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An Empirical Study of Impact of HIV/AIDS on India's Sustainable Growth Rate

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Abstract

India is one of the largest and most populated countries in the world, with over one billion inhabitants. Of this number, it's estimated that around 2.4 million people are currently living with HIV.

HIV emerged later in India than it did in many other countries. Infection rates soared throughout the 1990s, and today the epidemic affects *all* sectors of Indian society, not just the groups – such as sex workers and truck drivers – with which it was originally associated. In a country where poverty, illiteracy and poor health are rife, the spread of HIV presents a daunting challenge. This paper will analyze how the proliferation of HIV/AIDS in India can hamper its development in long term with the help of CGE model by giving an view of various sectorial study of impact of HIV/AIDS along with the NO HIV/AIDS and With HIV/AIDS comparison.

Keywords: HIV/AIDS in India, Impact on Indian Economy, Sectorial Analysis

1. Introduction

In 1978, in the Declaration of Alma Ata, the international community committed to achieving health for all by 2000. Clearly, that goal has not been reached, although most countries have achieved significant health improvements. In Asia, over the last fifteen years average life expectancy increased from 62.2 to 68.4 years, an improvement of over 6 years. Three of the most populous countries in the region, Bangladesh, India, and Indonesia all saw life expectancy grow by more than seven and a half years in this period. Health is now again at the heart of international debate. The UN Security Council is discussing the implications of AIDS for global security, the leaders of the Group of Eight Countries are signing up to new disease reduction targets. The renewed interest in health has two main causes. First, good health is of profound importance to people, topping the United Nations Millennium Poll as the thing that people most value in life. In rich and poor countries, voters place pressure on democratic governments to improve health standards, while internationally, the health problems of developing countries provide one focus for discontent at the perceived inequities of globalization. Second, we now know more about the importance of health to economic and social development. Healthy societies are more likely to become wealthy societies—an effect that was felt especially strongly by the Asian tiger economies.

Economists have conventionally believed that increased wealth leads to better health, and have largely overlooked the reverse link. Until the early 1990s, the empirical economic growth literature focused exclusively on the role of capital and labor (the latter often augmented by schooling), and technological change, but hardly ever on health as a key element of human capital. Even where a relationship has been found between indicators of health and income per capita, it has either been discounted, or thought to be an indication of the impact of economic development on health. The standard perspective of this earlier literature appears to have been that of Preston (1976) who noted the key role of economic development in improving life expectancy.

However, there is now significant evidence demonstrating the aggregate impacts of health on growth and on levels of real GDP per capita. For example, Bloom, Canning and Sevilla find that a one-year improvement in a population's life expectancy (a standard measure of health status)

contributes to a 4% increase in output. In another study, the same authors estimate that a one percentage point increase in adult survival rates boosts labor productivity by about 2.8%. Formal analysis suggests that a country can, on average, expect to see per capita incomes grow by an extra 0.3-0.5 percentage points a year for every 5 years it adds to its life expectancy. This is a considerable boost, given that between 1965 and 1990 global income per capita grew by an average of 2% per year.

India is one of the most populated countries in the world with a population of 1,156,897,766, as on July 2010, estimated by CIA the World Factbook. It is estimated that about 2.27 million people currently live with HIV/AIDS in the country. HIV emerged in India in the beginning of 1986; the first case was reported among sex workers in Chennai, Tamil Nadu. Initial infections among sex workers were reported as a result of contact with foreign visitors. In 1987, a National AIDS Control Programme was launched to cover surveillance, blood screening, and health education. At the end of 1987, out of 52,907 persons who had been tested, around 135 were found to be HIV positive and 14 had AIDS.
States like Andhra Pradesh, Goa, Karnataka, Maharashtra, Tamil Nadu, Manipur, Mizoram and Nagaland in India are reported to have high incidences of HIV/AIDS. This is the most serious health challenge the country faces, as it not only affects the health sector, but also has an impact on the economic and labour productivity of the country. According to an International Herald Tribune report, the country's annual average GDP growth is likely to decline by about 1 per cent over the next 10 years, if nothing is done to control the epidemic. In India, 90 per cent of the HIV-infected population is in the age group of 15 49. This reduces the supply of labour and slashes the income of workers, adversely affecting enterprise performance and national economies. The loss of labour income and increased medical expenditures measured 2.6 per cent of the country's health expenditure and 0.12 per cent of the GDP. The loss from external transfers (through debt, savings and social insurance) accounts for 5 per cent of the annual health expenditure and 0.23 per cent of the GDP.

1.1Current Epidemiological Situation of HIV/AIDS in India

HIV estimates derived using globally comparable methods and findings from the independent Impact Assessment Study show that the National AIDS Control Programme is progressing steadily towards the objective of halting and reversing the HIV epidemic in India over the period 2007- 2012. Available evidence on HIV prevalence and future statistical projections shows signs of stabilisation of HIV epidemic in India at national level. Provisional estimates show that there are 22.7 lakh People living with HIV/AIDS in India by the end of 2008 with an estimated adult HIV prevalence of 0.29 percent(fig.1). Declining trends are noted in high prevalence states indicating possible impact of sustained programme interventions. Even the prevalence among pregnant women in the age group of 15-24 years, which is considered proxy for incidence/new infections in general population, is showing a declining trend.

1.2 People Living with HIV/AIDS (PLHA)

The total number of people living with HIV/AIDS (PLHA) in India is estimated at 24 lakh (19.3 – 30.4) in 2009. Children (<15 yrs) account for 3.5% of all infections, while 83% are the in age group 15-49 years. Of all HIV infections, 39% (9.3 lakh) are among women. The four high prevalence states of South India (Andhra Pradesh – 5 lakh, Maharashtra – 4.2 lakh, Karnataka – 2.5 lakh, Tamil Nadu – 1.5 lakh) account for 55% of all HIV infections in the country. West Bengal, Gujarat, Bihar and Uttar Pradesh are estimated to have more than 1 lakh PLHA each

and together account for another 22% of HIV infections in India. The states of Punjab, Orissa, Rajasthan & Madhya Pradesh have 50,000 – 1 lakh HIV infections each and together account for another 12% of HIV infections. These states, in spite of low HIV prevalence, have large number of PLHA due to the large population size. The worst hit states of India is shown in the map of India in fig(2)

1.3 AIDS deaths

Using globally accepted methodologies and updated evidence on survival to HIV with and without treatment, it is estimated that about 1.72 lakh people died of AIDS related causes in 2009 in India. Wider access to ART has resulted in a decline of the number of people dying due to AIDS related causes. The trend of annual AIDS deaths is showing a steady decline since the roll out of free ART programme in India in 2004. The state wise HIV/AIDS prevalence in India is shown in Table(1)

1.4 Impact of HIV/AIDS on Indian Economy

The adverse economic impact of HIV and AIDS occurs at three levels: the individual/household, sector, and national or macro-levels. In the early phase of the epidemic, the impacts at the sector and macro-levels are rather mild and, hence, not easily measurable or quantifiable. So far in India, given the low overall prevalence, the focus has been on the effects at the level of the individual and the household.

The study, by Pradhan, Sundar and Singh (2006)1 also focuses on the impact of HIV and AIDS on affected households, which it finds to be seriously adverse, and, therefore, a matter of acute concern. At the same time, the study underplays the adverse economywide impact of AIDS. Given the current prevalence rate, the extrapolation of the household-level impact to the level of the state or the national economy does not reveal a large macro-economic impact. But, this is because the survey, on which the study is based, captures the snapshot of the economy at a given point of time, while the question of the macroeconomic impact of AIDS is essentially a dynamic one.

As the HIV epidemic unfolds, its impacts are bound to be deeply compounded. These impacts cannot be assessed in their totality by a mere extrapolation of the household level impact. Furthermore, in 2005, the number of HIV-infected persons exceeds 5 million, and this number is expected to quintuple to between 20 million and 25 million by 2010. With that kind of a jump in the number of HIV cases in the next 5-10 years, there is bound to be a visible impact on the national economy. At present, little or nothing is known about the potential macro-economic impact of HIV and AIDS on the Indian economy. The rough-and-ready estimates of the macro-economic costs of AIDS that are available are of no help in guiding and accelerating the response of the Government of India to the potential threat to the economy imposed by this epidemic. A quantitative assessment of the macro-economic impact of AIDS on the Indian economy, therefore, needs to be undertaken urgently to assist the policy makers. Keeping this in mind, the study analyses the macro-economic and sectoral impacts of HIV and AIDS in India, using a fivesector computable general equilibrium (CGE) model.

