

# Structural Change, Industrialization and Poverty Reduction: The Case of India

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## **FOREWORD**

The Development Papers series of the ESCAP South and South-West Asia Office (ESCAP-SSWA) promotes and disseminates policy-relevant research on the development challenges facing South and South-West Asia. It features policy research conducted at ESCAP-SSWA as well as by outside experts from within the region and beyond. The objective is to foster an informed debate on development policy challenges facing the subregion and sharing of development experiences and best practices.

Co-authored with Dr. Aradhna Aggarwal as an input to a United Nations Industrial Development Organisation (UNIDO) study on structural change and poverty reduction in the BRICS countries, this paper offers a case study of India's experience with industrialization and its impacts on poverty reduction over the last half century. The paper finds that while structural transformation has taken place in India, it has not been as conducive to poverty reduction as it might have otherwise have been. Our analysis suggests that this is because the pattern of growth in India has not been characterised by a change in the structure of employment towards manufacturing and services leaving agriculture to sustain the bulk of jobs with a very small share in GDP.

In light of our analysis, further industrial expansion combined with redistributive mechanisms to help alleviate poverty are important steps forward in addressing India's persistent poverty problem.

We hope that this paper will contribute to the ongoing debate on poverty reduction and structural change in the subregion.

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**STRUCTURAL CHANGE, INDUSTRIALIZATION AND POVERTY REDUCTION:  
THE CASE OF INDIA**Aradhna Aggarwal and Nagesh Kumar<sup>1</sup>**Abstract**

This paper analyses the growth-structural change-poverty linkages within the framework of the New Structural Economics using Indian data for the period since 1951-52. It finds that the Indian economy has recorded substantial improvement in its GDP growth performance over the past three decades with average rates of growth going up and fluctuations coming down. . The growth of the economy has been accompanied by a changing sectoral distribution of GDP towards high productivity sectors in particular services. However, the changing sectoral distribution of GDP has not been matched by a commensurate change in the distribution pattern of the labour force, as the agricultural sector and other low productivity sectors continue to dominate employment. Significantly, India's pattern of growth has not been characterised by a change in the structure of employment towards manufacturing, with the share of this sector in total employment stagnating, and recently declining, despite growth of output. Even within this sector, the resource and labour intensive low tech sectors remain the largest employers. The mismatch between the sectoral patterns of value added and employment has led to wide wage differentials across sectors. This raises an important question about the impact of growth on poverty. This is because growth is poverty reducing only if it 'enables the poor to actively participate in and significantly benefit from economic activity'. The present study finds that growth has indeed been accompanied by important reductions in poverty levels, but sizable population still remains stuck in poverty. The lack of structural change in the right direction seems to have impeded the poverty reducing effects of growth. We have shown that job creation by industrial expansion is clearly the way forward along with redistributive policies to solve poverty problems. While fostering industrialization India could pursue strategic import substitution and leverage the large domestic market that has now developed in several modern sectors.

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## **STRUCTURAL CHANGE, INDUSTRIALIZATION AND POVERTY REDUCTION: THE CASE OF INDIA**

### **I. INTRODUCTION**

Development policy often aims to reduce poverty through economic growth. However, a large body of evidence shows that the relationship between growth and poverty is ambiguous and that different growth episodes have very different impacts on poverty. Indeed, there is increasing recognition that growth comes about in a variety of ways and that different types of growth processes may have different effects on poverty (World Bank, 1990; Squire, 1993; Lipton and Ravallion, 1995; Chatterjee, 1995; McKay, 1997; Goudie and Ladd 1999 among others). The literature on growth-poverty nexus has therefore increasingly come to focus on particular growth mechanisms and their linkages with growth and poverty. One of the most striking developments in this literature is the revival of the structuralist economics of the Post War period that places structural change at the heart of the development process. The ‘New Structural Economics’, as it has come to be known as, emphasises that growth has poverty reducing impact if it ensures that a country’s limited resources, including its labor force, are directed to increasingly productive activities. An expansion of more productive and dynamic sectors can push the economy into a virtuous circle in which the growth of productive employment, productive capacities and earnings mutually reinforce each other to accelerate growth and reduce poverty.<sup>1</sup> Following the emergence of this thinking, there has been renewed interest in the impact of structural change on growth (Pasinetti, 1981; Kendrick, 1984; Maddison, 1987; Notarangelo, 1999; Fagerberg, 2000; Verspagen, 2000; Echevarria 1997, Stamer 1998; Matsuyama, 1999; Dietrich 2009; Cortuk and Singh, 2011; Macmillan and Rodrik, 2011) as well as poverty (Sundaram and Tendulkar 2006; Khan, 2007; Zapenda et al., 2007; Essama-Nssah and Bassole, 2010; Teal 2011 among several others ).<sup>2</sup>

Despite a renewed and growing interest in structural transformation and a burgeoning literature on growth, structural change and poverty reduction, comprehensive empirical studies providing evidence of the causal linkages from structural change to economic growth, employment and poverty reduction are scarce. Against that backdrop, this paper investigates the relationship between growth and structural change in India and its implications for human development and poverty. The main assumption underlying the study is that structural change brings about growth and in turn poverty reduction through the expansion of value-added and employment in higher productivity non-primary sectors at the cost of the lower productivity primary sector. Since labour productivity in non-primary sectors is higher, the large scale migration of labour out of primary activity should raise labour incomes and result in poverty reducing growth. Economic growth driven by structural change in income and employment therefore should have positive effects on poverty reduction. The present analysis looks at the degree to which this is the case, given the growth experience of the Indian economy since 1950-1.

The paper is structured as follows: We begin with a theoretical discussion on the impact of structural change on growth and poverty in Section 2. This is followed by an in-depth analysis of growth-structural change linkages in India in Section 3; and the growth-structural change-employment nexus in Section 4. Section 5 focuses on restructuring of the manufacturing sector and examines its impact on growth and employment. Section 6 examines growth-structural change-poverty linkages with Indian data. Finally, Section 7 concludes and draws policy implications.

### **II. UNDERSTANDING STRUCTURAL CHANGE, GROWTH AND POVERTY REDUCTION**

The term ‘structural change’ has been used in economic research with different meanings and interpretations. In development economics and in economic history, structural change is commonly understood as the change in distribution of economic activity and productive factors among various sectors of the economy (Silva and Teixeira, 2008). This study uses such a notion of structural change to analyze the structural change-growth-poverty nexus. This section provides an overview of structural

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change and growth inter-linkages and the theoretical relationship between structural change-induced growth and poverty. It makes a clear cut distinction between growth-structural change inter-linkages at the macroeconomic inter-sectoral level and those at the microeconomic intra-sectoral level.

### ***Macroeconomic or intersectoral structural change and growth***

The simplest explanation of the growth and structural change relationship holds that structural change is not expected to affect growth, but instead occurs as a result of the growth process. Sectoral changes in output are thought to occur as development proceeds because the income elasticity of demand for agricultural products is low, while for industrial, particularly manufacturing goods, it is high; and, for services, it is still higher. As levels of income rise, the demand for agricultural products relatively declines and that for industrial goods increases until after reaching a reasonably high level of income, demand for services increases sharply, as well. Accordingly, the shares of different sectors in output are affected by the changes in the pattern of demand which accompany growth (e.g., Chenery and Watanabe, 1958; Chenery, 1960; Chenery and Taylor, 1968).

Structural change can also be placed at the core of economic development with causality running from the former to the latter. While a heavy dependence on agriculture may create a vicious circle of low productivity and poverty, it is believed industrialisation can break this vicious circle by raising incomes to levels that raise saving and investment rates high enough to produce self-sustained growth (Lewis, 1954; Kaldor, 1966, 1967; Fei and Ranis, 1964). Shifting resources out of primary activities thus sustains the productivity gains that characterize economic development.<sup>3</sup>

Economic growth and structural change can also be seen as mutually reinforcing phenomena. Inter-linkages between growth and structural changes mean growth both leads to structural shifts and is inconceivable without them, (Kuznets 1966, 1971). In such a two-way relationship between structural change and growth, growth causes structural shift from agriculture to industry and then to services. In turn, structural changes promote growth. Agriculture being mainly dependent on a fixed factor of production, namely land, faces a limit on its growth and is subject to early operation of the law of diminishing returns. Industry, especially manufacturing, on the other hand, offers large scope for the use of capital and technology, which could be augmented almost without limit with human effort to push growth.

### ***Micro or intrasectoral structural change and growth***

In parallel with broad sectoral changes at the economy-wide levels the micro economic foundations of structural change also merit attention. Restructuring within the industrial sector itself can impact on macroeconomic growth. The intra-industry product cycle is driven by the emergence of new product groups within each industrial sector, i.e., from simple items to complex goods, while the inter-industry product cycle entails a shift in the relative mass of production from consumer to capital goods. Each product cycle, whether intra- or inter-industry, passes through a three-stage import-production-export sequence.<sup>4</sup> The country begins to import foreign goods, then begins itself to produce the imported manufactured goods (import-substituting production), and finally begins to export the excess production of these goods. During the cycle the efficiency, competitiveness and as a result value added is enhanced. If efficiency and competitiveness can no longer be enhanced, the industry ceases to exist. The interaction between the inter-industry and intra-industry stimulates the industrial development of the national economy (Kojima, 2000:379).

Another approach identifying 'leading industries' within the industrial sector and their growth effects highlights the importance of linkages among sectors, and has popularized the terms such as 'forward and backward linkages.'<sup>5</sup> The basic idea is that there are technical complementarities among the various industries and that the growth of one industry is linked to other industries through these complementarities. Leading sectors can however vary across countries depending on the level of

industrial development. In general, input-output tables are used as a tool to identify which sectors are highly linked with the rest of the economy.

A shift in capital formation within sectors can also drive development by moving resources from labour to capital intensive sectors (Rosenberg, 1963). The transformation of the industrial structure from consumer goods to capital goods entails higher capital intensity which in turn results into higher productivity growth at the aggregative level and hence drives growth.

More recent approaches to structural change view economic growth as a process of transformation and not convergence to a steady state growth path. Technological changes are seen to lie at the heart of economic growth as they provide the incentives for capital accumulation to drive efficiency and yield the benefits of increasing returns to scale. The evolution of the industrial structure should involve technological sophistication and up gradation, which generates a premium for aggregate productivity growth in the manufacturing sector. This means that economic growth is characterized by the creation of high tech industries and the replacement of old industries.<sup>6</sup> The former drive growth processes by accelerating the pace at which output, employment and productivity in the economy grow.

### *New structuralist perspective*

Increasingly, development practitioners and policymakers recognize that economic development requires continuous diversifying and upgrading from existing sectors/industries to new high productivity ones. Convergence in labor productivity at the sector and industry level is seen as an important aspect of growth<sup>7</sup>. The catching up process in manufacturing results from technology transfers and is a key driver of rapid productivity growth.<sup>8</sup> Within manufacturing, convergence is more rapid in technology- and knowledge-intensive modern sectors rather than in primary and traditional sectors; it appears to be least rapid in low technology intensive textiles and clothing sectors and most rapid in sectors that are technology intensive. Technology and knowledge intensive sectors/ industries produce tradable goods and can be rapidly integrated into global production networks, facilitating technology transfer and absorption. Even when they produce just for the home market, they operate under competitive threat from efficient suppliers from abroad, requiring that they upgrade their operations and remain efficient. If, instead poor economies get their resources stuck in traditional agriculture, selected non tradable services, and especially informal economic activities, the forces of convergence may be blunted or fail entirely.<sup>9</sup> The lack of productivity growth and the lack of structural change can thus reinforce each other trapping the economy in a low growth trajectory.<sup>10</sup>

Structural change should therefore remove constraints from productivity growth. When labor and other resources move from less productive to more productive activities, the economy grows even if there is no productivity growth within sectors.<sup>11</sup>

In his seminal paper of 1967, Baumol (1967) argued that the resource reallocation of productive manufacturing industries towards services in particular unproductive or stagnant service industries such as education, health and community services (known as Baumol's stagnant sectors) might eventually dampen productivity, increase costs and prices, and slow down aggregate growth.<sup>12</sup> However, there are some very important market service sectors such as the financial sector, software services, transport and logistics and retail sales and distribution where there are major productivity improvements, often based on ICTs. Also, since growth in part depends on the human capital formation and the 'stagnant services', namely education and health care sectors contribute most to human capital formation (Hartwig, 2010; Ngai and Pissarides, 2007; Acemoglu and Guerrieri, 2008; Pugno, 2006; van Zon and Muysken, 2005), GDP growth may benefit from structural change that leads to increased employment in the education and health care sectors.<sup>13</sup> Nonetheless, it is important to remember that not all service industries generate increases in productivity and eventual increases in worker's wellbeing in the same way. This is a

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crucial point to remember when considering the poverty reducing capability of a given structural change.

