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Contribution of informal economy for First Demographic Dividend:
Evidence and implications for India

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Contribution of informal economy for First Demographic Dividend: Evidence and implications for India

India's working-age population is projected to remain around 60 percent up to 2050 due to age structure transition and a large number of them may work in the informal economy. Using the National Transfer Accounts (NTA) methodology, this paper estimates the First Demographic Dividend, as it is related to informal economy in India, and offers evidence for its positive impact on economic growth. The Dividend is estimated by distinguishing the support ratios by the entire economy and informal economy from 2004 to 2050. Analyses of the empirical results are useful to understanding the nature and magnitude of impact of informal economy on India's economic growth through First Demographic Dividend. This implies that a policy for strengthening of the informal economy in terms of larger employment opportunities, higher labour productivity and better working conditions may be justifiable from the viewpoint of maximizing economic growth in India. Subject to the comparability of economic structure, however, the framework and implications are applicable and relevant for other developing countries.

1. INTRODUCTION

Age structure of a country's population may be distinguished by younger, working/adult and older generations. Age structure transition results in relative changes in the size and growth of these generations. Often, these changes are summarized by the dependency ratios. However, age structure transition has deeper implications for economic growth through demographic dividends.

India is predicted to undergo remarkable age structure transitions by the middle of the present century: a decline in the share of younger population, an increase in the share of older population; and the highest share of working population. Consequently, analyses of economic impacts and policy implications of age structure transition, as they are related to demographic dividends, are and will be of utmost relevance for India.

India's advantages and challenges of age structure transition are highlighted in the Approach Paper to 11th Five Year Plan [Planning Commission (2006)]: "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). This underlines the importance of productive employment generation to translate the demographic changes into higher economic growth. At the same time, productive employment will be a source of higher public revenue by way of income and consumption taxes. This will be contributory for public financing of human capital formation, consumption needs of younger population, and old age security programmes.

Growth of per capita income is a measurable indicator of economic growth. It may be measured by the sum of growth of (a) income per working age member or labour productivity and (b) proportion of population in working ages. Changes in proportion of working population are accountable for age structure transition in the total population. Thus, estimation of impact of changes in age structure transition on growth of per capita income is the focus of literature on demographic dividend and economic growth.

There are two distinct approaches to estimation of demographic dividends and economic growth. First, the National Transfer Accounts (NTA) approach [Mason et al (2006)] distinguishes the demographic dividends by first and second demographic dividends. If the entire working-age population is gainfully employed, they would constitute effective producers of goods and services and support for effective consumers who consume the goods and services. Ratio of effective producers to effective consumers is called support ratio. The period during which growth of support ratio increases is called **First Demographic Dividend** [(Mason (2005a)]. Support ratios are estimated from age profiles of labour income and consumption. Given the growth of productivity, support ratio increases growth of per capita income or economic growth. The **Second Demographic Dividend** (SDD) “operates through productivity growth by inducing the accumulation of wealth and capital deepening” [Mason (2005b): p.6]. Wealth affects life cycle consumption in two ways. (i) Older persons rely on transfer wealth or public and/or private transfers to finance their deficit consumption. (ii) Adult persons may rely on capital accumulation during working ages to finance consumption at older ages. At the same time, however, capital accumulation impacts on economic growth through changes in productivity. “If invested in the domestic economy, the result will be capital

deepening and more rapid growth in output per worker. If invested abroad, the result will be an increase in the current account and national income. In either case, per capita income will grow more rapidly". (p.4). This effect of capital accumulation on economic growth is the source of SDD. Second, the non-NTA approach. Growth of per capita income is explained by age structure transition effects through select demographic variables. For instance Bloom et al (2000) include growth of total population and working age population for estimation of demographic determinants in cross-country regression models. Positive and significant estimated coefficient of demographic variables confirms the link between demographic factors and economic growth.

Indian studies on demographic dividend are based on non-NTA approach and include Navaneetham (2002) and James (2008). Navaneetham regressed the growth rate of GDP on changes in share of population in different age groups by controlling for select macroeconomic indicators. The sample comprised eight South and South East Asia including India and period of study covered from 1960 through 1990. The results showed varied impact of age structure on economic growth by countries. In case of India, however, none of the estimated coefficient was statistically significant. James estimated the impact of age structure transition (controlling for literacy, overall population growth, initial per capita income etc) on growth rate of per capita income for 15 major states in India, using panel data for census years from 1971 to 2001. The Two-Stage Least Square estimates offered evidence for positive and significant impact of age-structure transition, when states are distinguished by poor (northern states and Assam) and medium (other non-southern states) age structure transition.

India's labour market is characterized by formal/organized and informal/unorganized sectors. The concept, definition and measurement issues in India's informal sector are elaborated in Narayana (2006) for analyses of employment and non-employment performance indicators. Most recently, National Commission for Enterprises in the Unorganized Sector [Government of India (2008a)] has thoroughly reviewed the past concepts, definitions and measurements of formal and informal sector; and provides with newer and separate measurements of size and growth of workers in informal sector and

informal workers. Further, the Commission presents a refined framework for estimation of national income from the informal sector in contrast with the official estimation of unorganized sector's contribution to national income. However, the Commission's framework does not link demographic dividends with informal sector and economic growth.

This paper is a new attempt to estimate the First Demographic Dividend in the NTA approach and relate it to informal economy in India.¹ It estimates the age profiles of income and consumption in 2004-05 and the support ratio from 2004 through 2050. The First Demographic Dividend is estimated by the entire economy and informal economy. Contribution of the informal economy to First Demographic Dividend and economic growth is estimated from 2004-2050. Analyses of these empirical results are useful to understanding the nature and extent of impact of informal economy on India's economic growth through First Demographic Dividend and for strengthening of the informal economy from the viewpoint of maximizing economic growth in India. Subject to the comparability of economic structure, however, the framework and implications are applicable and relevant for other developing countries with a dominant informal sector.