2.Why the CGE model?

Empirical models o n the macroeconomic impact of HIV and AIDS are essentially of the following three types : **(i)** Macro-econometric models, **(ii)** Macro simulation models, and

(iii) Computable general equilibrium (CGE) models.

2.1Macro-econometric models

Macro-econometric models are about econometrically estimating the impact of HIV and AIDS on the rate of growth of real Gross Domestic Product (GDP) per capita. However, these models are based on cross-country macro-level regressions, which can neither reflect the mechanism through which the adverse impact of HIV and AIDS work themselves out, nor can they capture the sectoral readjustments that take place in the economy that is coping with the epidemic.

2.2 Macro-simulation models

On the other hand, macro-simulation models, which are simulation exercises based on the one-sector neo-classical growth model, successfully capture the various channels through which AIDS impedes economic growth. The various channels through which AIDS affects economic growth are as follows:

i. a decline in total factor productivity resulting from the increased mortality and morbidity associated with AIDS,
ii. a change in the skill composition of the labour force due to unequal incidence of AIDS among different grades of labour,
iii. Decline in public and private savings due to increase in medical expenditure caused by AIDS, and a decline in the growth rate of the economically active population, because of deaths
iv. caused to young adults suffering from AIDS.

In general, the macro-simulation models are successful in highlighting the considerable deceleration in the growth rate of GDP that may result from an AIDS epidemic, but show only a marginal negative impact of the epidemic on the growth rate of per capita GDP. This is not surprising. Indeed, theoretically it is conceivable that, the per capita real GDP rises with the decline in population more than compensating the fall in real GDP, thereby, pointing towards the conclusion that the survivors of the epidemic are "indifferent" or "better-off".

However, that is merely a corollary of the fact that the population is declining in an economy afflicted by AIDS. And a population which is declining due to the increased mortality associated with AIDS can hardly be seen as a favourable occurrence offsetting the slowdown in GDP growth. More importantly, to infer from this that the survivors of the epidemic are "better-off" is not only trivial but also perverse. Finally, it must be noted that, a major limitation of the macro-simulation models arises from the fact that they are aggregate growth models. Accordingly,

they cannot capture the sectoral readjustments which serve to mitigate the loss in aggregate output resulting from an AIDS epidemic. To the extent that this mitigation effect is ignored in the macro-simulation models, the latter type models tend to overestimate the loss in aggregate output.

3 CGE models

CGE models, although resembling the one-sector neo-classical growth model in its dynamic structure, typically include a larger number of sectors. CGE models, therefore, are not only useful for assessing the aggregate economic impact of HIV and AIDS (i.e., the effect on the growth of real GDP per capita and other real macro-variables), but also allow a detailed insight into the happenings of the various sectors of the economy.

A characteristic feature of any economy is the existence of sectors that are not identical. Among other things, the relative use of different types of labour in combination with other factors – capital and land – will differ across sectors. Hence, when the labour supply declines due to AIDS-related deaths, there will be a differential impact across sectors. Typically, there will be a mildly negative impact on the outputs of sectors that use more of capital and less of labour, but sharp reductions in outputs will occur in the labour-intensive sectors. The latter sectors, in turn, will substitute relatively cheaper factors of production for labour inputs, and, thereby, regain some of the output loss. The net loss in (aggregate) output will, therefore, be smaller than what is usually estimated through the aggregate growth models. In other words, the latter type models are incapable of capturing the intra-sectoral and the intersectoral substitutions that necessarily take place to absorb the shock caused to an economy by an AIDS epidemic and, therefore, overestimate its impact. On the other hand, a multi-sectoral CGE model is ideally suited for assessing the impact of HIV and AIDS, as it takes into account the various intra-sectoral and inter-sectoral substitutions that take place in production, consumption and distribution in response to price changes. Moreover, because a CGE model simulates the workings of a market economy in which prices fluctuate to equate demand and supply for all goods and factors, it successfully captures the feedback between labour markets and the rest of

the economy, which is ignored in the one sector macro-simulation models. Typically, therefore, a CGE model provides a realistic estimate, rather than an overestimate, of the net loss in output resulting from a reduction in labour supply caused by increased mortality due to AIDS, which is generally the case in single-sector neoclassical growth models.

Furthermore, a CGE model is an ideal tool for capturing other impacts of the AIDS epidemic:

(i) fall in total factor productivity (TFP) due to higher hiring and training costs, necessitated by increased absenteeism of HIV-positive workers and due to slower technological adaptation,

(ii) lower efficiency (productivity) of workers with HIV

(iii) shifts in the household and government spending patterns towards healthcare.

Finally, an additional virtue of the CGE model is that it also brings out the sectoral impact of the epidemic.

3.1 CGE model for India

The model used in this study is a multisectoral, neo-classical type price-driven CGE model. The overall structure of the model is similar to the one presented in Arndt, C and Lewis, J. D. (2001). However, in formulating the details of the model, an eclectic approach has been followed keeping in mind the institutional features peculiar to the Indian economy.

The model has five production sectors: agriculture, tourism, manufacturing, services and health care, and three factors of production : land, capital and composite labour, which in turn, is a nested constant elasticity of substitution (CES) aggregation of non-educated (unskilled), secondaryeducated (semi-skilled) and highereducated (skilled) labour.

3.2 The 'no-AIDS' and 'with-AIDS' scenarios

The five-sector CGE model of the Indian economy is used to generate a 'no-AIDS' reference scenario and a 'with-AIDS' scenario for the 14-year period, 2002-03 to 2015-16, wherein a comparison of the latter with respect to the former yields an estimate of the macro-economic and sectoral impacts of the HIV epidemic in India.

In the 'with-AIDS' scenario, the following impacts of AIDS on the key exogenous variables are incorporated :

(i) slower growth in population and supply of labour by the skill categories, resulting from the AIDS-related deaths,

(ii) lower labour productivity of workers with HIV reflected in a lower effective labour input,

(iii) declines in sectoral TFP growth rates, initially, i.e., from 2002-03 to 2011-12, to 0.8 times the 'no-AIDS' growth rate, and, finally, during the height of the epidemic, i.e., from 2012-13 to 2015-16, to 0.7 times the 'no-AIDS' growth rate,

(iv) the share of health services spending of the HIV households, is augmented by an additional 10 percent of total consumption expenditure, at the expense of other non-food expenditures,

(v) an increase in the health expenditure of the government by 10 percent from 2002-03 to 2011-12, and by 15 percent from 2012- 13 to 2015-16.

3.3 The macro-economic impact of AIDS

The growth rates of supplies of labour of all the three skill types decline in the 'with-AIDS' scenario. The decline is maximum for the unskilled labour, followed by that of semi-skilled and skilled labour (Table 2). The increase in health expenditure of the households and the government results in a fall in their savings, which then crowds out investment. This fall in investment causes growth to slow down, and, hence, labour demand to shrink. The fall in labour demand outstrips the AIDS-induced fall in labour supply in case of all the three skill types of labour, and all the wage rates, therefore, decline, though unequally The slowdown in economic growth is manifested in a decline in the growth of real aggregate GDP as well as in the growth of per capita GDP (Fig. 3 and 4). The former decreased, on an average, by 0.86 percentage points, while the latter declined, on an average, by 0.55 percentage points in the 'with-AIDS' scenario compared to the 'no-AIDS' scenario. Hence, the survivors of the epidemic are not "indifferent" or "betteroff ". They are in fact "worse-off ", as the lower per capita incomes show (Table 2).

Household income growth rates for all the groups decline, though unequally. The decline in the household income growth rate is steepest for rural nonagricultural self employed, followed by that of rural agricultural labour, rural non-agricultural labour rural agricultural self employed and urban casual labour. These household groups are the ones which derive their incomes mainly from unskilled labour, which, among the three labour types, is affected most adversely by the HIV epidemic.

3.4 Impact on labour supply and wages

In the 'with-AIDS' scenario, growth rates of supplies of labour of all the three skill types decline. The decline is maximum for the unskilled labour, followed by that of semi-skilled and skilled labour (fig. 5). However, the decline in growth rates of labour supplies does not result in a rise in the growth of the wage rates. Instead, the growth in wages of the three labour types suffers a decline (Table 3). This happens because (in our general equilibrium framework), while the supply of labour falls due to deaths associated with the AIDS epidemic, the demand for labour falls proportionately more as a result of a slower overall economic growth accompanied by a changed sectoral pattern of growth in favour of sectors with relatively lower intensity of unskilled labour-use relative to other factors (as shall be seen later). The slowdown in economic growth occurs because of a decline in investment. The AIDS epidemic, it must be noted, induces an increase in health expenditure of the households and the government resulting in a fall in their savings, which then crowds out investment. The decline in investment demand in turn induces a cutback in labour demand, and the latter effect is reinforced in the unskilled labour-intensive sectors. All in all, the fall in labour demand outstrips the AIDS induced fall in labour supply, and the wage rates, therefore, decrease, rather than increase (fig. 6).

