus on formulation of macroeconomic public support policy for ageing.
3. Dissemination of India NTA research outcomes through networking of Indian policy makers and researchers

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ANNEURE 1

Data and variable descriptions for estimation of lifecycle deficit in India's NTA, 1999-00

Table A1: Age allocation of aggregate control variables in India's NTA, 1999-00

Aggregate control variable	Age allocation rule	Data source
1. Aggregate labour income	<ul style="list-style-type: none"> • Allocated according to the age profiles of wages and salaries of employed persons • Survey data comprised non-reported values for self-employed household persons in agricultural sector. These zero values were replaced by the average value of wages and salaries of all workers in their respective sample districts. • Labour income is separated by wage employment, compensation, and self-employment 	Employment and Unemployment in India, 1999-00 , National Sample Survey 55 th Round (July 1999 –June 2000), National Sample Survey Organization, Government of India (New Delhi)
2. Education consumption		
Public	<ul style="list-style-type: none"> • Using the combined revenue expenditure of Education and non-Education Departments in the Central and State Government, share of public education consumption is estimated by levels of education (i.e. primary education, secondary education, higher education, and training and adult education). • Enrolment in public (or government) education institutions is estimated by applying the National Sample Survey data on attendance rates by levels of education. • Using the estimated expenditure shares and enrolment, total public education consumption is estimated by levels of education. 	Data are drawn from different sources, and combined to generate public education consumption by levels of education, as detailed in Appendix 2
Private	Allocated by applying the NTA's regression approach [NTA (2006)], and by using age profile of private (out-of-pocket) education expenditure by household persons.	Household Consumer Expenditure in India 1999-00 , National Sample Survey 55 th Round (July-December 1999), National Sample Survey Organization, Government of India (New Delhi)

Table A1: Age allocation of aggregate control variables in India's NTA, 1999-00 (Continued)

Aggregate control variable	Age allocation rule	Data source
3. Health consumption		
Public	<p>India's total public expenditure (on revenue account) by all levels of governments in 2001-02 are divided between public health and others (includes family welfare programmes, but excludes expenditure on medical education, training, and research, and mass education as they are included under public education consumption). The shares of these expenditures are considered equal to their shares in public health consumption.</p> <p>Allocation rule is distinguished by public health and non-public health consumption.</p> <p>First, using data on age and out of pocket expenditure for out-patients and in-patients who utilized public health facilities, the estimated age pattern of expenditure for out-patients was flatter, and approximately U-shape for in-patients. Given the merged data of out and in patients, age profiles were closer to U-shape. Consequently, the merged age pattern has been used for age allocation of public consumption of health. For lack of data, merged age pattern in 2004 is used (as an approximation, however) for estimation of age allocation of public health consumption in 1999-00.</p> <p>Second, non-public health consumption is allocated on per capita basis.</p>	<p>1. National Health Account India 2001-02, National Health Accounts Cell, Ministry of Health and Family Welfare, Government of India (New Delhi): December 2005</p> <p>2. Morbidity, Health Care and the Conditions of the Aged, National Sample Survey 60th Round (January-June 2004), National Sample Survey Organization, Government of India (New Delhi)</p>
Private	<p>NTA's regression approach [NTA (2006)] is adopted for age allocation of household education expenditure.</p>	<p>Household Consumer Expenditure in India 1999-00, National Sample Survey 55th Round (July-December 1999), National Sample Survey Organization, Government of India (New Delhi)</p>

Table A1: Age allocation of aggregate control variables in India's NTA, 1999-00 (Continued)

Aggregate control variable	Age allocation rule	Data source
4. Consumption Other		
Public	Allocated on per capita basis for the entire population.	Census of India 2001: Table C13 India , Office of Registrar-General and Census Commissioner, Government of India (New Delhi)
Private	Allocated by the technique of Equivalence Scale, and distinguished by food and non-food consumption. Individual food consumption of members in a household is assumed to be proportional to an equivalence scale that is taken as 0.4 for children below 4 years of age, then increases linearly from 0.4 to 1 for individuals between 4 and 20 years and assumed to be constant at 1 thereafter for individuals 20 years and above. The same equivalence scale for food consumption is used for age allocation of non-food consumption, excluding housing and durables.	Household Consumer Expenditure in India 1999-00 , National Sample Survey 55 th Round (July-December 1999), National Sample Survey Organization, Government of India (New Delhi)

Notes: (1) All age allocation based on equivalent scale, regression method and direct age data from surveys are smoothed by Lowess. In case of age allocation on per capita basis, simple moving average is used for smoothing. (2) To scale the age allocation of consumption to the national level, the population weighted procedure and adjusted age allocation is computed: $C_{ix}^a = (AC)_x \frac{C_{ix} N_i}{\sum C_{ix} N_i}$, Where C_{ix} is the unadjusted age allocation for sector x for age i and N_i is population of age i, taken from the population census. $(AC)_x$ is national level aggregate control.