Rest of the paper is organized as follows. Section 2 describes the basic numbers on projected India's age structure transition and informal economy. This is intended to serve as a general background for the study. Framework for estimation and analysis of First Demographic Dividend, using the NTA approach, is presented in section 3. Measurement of variables and data descriptions is included in section 4. Estimation results are presented in section 5. Select qualifications/limitations of the approach and estimation results are mentioned in section 6. Section 7 includes preliminary conclusions and implications.

¹ Estimation of SDD is not attempted for lack of data for measurement of variables in regard to informal economy. A framework for estimation and numerical results of SDD is presented in Mason (2005a) and Mason (2005b).

2. BASIC NUMBERS

Some basic numbers on India's age structure transition and informal economy are described below from the published sources. These descriptions are intended to provide with a general background for the empirical issues and analyses in this paper.

2.1. Age structure transition

India's total population size increased from 683 million in 1981 to 846 million in 1991 and to 1029 million in 2001. During this period, India's total population had been characterized by two major features: dominant share of male population, declining share of rural population, and higher annual growth of female and urban population [**Table 1**].

A more remarkable feature of India's population is evident in its age structure changes. Using the census data from 1981 to 2001, the age structure transitions are shown in **Figure 1**. Most importantly, population under 15 years of age declined from 39.5 percent in 1981 to 35.3 percent in 2001. At the same time, the share of total population at age 60+ marginally increased from 6.5 percent in 1981 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 in 1981 to 56.9 percent in 2001.

The United Nations World Population Ageing 2007 [United Nations (2007a)] includes the projected age structure for India from 2007 to 2050. Total population is projected to increase from 1134 million in 2007 to 1395 million in 2025 and to 1593 million in 2050. Population under 15 (or over 60) years 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. (**Figure 1**).

In general, as in the past, the projected age structure changes will be the consequences of interaction effects of declining fertility and declining mortality (or increasing life expectancy at birth as well as at 60+). This is evident, for instance, by the (a) increasing life expectancy at birth; (b) increasing life expectancy and survival rate at older ages (at 60, 65 and 80 years); and (c) decline in Total Fertility Rate from 2005 through 2050 in **Table 2**. Consequently, growth rate of total population will be lower than at 60+ and that of 65+ and 80+ will be higher than at 60+.

The above age structure changes have many implications. First, 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 2050.² 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 India's current and future age structure transitions.³

2.2. Informal economy

Following Government of India's (2008a) approach to concepts and measurements of India's informal economy, the dominant share and composition of employment is distinguishable by informal sector and informal workers. To start with, **Table 3** shows that employment in informal sector contributed about 86 percent of India's total employment in 2004-05. By economic activity, informal sector contributed about 98 percent of total employment in agriculture, about 70 percent of total employment in industry and about 82 percent in services. Within the informal sector, however, the share of employment in agriculture (about 68 percent) dominates over employment in services (about 19 percent) and industry (about 10 percent). Interestingly, informal workers

² Ageing index refers to number of persons aged 60 years and above per hundred persons under age 15. Potential support ratio is measured by number of persons under age 15 to 64 per every person aged 65 or over.

³ Measurement of dependency ratios is as follows. First, total dependency ratio is equal to number of persons under age 15 years plus persons aged 65+ years per 100 persons 15 to 64 years; youth dependency ratio is equal to number of persons 0 to 14 years per 100 persons 15 to 64 years; and old age dependency ratio is equal to number of persons 65 years or over per 100 persons 15 to 64 years.

showed a higher share in total workers in all economic activities, as compared to the share of informal sector's employment in these activities. Differential growth rate of employment between formal and informal sectors is an important explanation for this dominant performance of informal sector. This is evident, for instance, by the recent comparative growth rate of employment between 1999-00 and 2004-05 by formal and informal sector and by economic activities (**Table 4**). In particular, a higher and positive growth rate of informal workers is clearly evident in agriculture, industry and services, as compared to negative growth rates of formal workers in all non-services' activities.

Composition of informal employment is distinguishable by residence (rural and urban) and gender (male and female) [**Table 5**]. For instance, share of informal employment (in particular, female employment) is higher in rural than in urban India. In fact, female informal workers comprised about 96 (or 75) of total employment in rural (or urban) India. In contrast, within the informal sector (as well as within the formal sector, however), male workers have a higher share in both rural and urban areas.

Employment data is also useful to distinguish the size of informal enterprises and develop economic indicators for labour productivity and employment generation. Measurement of size and economic indicators are based on three separate databases: Unorganised manufacturing enterprises,⁴ unorganised services sector enterprises⁵ and informal enterprises.⁶ **Table 6** presents the distribution of enterprises by employment size

⁴ Unorganized enterprises include unincorporated proprietary or partnership enterprises, enterprises run by co-operative societies, trusts, private and public limited companies (non ASI). [Government of India (2001: pp.3-4)]. In particular, unorganized manufacturing enterprises refer to enterprises not registered under the Factory Act 1948.

⁵ Unorganized service sector enterprises refer to all enterprises outside the purview of public sector in India's National Accounts.

⁶ Informal enterprises refer to all unincorporated proprietary enterprises and partnership enterprises. An informal enterprise is distinguished between an *own account enterprise* (OAE) and an *establishment*. An OAE is run by household labour, usually without any hired worker employed on a fairly regular basis. An establishment has less than 10 workers with at least one hired labourer on a fairly regular basis. An establishment is further distinguished between a Directory Establishment (DE) and a Non-directory Establishment (NDE). A DE (or NDE) employs more than 5 workers (or less than 6 workers) with at least one hired labourer. Thus, informal enterprises are a part of unorganized enterprises. [Government of India (2001: pp.3-4)]

and by labour productivity indicators. It is apparent that enterprises with employment of less than 10 persons in general, and with less than 6 persons in particular, have the highest percent share of enterprises, employment and Gross Value Added (GVA) in unorganized manufacturing, unorganized services sector and informal enterprises. For instance, about 99 (or 97) percent of enterprises, about 94 (or 87) of employment, and about 89 (76) percent of GVA in informal enterprises in 1999-00 belong to enterprises with employment of less than 10 persons. This implies the presence of large number of small sized enterprises with varying labour productivity (as measured by average GVA per worker). Except for unregistered manufacturing enterprises, labour productivity does not show an increase with employment size of the enterprises.