The decline in the wage rates, however, is not uniform across the three types of labour. The decline is largest for unskilled labour, followed by that of semi-skilled and skilled labour (Table 3). The result is a marginal increase in wage inequality, with the semi-skilled and skilled workers earning wages which are respectively 1.80 and 6.79 times the wage of unskilled workers (Table 4).

3.5 Impact on GDP and household incomes

Real GDP in the 'with-AIDS' scenario grows at 7.34 percent per annum, which is 0.86 % point less than the annual GDP growth rate of the 'no- AIDS' scenario (Table 5). The fall in GDP growth is not "offset", as is sometimes believed, by the decline in population growth caused by the AIDS epidemic. This is obvious from the fact that growth of real GDP per capita also declines by 0.55 percentage points in the 'with-AIDS' scenario (fig. 3).

The crowding out of investment in the 'with-AIDS' scenario is clearly shown by a 1.16 percentage point decline in the investment/GDP ratio. It is the result of a fall in both household and government savings. The ratios of household and government savings to GDP decline respectively by 1.15 and 0.67 percentage points respectively (Table 5).

Growth in household income as a whole also suffers a decline of 0.46 percentage points. Furthermore, an inter-group comparison of the household income growth rates reveals that all groups experience a slower growth in their incomes. The extent of slowdown in the income growth rates, however, varies widely across the household groups.

The household groups for whom the declines in their income growth rates are relatively sharper are the following : rural non-agricultural self-employed, rural agricultural labour, rural nonagricultural labour, rural agricultural selfemployed and urban casual labour (in that order) (see Table 5). These household groups are the ones which derive their livelihood predominantly from unskilled labour. And it is the unskilled labour which is relatively harder hit by the AIDS epidemic.

3.6 The sectoral impact of AIDS

In sectoral terms, the HIV epidemic hits harder the sectors that use unskilled labour intensively. For example, 'tourism', which is the second-most unskilled labour-intensive sector, suffers the maximum loss of 18 percent in value addedterms in the 'with-AIDS' scenario in the final year 2015-16. It is followed by the 'manufacturing' or 'industry' sector, occupying the third position in the unskilled labour intensity ranking, and having a value-added which is 12 percent smaller in the 'with-AIDS' scenario as compared to the 'no-AIDS' scenario.

On the other end of the scale, is the healthcare sector, which is least unskilled labour-intensive, and, hence, experiences a minor 2 percent loss in its value-added. The other reason for this obviously, is that the demand for health care by workers with HIV increases relatively. Overall, the sectoral pattern of production changes in favour of 'healthcare' and 'services' – i.e. sectors having relatively lower unskilled labour intensity - at the cost of 'tourism' and 'manufacturing' – i.e., sectors with relatively higher unskilled labour intensity (Table 6).

The sectoral impact of the AIDS epidemic, with the exception of 'agriculture', its adverse impact on value-added is greater for sectors that use unskilled labour intensively. For example, 'tourism', which is the second-most unskilled labour-intensive sector, suffers the maximum loss of 18.31 percent in value-added terms in the 'with-AIDS' scenario in the final year 2015-16. It is followed by the 'manufacturing' sector, occupying third position in the unskilled labour intensity ranking, and having a value-added which is 12.48 percent smaller in the 'with-AIDS' scenario as compared to the 'no-AIDS' scenario. Next comes the 'services' sector, which is placed fourth in the unskilled labour intensity ranking. The value-added in this sector declines by 10.13 percent. The value-added in 'agriculture', which is the most unskilled labour-intensive sector, however, declines by only 9.08 percent. Finally, there is the healthcare', the least unskilled labour-intensive sector, suffering a minor 1.93 percent loss in its value-added . It follows that, the sectoral pattern of production changes in favour of 'healthcare' and 'services' – i.e., sectors having relatively lower unskilled labour intensity – at the cost of 'tourism' and 'manufacturing' – i.e., sectors with relatively higher unskilled labour intensity.

4. The Impact of HIV and AIDS on Indian Industry

In extended CGE model, the Indian industry is disaggregated into 16 constituent sectors. Over and above, we have the agricultural sector and 11 other sectors covering all the services. In other words, the economy is made of 28 producing sectors, 16 of which comprise its industrial activities. These 28 sectors are as follows :

Agriculture

1) Agriculture

Industry

2 Mining and quarrying (Min. and Qua.)

3) Food and beverages (Food & Bev.)

4) Textiles

5) Wood & wood products (Wd. & Wd. Prods.)

6) Paper and printing (Paper & Print.)

7) Leather & leather products (Lr. & Lr. Prods.)

8) Petroleum products (Pet. Prods.)

9) Chemicals

10) Non-metallic products (Non-met. Prods.)

11) Basic metals

12) Metal products

13) Capital goods

14) Other manufacturing (Other Manuf.)

15) Construction

16) Electricity

17) Gas & water supply (Gas & Water Su.)

Services

18) Rail transport service (Rail Transport)

19) Other transport service (Other Transport)

20) Storage

21) Communications
22) Trade
23) Hotels and restaurants (Hotels & Res.)
24) Finance and ownership of dwellings (Fin. & O of D.)
25) Education & research (Ed. & Rsch.)
26) Healthcare
27) Public administration & Other Services (Public Ad. & Other Services)
28) Tourism

Agriculture

Agriculture, in our sectoral classification, is very broadly defined to include all the food, cash and plantation crops, animal husbandry, forestry and logging, and fishing. Thus defined, agriculture produces 22 percent of India's GDP. In a three-sector division of the Indian economy – agriculture (primary sector), industry (secondary sector) and services (tertiary sector) – agriculture has the highest unskilled labour intensity, defined as the share of unskilled labour in total sectoral labour value-added. The share of unskilled labour in total sectoral value added is also the maximum in case of agriculture. However, agriculture has the lowest intensities for semi-skilled labour, skilled labour and capital (Tables 5 & 6).

Industry

In terms of share in GDP, industry is an equal of agriculture. Industry produces 23 percent of India's GDP. The unskilled labour intensity in industry is lower in comparison to agriculture, but higher as compared to services. The semi-skilled labour intensity in industry is highest among the three sectors. As far as skilled labour intensity is concerned, industry occupies an intermediate position between agriculture and services. The capital intensity in both industry and services is around 50 percent – which is about 6 percent higher than that in agriculture.

In Tables 8 and 9, we have arranged the 16 industrial sectors according to their ranks, in descending order, of their unskilled labour intensities (i.e. share of unskilled labour in total sectoral labour value-added). In this arrangement, the first five sectors – Non-metallic products, Wood and Wood Products, Construction, Food and Beverage and Textiles – are referred as the high unskilled labour intensity (HULI) sectors; the second set of four sectors – Leather and Leather Products, Other Manufacturing, Metal Products, and Mining and Quarrying – as the medium unskilled labour intensity (MULI) industries; the third set of seven sectors – Chemicals, Capital Goods, Paper and Printing, Basic Metals, Gas and Water Supply, Petroleum Products, Electricity - as the low unskilled labour intensity (LULI) industries. It is obvious that, in characterising the sectors above the sectoral can be classified as table7.

Non-metallic products

The non-metallic products include structural clay products, cement and other non-metallic mineral products, such as glass and glass products, earthenware, pottery, sanitaryware, porcelainware, insulators, lime and plaster, mica products, graphite etc. This sector produces 3.24 percent of industrial GDP, which is 0.74 percent of national GDP. This sector is highly unskilled labour-intensive. In this sector, the share of unskilled labour in total sectoral labour value-added is 68.22 percent – the highest among all the industrial sectors (Tables 8 & 9).

Wood and wood products

This sector consists of wooden, bamboo and cane furniture and fixtures, and repair of such furniture, manufacture of veneer, plywood and their products, sawing and planing of wood, structural wooden goods, wooden industrial goods, cork and cork products, and other miscellaneous wood, bamboo and cane products. This sector produces only 1.31 percent of industrial GDP – i.e., 0.30 percent of the country's GDP. Among the industrial sectors, its rank in terms of its share in GDP is 10 out of 16. This sector is a HULI sector - in fact, it is the second-most unskilled labour intensive sector within industry (Table 8).