### ***Growth, structural change and poverty reduction***

A pertinent question is whether rapid growth can result into poverty reduction which is the primary goal of development. Theoretically, growth can result in poverty reduction (particularly in very poor countries) but its distributional effects can be negative in the short run (Kuznets, 1955). Industrialisation can generate highly unequal income and wealth distribution effects in the short run. Some argue that this is acceptable as high incomes (personal and corporate) are a necessary condition for higher savings, which in turn are needed for investment and further economic growth (Todaro, 1994). But this entails a highly unequal growth process.<sup>14</sup>

Poverty reduction induced by structural change through rural-urban migration is still possible however even given an otherwise immiserizing growth process. Surplus labour in the rural sector can supply the workforce for the urban industrial economy and bridge the wage differential across sectors. But limited absorption of labour in high productivity activities can lead to a residual absorption of labour in low productivity activities in the so called 'urban informal sector', which perpetuates a high incidence of urban poverty (Harris and Todaro 1970). Thus the phenomenon of over-urbanisation may enhance poverty in the development process. Nonetheless, the evidence is not conclusive. A large number of empirical studies exist to suggest that migrants have been able to escape poverty even when they could not graduate to the formal sector (Banerjee, 1986; Mitra, 1994; Papola, 1981).

There is a voluminous literature that suggests that the relationship between growth, poverty reduction and inequality greatly depends on whether economic growth generates new jobs.<sup>15</sup> Most of the poor are endowed with labor as the only significant resource. Poverty reduction thus depends on the enhancement of opportunity for people living in poverty to be employed. But the New Structuralists argue that rather than simply expand employment, the challenge is to employ the workforce more intensively, productively and remuneratively.

Sectoral employment change from low productivity to high productivity sectors can contribute significantly to poverty reduction by raising income levels of those absorbed in the more productive sectors. Moving out of less productive sector (generally agriculture) where poverty rates are often much higher to more productive sectors may also relieve some of the pressure put on agricultural productivity and have some direct poverty reducing effect through raising agricultural incomes. Such change in the structure of employment can have very large effects on poverty, as it may enable people to escape poverty traps.

It is instructive to note that the structural change in sectoral shares may not always produce desired sectoral structure of employment. A structural change in the sectoral share may actually be associated with a rise in poverty unless it is matched by a desired structural change in employment. For instance, an expansion in the more productive sectors at the cost of the less productive sectors (in terms of value added) may result in a net reduction in employment. Where the displaced workers go can have an important impact on poverty outcomes. If it generates unemployment and informality, it can put downward pressure wages. This in turn can have poverty enhancing effect in terms of both absolute and relative poverty.

Structural change in GDP requires critical expansion of employment in high productivity sectors to have substantial impact on poverty reducing effects. This line of thinking does not focus on employment generation per se but on the patterns and quality of employment generation. Structural change expands the shares of non-primary sectors and results in significant increases in employment in more productive sectors. In so much as the labor market clears and higher productivity sector have higher returns, this structural change in employment will have poverty reducing effects. For example, since 1990 structural shifts in employment has been in favour of low productive sectors in Latin America, where labour

absorbing sectors have been non-tradable sectors such as personal and community services and wholesale and retail trade, as well as in Africa where the employment share of relatively unproductive agriculture has increased significantly (McMillan and Rodrik, 2011). In Asia on the other hand, there are indications of shift in the structural employment in favour of more productive sectors which had a positive impact on poverty.

Additionally, there is also an emerging view that growth will also not be sustainable unless it is accompanied by poverty reduction. Lower poverty levels can actually improve growth prospects by a variety of channels. Rising income levels among people living in poverty will stimulate demand for domestic products and increase employment and production. In contrast, poor health, nutrition, and education outcomes will limit human capital formation and reduce overall labour productivity, causing lower economic growth. In a similar vein, greater inequality can lead to credit market failure, whereby the poor are unable to use growth-promoting investment opportunities (in physical and human capital). More equitable distribution of income may also act as a material and psychological incentive to widespread public participation in the development process (Todaro, 1994), whereas inequality may cause political and economic instability. It is therefore increasingly believed that rapid elimination of absolute poverty, under all forms, is essential for a sustainable growth process.

### III. GROWTH AND STRUCTURAL CHANGE IN INDIA

Over the past century, the link between structural transformation, growth, and poverty reduction has changed as the policy orientation moved from a free trade regime to a relatively closed, protectionist regime following independence, until the 1980s when the country began to move back towards an open, increasingly liberal regime. Initially in this period policy focused solely on achieving high rates of growth, but from 1968-69 onwards the issues of aggregate poverty, income distribution and hunger started to dominate the attention of the policy makers.

Since 1980-81, there has been a clear shift adopted in favour of the market-led growth regime. In the early 1990s, the introduction of sweeping reforms assigned the private sector the role of commanding heights of the economy. A market led growth model with increasingly liberalized regime aimed at growth with efficiency through domestic decontrols from 1980-81 to 1990-91; and was followed by fuller economic liberalization and globalisation from 1991-92 onwards.

This section looks at changes in the gross domestic product and analyses structural changes and their contribution to growth since independence. A series of policy shocks make India an interesting case for an analysis of structural change induced growth and poverty effects.

#### *India's growth experience 1950-2010: Role of Policy Changes*

At independence mining, manufacturing and small enterprises contributed around 17 per cent of national income and less than 10 per cent of employment.<sup>16</sup> Within the manufacturing sector, nearly two-thirds of organised sector production consisted of traditional activities like textiles, food processing and processing of agricultural and mineral raw materials, while capital goods and intermediates had to be procured from the international market (Chandrashekhar, 1988). Modeled on 'Fabian socialism' and the experience of 'Soviet state socialism', the state adopted a policy of rapidly accelerating industrialization and massively stepped up public investment with emphasis on heavy industry, and high tariff walls to protect the manufacturing sector. A wide range of controls such as industrial licensing system were devised and exercised on capacity creation, production and prices to ensure that the funds would be utilised in accordance with the investment-mix specified under the strategy of planned industrialization. The public sector occupied commanding heights of the economy under a state-led model of growth.

By the late 1960s, national planning shifted focus from growth to growth-with-social-justice. Explicit policy measures emphasized distributional aspects of growth and increased controls on the domestic



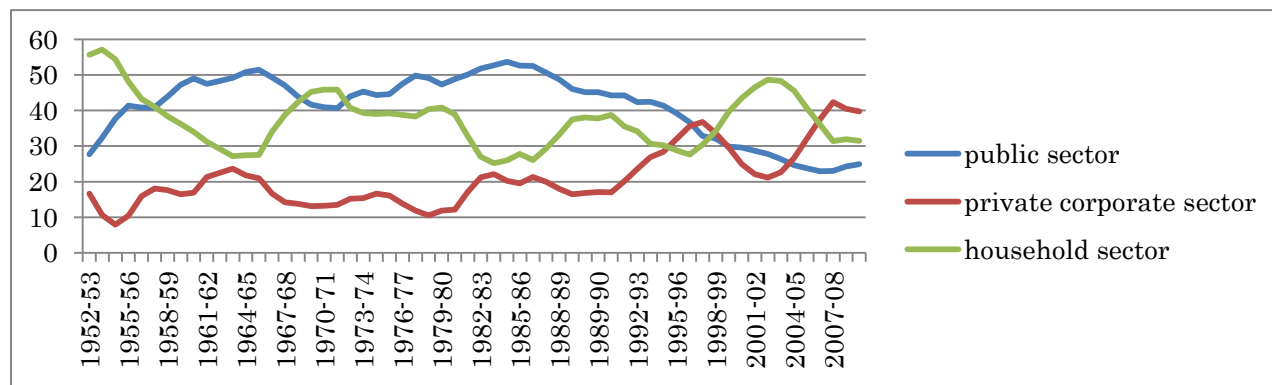
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economy through various measures to ensure growth with equity. The industrial licensing system was tightened; the import substitution drive was accelerated; and the foreign trade sector regulated progressively. Numerous restrictions were imposed on foreign direct investment and technology transfers by way of the Foreign Exchange Regulation Act (FERA) in 1973. The Monopolistic and Restrictive Trade Practices (MRTP) Act was devised to regulate the expansion of large firms; the reservation policy was introduced to protect the small-scale sector; and banks and other financial institutions were nationalized to ensure the flow of credit to the designated sectors. A variety of redistributive programmes were launched to generate employment and alleviate poverty; industrially backward regions were given special attention, and tax rates were raised to curb the consumption of the rich in favour of the poor.<sup>17</sup>

Industrial and trade policies were reoriented from growth-with-social justice to growth-with-efficiency in the 1980s when the country faced decelerating exports, a worsening balance of payments and stagnating industrial growth. The Industrial Policy Resolution 1980 stressed the need for the optimum utilization of installed capacity and for achieving higher productivity and, towards that end, proposed liberalization of the industrial licensing policies by introducing de-licensing, regularization of excess capacity and the capacity re-endorsement schemes. In the foreign trade sector, a move was initiated to cut down import restrictions and tariffs. The process of deregulation was accelerated in the mid-1980s, when industrial licensing was abolished in a number of industries and major reforms were introduced in the foreign trade sector.

Subsequently, a massive dose of liberalization was administered in 1991. More than 80% of the industrial sector was delicensed; the number of industries reserved for the public sector reduced from 17 in 1990 to 6; and plans were chalked out for the dis-investment of the public sector undertakings. In addition to fostering domestic competition, the economy was open to external competition as well. Maximum tariff was reduced from 300% in 1991 to 65% progressively by 1994-95; the rupee was made convertible on current account; and the FERA, 1973 was repealed to liberalise FDI and technology transfers. Since then, there has been continuing liberalization in the financial, infrastructure, information technology, telecom and foreign trade sectors. The policy reforms have aimed not only at freeing private actors from government controls but also reducing the direct government participation in economic activities. It is evident by a steep decline in the share of the public sector in total capital formation in the period after these reforms (Figure 1). Initially, the rise in the private sector investment was supported by both the corporate and household sectors; in the mid-2000s investment in the latter started decelerating and converging with the corporate sector investment.