Absence of a statutory age limit for retirement is an important feature of informal sector employment and working condition. This implies that informal workers can work beyond the age of 60 years. This is evident in the labour force participation rate (LFPR) of 39.4 percent at 60+ in the 61st Round of NSS on Employment and Unemployment 2004-05. By residence, the old age LFPR is higher in rural India (44.8 percent) than in rural India (22.8 percent). By gender, male LFPR was higher in both rural India (64.5 percent) and urban India (36.6 percent) than female PFPR.⁷ In contrast, the United Nations (2007a) project the LFPR at age 65+ in 2020 to be 27.3 percent and female LFPR (45.1 percent) to be higher than male LFPR (11.6 percent).

The above descriptions of India's informal economy show its rich diversity by concepts, definitions and measurement, employment size, number of enterprises, productivity differentials, rural and urban distinctions, and male and female categories. In general, these diversities reflect the underlying realities that need to be captured for measurement of contributions of the informal economy for India's first demographic dividend and economic growth.

⁷ Details of LFPR by broad age groups [15-29, 30-44, 45-59, and 60+] from 1987-88 to 2004-05 are available in IAMR (2008).

3. FRAMEWORK FOR ANALYSIS

Following Mason and Lee (2007) and Mason et al (2007), a general framework is presented below for estimation of First Demographic Dividend in terms of age structure transition effects on growth of income.

Let Y be the national income, N be the total population, and L be the population in working ages. Then, per capita income (Y/N) can be expressed as dependent on (a) income per working age member (Y/L) or labour productivity, and (b) proportion of population in working ages (L/N). That is,

$$Y/N = (Y/L).(L/N) \quad (1)$$

In technical terms, (L/N) is called economic support ratio, or ratio of effective producers to effective consumers. Age structure transition leads to large shifts in the support ratio and interacts with labour productivity to determine per capita income.

Thus, growth of per capita income is equal to:

$$\text{growth}(Y/N) = \text{growth}(Y/L) + \text{growth}(L/N) \quad (2)$$

Given the growth of productivity, growth of support ratio increases growth of per capita income. The period during which growth of support ratio leads to increase in economic growth is called **First Demographic Dividend (FDD)**. Thus, estimation of support ratios is essential for estimation of the FDD.

Informal economy enters into the above analysis because L is equal to sum of working population in formal sector (L_F) and informal sector (L_{IF}). This may be contributory to labour productivity and working population. Other things being the same, however,

changes in support ratios may be associated with growth of L_{IF} and growth of (Y/N) . This is the essence of informal economy's contribution to the FDD.

Following Mason (2005a), support ratio may be formally defined as follows.

$$\mathbf{L(t)/N(t)} = \sum \gamma(\mathbf{a}).\mathbf{P(a,t)}/\sum \phi(\mathbf{a}).\mathbf{P(a,t)}, \quad (3)$$

Where $\gamma(\mathbf{a})$ is productivity at age-a ($a=1, \dots, w$) or productivity age profile; $\phi(\mathbf{a})$ is consumption needs at age age-a ($a=1, \dots, w$) or consumption needs age profile; and $\mathbf{P(a,t)}$ is population at age-a and time-t. The summation in (3) is over all ages.

National Transfers Account (NTA) is a useful framework for estimation of productivity and consumption age profiles. Following Mason et al (2006), 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) draw on lifecycle surplus (e.g. generated during working ages). 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. Public and private (e.g. families) institutions mediate the individual transactions. Thus, all estimations in the NTA are distinguished by public and private sectors. The entire methodology of NTA is available in NTA (2008).

From the viewpoint of macroeconomics, NTA is an attempt to introduce age into National Income and Product Accounts (NIPA). The NTA flow account identity is defined by the following.

$$(C_{f,i} + C_{g,i}) - Y_{L,i} = (Y_{A,i} - S_i) + (T_{f,i}^+ - T_{f,i}^-) + (T_{g,i}^+ - T_{g,i}^-), \quad (4)$$

Where $C_{f,i}$ is private consumption expenditure, $C_{g,i}$ is public (government) consumption expenditure, S_i is savings, $Y_{L,i}$ 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, $T_{g,i}^+$ and $T_{g,i}^-$ are public transfer inflows and outflows respectively. Suffix i refers to individual or age group.

The LHS of (4) is Lifecycle Deficit (LCD). On the RHS, $(Y_{A,i} - S_i)$ is asset reallocations, $(T_{f,i}^+ - T_{f,i}^-)$ is net private transfers, and $(T_{g,i}^+ - T_{g,i}^-)$ is net public transfers. Thus, the RHS is equal to age reallocations.

Net exports are introduced to take care of Rest-of-World (ROW) in NTA. Unlike in NIPA, net exports are introduced indirectly into NTA through variables in (4). Net exports (NX) are defined as follows.

$$NX = Y_{L,ROW} + Y_{A,ROW} + (T_{ROW}^+ - T_{ROW}^-) + S_{ROW} \quad (5)$$

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 (4) are inclusive of ROW for an open-macro economy.

4. MEASUREMENT OF VARIABLES AND DATA DESCRIPTIONS

Estimation of age profiles of consumption and labour income [left hand side of equation (4)] is essential for estimation of support ratios [equation (3)]. In the NTA framework, these age profiles are derived by estimation of (a) aggregate controls for labour income and consumption variables and (b) age profiles of the aggregate controls.

In order to ensure consistency between NIPA and NTA, all aggregate controls are derived from the NIPA.

Table 7 presents the definition and measurement of aggregate controls within the framework of India's National Income Accounting in 2004-05. Aggregate labour income is sum of compensation of employees in the organized and unorganized sectors, and net compensation of employees from the rest of the world. Compensation of employees in the unorganized sector is presumed to be equal to (2/3)rd of mixed income. Aggregate consumption is decomposed into education, health and others in order to account for age specificity in consumption.

Age profiles of the above aggregate controls are derived by using different databases in 2004-05 [Narayana and Ladusingh (2008)]. First, UN projected population by single years in 2004 is used for all age profile estimations. Second, India Human Development Survey 2005 [Desai et al (2008)] is the micro data on households and individuals from a nationally representative sample of 41,554 households and 215754 individuals, spread over 1503 villages and 971 urban neighborhoods. Using this data, the age profiles for labour income and private consumption are derived by variables. **Table 8** summarizes the age allocation rule and data sources for all aggregate controls by labour income and consumption variables.