Construction

The construction sector subsumes all activities concerned with construction and maintenance of buildings , aerodromes, roads, railways, bridges, pipelines, ports, harbours, runways, etc. This is the largest sector in industry in terms of relative value-added. Within industry, its rank with respect to its share in GDP is one out of 16. It accounts for 22.65 percent of industrial GDP or 5.17 percent national GDP. Construction, a HULI sector, is the third-most unskilled labour intensive sector within industry (Table 8).

Food and beverages

The food and beverage sector covers the following: manufacture and refining of sugar, boora, candy and khandsari, hydrogenated oils, vanaspati ghee, edible oils other than vanaspati, tea and coffee processing, miscellaneous food products, beverages, and tobacco products. Its contribution to industrial GDP is 2.17 percent, and to national GDP it is 9.15 percent. In value-added terms, it is the fourth largest sector within industry (Table 8). It is also a HULI sector.

Textiles

The textiles sector includes khadi and cotton textiles, silk textiles, art silk and synthetic fibre textiles, jute, hemp and mesta textiles, readymade garments, and miscellaneous textile products. It is the seventh largest sector within industry. It contributes 6.66 percent of industrial GDP and 1.52 percent of national GDP (Table 8). It is a HULI sector.

Leather and leather products

This sector subsumes tanning, curing, finishing, embossing and japanning of leather, manufacture of wearing apparel, manufacture and repair of leather cum-rubber footwear and various other leather-related activities. In terms of relative value-added, this is the smallest sector within industry. It produces only 0.66 percent of industrial GDP, which is 0.15 percent of national GDP (Table 8). It is a MULI sector.

Other manufacturing

Other manufacturing is actually a residual sector. Whatever does not belong to any one of the other 15 sectors is included here. It is also referred to as miscellaneous manufacturing. It covers the following economic activities: manufacture and repair of watches, clocks and time pieces, manufacture of surgical, medical, laboratory, scientific and mathematical instruments, such as water meters, electricity meters, photographic and optical goods, jewellery and related articles, sports and athletic goods, toys, manufacture of aircraft and parts and repair of enterprises not elsewhere classified. Its contribution to industrial GDP is 3.11 percent, and to national GDP it is 0.71 percent (Table 8). It is a MULI sector.

Metal products

Metal products sector consists of hand tools, hardware, and miscellaneous metal products. This sector produces only 2.37 percent of industrial GDP or 0.54 percent of national GDP (Table 8). It is a MULI sector.

Mining and quarrying

Mining and quarrying includes coal and lignite mining, crude petroleum, natural gas, iron ore mining, manganese ore mining, bauxite mining, copper ore mining, other metallic minerals, limestone mining, mica mining and other non-metallic minerals. Mining and quarrying is the second largest industrial sector. It accounts for 10.11 percent of industrial GDP, which is 2.31 percent of national GDP (Table 8). Mining and quarrying is a MULI sector.

Chemicals

Chemicals sector has a very wide coverage. It includes inorganic heavy chemicals, organic heavy chemicals, fertilisers, pesticides, paints, varnishes and lacquers, drugs and medicines, soaps and cosmetics, synthetic fibres, resin and other chemicals. Within industry, chemicals is the third largest sector. It produces 9.98 percent of industrial GDP, which is 2.28 percent of national GDP (Table 8). Chemicals sector is a LULI sector.

Capital goods

Capital goods sector covers a wide variety of machineries, machine tools, equipments, appliances and consumer durables. This sector includes the following: industrial machinery for various industries, machine tools, tractors and other agricultural implements, office computing and accounting machinery, other non-electrical and electrical machinery, electrical industrial machinery, electrical cables, wires, batteries, electrical appliances, communication equipment, electronic equipment including television, ships and boats, rail equipment, motor vehicles, motor cycles and scooters, bicycles and cycle-rickshaws, and other transport equipment. Capital goods sector is the fifth largest industrial sector. It accounts for 8.94 percent of industrial GDP, which is 2.04 percent of national GDP (Table 8). It is a LULI sector.

Paper and printing

Paper and printing sector includes paper, paper products and newsprint, printing, publishing and allied activities. Paper and printing is a small industrial sector, accounting for only 2.10 percent of industrial GDP, and 0.48 percent of national GDP. It is a LULI sector.

Basic metals

Basic metals sector consists of manufacture of iron and steel ferro-alloys, iron and steel foundries, iron and steel casting and forging, non-ferrous basic metals and alloys. Basic metals is the eighth largest sector. It accounts for 5.52 percent of industrial GDP, which is 1.26 percent of national GDP. It is a LULI sector.

Gas and water supply

Gas and water supply sector includes manufacture of gas in gasworks, distribution through mains to household, industrial and commercial and other users, LPG and gobar gas, collection, purification and distribution of water. Gas and water supply is a very small sector, producing only 1.87 percent of industrial GDP, which is 0.43 percent of national GDP. This sector is a LULI sector.

Petroleum products

Petroleum products sector subsumes petroleum products rubber and plastic products, as well as coal tar products. Petroleum products contribute 5 percent of industrial GDP, which is 1.14 percent of national GDP. It is a LULI sector.

Electricity

Electricity sector includes generation and transmission of electric energy and its distribution to households, industrial, commercial and other users. Electricity is the sixth largest industrial sector, contributing 6.96 percent of industrial GDP, which is 1.59 percent of national GDP (Table 5). Electricity is, expectedly, a LULI sector.

Services

Among the three broad sectors of the Indian economy – agriculture, industry, and services – services is the largest contributor to GDP. The services or tertiary sector produces 54.29 percent of India's GDP. Among the three sectors, services has the lowest unskilled labour intensity. As far as semi-skilled labour intensity is concerned, services occupies an intermediate position between agriculture and industry. The skilled labour intensity in services is highest among the three sectors. The capital intensity in services is around 50 percent – the same as in industry.

In Tables 5 and 6, 11 service sectors are arranged according to their ranks, in descending order of their unskilled labour intensities (i.e. share of unskilled labour in total sectoral labour value- added). In this arrangement, we would refer to the first five sectors – Hotels and restaurants, Other transport, Tourism, Storage, and Trade – as the medium unskilled labour intensity (MULI) sectors, and the second set of six sectors – Rail transport, Public administration and other services, Education and research, Finance and ownership of dwellings, Health and communications – as the low unskilled labour intensity (LULI) services.

Hotels and restaurants

Hotels and restaurants sector covers services rendered by hotels, boarding houses, eating houses, cafes, restaurants, canteen etc. This is a small sector contributing only 1.86 percent of tertiary sector's GDP, which amounts to 1.01 percent of national GDP. It is MULI sector.

Other transport

Other transport services include all transport services rendered by buses, tramways, trucks, taxis, auto-rickshaws, animals, anima-drawn carts, cycles, rickshaws, ships, boats, steamers, ferries, aircrafts etc. This sector is the fourth largest tertiary sector, producing 10.36 percent of the tertiary sector's GDP, which is 5.62 percent of national GDP. Other transport services is a MULI sector.

Tourism

Tourism is the smallest tertiary sector. It accounts for only 0.06 percent of tertiary sector's GDP, which is 0.03 percent of national GDP. It is MULI sector.

Storage

Storage sector includes cold storage, storage and warehousing. It is the second smallest tertiary sector, producing only 0.11 percent of tertiary sector's GDP, which amounts to 0.06 percent of national GDP. Storage sector is a MULI sector.

Trade

Trade sector includes all wholesale and retail trade. It is the largest tertiary sector, contributing 26.85 percent of tertiary sector's GDP, which amounts to 14.57 percent of national GDP. It is a MULI sector.

Rail transport

Railway transport services sector includes all transport services rendered by government and private railways. It is the third smallest sector, producing 1.81 percent of tertiary sector's GDP, which is 0.98 percent of national GDP. It is a LULI sector.

Public administration and other services

Public Administration and Other Services cover public administration, defence and a whole lot of other services rendered by real estate, religious and legal institutions, information, broadcasting and entertainment companies,

laundries, barber and beauty shops and other personal services. This sector is the second largest sector, accounting for 22.45 percent of tertiary sector's GDP, which amounts to 12.18 percent of national GDP. It is a LULI sector.

Education and research

Education and research sector includes all services rendered by education, scientific and research services. It is fifth largest sector, producing 22.04 percent of tertiary sector's GDP, i.e., 11.96 percent of national GDP. Education and research is a LULI sector. Expectedly, it is a highly skilled labour intensive sector.