**Figure 1: Capital formation by institution in India: 1950-1 to 2009-10 ( Three years' moving average of percent share)**

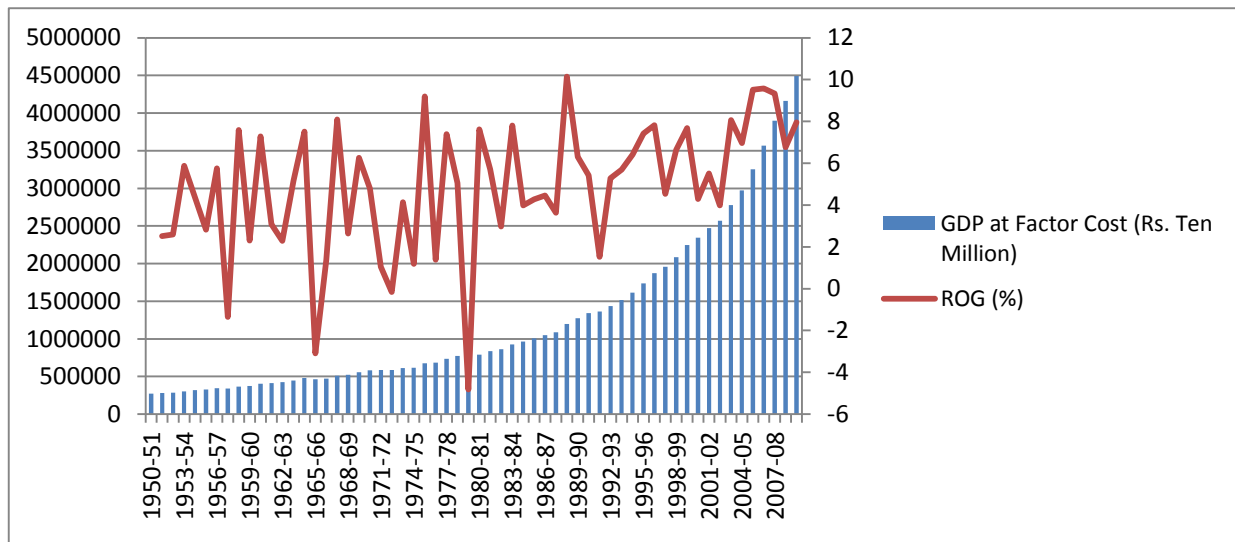


Source: Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

Thus, the past 60 years of India’s growth history have been marked by two broad policy regimes and in each policy regime two distinct phases of policy approaches are discernible. The first thirty years 1951-1980 were associated with the state-led model of growth with the public sector occupying commanding heights of the economy. During the first 15 odd years of this regime, the focus had been to achieve high rates of growth but from 1967-68 onwards, the issues of aggregate poverty, income distribution and hunger dominated the attention of the policy makers. The market led growth regime can also be broken into two policy episodes: 1980-1 to 1990-91 and thereafter. In 1980-81, there was a clear shift in favour of the market-led growth regime. Sweeping reforms which assigned the private sector the role of commanding heights of the economy have however been introduced since the early 1990s.

While differences over the four periods are apparent, it remains to be seen whether policy regime changes had a statistically significant impact on growth. India’s growth rate and GDP at factor cost from 1951-52 to 2009-10 are depicted in Figure 2 based on the recently available revised series of national income at 2004-05 prices computed by the CSO for all the years from 1950-51. There are clearly differences in growth rate and output volatility between the policy regimes described above. Between different successive periods since 1965-66, the mean growth rate has gone up and its volatility has come down as reflected by the lower values of standard deviation.

**Figure 2: GDP growth rate: 1950-51 to 2009-10**



<b>1950-51 to 1964-65</b> <b>Mean: 4.091%</b> <b>SD: 2.549</b>	<b>1965-66 to 1979-80</b> <b>Mean: 2.9379%</b> <b>SD: 4.1792</b>	<b>1980-81 to 1990-91</b> <b>Mean: 5.39</b> <b>SD: 2.22</b>	<b>1991-92 to 2009-10</b> <b>Mean: 6.85%</b> <b>SD: 1.753</b>
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Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India database

The impact of policy regime changes on economic growth in terms of structural break points can be identified endogenously from the Zivot Andrews (ZA), Clemente, Montañés and Reyes (CMR) and Bai-Perron (BP) tests. There are a few existing studies on India that have done this exercise but they all are single-test based (Wallack, 2003; Rodrik and Subramaniam, 2004; Hausmann and Rodrik, 2008; Cortuk and Singh, 2011). Since each test has its own limitations<sup>18</sup>, we use all three tests to check the robustness of the breakpoints identified. The results are provided in Table 1 below.

**Table 1: Structural breakpoints in GDP growth over 1950-51 to 2009-10: statistical test results**

Test	Test-Statistics					
Bai Perron		<b>Segment 1</b>	<b>Segment 2</b>	<b>Optimal break points</b>		
	1950-51 to 2009-10	3.86	6.67	1987-88		
ZA		<b>Lags included</b>	<b>Minimum t value</b>	<b>Optimal break points</b>	<b>1% critical value</b>	<b>5% critical value</b>
	1950-51 to 2009-10	0	-10.385	1965-66	-5.57	-4.80
	1965-66 to 2009-10	0	-8.274	1979-80	-5.57	-4.80
CMR		<b>Break point 1</b>	<b>Break point 2</b>		<b>Rho 1</b>	<b>const</b>
	Additive outlier	0.019 (2.456)	0.027 (2.129)	1981-82; 2003-04	-1.32 -10.398	0.03729
	Innovational model	0.046 (4.431)	0.054 (3.5)	1986-87, 2003-04	-2.29 (-6.288)	0.088

Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

The Zivot Andrews test selects the break date where the t statistics from the ADF test of unit root is at a minimum (most negative). It indicates that growth decelerated significantly in 1965-66 and 1979-80. Both these years precede major policy changes. The CMR test offers two different models: (1) an additive outliers (AO) model, which captures a sudden change in the mean of a series; and (2) an innovational outliers (IO) model, which allows for a gradual shift in the mean of the series. The results indicate that the first sudden shift in the mean of the series occurred in 1981-82 (The additive outlier model) following the major policy reforms introduced in 1980-81. That the break occurred around 1980 is also in line with most existing studies.<sup>19</sup> The policy reforms of the 1980s also resulted in gradual shift in GDP growth in the late 1980s, more specifically 1986-87 (The innovative model). The second break point came in 2003-04. The sweeping reforms of the 1990s did push the growth rate up but they did not result in structural break in terms of GDP growth due perhaps to an increased sensitivity of growth to global conditions. Thus the next turning point came around 2003-04 when the global boom conditions prevailed and benefited the economy through global linkages. The Bai Perron test confirms that the breakpoint occurred in the late 1980s.<sup>20</sup> Overall, significantly higher growth rates have been associated with policy regime changes of the 1980s and 1990s while the mid-1960s were a period of stagnation.

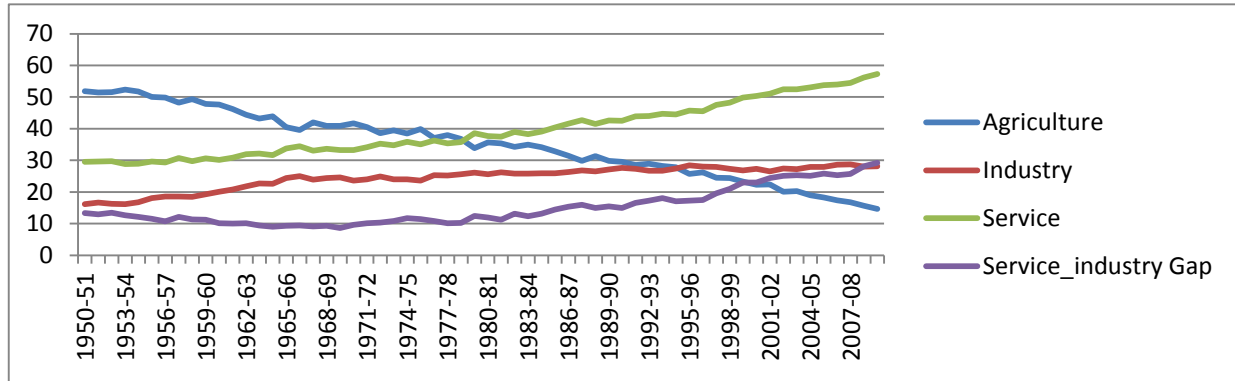
### ***Structural change and its contribution to growth***

Long-term economic growth in India is associated with changes in sectoral contributions to GDP. There has been a substantial shift in the share of GDP generated in the agricultural sector to other economic sectors namely industry and services. Figure 3 depicts GDP shares of the three sectors: agriculture, industry and services. In the first decade and a half after independence under the growth regime, the share of industry in GDP rose faster than the service sector due primarily to the heavy emphasis given to industry by the government. But towards the late 1960s the GDP structure started slowly shifting in favour of services. The pace of service sector growth accelerated in the late 1970s with the share of



agriculture in GDP declining and that of industry remaining almost stagnant. The late 1990s witnessed an explosion in the growth of services matched by rapid erosion in the share of the agricultural sector. Industry barely managed to retain its share in GDP at almost the same level.

**Figure 3: Composition of GDP: 1950-51 to 2009-10**



Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India database

To examine the contribution of structural shifts to the sectoral GDP, change in sectoral output can be decomposed into three components: i) contribution of intra-sectoral growth (growth effect); ii) contribution of shift in the sectoral share (Shift effect); and iii) contribution of interaction between change in GDP and change in sectoral share. This can be expressed by the following equation:

$$\Delta Y_i = \Delta Y_{t-k} \cdot S_{ik} + Y_k \cdot \Delta S_{i,t-k} + \Delta S_{i,t-k} \cdot \Delta Y_{t-k} \text{ where } k < t$$

Where,  $\Delta Y_i$ : change in sectoral GDP between period k and t,

$S_{ik}$ : Share of sector i in period k,  $t > k$

$\Delta Y_{t-k} \cdot S_{ik}$ : Growth effect

$Y_k \cdot \Delta S_{i,t-k}$ : Shift effect

$\Delta S_{i,t-k} \cdot \Delta Y_{t-k}$ : Interaction effect

The overall structural change is estimated using the index of ‘Norm of Absolute Values’ (NAV). It is the sum of absolute amounts of the differences of the sector shares  $x_i$  between two points in time k and t. Since each change is counted twice it is divided by two (Dietrich, 2009). It is represented by

$$NAV = 1/2(\sum |Y_{it} - Y_{ik}|)$$

Table 2 shows the decomposition of change in sectoral GDP for four periods: 1991-52 to 1964-65; 1965-66 to 1979-80; 1980-81 to 2002-03, and 2003-04 to 2009-10. The growth effects are much larger than the shift effects as shown in the table. Further, the post-independence Indian economy experienced a massive transformation in the composition of GDP during the state-led policy regime.<sup>21</sup> Consistent with theoretical expectations there was a shift from agriculture to industry. But soon industry share started stagnating with

services gaining importance. The most dramatic shifts in the structure of GDP occurred from 1965-66 to 1979-80 when the shift effects across all the sectors contributed significantly to GDP growth. The average annual NAV index turned out to be 1.63. The market driven policy regime from 1980 onwards reinforced the structural change set in the state-led growth regime. The service sector continued to expand at an accelerated rate while the role of agriculture and industry declined. The expansion in services is thus not a new phenomenon in the Indian context as is generally believed (Eichengreen and Gupta, 2011).