Per capita age profile of producers (and consumers) is multiplied by population age distribution to estimate the effective number of producers (and consumers). This ratio of effective producers to effective consumers is the empirical measurement of "support ratio" in equation (3) for India.

5. RESULTS OF ESTIMATION

To start with, the support ratios are estimated for the entire economy (comprising formal and informal sectors). Using the estimated per capita income and consumption

profiles in 2004-05 as given, support ratios are obtained from 2005 through 2050 for five-year period. This estimation is based on projected population (single years of age) in the World Population Prospects: The 2006 Revision [United Nations (2007b)].

Estimated support ratios for India are shown in **Figure 3**. Support ratio rises from 0.859 in 2004 to 0.891 in 2010, 0.941 in 2020, 0.989 in 2030, 1.019 in 2040 and 1.027 in 2046. This period characterizes the phase of FDD in India, if income and consumption profiles were to remain the same as in 2004-05.

Impact of FDD on economic growth of the entire economy is estimated by using equation (2). Annual growth of support ratio is estimated from Figure 3. Per capita labour productivity is estimated (exogenously, however) at 3.01 percent by the ratio of Gross Value Added (at 1999-00 prices) to total workers in 2004-05, using the data in Government of India (2008a). Given this positive and constant productivity, growth rate of per capita income is proportional to growth rate of support ratio. **Table 9** summarizes the estimated annual growth of support ratios and per capita income of India. Thus, other things being the same, age structure transition is contributory for India's economic growth throughout, in terms of its positive growth rate of per capita income.

Given the all India results above, contribution of informal economy of India to FDD is estimated in the following way. First, using the India Human Development Survey 2005, per capita labour income is estimated for informal sector workers. Income from farm, agricultural daily wages, non-agricultural daily wages, and non-farm business are included for this estimation. Survey data reports all income by head of household. For lack of better alternative, household income from informal works is equally allocated for all adult members within the household. Accordingly, age profile of per capita informal labour income is estimated; and using the age profile of consumption for all sectors (because consumption is not separable between formal and informal sectors' population), support ratio and its annual growth rate is estimated. Per capita informal labour productivity is estimated at 2.17 percent by the ratio of Gross Value Added (at 1999-00

prices) by the informal sector to total informal workers in 2004-05, using the data in Government of India (2008a).

Estimation results for informal sector are presented in **Figure 4** and compared with the total economy in **Table 10**. Throughout, about 50 percent of support ratio of India is contributed by the informal sector. Most importantly, informal sector is highly contributory for India's economic growth, because the difference in growth rate between the estimated per capita income of the entire economy and informal economy is about 0.9 percentage points.⁸

The duration of FDD is 42 years. Total dividend [i.e. the support ratio at the end of the dividend period (2045) divided by the support ratio at the beginning of the dividend period (2004)] is equal to 119 percent for the entire economy and 117 percent for the informal economy.

To the best of our knowledge, estimation of FDD is not separated between formal and informal sectors in other countries. Hence, the results above are not directly comparable at international level.

However, the estimates of FDD for the entire economy in this paper may be comparable at international level. Mason (2005b) applied the estimates age profile of consumption and labor income for the United States in 2000 for India and showed that India experienced the FDD from 1975-2005 and anticipated to continue until 2040. The growth rate of support ratio was estimated at 0.20 during 2005-2050. This estimate is lower than in this paper from 2004 through 2040 due to different age profiles of labour

⁸ Ratio of estimated annual growth of support ratio to actual GDP growth rate is another measure of impact of FDD on economic growth. For the entire economy, this impact is about 8 percent per annum from 2004-05 to 2008-09. Further, predicted GDP rate as a ratio of actual GDP growth rate is a measure of explanatory power of the FDD model. This explanatory power varied between years: from 54.40 percent in 2004-05 to 48.20 percent in 2008-09. For lack of estimates of informal sector's GDP since 2004-05, these computations are not worked out for informal economy.

income and consumption.⁹ Mason (2005a) presents annual increase in the support ratio (%) and total increase in support ratio (%) for the top 10 countries and bottom 10 countries in their sample. The top and bottom country by annual increase in the support ratio is Singapore (1.02 percent) and Uruguay (0.15 percent) respectively; and by total increase in the support ratio is United Arab Emirates (64 percent) and Sweden (3 percent). As compared to these countries, India's annual increase in the support ratio (%) during 2004-2050 (0.37 percent) is below the top ten countries, but India's total increase in support ratio is above the top ten countries. Thus, at the international level, the gains from the FDD are remarkable for India.

6. QUALIFICATIONS

Estimates in this paper are based on several assumptions due to limitations on data availability. These limitations qualify the conclusions and implications in the following section. First, the entire estimation of FDD assumes that the cross-sectional age profiles of income and consumption, and growth of labour productivity in 2004-05 remain the same up to 2050. Second, the entire analysis is aggregate without gender and spatial (e.g. rural and urban) distinctions. Third, consumption profile is not separable for population in informal economy. In fact, the second and third limitations are imposed by current National Accounts Statistics in India, which is the basis for construction of aggregate controls to draw age profiles of income and consumption.

7. CONCLUSIONS AND IMPLICATIONS

This paper estimates the First Demographic Dividend and its impact on economic growth of India, as they are related to informal economy. National Transfer Accounts is

⁹ In addition, Mason (2005b) applied the estimates age profile of consumption and labor income for the United States in 2000 for India and showed that India experienced a higher SDD than FDD throughout. For instance, the estimated SDD during was 1.02 percent 1975-2005 and 1.04 percent during 2005-2050. The FDD and SDD as a percentage of actual GDP growth per effective consumer were estimated at 45.8 percent.

the framework for estimation of age profiles of income and consumption in 2004-05. Assuming these profiles persists over time, the estimated duration of the First Demographic Dividend is up to 2045 and its impact on growth of per capita income is positive up to 2050.