Source: Authors.

ANNEXURE 2

Data sources and variable descriptions for age allocation of public education consumption in India

Data requirements for age allocations are enrolment of students in public institutions by levels of education. Data sources by variables and methods for generation of the required data are as follows.

Enrolment of students by levels of education and by public institutions

Enrolment data by primary, secondary, and higher education is published in the Selected Educational Statistics (Ministry of Human Resource Development, Government of India). This data does not distinguish the enrolment of students by public (or Government) and private (or non-government) education institutions. To overcome this limitation, attendance data in educational institution in general education (includes general school education from the primary to the higher secondary level, normal university education for a degree including professional education like engineering, medicine and agriculture) is used from a national sample survey, conducted by the National Sample Survey Organization. The estimated attendance rates include higher education and distinguish elementary education by lower and upper elementary education. Accordingly, share of enrolment through attendance by levels of education and by types of institutions can be determined as follows.

Table A2.1 summarizes the attendance of household persons in age group 5-24 by levels of education and by types of institutions from the national sample survey data in 1995-96. We presume that the above shares in 1995-96 remained the same in 1999-00. Within each level of education, we allocated the household persons for public education according to the combined share of Government and Local Body institutions in total attendance within each level of education (**Row 6 in Table A2**). Accordingly, total enrolment of student in government education institutions by levels of education is obtained.

Table A2.1: Attendance by levels of education and types of institution, 1995-96

Unit of measurement: Per 1000 distribution of persons of age 5-24 years pursuing general education by levels of education and by types of institution.

Type of institution and summary indicators	Lower primary education	Upper primary education	Secondary education	Higher education	All education
Age group	6-10 years	11-13 years	14-17 years	18-24 years	6-24 years
1. Government	363 (68.88)	148 (61.92)	105 (54.97)	21 (52.50)	637 (63.89)
2. Local Body	45 (8.54)	20 (8.37)	11 (5.76)	2 (5.00)	78 (7.82)
3. Private aided	53 (10.06)	50 (20.92)	60 (31.41)	14 (35.00)	177 (17.75)
4. Private unaided	66 (12.52)	21 (8.79)	15 (7.85)	3 (7.50)	105 (10.53)
5. Total	527 (100.00)	239 (100.00)	191 (100.00)	40 (100.00)	997 (100.00)
6. Combined share (%) of Government and Local Body in attendance of all institutions within each level of education	77.42	70.29	60.73	57.50	71.72

Note: Figures in parentheses refer to total number of household persons.

Sources: Computed by using the basic data in NSSO (200a) and NSSO (2000b).

Share of public education consumption by levels of education in 1999-00 (Table A2.2) is assumed to be proportional to the share of revenue expenditure by levels of education. Accordingly, the share of public consumption by levels of education is equal to the share of revenue expenditure by levels of education under the (a) Education Department (Column 2 in Table A2.2), or (b) Education Department, and non-education departments on education (Column 3 in Table A2.2), or (c) Education Department and non-Education Department on education and training (Column 3 in Table A2.2). Share of expenditure under (c) is most comprehensive for education expenditure. Hence, it is used as a basis for age allocation of public education consumption.

Expenditure by non-education departments on formal and informal training is considered more relevant for on-job persons. In the same way, expenditure on adult education is relevant for

persons in the age group: 15-59. Thus, (a) expenditure by non-education departments/ministries on formal and informal training, and (b) expenditure on adult education, is allocated for age group 25-59 years on per capita basis.

Table A2.2: Share of revenue expenditure by levels of education, 1999-00

Level of education	Share (%) within Education Department	Share (%) within Education Department and non-education departments on education	Share (%) within Education Department and non-education departments on education and training
1. Elementary education	48	39	36
2. Secondary education	31	26	24
3. Higher education	21 *	35 **	32
4. Training and adult education (25-59 years)			8 ***
Total	100	100	100

* Includes adult education (about 0.36 percent of total expenditure by the Education Department).

** Excludes expenditure on formal and non-formal training by non-education departments.

*** Includes adult education, and formal and informal training

Sources: Computed by using the basic data in Government of India (2003).

In short, the main assumptions for the estimation and age allocation of public education consumption are as follows.

- Share of enrolment in public education institutions (Government and local body schools or colleges) is proportional to the attendance rate of students in public education institutions within each level of education.
- Structure of attendance rate in 1999-00 remained the same as in 1995-96.
- Share of aggregate public education consumption is proportional to share of revenue expenditure on education and training by education and non-education departments of the national and sub-national governments within each level of education.
- Per capita public education consumption is uniform within primary, secondary, and higher education.
- Equal per capita consumption for training and adult education for the population in the age group 25-59 years. Population by single year in Census of India 2001 is used for estimation of per capita consumption of training and adult education.