**Table 2: Contribution of structural change to GDP growth**

	Growth Effect				Shift effect				Interaction effect			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
<b>agriculture, forestry &amp; fishing</b>	<b>145.8</b>	<b>265.6</b>	<b>193.3</b>	<b>248.1</b>	<b>-45.2</b>	<b>-174.5</b>	<b>-89.5</b>	<b>-137.1</b>	<b>-0.6</b>	<b>9.0</b>	<b>-3.8</b>	<b>-11.1</b>
mining & quarrying	76.6	84.1	99.1	186.6	23.8	19.5	1.3	-79.7	-0.4	-3.6	-0.3	-6.9
manufacturing	62.5	69.0	97.7	94.9	36.6	32.0	2.1	4.6	0.9	-1.0	0.2	0.6
electricity, gas & water supply	37.5	38.0	86.5	120.0	60.6	61.4	13.2	-18.4	1.9	0.6	0.3	-1.5
construction	61.9	103.3	101.5	82.2	35.6	-1.5	-1.1	16.5	2.5	-1.8	-0.3	1.3
<b>Industry</b>	<b>62.5</b>	<b>75.4</b>	<b>97.8</b>	<b>96.7</b>	<b>36.1</b>	<b>25.8</b>	<b>2.2</b>	<b>2.9</b>	<b>1.3</b>	<b>-1.3</b>	<b>0.0</b>	<b>0.3</b>
trade, hotels & restaurants	72.7	71.8	78.7	94.3	26.7	28.2	20.3	5.2	0.6	-0.1	1.0	0.5
transport, storage & communication	70.4	51.9	67.0	63.7	29.3	49.6	31.5	33.6	0.3	-1.5	1.5	2.7
financing, ins., real est.& bus. services	136.3	71.9	71.2	76.2	-32.6	30.1	27.7	22.0	-3.7	-2.0	1.1	1.8
community, social & personal services	92.1	69.9	90.4	108.1	8.7	33.4	9.3	-7.1	-0.8	-3.2	0.3	-1.0
<b>Services</b>	<b>89.7</b>	<b>68.1</b>	<b>77.8</b>	<b>84.6</b>	<b>11.0</b>	<b>33.7</b>	<b>21.3</b>	<b>14.2</b>	<b>-0.7</b>	<b>-1.8</b>	<b>0.9</b>	<b>1.1</b>
<b>total GDPfc: NAV</b>					<b>1.10</b>	<b>1.63</b>	<b>1.19</b>	<b>0.93</b>				

Note: I: 1951-52 to 1964-65; II: 1965-66 to 1979-80; III: 1980-81 to 2002-03; IV: 2003-04 to 2009-10

Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

Within industry, a striking result is that after expanding rapidly in the early periods, the manufacturing sector ushered into a phase of near stagnating share from 1980 onwards. Furthermore, other non-construction industrial sectors, such as ‘mining and quarrying’ and ‘electricity and water’ also moved from expanding in the earlier periods to contracting gradually following 1980, particularly during the last decade. A shift away from these sectors might have had serious effects on the poverty reduction potential of the country. In recent years, industrial growth has been essentially driven by construction. Between 2005 and 2008 the growth of world value added has been faster in agriculture and industry than in services (Memedovic and Lapadre, 2009). In India however, there has been no reversal of the growth patterns. Within the service sector, early expansion was led by trade, hotels and restaurants. From the late 1960s to 1979-80, community services and public administration, which are usually termed as Baumolian stagnant sectors, expanded most rapidly followed by trade and transport. Since 1980, there has been a clear trend of shifts towards modern sectors of transport, communication, and business (including ICT) and financial services. Apparently, while there has been retrogression in the structural change in the industry sector with manufacturing remaining almost constant and infrastructure losing its share, the service sector has witnessed shifts in favour of more dynamic sectors.

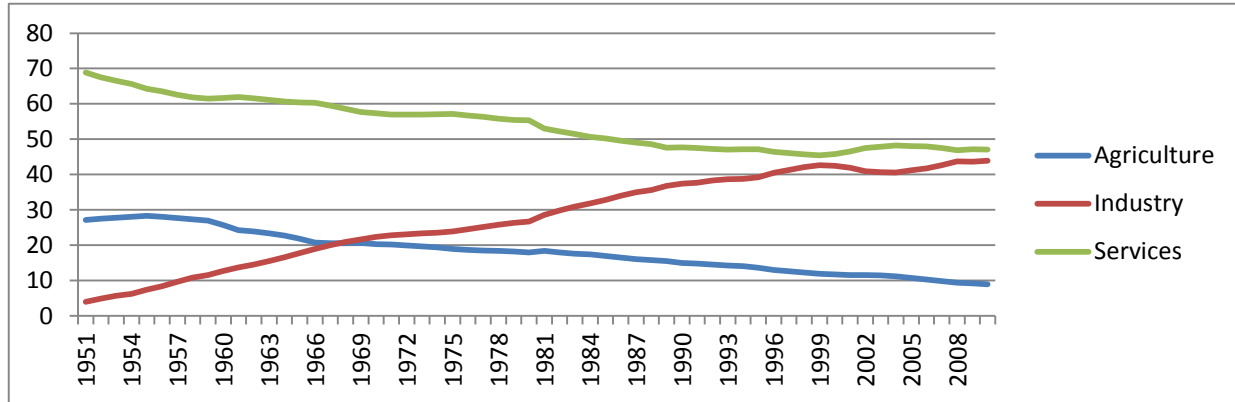
In general, interactions between growth and structural change in India seem to defy the conventional theoretical propositions. Although the basic premise of the state driven growth model was to promote industrialization, the rate at which industry expanded slowed down after 1964-65 and service sector growth outpaced that of industry to emerge as a leading sector during the period after the mid-1960s. The market driven growth regime since the 1980s carried forward the patterns set in the state-led run period. India’s growth patterns thus need an explanation.

### *Explaining the patterns of growth*

In the initial post-independence periods huge public sector investments were made in the heavy industrial sector. The resources were directed to the heavy industry in the belief that it would also push the service and agricultural sectors through backward linkages. Consequent upon the growth strategy, there was a

steep rise in capital formation in the industrial sector at the cost of both agriculture and service sectors (Figure 4).

**Figure 4: Sectoral share of net capital stock: 1950-51 to 2009-2010**

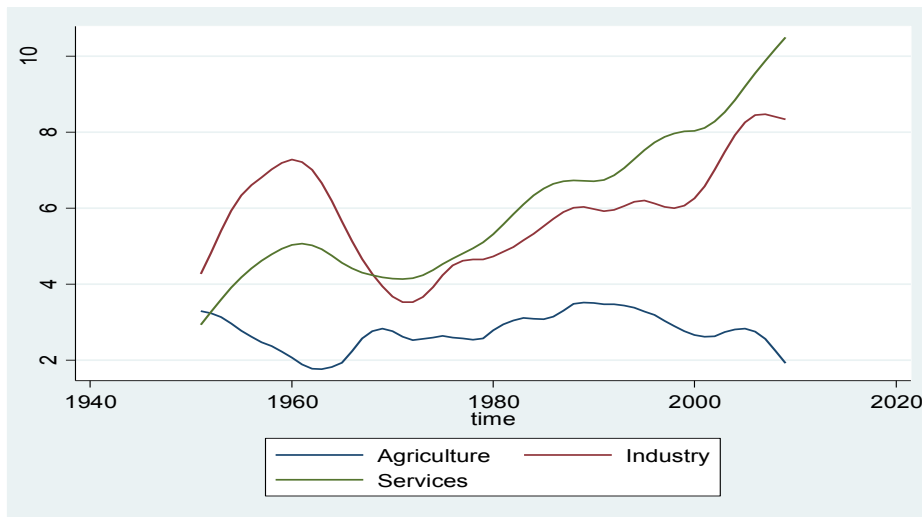


Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

While a big push was given to the industrial sector through large investments of physical capital, the government was also cognizant of the need to create a scientific base as a prerequisite for developing human capital to meet the industry demand. Their efforts resulted in a four-fold increase in science and engineering personnel per million of population between 1950 and 1970.<sup>22</sup>

The strategy adopted for industrialization paid off and produced an unprecedented spurt in industrial growth during the 1950s and 1960s as shown above in Table 2. Notably, all the major components of industry expanded and contributed positively to growth with manufacturing and construction taking a lead (Table 2). It was followed closely by services in particular in trade, hotel, transport and communication sectors which were directly linked with the manufacturing growth.

**Figure 5: GDP growth rates by sector filtered by Hodrick Prescott: 1951-2010**



Note: The cyclical component of a time series is separated from raw data using the Hodrick–Prescott filter. Following the common practice, the series are smoothed by 50.

Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

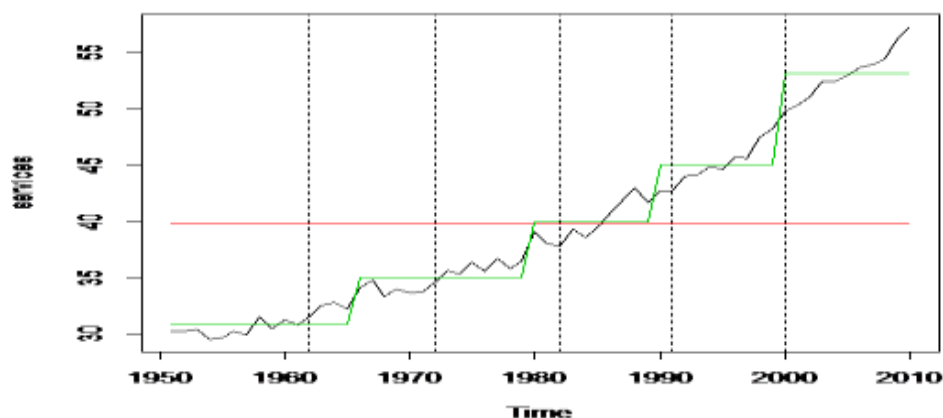
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The patterns of growth however started deviating from the planned approach towards the mid 1960s. Figure 5 presents growth patterns of the three sectors and shows that the rate of industrial growth which surged during the first decade and a half of the Indian planning started decelerating towards the late 1960s. This occurred despite the creation of sizeable capacities in a wide range of organised industries through public investment.<sup>23</sup> The state-engineered expansion of industry was faced with constraints on both demand and supply sides. On the demand side, import substitution which provided a major part of the stimulus for growth was exhausted by the mid-1960s. Thus, any further growth depended on the growth of the domestic market that could not materialize due to sluggish growth in agriculture,<sup>24</sup> which, as the source of livelihood for nearly two-thirds of India's working population, constituted a major source of demand.

On the supply side, despite high levels of protection, dependence on imports of basic and intermediate goods increased substantially to meet industry demand in the growing stages. This led to worsening of the balance of payments position and created a foreign exchange bottleneck. Furthermore, stagnation of agriculture also affected the pace of industrialization by driving up the prices of inputs to major traditional industries of the time like cotton and jute textiles, sugar, vegetable oils and tobacco which constituted almost two-thirds of the sector. If agricultural constraint did not affect industrial growth in the first period it was because of India's large imports of food under US Public Law 480 that helped augment supplies and hold the price level. During the late 1960s, this facility was exhausted and drove up prices. Finally, the cut back in public investment created not only demand side bottleneck but it also constrained supply side responses. Evidence suggests that during this period, the process of growth was essentially driven by increasing physical capital, as productivity levels remained rather low.<sup>25</sup>

While the pace at which the industry sector was rising slowed down, the services sector, particularly 'public administration and defense', experienced fast growth pushing up the share of the service sector.<sup>26</sup> Figure 6 which depicts break points in the service sector share based on the Bai-Perron test over the period since 1950-51 shows that the first structural jump in the share of the service sector came about in the mid 1960s.