Finance and ownership of dwellings

Finance and ownership of dwellings sector subsumes the services rendered by the commercial banks, banking department of RBI, other financial companies, industrial development and financial corporations, post office saving banks, cumulative time deposit accounts, cooperative credit societies, life insurance corporation, postal life insurance, employees state insurance and non-life insurance and ownership of residential houses. Finance and ownership of dwellings is the third largest tertiary sector, accounting for 11.96 percent of tertiary sector's GDP and 22.45 percent of national GDP. This sector is a LULI sector. On the other hand, it is the most capital intensive sector.

Healthcare

Healthcare sector includes all the medical and health services. It accounts for only 2.59 percent of the tertiary sector's GDP, which is 1.40 percent of the country's GDP. Health sector is a low unskilled labour intensive sector, but is a highly skilled labour intensive sector.

Communications

Communications sector includes postal, telephonic and telegraphic services rendered by postal and telegraph department and overseas communication services. Communication services sector contributes 2.92 percent of the tertiary sector's GDP, which is 1.58 percent of national GDP. It is a LULI sector, but a highly capital intensive sector.

5. Conclusion

The adverse economic impact of HIV and AIDS occurs at three levels: the individual/household, sector and national or macro-levels. In the early phase of the epidemic, the impacts at the sector and macro-levels are rather mild and hence, not easily measurable or quantifiable. So far in India, given the low overall prevalence, the focus has been on the effects at the level of the individual and the household. However, in 2005 the number of HIV-affected persons exceeds 5 million, and this number is expected to quintuple to between 20 million and 25 million by 2010. With that kind of a jump in the number of HIV cases in the next 5-10 years, there is bound to be a visible impact on the macro-economy. The increase in health expenditure of the households and the government results in a fall in their savings, which then crowds out investment. The fall in investment causes growth to slow down, and, hence, labour demand to shrink. The fall in labour demand, in fact, outstrips the AIDS-induced fall in labour supply in case of all the three skill types of labour, and all the wage rates, therefore, decline, though unequally.

The slowdown in economic growth is manifested in a decline in the growth of real aggregate GDP as well as in the growth of per capita GDP. The former decreased, on an average, by 0.86 percentage points, while the latter declined, on an average, by 0.55 percentage points in the 'with- AIDS' scenario compared to the 'no- AIDS' scenario. Hence, the survivors of the epidemic are not "indifferent" or "better-off". They are in fact "worse-off", as the lower per capita incomes show. Household income growth rates for all the groups decline, though unequally. The decline in the household income growth rate is steepest for rural non-agricultural self-employed, followed by that of rural agricultural labour, rural non-agricultural labour, rural agricultural self-employed and urban casual labour, in that order. These household groups are the ones which derive their incomes mainly from unskilled labour, which, among the three labour types, is affected most adversely by the HIV epidemic. In sectoral terms, the HIV epidemic hits

the sectors that use unskilled labour intensively harder. For example, 'tourism', which is the second-most unskilled labour intensive sector, suffers the maximum loss of 18.31 percent in valueadded terms in the 'with-AIDS' scenario in the final year 2015-16. It is followed by the 'manufacturing' or 'industry' sector, occupying the third position in the unskilled labour intensity ranking, and undergoing a value-added loss of 12.48 percent. On the other end of the scale, is the healthcare sector, which is least unskilled labour intensive, and hence, experiences a minor 1.93 percent loss in its value-added. Overall, the sectoral pattern of production changes in favour of 'healthcare' and 'services' – i.e. sectors having relatively lower unskilled labour intensity – at the cost of 'tourism' and 'manufacturing' – i.e. sectors with relatively higher unskilled labour intensity.

As observed, in the absence of remedial policy action, the HIV epidemic in India is likely to bring down the average annual GDP growth rate during 2002-03 to 2015-16 by about 1 percent. Conversely speaking - i.e., assuming that the 'with- AIDS' scenario is the business-as-usual scenario, and the 'no-AIDS' scenario is the counter-factual policy scenario – it is possible to argue that in the next decade the annual GDP growth rate can be increased by upto 1 percent, if AIDS is effectively countered. It is time, therefore, to begin to see policy action against AIDS as a growth-enhancing policy endeavour, and, first and foremost, dedicate adequate resources for this purpose. However, allocating plentiful resources by itself will not suffice for combating AIDS. Availability of financial resources fulfill only the necessary condition for successful HIV Prevention and Control programmes. For sufficient condition to hold as well, new ideas, innovative institutions, and bold implementation must follow suit.

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Table 1 State wise estimated HIV prevalence

Statewise Estimated Adult (15-49) HIV Prevalence and Number of HIV Infections with Uncertainty Bounds, 2009						
State/UT	Estimated Adult HIV Prevalence, 2009 (%)			Estimated Number of HIV Infections, 2009		
	Estimate	Uncertainty bounds		Estimate	Uncertainty bounds	
		Lower	Upper		Lower	Upper
Andaman & Nicobar Islands	0.26	0.19	0.36	395	292	536
Andhra Pradesh	0.90	0.77	1.07	4,99,620	4,24,214	5,96,011
Arunachal Pradesh	0.16	0.12	0.22	1,082	808	1,481
Assam	0.08	0.06	0.12	14,244	10,400	21,599
Bihar	0.22	0.18	0.27	1,20,470	1,00,493	1,47,676
Chandigarh	0.39	0.32	0.47	3,067	2,571	3,716
Chattisgarh	0.28	0.20	0.38	39,774	29,188	53,885
Dadra & Nagar Haveli	0.15	0.11	0.20	285	217	383
Daman & Diu	0.16	0.12	0.21	251	192	336
Delhi	0.30	0.25	0.36	34,216	28,735	41,076
Goa	0.49	0.31	0.73	5,440	3,584	8,027
Gujarat	0.37	0.30	0.55	1,36,875	1,09,952	2,00,826
Haryana	0.10	0.09	0.13	15,852	13,189	19,122
Himachal Pradesh	0.19	0.16	0.24	8,878	7,105	11,069
Jammu & Kashmir	0.08	0.06	0.11	5,403	3,971	7,444
Jharkhand	0.13	0.11	0.17	23,574	19,133	29,301
Karnataka	0.63	0.46	0.88	2,45,522	1,79,205	3,35,119
Kerala	0.19	0.15	0.24	40,060	32,654	49,352
Madhya Pradesh	0.19	0.16	0.24	84,803	69,916	1,03,540
Maharashtra	0.55	0.44	0.71	4,19,789	3,31,891	5,48,366
Manipur	1.40	1.16	1.64	26,773	22,113	32,374
Meghalaya	0.08	0.06	0.12	1,332	1,002	1,921
Mizoram	0.81	0.60	1.12	6,025	4,448	8,361
Nagaland	0.78	0.66	0.93	13,120	11,005	15,578
Orissa	0.29	0.24	0.37	71,813	58,879	90,117
Puducherry	0.28	0.22	0.36	2,254	1,768	2,860
Punjab	0.32	0.26	0.39	56,928	47,077	67,967
Rajasthan	0.19	0.16	0.23	76,316	63,998	92,466
Sikkim	0.06	0.05	0.08	231	173	296
Tamil Nadu	0.33	0.26	0.41	1,54,742	1,21,000	1,94,611
Tripura	0.15	0.10	0.21	3,425	2,381	4,845
Uttar Pradesh	0.09	0.08	0.11	1,09,352	90,199	1,37,193
Uttarakhand	0.10	0.07	0.15	5,539	3,893	8,597
West Bengal	0.29	0.24	0.35	1,67,994	1,38,348	2,06,930
India	**0.31**	**0.25**	**0.39**	**23,95,444**	**19,33,994**	**30,42,981**

Table 2 Macro-economic impact of AIDS "with AIDS" scenario & "No-AIDS" scnario

Macro-economic impact of AIDS

	Average annual growth rates for 2002-03 to 2015–16 (in percent)		Diff. from 'no-AIDS' scenario in percentage points
	'with-AIDS' scenario	'no-AIDS' reference scenario	'with-AIDS' scenario
Labour supply	**1.70**	**2.01**	**-0.31**
Unskilled labour	0.69	1.03	-0.34
Semi-skilled labour	3.18	3.49	-0.31
Skilled labour	4.46	4.68	-0.22
Wage rate (real)	**5.07**	**5.17**	**-0.10**
Unskilled labour	4.21	4.28	-0.07
Semi-skilled labour	3.82	3.86	-0.05
Skilled labour	3.60	3.63	-0.03
Real GDP	**7.34**	**8.21**	**-0.86**
Real GDP per capita	**6.13**	*6.68*	**-0.55**
Government saving (percent of GDP)	-2.26	-1.59	-0.67
Household saving (percent of GDP)	27.86	29.01	-1.15
Investment (percent of GDP)	27.95	29.11	-1.16