Using the above methodology, public education consumption by levels of education is estimated as given in Table A2.3.

A2.3: Estimation of age allocation of public education consumption, 1999-00

Institutions	Primary education	Secondary education	Higher education	All levels of education	Training and adult education
Age group	6-13 years	14-17 years	18-24	6-24 years	25-59 years
1. Estimated total enrolment of students in public education institutions	117527160	17256100	4646349	137827052	395658701
2. Estimated total public education consumption (Rs. in million at current prices)	14828	9885	13180	37894	3295
3. Estimated per student or persons public education consumption (Rs. at current prices)	1262	5729	28367	2749	83

Note: Aggregate control for public education consumption is equal to Rs411890 million at current prices.

Source: Estimated by authors.

ANNEXURE 3

Aggregate controls and age allocation rules for public asset-based reallocations in India's NTA 1999-00

Table A3.1: Aggregate controls for public asset-based reallocations in India's NTA 1999-00

Variable	Measurement of variables	Sources
Public Investment Transactions		
• Public net investment(t)	Net domestic capital formation in public sector	Statement 32, National Accounts Statistics 2005: p.96
• Public capital stock (t) (end of year)	Net capital stock in public sector (end of 2000)	Statement 21, National Accounts Statistics 2006; p.48
• Public capital stock (t-1) (end of year)	Net capital stock in public sector (end of 1999)	Statement 21, National Accounts Statistics 2005; p.51
• Other economic flows, capital	NTA Methodology	Revised Estimation of Public AR -NTA Website
• Other economic flows/Capital (t-1)	NTA Methodology	Revised Estimation of Public AR -NTA Website
Public Credit Transactions		
• Interest payment on public debt	Interest on public debt	Statement 4: National Accounts Statistics 2005
• Public lending (t)	Net lending (net savings - net investment)	Statement 32 and 30: National Accounts Statistics 2005
• Public credit (t) (end of year)	Total public debt at the end of 1999-00	Table 8.2.: Indian Public Finance Statistics 2001-02
• Public credit (t-1) (end of year)	Total public debt at the end of 1998-99	Table 8.2: Indian Public Finance Statistics 2001-02
• Other economic flows, credit	NTA Methodology	Revised Estimation of Public AR -NTA Website
• Other economic flows/Credit(t-1)	NTA Methodology	Revised Estimation of Public AR -NTA Website
Other Variables		
• Population (t)	Total population of India as per Census of India 2001	http://www.censusindia.net/t_00_003.html
• Labour income (30-49) per capita	NTA Methodology	Revised Estimation of Public AR -NTA Website

Source: Authors

Table A3.2: Age allocation of aggregate controls for public asset-based reallocations in India's NTA 1999-00

Variable	Age allocation rule	Data source/s
Public Investment Transactions		
• Public net investment(t)	Age profile of general tax revenue (t)	Same as in Table A4.2 in Annexure 4
• Public capital stock (t) (end of year)	Age profile of general tax revenue (t)	Same as in Table A4.2 in Annexure 4
• Public capital stock (t-1) (end of year)	Age profile of general tax revenue (t-1)	Same as in Table A4.2 in Annexure 4
Public Credit Transactions		
• Public lending (t)		
➤ By taxpayers	Age profile of general tax revenue	Same as in Table A4.2 in Annexure 4
➤ By investors	Age distribution of individual asset income	Same as in Table A4.2 in Annexure 4
• Public credit (t) (end of year)	Age profile of general tax revenue (t)	Same as in Table A4.2 in Annexure 4
• Public credit (t-1) (end of year)	Age profile of general tax revenue (t-1)	Same as in Table A4.2 in Annexure 4
Public bequest		
• Capital bequest	Age profile of general tax revenue (t-1)	Same as in Table A4.2 in Annexure 4
• Credit bequest	Age profile of general tax revenue (t-1)	Same as in Table A4.2 in Annexure 4
Other Variables		
• Population (t)	Total population of India as per Census of India 2001 - Smoothed by using the technique of Sprangue Multiplier	Census of India 2001: http://www.censusindia.net/t_00_003.html
• Population (t-1)	Total population in 1999-2000, approximated by applying the age structure of actual population in 2001 to projected population in 2000 - Smoothed by using the technique of Sprangue Multiplier	Computed by using the projected total population for 2000 in the Planning Commission, Government of India: www.planningcommission.nic.in/data/dataf.htm
• Labour income (30-49) per capita	Same as in Table A1 in Annexure 1	Same as in Table A1 in Annexure 1

Note: (a) Age profile of general tax revenue is equal to the sum of individual age profile of income tax, corporation tax, indirect taxes, and non-tax revenues. (b) Public capital bequest is estimated as a function of capital stock, net investment, and other economic flows. Public credit bequest is estimated as a function of net public lending, public credit, and other economic flows. Thus, bequest has the same age allocation rule of general tax revenue.