**Figure 6: Service sector share and structural break points based on Bai-Perron Test**

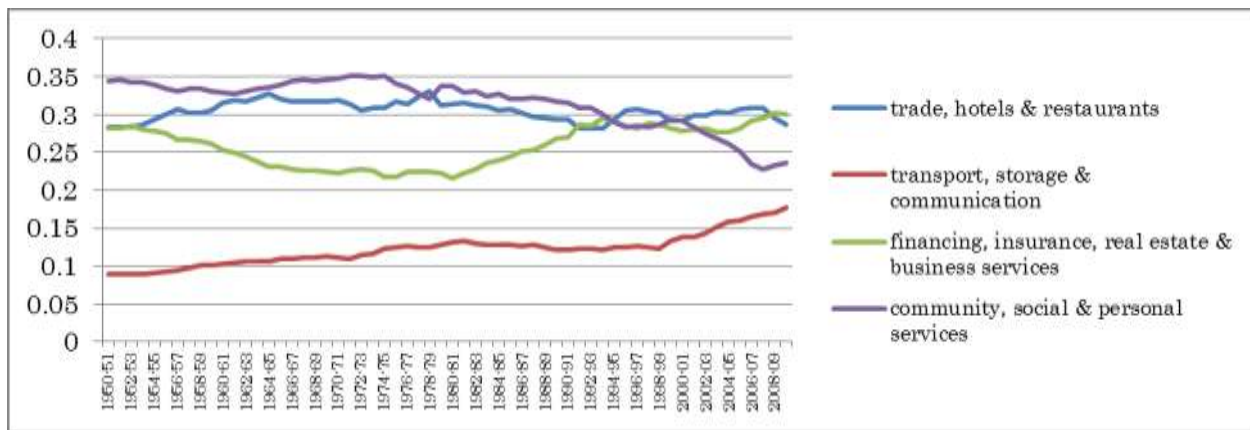


Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

The early 1980s saw a recovery in the GDP growth due to both policy changes and external factors, but which crucially featured a pick-up in GDP growth supported by all the three sectors. Industry grew at an average growth rate of 6.1% in contrast to 3.9% growth in during 1965-80 even if its share in GDP remained almost constant due to faster rise in services. Acceleration in the industrial growth could be attributed to improvements in both the rate of investment and productivity (Kohli, 2006a, 2006b., Trivedi et al. 2011; Rodrik and Subramanian 2004). This period also witnesses a very favorable

growth rates in the agricultural sector due mainly to the diffusion of private tube-wells, agricultural diversification towards more remunerative commodities and technological breakthroughs (Fujita, 2010; Joshi et al., 2006). This came to be known as the second green revolution in India (Fujita, 2010). Nonetheless, the share of agriculture declined largely because the service sector expansion outpaced its growth. The share of industry did not appreciate either. Within services, there had been a noticeable shift away from the low productivity Baumolian sectors namely community services and public administration to high productivity business and financial services followed by trade and hotels (Figure 7). India had been able to move into the new activity drawing on a large pool of underemployed skilled labour which was created due to India's education and science and technology policy adopted since the late 1950s. The upshot is that increasing investment coupled with increasing productivity led to the structural break in GDP growth during the 1980s. In this process, the services became the driving force with expansion in size and change in the composition.

**Figure 7: Composition of the service sector: 1950-51 to 2009-10**



Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

The rate of GDP growth was given another push in the early 1990s through radical reforms. However, towards the late 1990s, it started stagnating first due to the East Asian crisis and then the global economy plunged into recession. In 2003-04 economic revival occurred worldwide when all the emerging countries registered growth. In India, it marked yet another turning point and a phase of unprecedented growth. This was led by explosion in the service sector which had already started growing rapidly towards the end of the 1990s especially with the rise of growing exports of software and ICT-enabled services following the success of Indian companies in fixing the Y2K bug. Figure 6 which depicts structural break points in the service sector growth confirms that the service sector growth accelerated appreciably in the late 1980s and then in the late 1990s. The composition of services has also continued to change in favour of the modern and dynamic services namely transport, communication, financial and business (including the software and related) services. On the other hand, the traditional trade, hotels, community, and public administration services have shrunk in importance.

The emergence of services as a leading sector raises questions but is not entirely surprising<sup>27</sup> as in a market led growth regime resource allocation and technical efficiency is driven by competitive advantages. India appears to have developed competitive advantages in services due to the presence of a large pool of skilled labour which the education and technology policies adopted in the early phases helped to create a large pool of trained workforce (see Kumar 2001; Kumar and Joseph, 2005). That India did not enjoy competitive advantages in industry is amply demonstrated by the near stagnant industry share. Poor investment climate, poor infrastructure, unfavourable attitude towards large industrialisation, rising costs, and scarcity of land have been the major obstacles in the promotion of industry. Indeed,

several attempts have been made to promote manufacturing. But, the results have been disappointing. A key question in this context is whether an unusually large service share is a bane for growth potential in India, or not.

***Growth and structural change: analysis of causality***

A Granger-Causality analysis of the link between structural change, as well as the broad sectoral growth rates and growth helps disentangle the direction of causality between structural change and growth during the periods of economic growth and structural change described above. The results of this analysis by sector are reported in Table 3 below. Overall, there is no significant relationship between growth and structural change during the state led growth regime whereas the causality runs from structural change to growth in the market driven growth regime.<sup>28</sup>

**Table 3: Granger causality test: change in sectoral share and rate of growth**

Year	Results	F statistics	Sign of relationship
<b>1950-1980</b>	<b>GDP Growth causes agricultural share change</b>	<b>14.826*</b>	<b>-ve</b>
1981-2010	Agricultural share change causes <b>GDP</b> growth	10.804*	-ve
<b>1950-1980</b>	No causality between industrial share and <b>GDP</b> growth	-	-
<b>1981-2010</b>	No causality between structural change and <b>GDP</b> growth	-	-
<b>1950-1980</b>	<b>GDP Growth causes service share change</b>	<b>6.2956*</b>	<b>+ve</b>
1981-2010	Service-share change causes <b>GDP</b> Growth	5.3986*	+ve
1981-2010	<b>GDP</b> Growth causes services share change	7.1629*	+ve
<b>1950-1980</b>	No causality between structural change and <b>GDP</b> growth	-	-
1981-2010	Structural change causes <b>GDP</b> growth	6.112*	+ve

Note: It is represented by Norm of Absolute Values (NAV) where  $NAV = 0.5 \sum |x_{it} - x_{is}|$ ; \* significant at 1%  
 Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

Sectorally, during the initial period of India’s post-independence growth, structural change in services and agriculture was driven by economic growth. As the state-engineered growth proceeded, demand for both services and agricultural products rose. But given the demand elasticities of the two sectors, services grew rather rapidly. As a result, while services expanded, the agricultural sector diminished in importance. In the later stages of growth, Granger causality instead runs from structural change to agriculture sector. It could be that supply side linkages have become more important than the demand linkages at higher levels of growth. Thus, low productivity in the agricultural sector implies that a decline in the share of agriculture has a positive effect on growth. Perhaps due to very slow changes in the share of industry



throughout this period, there is no granger causality between growth and the industrial sector. In the case of the service sector however, a two-way Granger causality exists between the service sector and GDP growth mutually reinforcing each other.

A question arises whether this service oriented growth sustainable? Evidence suggests that almost all of the growth miracles of the last 60 years have been based on rapid industrialization (Rodrik, 2012). The development of the modern industrial sector contributes more in *dynamic* terms to overall output growth, because of its higher productivity growth which results from increasing returns to scale and gains from innovations and learning by doing. Further, it is found that the industrial sector rather than service sector has the strongest links to the domestic economy in India. Table 4 shows production and demand linkages of the three sectors with the domestic economy for the selected years during 1968-69 to 2003-04. The total linkage of each sector with the economy is calculated by summing up its linkages with each sector. Production linkages report value of inputs to each sector required per unit of output while demand linkages represent the total value of demand generated by one unit of demand in each sector. The results amply demonstrate that the industrial sector has the strongest production and demand linkages with the domestic economy. It contributes to the economy more through its inter-industry and inter-sectoral linkages than the service sector. These linkages moved somewhat downwards in the 1980s after the process of deregulation started but they still are rather large as compared with the service and agricultural sectors. This supports the view that the industrial sector tends to have larger potential to induce deeper domestic integration by processing raw materials and semi-industrial inputs and requiring a number of ancillary services. The most recent 'IO table' (2003-04) shows that even agricultural sector's linkages have increased faster than that of services due to increasing technological and organization sophistication in this sector.

**Table 4: Production and demand linkages across sectors in selected years: 1968-69 to 2003-04**

	Production linkages			Demand linkages		
	Agriculture	Industry	Service	Agriculture	Industry	Service
1968-69	0.241	0.595	0.245	1.352	2.046	1.43
1979-80	0.248	0.624	0.24	1.398	2.13	1.413
1989-90	0.357	0.603	0.392	1.683	2.237	1.77
1993-94	0.317	0.561	0.385	1.589	2.142	1.76
1999-00	0.248	0.624	0.24	1.659	2.122	1.715
2003-04	0.421	0.591	0.374	1.854	2.282	1.775

Source: Based on Kaur et al (2009)

That service led growth may not be a sustainable source of further growth also stems from the fact that the service sector is characterized by a high informality in India. A shift of economic activity to high productive modern sectors, in particular to non-agricultural sectors, is often argued to drive economic growth. However, the organizational structure of non-primary sectors is often neglected. The estimates of value added for the informal sector as presented in Table 5, show that between 40 to 75 per cent of the value added in the service sector is generated in the informal sector which has strong negative implications both for efficiency and equity in the economy. There is evidence that there are significant productivity differences between the informal and formal sectors (Kochhar et al. 2006, Mazumdar and Sarkar 2008; Kathuria et al, 2010). The lack of significant structural change that reallocates activity from

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the low-productivity informal sector to the high-productivity formal sector can constrain the growth of aggregate productivity in the economy. Since the degree of informality is lowest in manufacturing, this is an additional reason for a shift in favour of manufacturing leading to increased productivity growth.

**Table 5: Share of informal economy in value added (%)**

Sector	2004-05	2009-10
Agriculture	94.39	94.56
Mining and Quarrying	8.73	12.23
Manufacturing	35.49	31.68
Electricity, water etc	3.14	2.92
Construction	63.55	56.30
Trade, hotels & restaurants	77.40	75.13
Transport storage. & Communication	55.79	60.23
Financing, real estate. & business.	49.18	50.00
Trade, hotels & restaurants	42.96	40.31
Total	56.15	54.78

Source: Based on National Commission for Enterprises in the Unorganised Sector (NCEUS) database

To sum up, this section has shown that policy regime changes appear to have injected growth dynamics in the economy in general. In the early phase of growth, industry-led growth strategy resulted in the decline of the agricultural share. The spurt in the growth of industry drove growth in demand for services as well, in particular trade, hotel, transport, communication and community services. During the mid-1960s, however the pace of industrial growth slowed down as the potential of import substitution reached a plateau. Unlike the East Asian countries, India failed to tap the potential of export-oriented industrialization after exploiting the opportunities of import substituting industrialization. Nonetheless, services continued to increase due to the increasing role of government in economic planning and execution, the historical role of urban middle class in wholesale trade and distribution, and the demonstration effect of high income countries. This was the period when community services registered a rapid growth due to change in the policy approach towards redistribution. Their share increased substantially in GDP (Table 2). This period witnessed a dramatic change in the structural composition of GDP. Over 41% of the total growth in GDP occurred during this period was accounted for by structural shifts in the share of its components. It was driven by the growth process. While there was no systematic causal relationship between growth and structural change during this period, a sector-level analysis indicates that structural change in agriculture and services was driven by the growth process via demand side channels. The structural transformation did take place in India but it was a 'service-oriented structural transformation' unlike the 'industry-oriented transformation' that took place in the East Asian countries like Japan, Republic of Korea, and later in China.

The market driven regime pursued since 1980 not only pushed the growth rates up but also strengthened the service-oriented pattern of structural change that had taken roots during the restrictive regime. There were intra-sectoral changes, in particular in the service sector where the share of modern services including financial, business, trade, transport and communication increased rapidly while those of



Baumolian stagnant sectors declined. Within the industrial sector, there has been shift away from manufacturing and infrastructure to construction. This period also exhibits strong support of causality from structural change to growth quite contrary to the previous regime period when there was no such causality between the two. The sector level analysis indicates that in the current regime a decline in agricultural share contributes to GDP growth rate. The relationship between service sector share and growth has however been bi-directional and they seem to be reinforcing each other. The industry share change does not seem to have a causal relationship with growth. This is despite the fact that demand and production linkages have been the strongest for this sector.