The growth rates of supplies of labour of all the three skill types decline in the 'with-AIDS' scenario. The decline is maximum for the unskilled labour, followed by that of semi-skilled and

skilled labour

Table 3 Labour supply & wage rates "with AIDS" scenario & "No-AIDS" scnario

Labour supply and wage rates

	Average annual growth rates for 2002-03 to 2015–16 (in percent)		Difference from 'no-AIDS' reference scenario in percentage points
	'with-AIDS' scenario	'no-AIDS' reference scenario	'with-AIDS' scenario
Labour supply	**1.70**	**2.01**	**-0.31**
Unskilled labour	0.69	1.03	-0.34
Semi-skilled labour	3.18	3.49	-0.31
Skilled labour	4.46	4.68	-0.22
Wage rate (real)	**5.07**	**5.17**	**-0.10**
Unskilled labour	4.21	4.28	-0.07
Semi-skilled labour	3.82	3.86	-0.05
Skilled labour	3.60	3.63	-0.03

The decline in the wage rates, however, is not uniform across the three types of labour. The decline is largest for unskilled labour, followed by that of semi-skilled and skilled labour

Table 4 Wage Rate Indexes with AIDS" scenario & "No-AIDS" scnario

Wage rate indexes

	Wage rate as a multiple of unskilled labour's wage rate in 2015-16	
	'with-AIDS' scenario	'no-AIDS' reference scenario
Wage rate (real)		
Unskilled labour	1.00	1.00
Semi-skilled labour	1.80	1.78
Skilled labour	6.79	6.76

There is a marginal increase in wage inequality, with the semi-skilled and skilled workers earning wages which are respectively 1.80 and 6.79 times the wage of unskilled workers

Table 5 GDP & household Income "with AIDS" scenario & "No-AIDS" scenario

GDP and household income

	Average annual growth rates for 2002-03 to 2015-16 (in percent) 'with-AIDS' scenario	Average annual growth rates for 2002-03 to 2015-16 (in percent) 'no-AIDS' reference scenario	Difference from 'no-AIDS' reference scenario in percentage points 'with-AIDS' scenario
Real GDP	**7.34**	**8.21**	**-0.86**
Real GDP per capita	**6.13**	**6.68**	**-0.55**
Government saving (% of GDP)	-2.26	-1.59	-0.67
Household saving (% of GDP)	27.86	29.01	-1.15
Investment (% of GDP)	27.95	29.11	-1.16
Household income (real)	**7.22**	**7.68**	**-0.46**
Rural agricultural self-employed	**6.08**	**6.55**	**-0.47**
Rural non-agricultural self-employed	**5.64**	**6.49**	**-0.84**
Rural non-agricultural labour	**6.56**	**7.03**	**-0.47**
Rural agricultural labour	**6.48**	**7.26**	**-0.78**
Rural other households	7.84	8.03	-0.18
Urban self-employed	6.91	7.06	-0.15
Urban salaried households	**9.14**	**9.26**	**-0.12**
Urban casual labour	7.09	7.47	-0.39
Urban other households	6.20	6.44	-0.24

The ratios of household and government savings to GDP decline respectively by 1.15 and 0.67 percentage points respectively

Table 6 Sectoral Impact of AIDS

Sectoral impact of AIDS

	For the year 2015-16		Computed from the base-year (2002-03) values				
	'with-AIDS'/ 'no-AIDS' value-added ratio (in percent)	Loss in value-added due to AIDS (in percent)	Share in GDP (in percent)	Share of unskilled labour in total sectoral labour value-added (in percent)	Share of unskilled labour in total sectoral value-added (in percent)	Ranking (descending order) as per cols. 5 & 6	Ranking (descending order) as per col. 3
Agriculture	90.92	9.08	22.98	70.04	37.65	1st	4th
Tourism	81.69	18.31	00.03	37.45	21.82	2nd	1st
Manufacturing (Industry)	87.52	12.48	22.40	36.31	20.77	3rd	2nd
Services	89.87	10.13	53.20	21.26	10.71	4th	3rd
Healthcare	98.07	1.93	01.39	08.07	05.55	5th	5th
Simple Average	89.61	10.31	20.00	34.63	19.30		
Real GDP	**90.11**	**9.89**	**100.00**	**36.86**	**20.51**		

the sectoral pattern of production changes in favour of 'healthcare' and 'services' – i.e. sectors having relatively lower unskilled labour intensity - at the cost of 'tourism' and 'manufacturing' – i.e., sectors with relatively higher unskilled labour intensity

Table 7 Classification of different sectors on the basis of labour

(i)	Share of unskilled labour in total sectoral labour value-added	upto 30 %	Low unskilled labour intensity (LULI) sectors
(ii)	Share of unskilled labour in total sectoral labour value-added	above 30 % to 50 %	Medium unskilled labour intensity (MULI) sectors
(iii)	Share of unskilled labour in total sectoral labour value-added	above 50 % to 80 %	High unskilled labour intensity (HULI) sectors

Table 8 The Macro-Economic and Sectoral Impacts of HIV and AIDS in India

Sectors of the Indian economy I

Sector no.		For the year 2015-16			Computed from base-year (2002-03) values						
		'With-AIDS' / 'no-AIDS' value-added ratio	Loss in value-added due to AIDS		Share in GDP			Share of unskilled labour in total sectoral labour value-added		Share of unskilled labour in total sectoral value-added	
		(in %)	(in %)	Rank	Sectoral (in %)	National (in %)	Rank	(in %)	Rank	(in %)	Rank
	Agriculture	81.37	8.73		100.00	22.26		70.05		37.66	
1	Agriculture	81.37	8.73		100.00	22.26		70.05		37.66	
	Industry	88.19	11.81		100.00	22.82		36.84		21.55	
10	Non-met. prods.	84.85	15.15	2	3.24	0.74	10	68.22	1	27.69	4
5	Wd. & wd. prods.	87.29	12.71	3	1.31	0.30	15	66.67	2	42.90	2
15	Construction	76.92	23.08	1	22.65	5.17	1	63.26	3	49.22	1
3	Food and bev.	96.80	3.20	16	9.51	2.17	4	56.42	4	25.29	5
4	Textiles	91.84	8.16	12	6.66	1.52	7	52.02	5	28.76	3
7	Lr. & lr. prods.	90.14	9.86	6	0.66	0.15	16	41.49	6	23.67	6
14	Other manuf.	90.98	9.02	9	3.11	0.71	11	40.85	7	20.21	7
12	Metal products	89.59	10.41	4	2.37	0.54	12	35.37	8	15.10	8
2	Min. and qua.	90.24	9.76	7	10.11	2.31	2	33.12	9	10.43	10
9	Chemicals	89.84	10.16	5	9.98	2.28	3	23.58	10	6.50	13
13	Capital goods	90.39	9.61	8	8.94	2.04	5	22.81	11	10.76	9
6	Paper and print.	91.61	8.39	10	2.10	0.48	13	20.61	12	9.49	11
11	Basic metals	92.72	7.28	14	5.52	1.26	8	17.32	13	6.73	12
17	Gas & water su.	91.99	8.01	13	1.87	0.43	14	14.35	14	9.00	16
8	Pet. prods.	91.83	8.17	11	5.00	1.14	9	13.28	15	3.63	15
16	Electricity	93.00	7.00	15	6.96	1.59	6	13.26	16	4.69	14
	Services	90.98	9.02		100.00	54.29		24.14		12.05	
23	Hotels & res.	85.00	15.00	4	1.86	1.01	8	48.19	1	29.85	1
19	Other transport	83.15	16.85	3	10.36	5.62	4	42.28	2	26.54	2
28	Tourism	81.60	18.40	1	0.06	0.03	11	37.44	3	21.81	3
20	Storage	82.94	17.06	2	0.11	0.06	10	33.62	4	18.34	4
22	Trade	86.81	13.19	5	26.85	14.57	1	30.58	5	10.36	8
18	Rail transport	91.35	8.65	7	1.81	0.98	9	21.76	6	13.95	6
27	Public ad. & other services	97.88	2.12	10	22.45	12.18	2	21.26	7	16.45	5
25	Ed. & rsch.	97.63	2.37	9	8.97	4.87	5	16.49	8	12.89	7
24	Fin. & O. of D.	89.07	10.93	6	22.04	11.96	3	14.54	9	3.29	10
26	Healthcare	98.59	1.41	11	2.59	1.40	7	8.08	10	5.57	9
21	Communications	95.26	4.74	8	2.92	1.58	6	4.79	11	1.16	11

Note : The ranks in all the columns are in descending order.