ANNEXURE 4

Aggregate controls and age allocation rules for public transfers in India's NTA 1999-00

Table A4.1: Aggregate controls for age reallocations by public transfers in India's NTA 1999-00

Variables	Definition	Measurement for India's NTA	Data sources
In-kind transfers	<ul style="list-style-type: none"> • In-kind transfers of education • In-kind transfer of health • In-kind transfer of others 	Proportion of total final Government Consumption expenditure of administrative departments to education, health, and others - determined by the share of expenditure on education, health, and others in the Government Final Consumption Expenditure by Purpose	Statement 29, National Income Statistics 2005 Statement 36, National Income Statistics 2005
Cash transfers	Sum of social benefits (e.g. National Social Assurance Programme and Other Social Security Programmes) and other current transfers	Current transfers from government administrative departments to private income	Statement 4, National Income Statistics 2005
Explicit taxes	<ul style="list-style-type: none"> • Direct taxes • Indirect taxes 	<ul style="list-style-type: none"> • Income tax • Corporation tax • All indirect taxes 	Statement 4, National Income Statistics 2005 Table 1.2, Indian Public Finance Statistics 2001-02
Implicit taxes	Non-tax revenues	Sum of non-tax revenues and balance between public sector inflows and outflows	Table 1.2, Indian Public Finance Statistics 2001-02

Source: Authors

Table A4.2: Age allocation rules for age reallocations by public transfers in India's NTA 1999-00

Aggregate control variable	Age allocation rule	Data source/s
1. Public transfer inflows		
In-kind transfers	Allocated by the same rule as that of public consumption of education, health, and others in the estimation of Life Cycle Deficit, 1999-00, as given in Table A1.	Same as in Table A1 for public consumption of education, health, and others
Cash transfers	Allocated in proportion to the number of pensioners by age NSSO's Employment and Unemployment Survey 1999-00 (55 th Round: July 1999 – June 2000) provides with data on usual principal activity particulars of household members [Block 5.1]. These particulars include age of pensioners (under rentiers, pensioners, remittance recipients etc: Activity Status Code 94). This data is the basis for age allocation of public cash transfers.	Employment and Unemployment in India, 1999-00 , National Sample Survey 55 th Round (July 1999 –June 2000), National Sample Survey Organization, Government of India (New Delhi)
2. Public transfer outflows		
Income tax	Allocated in proportion to the income from wages and salaries of workers	Employment and Unemployment in India, 1999-00 , National Sample Survey 55 th Round (July 1999 –June 2000), National Sample Survey Organization, Government of India (New Delhi)
Corporation tax	Allocated in proportion to the private asset income of	Household Consumer Expenditure in India 1999-00 , National Sample Survey 55 th Round (July-December 1999), National Sample Survey Organization, Government of India (New Delhi)
Indirect taxes	All indirect taxes are allocated in proportion to household persons' consumption expenditure after deducting for education and health consumption expenditures	Household Consumer Expenditure in India 1999-00 , National Sample Survey 55 th Round (July-December 1999), National Sample Survey Organization, Government of India (New Delhi)
Non-tax revenues	Allocated in proportion of combined direct and indirect taxes	Same as for income tax, corporation tax, and indirect taxes above

Source: Compiled by authors

ANNEXURE 5

Aggregate controls and age allocation rules for private transfers in India's NTA 1999-00

Aggregate control variable	Age allocation rule	Data source/s
Intra-household transfers		
<ul style="list-style-type: none"> • Aggregate labour income 	Allocated according to the age profiles of wages and salaries of employed persons, as given in Table A1	Same as in Table A1 for labour income
<ul style="list-style-type: none"> • Current consumption 	Allocated by the same rule as that of consumption of education, health, and others in the estimation of Life Cycle Deficit, 1999-00, as given in Table A1.	Same as in Table A1 for private consumption of education, health, and others
<ul style="list-style-type: none"> • Public cash transfers 	Allocated in proportion to the number of pensioners by age, as given in Table A4.2	Same as in Table A4.2
<ul style="list-style-type: none"> • Public tax 	All taxes paid by the households (i.e. income tax, corporation tax, indirect taxes, and non-tax revenue or implicit taxes) – Allocated as given in Table A4.2	Same as in Table A4.2
Inter-household transfers	Net other current transfers from the Rest of World is allocated to the head of household	Household Consumer Expenditure in India 1999-00 , National Sample Survey 55 th Round (July-December 1999), National Sample Survey Organization, Government of India (New Delhi)

Source: Compiled by authors