Informal economy is known for its large supply of labour and considerable contribution to national income by unorganized and informal sector. The results of this paper add to these contributions of informal sector to national economic growth through positive First Demographic Dividend and labour productivity. Preliminary numerical estimates of these contributions are remarkable. These estimates provide with empirical justifications for further policies and programmes for promotion and development of employment and productivity in informal economy.

Better working conditions (including social security schemes) are conducive for enhancing labour productivity. Other things being the same, a higher labour productivity is contributory for higher economic growth. Thus, India's labour sector reforms may aim at simultaneous improvements in employment opportunities, labour productivity and working conditions in informal economy for maximization of demographic dividends and economic growth.

The results of this paper may be considered preliminary and qualified by assumptions and data limitations. In fact, the informal sector is highly diversified by all descriptions and they need to be captured, subject to the availability of data for their measurements in future. In the meanwhile, subject to the comparability of economic structure, the framework and implications of this paper are applicable and relevant for other developing countries to estimate the demographic contributions of their informal sector and its impact on economic growth.

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Table 1: India's population size and growth by gender and residence: 1981 to 2001

Indicator	1981	1991	2001
1. Total population (millions)	683	846	1029
2. Percent of male population in total population	51.70	51.90	51.73
3. Percent of urban population in total population	23.30	25.70	27.82
3. Annual growth rate (%)	1971-81	1981-1991	1991-2001
• Female population	2.25	2.12	2.01
• Male population	2.21	2.20	1.94
• Urban population	3.85	3.17	2.79
• Rural population	1.78	1.84	1.68

Source: Computed by using the basic data in Government of India (2006a)

Table 2: Projected life expectancy and survival rate of population in India: 2005-2050

Indicator	2005-10	2025-30	2045-50
1. Life expectancy (years)			
• At birth	64.9	71.3	75.9
• At 60 years	17.9	19.7	21.4
• At 65 years	14.5	16.1	17.6
• At 80 years	7.1	7.7	8.4
2. Total Fertility Rate (per woman)	2.8	1.9	1.9
3. Growth rate of population (%)			
Total	1.4	0.8	0.3
60+	2.8	3.2	2.4
65+	2.8	3.6	2.6
80+	4.3	3.9	3.7

Source: United Nations (2007a)

Table 3: Distribution of workers by economic activity and gender in informal sector: 2004-05

Economic activity	Distribution of workers in informal sector (%)		Distribution of informal workers (%)	
	In all sectors	Within informal sector	In all sectors	Within informal sector
Agriculture	97.65	67.77	98.89	60.59
Industry	70.40	10.08	89.39	18.13
Services	81.72	19.15	79.70	21.27
Total	86.32	100.00	92.38	100.00
Total informal workers (million)	394.90			
Total workers in all sectors (million)	457.46			
Total informal workers in informal sector (million)			393.47	
Total informal workers (million)			422.61	

Note: All sectors refer to formal and informal sectors.

Source: Compiled from Government of India (2008a)

Table 4: Comparative growth rate of employment between informal and formal sectors: 1999-00 and 2004-05

Economic activity	Growth rate of employment between 1999-00 and 2004-05 (%)					
	Informal sector	Formal sector	All sectors	Informal workers	Formal workers	Total workers
Agriculture	1.72	2.20	1.73	1.75	-0.18	1.73
Industry	6.13	4.79	5.73	6.66	-0.60	5.73
Services	4.48	1.70	3.67	4.71	0.12	3.67
Total	2.88	2.99	2.89	3.16	-0.10	2.89

Source: Compiled from Government of India (2008a)

Table 5: Distribution of workers in formal and informal sector by gender and residence: 2004-05

Economic activity	Distribution of workers in all sectors (%)						Distribution of workers within the sector (%)					
	Rural			Urban			Rural			Urban		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Informal	90.33	94.50	91.84	68.52	74.50	69.78	50.11	29.68	79.79	15.69	4.53	20.21
Formal	9.67	5.50	8.16	31.48	25.50	30.22	33.84	10.90	44.74	45.48	9.78	55.26
Total	100.00	100.00	100.00	100.00	100.00	100.00	47.88	27.11	74.99	19.76	5.25	25.01

Source: Government of India (2008a)

Table 6: Labour productivity by unorganized and informal sector enterprises

Employment size	Unorganized manufacturing enterprises 2000-01			Unorganized services sector enterprises 2001-02			Informal enterprises 1999-00		
	Percent of enterprises (and employment)	Average GVA per worker (INR)	Percent of GVA	Percent of enterprises (and employment)	Average GVA per worker	Percent of GVA	Percent of enterprises (and employment)	Average GVA per worker	Percent of GVA
1	42.44 (19.49)	12846	15.42	64.33 (35.06)	23484	29.23	57.10 (31.80)	22183	29.08
2-5	53.38 (61.85)	13363	50.92	32.27 (43.33)	21882	33.68	40.29 (54.74)	20782	46.94
6-9	3.00(9.66)	30649	18.24	2.13 (8.81)	30342	8.81	1.92 (7.50)	42915	13.27
Less than 10	98.82 (91.00)	15087	84.58	98.73 (86.56)	23333	71.72	99.31 (94.40)	23020	89.29
All	100 (100)	16233	100.00	100 (100)	28160	100.00	100 (100)	24243	100.00

Notes: (a) Average GVA is measured by Indian Rupee (INR) at current prices. (b) Data for unorganized manufacturing is from NSS 56th Round on Unorganised Manufacturing Sector in India 2000-2001; Data for unorganized services sector enterprises is from NSS 57th Round on Unorganised Service Sector in India 2001-02; and data for informal enterprises is from NSS 55th Round on Informal Sector in India 1999-2000.

Source: Compiled from Government of India (2008a).