Table 9 The Macro-Economic and Sectoral Impacts of HIV and AIDS in India

Sectors of the Indian Economy II

Sector no.		Computed from base-year (2002-03) values									
		Share of semi-skilled labour in total sectoral labour value-added		Share of semi-skilled labour in total sectoral value-added		Share of skilled labour in total sectoral labour value-added		Share of skilled labour in total sectoral value-added		Share of capital in total sectoral value-added	
		(in %)	Rank	(in %)	Rank	(in %)	Rank	(in %)	Rank	(in %)	Rank
	Agriculture	22.61		12.86		7.35		5.09		44.39	
1	Agriculture	22.61		12.86		7.35		5.09		44.39	
	Industry	35.27		16.22		27.89		11.73		50.51	
10	Non-met. prods.	22.62	16	9.18	14	9.16	15	3.72	16	59.41	6
5	Wd. & wd. prods.	26.12	13	16.81	7	7.21	16	4.64	15	35.66	15
15	Construction	25.59	15	19.91	3	11.15	14	8.68	12	22.19	16
3	Food and bev.	26.83	12	12.03	11	16.75	12	7.51	13	55.18	8
4	Textiles	35.09	7	19.40	4	12.90	13	7.13	14	44.72	12
7	Lr. & lr. prods.	39.68	3	22.64	2	18.83	11	10.74	10	42.95	13
14	Other manuf.	38.07	4	18.84	5	21.08	10	10.43	11	50.52	11
12	Metal products	37.75	5	16.11	10	26.87	9	11.47	8	57.32	7
2	Min. and qua.	31.34	10	9.86	13	35.54	7	11.19	9	68.52	3
9	Chemicals	25.87	14	7.13	16	50.55	3	13.93	7	72.45	2
13	Capital goods	37.08	6	17.49	6	40.10	5	18.92	3	52.83	10
6	Paper and print.	35.03	8	16.13	9	44.36	4	20.42	2	53.96	9
11	Basic metals	29.66	11	11.53	12	53.03	2	20.61	1	61.13	5
17	Gas & water su.	57.02	1	35.76	1	28.63	8	17.96	4	37.28	14
8	Pet. prods.	31.43	9	8.60	15	55.29	1	15.13	5	72.64	1
16	Electricity	46.71	2	16.53	8	40.03	6	14.17	6	64.61	4
	Services	29.92		14.94		45.94		22.94		50.07	
23	Hotels & res.	36.85	5	22.82	4	14.96	11	9.27	11	38.06	6
19	Other transport	42.17	3	26.47	2	15.55	10	9.76	10	37.23	7
28	Tourism	24.49	8	14.89	7	38.05	6	23.15	4	40.15	5
20	Storage	47.89	1	26.13	3	18.49	9	10.09	9	45.44	4
22	Trade	36.12	6	12.23	9	33.30	8	11.28	8	66.14	3
18	Rail transport	44.06	2	28.23	1	34.17	7	21.90	5	35.93	8
27	Public ad. & other services	29.26	7	22.65	5	49.49	5	38.30	3	22.60	10
25	Ed. & rsch.	17.45	11	13.63	8	66.05	2	51.60	1	21.88	11
24	Fin. & O. of D.	20.33	10	4.60	11	65.13	3	14.76	6	77.34	1
26	Healthcare	21.77	9	15.33	6	70.15	1	49.34	2	29.76	9
21	Communications	39.97	4	9.64	10	55.24	4	13.33	7	75.88	2

Note : The ranks in all the columns are in descending order.

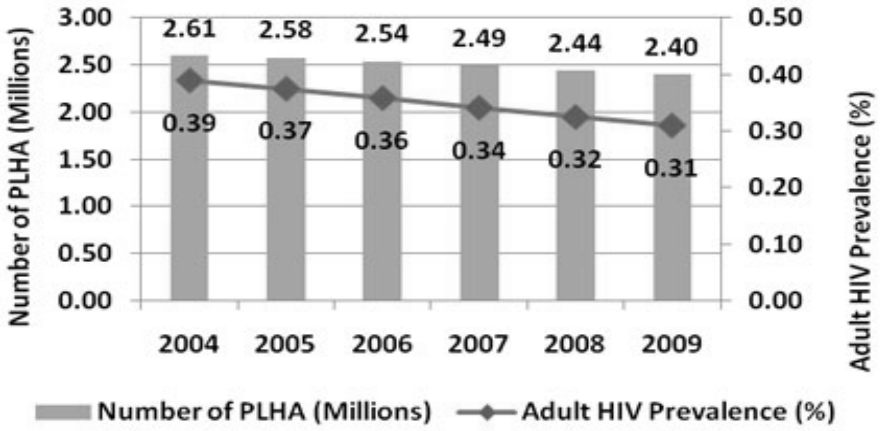

Figure 1. Number of HIV/AIDS cases in India

HIV epidemic in India at national level. Provisional estimates show that there are 22.7 lakh People living with HIV/AIDS in India by the end of 2008 with an estimated adult HIV prevalence of 0.29 percent

Figure 2. Map of India showing the worst affected states by HIV/AIDS

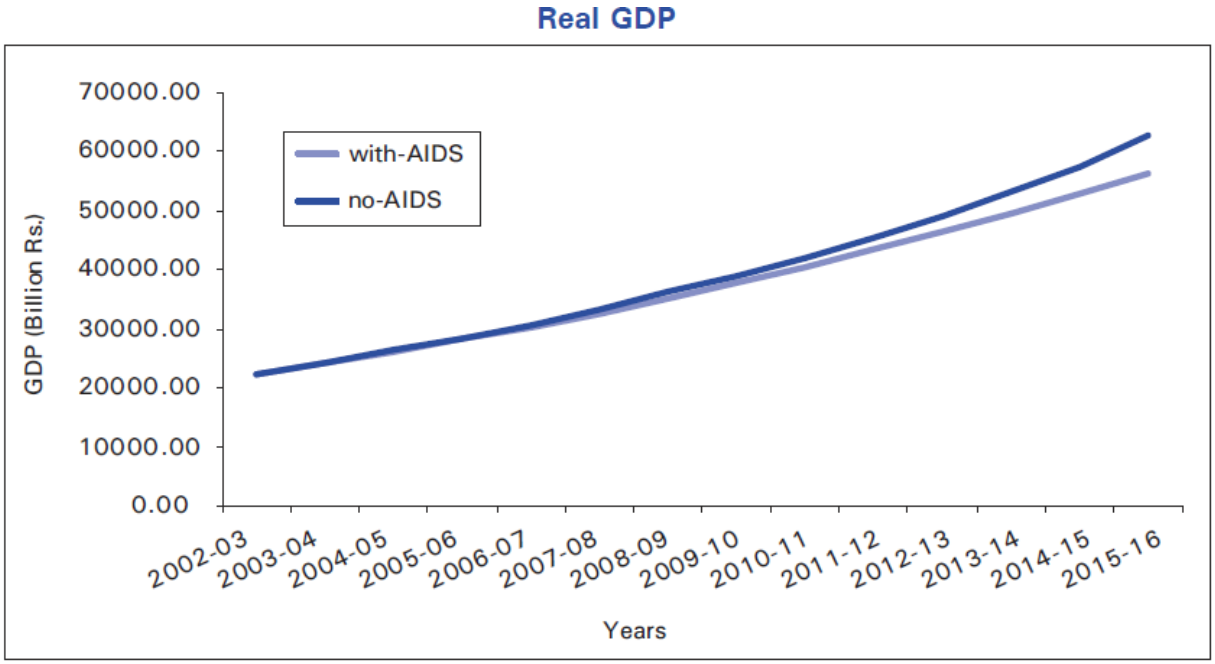

Fig 3 Real GDP of India over the period of 2002-2003 to 2015-2016

The slowdown in economic growth is manifested in a decline in the growth of real aggregate GDP which is decreased, on an average, by 0.86 percentage points, in the 'with-AIDS' scenario compared to the 'no-AIDS' scenario.