Finally, despite increasing global economic integration of the Indian economy, the informal economy persists in terms of its share in sectoral and total economy. The persistence of this sector can constrain future growth potential due to low productivity. Thus the growth-structural transformation linkage in India poses difficult pertinent questions whose responses require further analysis, such as ‘will the kind of rapid growth on sustained basis experienced by countries like South Korea, Taiwan, and China ever become possible in India?’ and ‘is there a need for a correction in terms of the structural balance between the three sectors for enhancing growth synergies among them?’

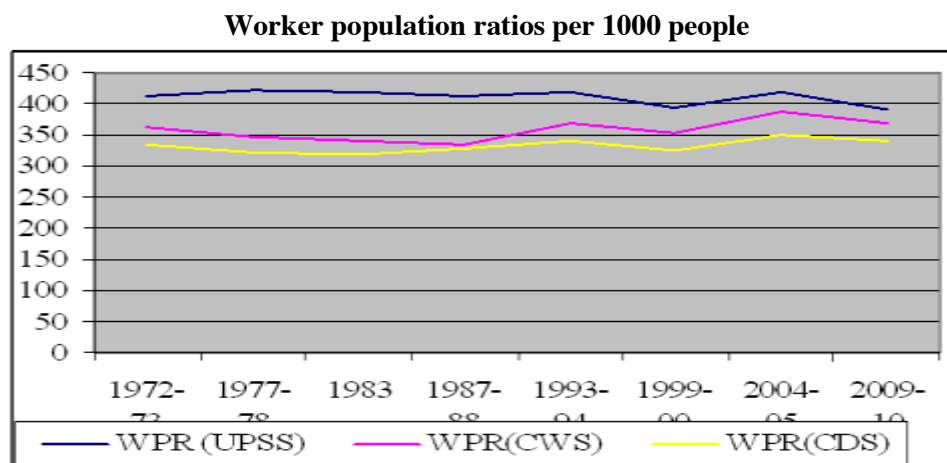
#### **IV. GROWTH, STRUCTURAL CHANGE AND EMPLOYMENT**

The Indian economy has witnessed large and speedy transitions out of agriculture into nonagricultural sector, in particular services. It has lagged behind in terms of transition from informal to formal economy though. What remains to be seen is whether employment and labour productivity have also shifted along with patterns of growth and structural change in the country. As argued above, expanded opportunities for good quality and well paying employment are an important channel by which structural change can lead to poverty reduction. This section analyses overall employment patterns and then examines structural change in employment and its impact on productivity.

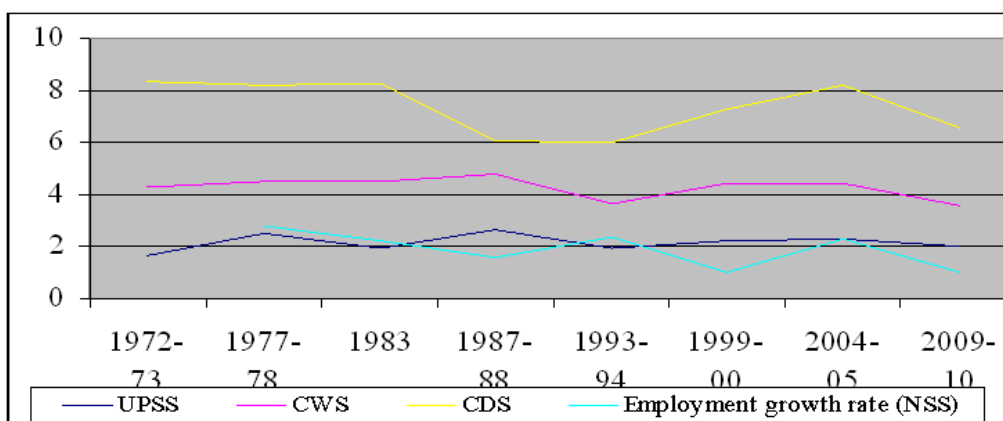
During the first decade and a half of development planning in India, unemployment was not expected to emerge as a major problem by the policy makers (Second Plan document, 1956). Growth, it was assumed, would automatically translate into job creation. Though there are no official estimates on employment generation for the period before 1972-73, individual studies indicate that these expectations were belied. Unemployment rates actually increased in this early post-independence period despite robust growth<sup>29</sup>. This situation began to change during the 1970s due to a shift in policy from an approach solely focused on growth towards one concerned with redistribution. Several employment generation and poverty alleviation programmes were launched at this time and the first country-wide survey on employment and unemployment was conducted by the National Sample Survey Organisation (NSSO) in 1972-73 to gauge the problem of unemployment in the country. Since then, eight such NSSO surveys on unemployment and employment have been conducted, the first, the 27<sup>th</sup> round survey (1972-73) was followed by the 32<sup>nd</sup> round (1977-78), 38<sup>th</sup> round (1983), 43<sup>rd</sup> round (1987-88), 50<sup>th</sup> round (1993-94), 55<sup>th</sup> round (1999-2000), 61<sup>st</sup> round (2004-05), and 66<sup>th</sup> round (2009-2010) surveys.

Based on the NSS Surveys on employment and unemployment, Figure 8 presents estimates of worker participation rates since 1972-73 (Part I) and shows growth rates in participation rates and the average annual growth rate of employment over this period (Part II). In addition to the typical measure of employment (UPSS) we have provided estimates based on measures of under-employment (CWD and CWS) as well. Both, the employment growth and workforce participation rates reached the peak level in 1977-78. Since then, there has been a trend towards decline in both these employment growth indicators. The global boom of the early 2000s witnessed some acceleration in employment generation but once recession set in after 2007 it started decelerating, despite the fact that India’s GDP had grown at around 7% rate even during this recent period.

**Figure 8: Selected indicators of employment growth : 1972-73 to 2009-10**



**Growth rates in worker population ratios by status and overall employment**



UPSS: Usual Principal and Subsidiary Status status asks whether someone is employed according to Principal status and whether working or available but unable to find work on a subsidiary basis, during a year; CWS: Current Weekly Status asks if a person is working or available and unable to find work even for one hour during the reference week; CDS: Current Daily Status measures employment/unemployment in terms of person days of employment of all persons in the labour force during the reference week.

Source: National Sample Surveys Rounds on Employment Unemployment for respective years

Evidently, despite fairly robust growth in GDP over the period since 1980, the movement in the labour market has been lukewarm; the growth process that occurred during the period since 1980, did not have an appreciative impact on the size of employment. Table 6 presents estimates of average annual employment growth rates, which endorse the finding that employment growth rates declined in the post 1980 period and fluctuated around 2%.<sup>30</sup>

**Table 6 : Employment growth rate (%)**

1961-1970	1971-1980	1981-1990	1991-2000	2001-2007	2008-2010
0.86	3.08	2.56	1.844	2.47	1.82

Source: Authors' calculations based on Total Economy (TED) Database

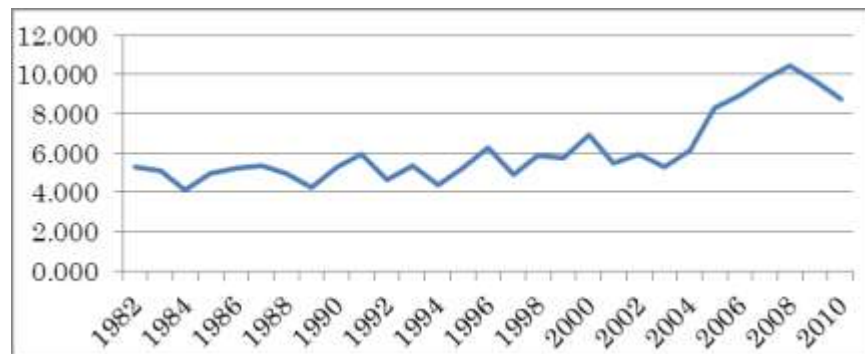
Deceleration in the worker-population ratio has not translated into a higher unemployment rate, however. Unemployment reached the peak rate of over 3% in 1977-78, when the employment growth rate was also at the peak of 3%. Since then it declined and hovered around the mean rate of 2.37 (with standard

deviation of 0.332). This implies that along with worker-population ratio (WPR), the labour force-population ratio (LFPR) also exhibited a tendency to decline since then.<sup>31</sup>

The changes reflect a reduction in the female work to a significant extent. As a matter of fact, female participation rates have exhibited a tendency to decline since the 1980s. This is not quite unexpected. Typically in developing countries, there is a U-shaped relationship between women's LFPR and the level of development (Boserup, 1970).<sup>32</sup> This is because at low levels of income, survival instincts dictate that the women work gainfully. As income increases, women feel less pressured to work and therefore withdraw from the workplace.<sup>33</sup> Eventually, after income levels reach a certain high level, women re-enter the work force which is commensurate with their family status. A real concern exists however that as the country develops, when women re-enter the labour force, there will be a sharp rise in the unemployment rates. A rise in the student-population ratios, in particular amongst women, change in age structure and a decline in self-employed workers are other factors that contributed to a decline in the labour force.

In fact, employment growth at the current rate can only support a much larger increase in GDP, if there is an appreciable increase in either net capital stock and/or the total factor productivity. Figure 9 depicts the growth rate in the net capital stocks over the period since 1981 and shows how growth in capital accelerated in the mid 1990s and since 2003 has been growing at a around 9%.

**Figure 9: Growth rate of net capital stock: 1982-2010 (%)**



Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

The capital labour ratio rose sharply over this period from 9.37 in 1982 to over 29 in 2009-10, since employment was only growing at an average growth rate of 2%. While all sectors exhibited capital deepening, the most dramatic rise in the capital labour ratio occurred in infrastructure and manufacturing. Figure 10 (I and II) confirms that there has been a clear shift from from less capital intensive to more capital intensive methods of production within each sector.

**Figure 10: The rate of growth in capital stock by sector**



Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India

In contrast, total factor productivity growth remained stagnant at the rate of around 2% from 1980 to 2007.<sup>34</sup> Indeed there has been some improvement in productivity both, sectorally and in aggregate terms, in the market led growth regime as compared with that in the state-led growth regime (Table 7a, 7b). Yet, it is not appreciable and unambiguous.

**Table 7a: Review of productivity estimates: 1960-2007**

Author	Reference period	TFP growth	Reference period	TFP growth	Reference period	TFP growth
Dholakia (2002)	1960-1985	0.79	1985-2000	2.85		
Sivasubramonian (2004)	1980-1990	2.02	1990-1999	2.01		
Virmani (2004)	1980-1991	2.5	1992-2003	3.6		
Jorgenson and Vu (2005)	1989-1995	2.06	1995-2003	2.49		
Bosworth, Collins and Virmani (2007)	1983-1993	1.7	1993-1999	2.8	1999-2004	2.00
Bosworth and Collins (2008)	1978-1993	1.1	1993-2004	2.3		
Bosworth and Maertens (2010)	1980-1990	2.2	1990-2000	1.8	2000-2006	2.10
Das et al (2011)	1980-1985	1.71	1991-96	1.77	1997-04	0.76

Source: Compiled from Das et al (2011) and other studies

**Table 7b: Review of productivity estimates by sector: 1960-2007**

	Das et al (2011)			Bosworth and Maertens (2010)		
	Agriculture	Industry	Service	Agriculture	Industry	Service
1980-90	2.3	-0.4	1.9	1.9	1.5	2.1
1990-00	0.2	-1.1	2.4	0.7	0.6	3.1
2000-04	-0.8	2.2	0.4	0.9	1.6	1.9

Source: Das et al (2011) and Bosworth and Maertens (2010)

Despite increase in productivity in the market led growth regime, TFP's contribution to GDP growth rate remained small. Instead, growth in physical capital has been instrumental in driving growth in India, in particular after the 1990 reforms. This is clearly brought out in the latest study conducted under the India KLEMS project ( Table 8).