Table 7: Definition and measurement of aggregate controls for labour income and consumption

Aggregate controls	Measurement of aggregate variables Database for all variables: National Accounts Statistics
1. Labour income	Compensation of employees + (2/3) of mixed income + net compensation of employees from ROW
2. Aggregate consumption	
Public	Government Final Consumption Expenditure (GFCE)
Private	Private Final Consumption Expenditure (PFCE)
2.1. Education consumption	
Public	Expenditure on education services under GFCE
Private	Expenditure on education under PFCE
2.2. Health consumption	
Public	Expenditure on health and other services under GFCE
Private	Expenditure on medical care and health services under PFCE
2.3. Consumption Other	
Public	Expenditure on non-education services, and non-health and other services, under GFCE
Private	Expenditure on non-education, and non-medical care and health services, under PFCE

Notes: (1) Public consumption other 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) Private consumption other includes food and beverages, clothing and footwear; fuel and power; furniture, furnishing, appliances; transport and communication; and recreation and cultural services.

Source: Compiled from National Accounts Statistics 2008 [Government of India (2008b)]

Table 8: Age allocation of aggregate control variables, 2004-05

Aggregate control variable	Age allocation rule/base	Data source
1. Labour income	Allocated based on individual income from wage and salary and self-employment (i.e. income from business, agriculture and non-agriculture).	India Human Development Survey 2005
2. Consumption		
Public education	Allocated by using the following estimated enrolment rates and public expenditure by level of education. First, using estimated attendance data from the 61 st 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. For primary and middle school education, public included attendance in government, local body and private aided institutions. For secondary and higher education public included government and local body institutions. Second, using Government of India's <i>Indian Public Finance Statistics 2006-07</i> , revenue expenditure on education by all levels of governments (including non-education departments) is obtained. Using the enrolment data in public institutions, per student expenditure is computed by different levels of education. This is interpreted as unit cost. Unit cost is uniform with each level of education. Third, public education consumption is presumed to be proportional to revenue expenditure by levels of education. Per student public education consumption is obtained by using enrolment data in public institutions. Fourth, expenditure on adult education and training is allocated on per capita basis for age group 30-60.	Government of India (2006b), Government of India (2007a) and Government of India (2007b).
Private education	Allocated by regressing the household private consumption expenditure of education on the number of enrolled members in each age group [a], and number of not enrolled members if household educational spending includes non-formal education system.. Using the estimated coefficients, household education expenditure is allocated for i-th enrolled member in the j-th household.	India Human Development Survey 2005
Public health	Allocated based on individual utilization of public health facilities.	NSSO(2004)
Private health	Allocated by regressing the household private consumption expenditure of health on the number of household members in each age group. The estimated regression coefficients are used to allocate the health expenditure for i-th member of j-th household.	India Human Development Survey 2005
Consumption Other		
Public	Allocated on per capita basis for the entire population.	
Private	Private consumption other by using Equivalence Scale: The 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.	India Human Development Survey 2005

Notes: (a) Except for public education and public health, age allocation rule for all other aggregate controls variables follows the NTA general methodology [NTA (2009)]. (b) India Human Development Survey 2005 is sourced from [Desai et al (2008)]

Source: Author

Table 9: Estimated impact of age structure transition on economic growth of India

Year	Annual growth of support ratio (%)	Annual growth of per capita income (%)
2004-2010	0.723	3.73
2010-2015	0.542	3.55
2015-2020	0.567	3.58
2002-2025	0.530	3.54
2025-2030	0.463	3.47
2030-2035	0.371	3.38
2025-2040	0.220	3.23
2040-2045	0.073	3.08
2045-2050	-0.094	2.92

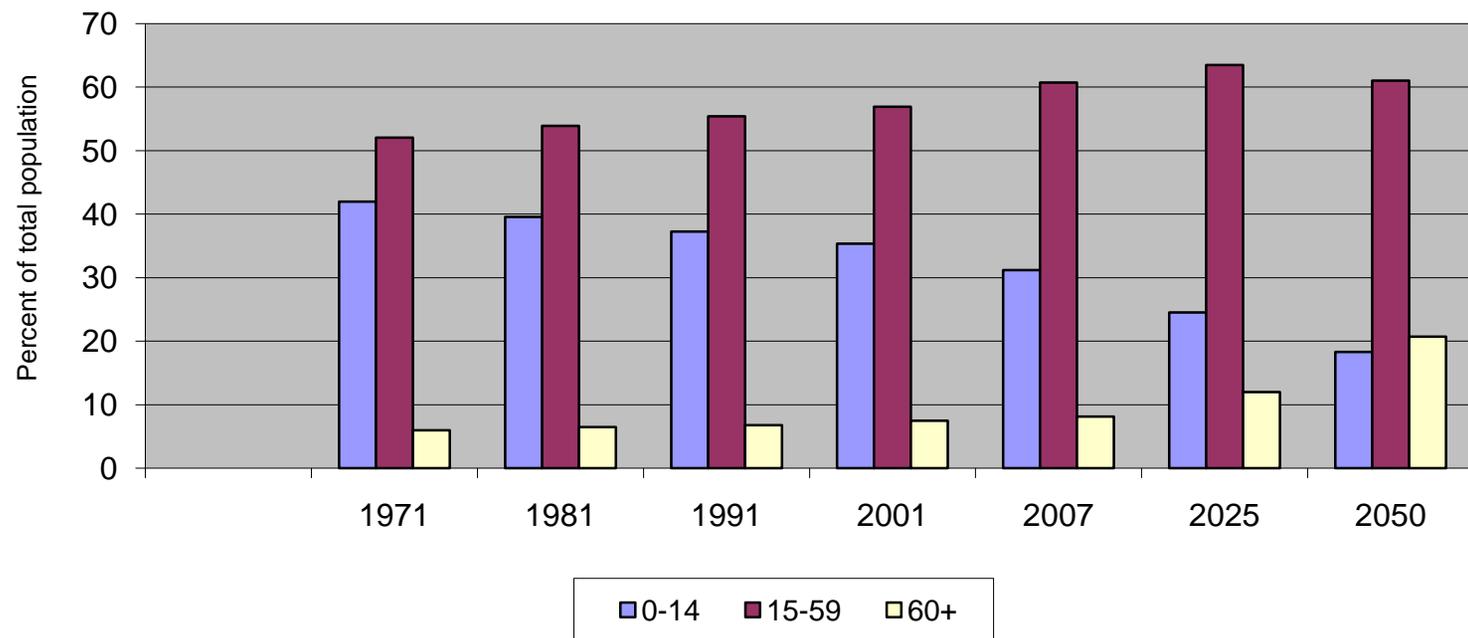
Source: Estimated by the author, using equation (2)