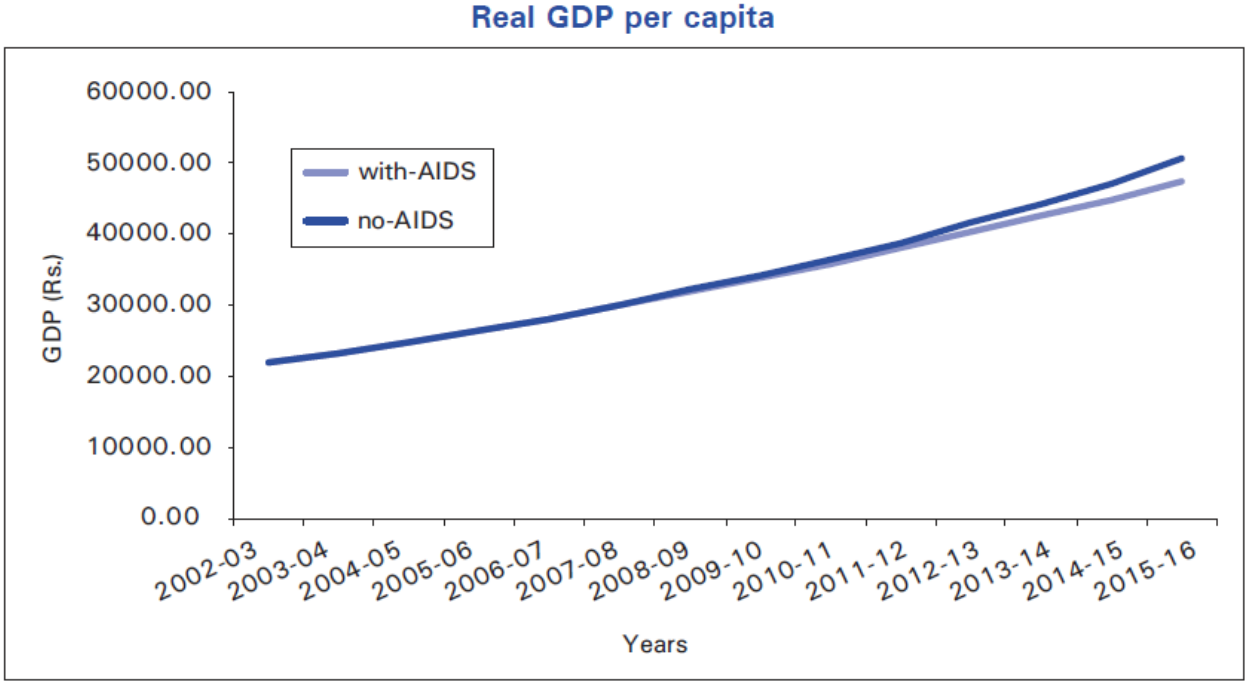

Fig. 4 Real GDP per capita of India over the period of 2002-2003 to 2015-2016

Growth of per capita GDP is declined, on an average, by 0.55 percentage points in the 'with-AIDS' scenario compared to the 'no-AIDS' scenario.

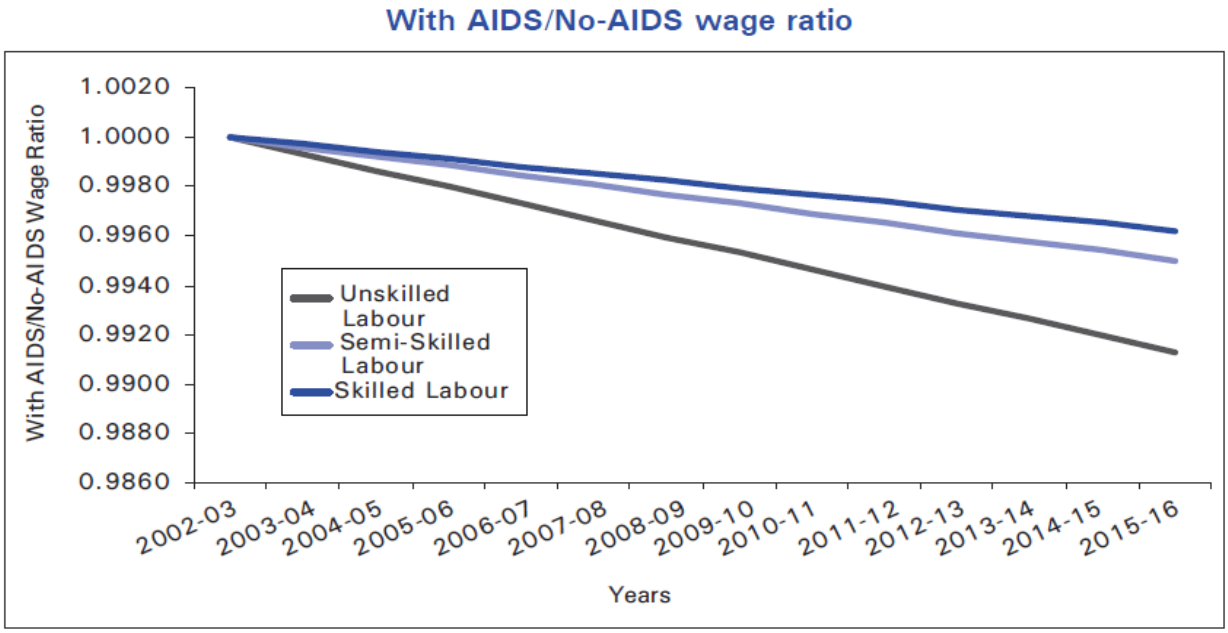

Fig. 5 With AIDS/NO-AIDS labour wage ratio

In the 'with-AIDS' scenario, growth rates of supplies of labour of all the three skill types decline. The decline is maximum for the unskilled labour, followed by that of semi-skilled and skilled labour

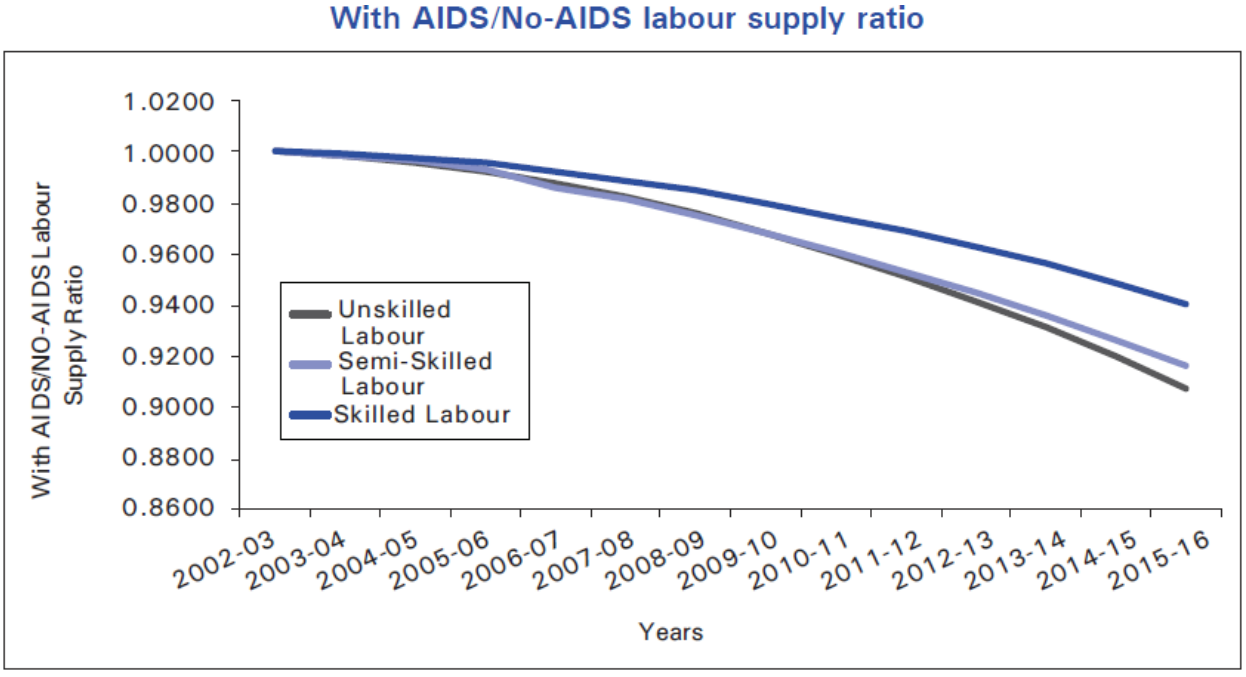

Fig. 6 With AIDS/NO-AIDS Labour Supply Ratio

The fall in labour demand outstrips the AIDS induced fall in labour supply, and the wage rates, therefore, decrease, rather than increase