**Table 8: Summary of findings based on growth account in India**

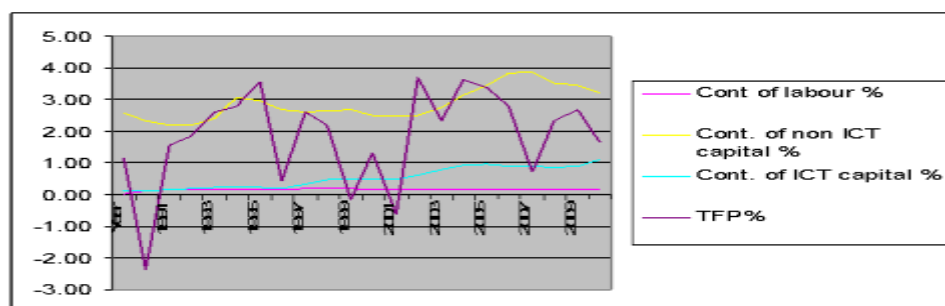
<b>Das et. al 2011 (India KLEM)</b>						
	Value added growth	Hours worked	Labour quality	Non-ICT capital	ICT capital	TFPG
1980-85	5.08	1.52	0.11	1.59	0.14	1.71
1986-90	5.92	2.66	0.19	1.69	0.27	1.1
1991-96	6.49	1.47	0.15	2.78	0.33	1.77
1997-04	5.69	1.62	0.13	2.95	0.23	0.76
1980-04	5.78	1.79	0.14	2.34	0.24	1.26
<b>Bosworth et al (2007)</b>						
	output growth	employment	Physical capital	Land	education	TFP
1960-73	3.3	2	1.1	-0.2	0.1	0.2
1973-83	4.2	2.4	0.9	-0.2	0.3	0.6
1983-93	5	2.1	0.9	-0.1	0.3	1.7
1993-99	7	1.2	2.4	-0.1	0.4	2.8
1999-04	6	2.4	1.2	0.1	0.4	2
<b>Tendulkar and Bhavani (2005)</b>						
	GDP Growth	Labour growth	Productivity	K_L ratio		
1961-83	3.42	2.17	1.22	1.51		
1983-94	5.56	2.04	3.45	2.16		
1994-2000	6.47	1.03	5.38	4.86		

Source: Compiled from various studies

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It shows that growth has been driven by physical capital accumulation, supported by ICT capital accumulation, since the 1990s, while the contribution of labour and productivity is rather low. The findings of the India-KLEMS study are supported by the “Total Economy Database” analysis. Figure 11 demonstrates that capital accumulation in the non-ICT sectors consistently contributed more to Indian growth over the last quarter century, than ICT capital or TFP growth.

**Figure 11: Contribution of labour and capital to growth: 1985-2009**



Source: Total Economy Database; <http://www.conference-board.org/data/economydatabase/>

Growth accounts by sector indicate the same patterns.<sup>35</sup> Tendulkar and Bhavani (2006) observe that increases in the capital-labour ratio were most pronounced in manufacturing where it increased from 3.73 to 10.5 from 1994-2000. In other sectors the increase was from 1% point (agriculture) to over 2.6% point (service sector). Interestingly, structural change in the distribution of labour force could have made a significant contribution of GDP growth, however the overall contribution of employment remains insignificant. In what follows we focus on the structural change in employment and its impact on growth.

### ***Structural change in employment and employment growth***

The differential growth of GDP among different sectors of the economy has had obvious impacts on the structure of employment. Over the period since 1972-73, work force increased by over 94%. Employment growth during the 1970s was recorded to be over 13%, thereafter it decelerated almost continuously on decadal basis (Table 9). A higher growth during this period seems to have been primarily contributed by industry with all its constituents (including manufacturing) expanding rapidly in terms of employment. It was followed by services with ‘trade and transport’ sectors contributing significantly to employment growth. During the 1980s, employment growth slowed down across all the sectors. Industry workforce managed to increase by 15.9% essentially due to employment expansion in construction. Employment growth decelerated in the service sector also but it managed to outpace industry. Post liberalisation period has had a major impact on employment growth and its composition. Employment grew by 7.3 percent over the years between 1993-94 and 2009-10. Three sectors that recorded impressive growth were construction, trade and hotels, and transport, storage and communication. All other sectors witnessed drastic fall in employment expansion during this period.

This resulted in substantial structural change in employment. Table 9 shows NAV index of employment across nine sectors over the period since 1972-73. As seen in the table, during the 1970s, the share of agriculture in total employment declined. But manufacturing expanded rapidly to offer alternative employment opportunities. The service sectors which were directly linked with manufacturing such as trade, hotels, transport and storage also expanded fast. In the 1980s, employment in agriculture further declined *albeit* at a decelerated rate. However, manufacturing was not in a position to absorb labour. Employment growth in both manufacturing and infrastructure contracted. Construction emerged as a major employer. The service sector also expanded in particular other services. As discussed earlier, in the late 1970s and 1980s there was expansion in value added in community services. This sector appears to have witnessed a rapid expansion in employment also. In the post liberalization period, agricultural

employment declined rapidly but the only sectors that expanded to absorb labour were construction and trade and hotels both of which are low productivity sectors with a high degree of informality.

**Table 9 : Employment growth and structural change in employment by sector (%)**

	1972-73 to 1983	1983 to 1993-94	1993-94 to 2009-10	1972- 73 to 1983	1983 to 1993- 94	1993-94 to 2009-10
<b>Agriculture</b>	<b>8.57</b>	<b>7.90</b>	<b>0.87</b>	<b>-2.87</b>	<b>-2.25</b>	<b>-3.58</b>
Mining and Quarrying	35.24	21.89	5.19	0.09	0.06	-0.02
Manufacturing	24.91	10.86	9.32	0.97	-0.05	0.12
Electricity, water etc	50.11	29.36	-5.96	0.06	0.05	-0.04
Construction	26.67	38.83	54.61	0.19	0.48	2.13
<b>Industry</b>	<b>25.64</b>	<b>15.86</b>	<b>21.10</b>	<b>1.31</b>	<b>0.54</b>	<b>2.18</b>
Trade, Hotels & Restaurants	26.67	21.82	21.84	0.65	0.63	1.08
Transport, storage and communications	35.36	19.20	23.80	0.37	0.18	0.50
Other services	21.00	22.40	5.56	0.54	0.90	-0.18
<b>Service</b>	<b>24.65</b>	<b>21.69</b>	<b>14.01</b>	<b>1.56</b>	<b>1.71</b>	<b>1.40</b>
Total	13.05	11.46	7.25	8.60	6.70	11.10

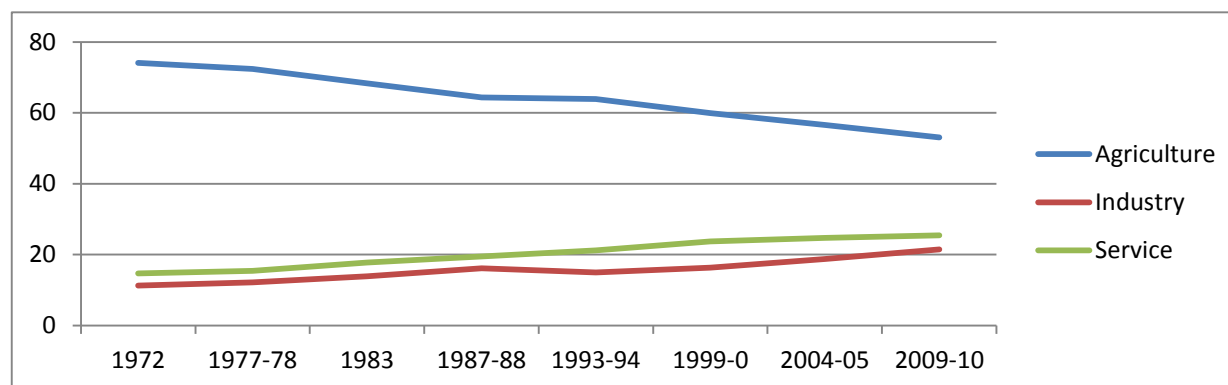
Source: Own calculations based on NSS surveys on Employment and Unemployment

Figure 12 depicts the decline in the share of agriculture and increase in the share of industry and services in total employment. The table at the bottom of Figure 12 shows percent point change in the sectoral shares between 1972-73 and 2009-2010. It also shows the norm of absolute values (NAV) of change in employment shares in percentage terms (also referred to as dissimilarity index in the literature). It is one-half the sum of the absolute value of the employment share differences of each sector between the beginning and ending year of the period, and in this case captures the amount of employment (and value added) shares transferred from declining to growing industries during the period. It takes on a value of zero when no change occurs and 100 when 100 per cent of employment is shifted from one group to another. It is interesting to note that the process of structural change in employment has been comparable with that in GDP. Nevertheless due to heavy concentration of workforce in the agricultural sector in the base year 1972-73, the distribution of employment is still highly skewed in favour of agriculture. Clearly, the first phase of a decade and a half of planning had little impact on employment structure. Thus, 53% of the workforce still remains in agriculture contributing only 14.6% of GDP whereas 25.4% of workforce in services has been contributing over 57% of GDP. Industry attracts 21.7% of workforce producing over 28% of value added.

It appears industry is more employment intensive as compared with services. While industry increased its share in GDP by only 2.8% points over the period since 1972-73, it gained over 10% points of share in employment. The service sector in contrast increased its share in GDP by 22% points adding only 10% point in employment share.



**Figure 12: Composition of employment by sector: 1972-73 to 2009-10 (%)**



% point change in	Agriculture	Industry	Service	NAV or dissimilarity index
GDP	-24.45	2.84	21.59	24.43
Employment	-20.89	10.24	10.77	20.98

Source: Own calculations based on NSS rounds on Employment and Unemployment and CSO