Table 10: Estimated impact of age structure transition on economic growth of India's informal economy

Year	Estimated support ratio in informal economy as a percentage of total economy	Year	Difference in the annual growth rate (%) of per capita income between total economy and informal economy
2004	50.79	2004-2010	0.87
2010	50.71	2010-2015	0.85
2015	50.67	2015-2020	0.86
2020	50.62	2002-2025	0.88
2025	50.53	2025-2030	0.89
2030	50.40	2030-2035	0.90
2035	50.26	3025-2040	0.89
2040	50.14	2040-2045	0.88
2045	50.04	2045-2050	0.86
2050	49.98		

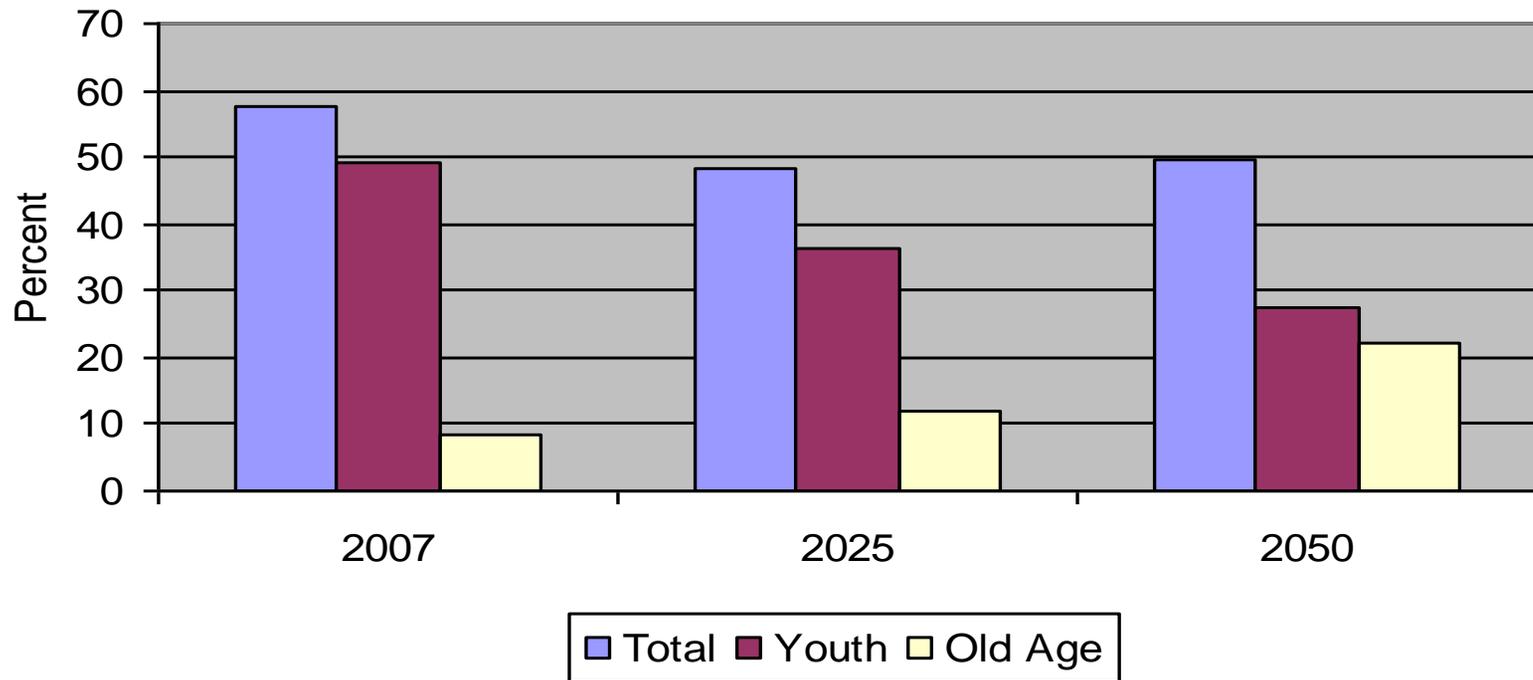
Source: Estimated by the author

Figure 1: Age structure transition in India: 1971-2001

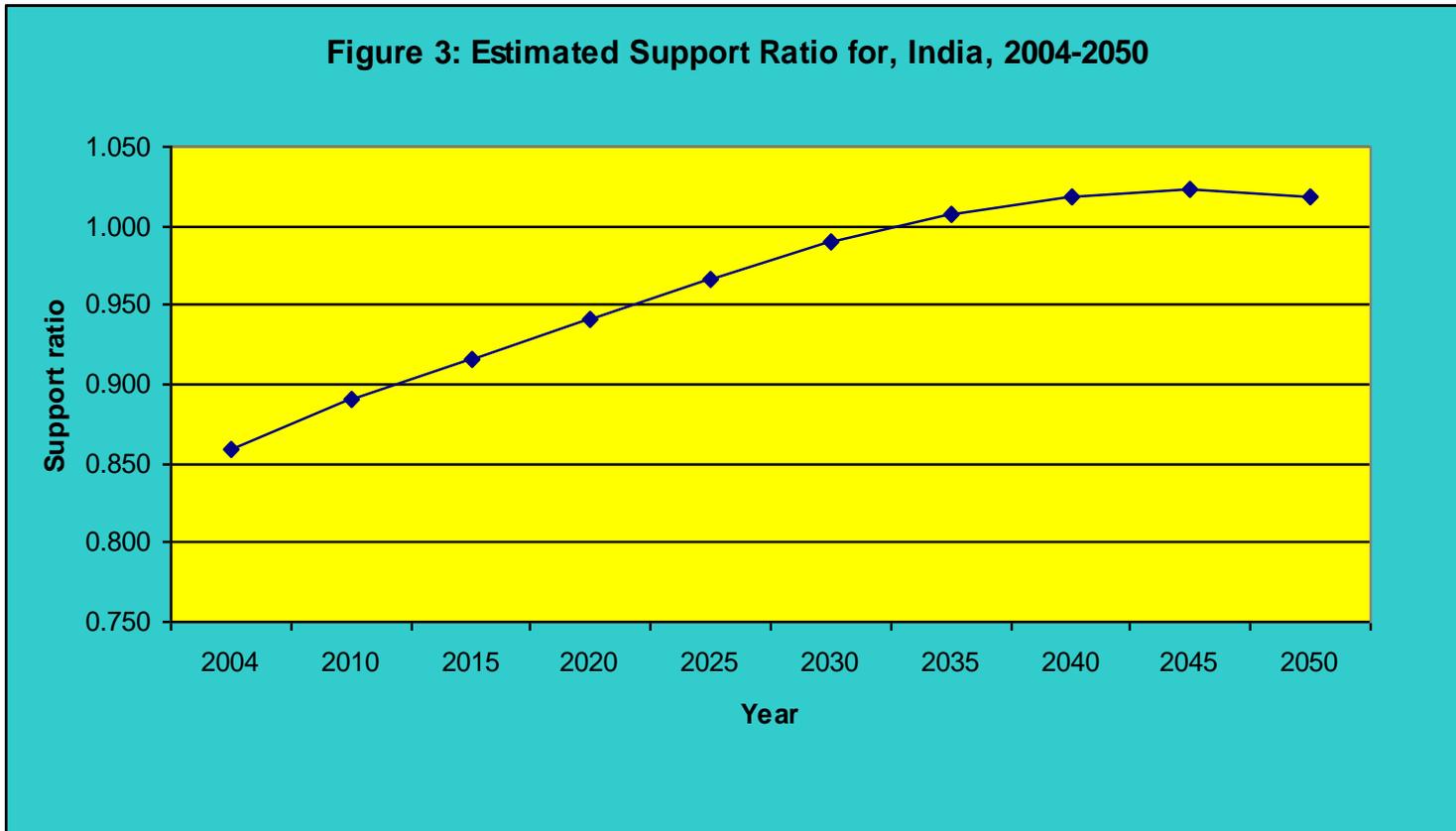


Source: Census of India – Various reports- and United Nations (2007a).

Figure 2: India's dependency ratio: 2007-2050

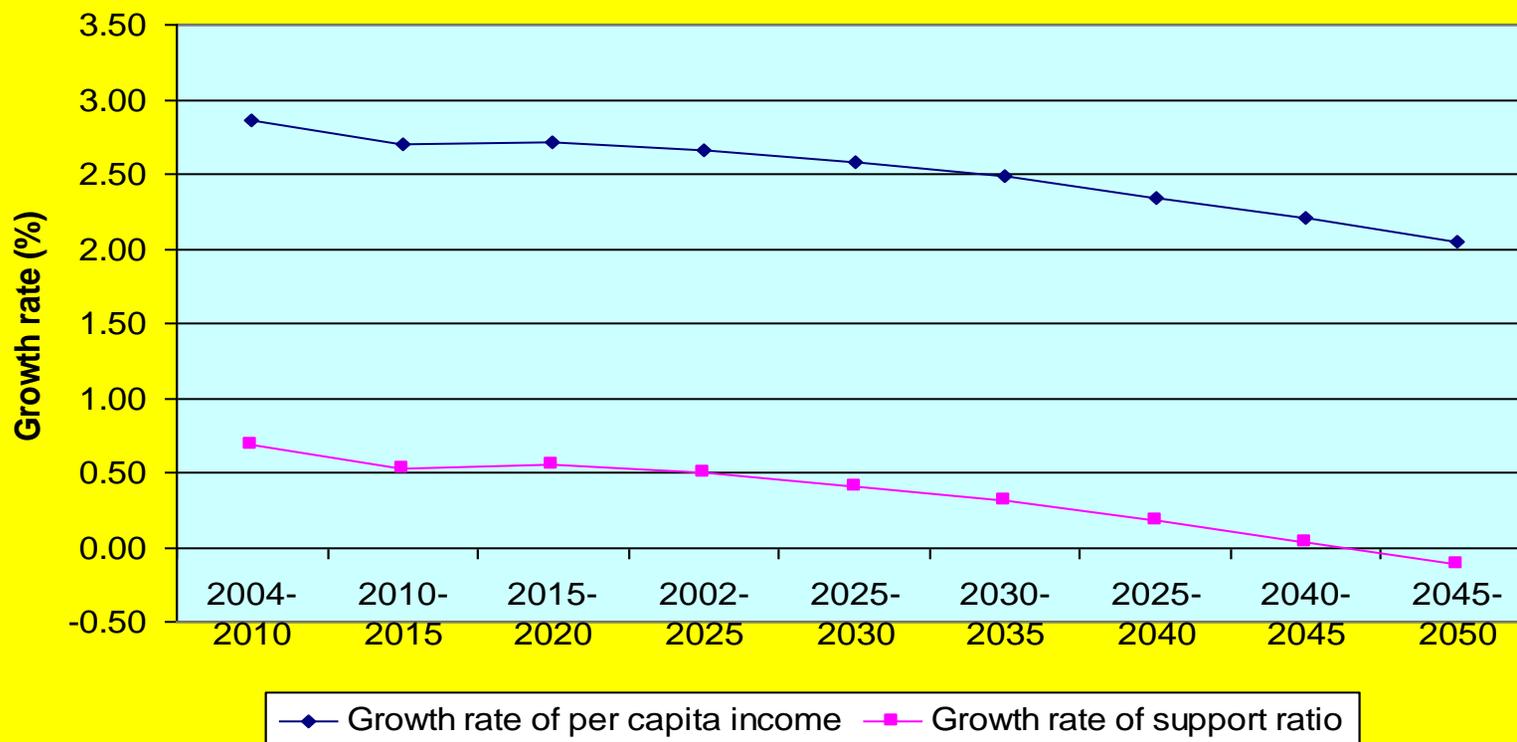


Source: United Nations (2007a)



Source: Estimated by the author by using equation (3).

Figure 4: Estimated growth rate of support ratio and per capita income for India's informal economy



Source: Estimated by the author.