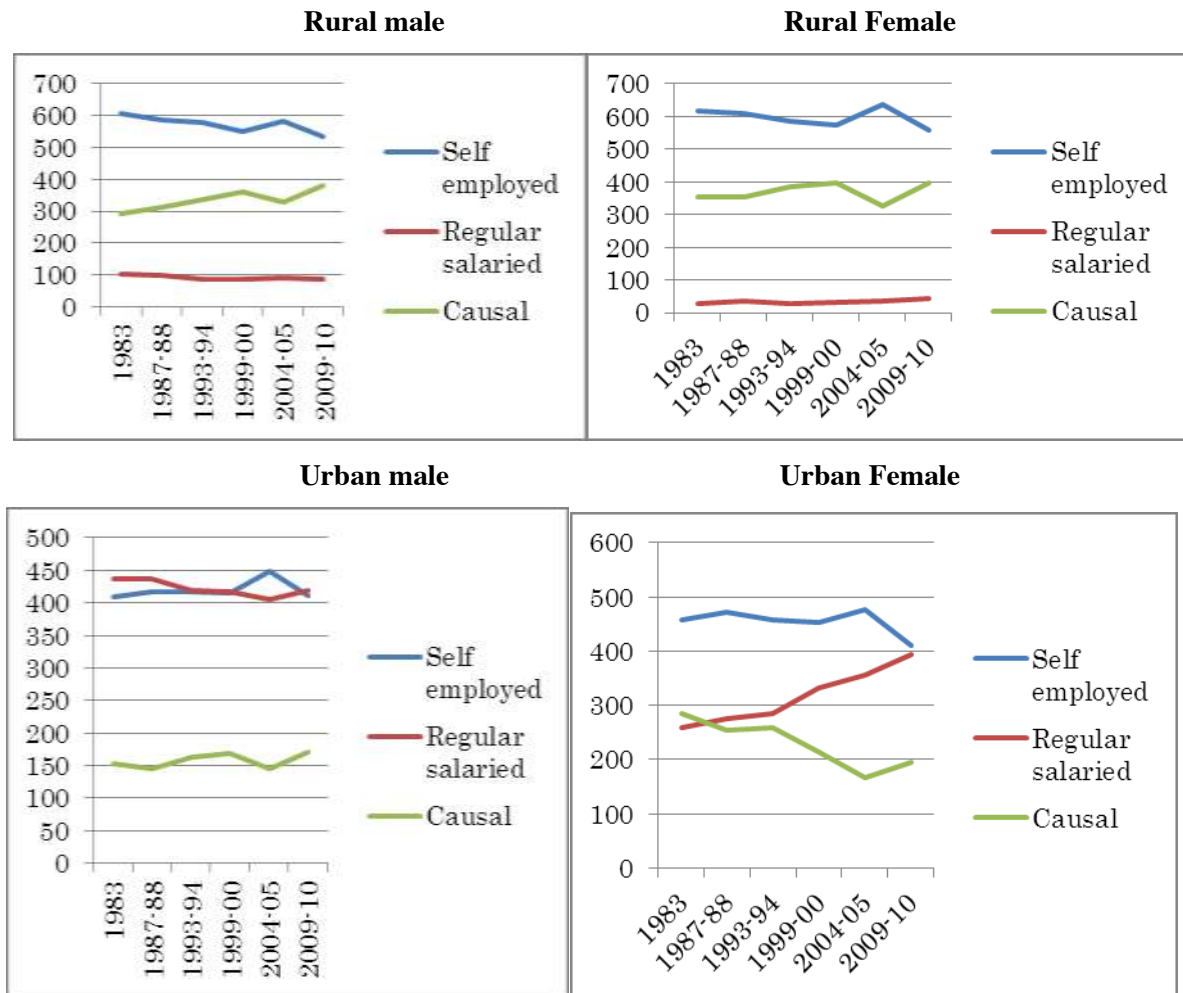
Substantial structural changes in employment consistent with GDP have generally not been in favour of high productivity sectors. Much of the labour released from agriculture has been absorbed in the construction sector where employment has been expanding rapidly. Mining and quarrying is the other important sector which has shown consistently higher employment growth than manufacturing. Infrastructure has been marginalized since the 1990s. Within the service sector, employment in the trade and hotels has been increasing significantly despite the fact that the modern service sector (business services) has grown rapidly in terms of value added. Apparently, this sector could not generate employment opportunities.

### ***Increasing casualization of employment***

An increasing ‘casualisation’ of the workforce has seen the quality of new employment created deteriorate. As seen above, while regular employment (UPSS) increased rather slowly, the CWS and CDS based participation rates which depict underemployment have gone up sharply since the late 1980s (Figure 8). Figure 13 shows the distribution of usually employed workforce by three categories of employment: self employed, regular salaried, and casual. Strikingly, the proportion of self employed workers has been falling with a corresponding rise in that of casual workers. The proportion of regular salaried workers remains stagnant. This tendency is evident across both, rural and urban areas, and for both genders.



**Figure 13: Participation rate 1000 of usually employed (UPSS) by category of employment**



Source: Own calculations based on NSS surveys of relevant rounds

A rise in casual workers is essentially displacing self employed workers. Since regular jobs remain near constant, it could be that most new jobs created are casual in nature.<sup>36</sup> In rural areas, agriculture is increasingly becoming unable to productively absorb the growing rural labour force. However, there has been growth of employment opportunities in non - agricultural activities such construction, trade and services which can partly be attributed to state sponsored employment programmes. These opportunities have been of temporary and casual nature and have become major source of casual employment. In urban areas, it is a widely held belief that regular jobs have been cut down due to technological and competitive compulsions as a result of which a part of the regular workforce has been rendered casual.

There is evidence that the working conditions for regular workers are better than those of casual and self-employed workers. Findings from the NSS 66<sup>th</sup> round in Table 10 depict the gap in working conditions between regular workers and others. A wider use of non-regular work arrangements has led to greater uncertainty about workers' employment status, giving rise to precariousness and vulnerability among certain groups of workers.

**Table 10 Working conditions of workers**

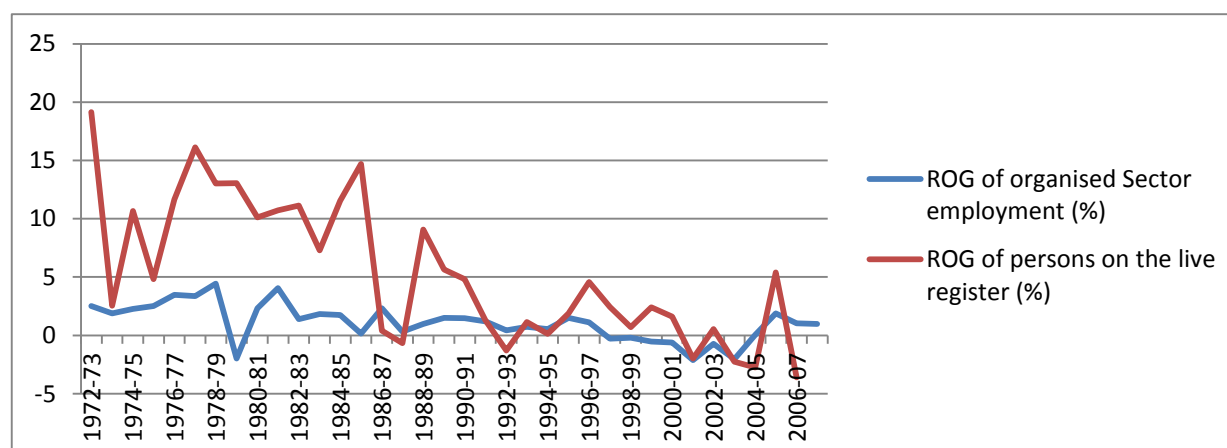
Benefit	All		Regular	
	Rural	Urban	Rural	Urban
No written Job contract	81	74	60	65
Temporary Nature	52	42	32	33
No Paid leave	80	60	50	46
<b>No social security benefit</b>	82	64	57	53
No Labour union in all	82.5	65.6	54.7	59.6

Source: NSS report on informal sector and employment conditions, 2011

### ***Growth of the informal sector employment***

Further, most jobs created under the market-led policy regime have been in the informal segment. While the over-all workers' participation rates have been near stagnant since the late 1970s, growth in the organized sector employment has shown an almost steady decline (Figure 14). Since the late 1990s, the absolute number of workers in the organised sector also declined. Persons on the live registers have also grown at a decreasing rate.

**Figure 14: Organised sector employment: 1971-72 to 2007-08**



Source: The Reserve Bank of India, Handbook of Indian Economy, 2011

Interestingly, the proportion of workers in informal sector has also declined in both agriculture and non-agricultural sectors, but it still remains unusually high. As Table 11 demonstrates, in 2009-10, among all workers nearly 71 per cent were engaged in the informal sector (74 per cent in the rural areas and 67 per cent in the urban areas). More than 93 per cent of workers in both rural and urban areas engaged in the primary sector belonged to the informal sector. In the non-agriculture sector, nearly 71 per cent of the workers in rural areas and 67 in urban areas were engaged in the informal sector. In the informal sector productivity and wages both are lower than in the formal segment as discussed in the previous section. The population working in this sector is termed as vulnerable workers by the ILO.

**Table 11: percentage share of informal employment by sector 2004-05 and 2009-10**

	2004-05				2009-10			
	Rural		Urban		rural		urban	
	Male	female	Male	female	male	female	male	female
AGEGC	90.4	97.2	86.8	94.9	90.6	95.0	88.3	97.7
Non-agriculture	78.1	77.1	73.7	63.5	73.0	64.1	68.3	60.1
Overall	79.2	86.4	73.9	65.4	74.2	74.4	68.5	61.6
	81.6		72.2		74.2		67.3	

Source: NSS report on Informal sector and employment conditions, 2011

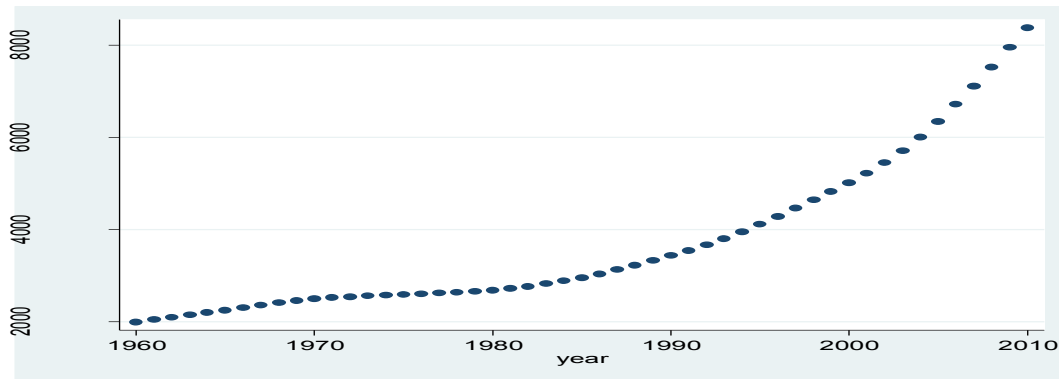
India's distinct advantage in the labour market compared to developed and less developed countries should be the fast changing age distribution of population. India is expected to enjoy a significant demographic bulge during the next few decades, unavailable to most other countries. The population growth rate is declining, leading to a rapid decrease in the percentage of children (aged less than 15) while the working age population is increasing.

This demographic bulge may not however translate into a demographic dividend. Labour participation rates have not gone up. The worker-population ratio also shows near stagnancy. There is evidence that employment has casualised, and there are definite patterns of falling employment in the organized sector with a rising opportunities in the unorganized segment. Unorganized employment is vulnerable and often characterized by inadequate earnings, low productivity and difficult conditions of work that undermine workers fundamental rights. This sector essentially creates opportunities for non regular workers. Over 93 percent of self-employed and almost 75% of casual workers are in the informal sector against 40% of regular workers. And as discussed above, casual workers are more likely to lack elements associated with decent employment, such as adequate social security and recourse to effective social dialogue mechanisms.

### ***Structural change in employment and productivity***

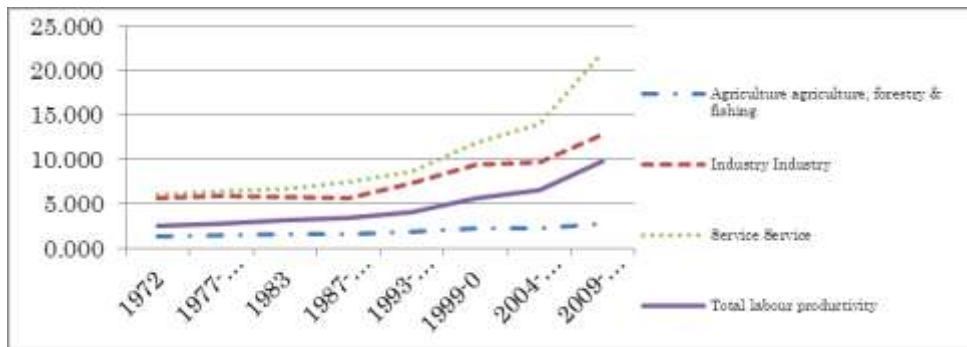
Productivity per worker in the Indian economy has grown dramatically in particular after 1980. We estimate GVA per worker by dividing the total GVA by the number of workers using the Total Economy Database (TED) database which provides annual time series data from 1960 onwards (Figure 15A). The fastest growth in productivity had been in the service sector followed by industry. In agriculture, however, there was a marginal improvement. The NSS data support these findings (Figure 15B). Figure 15C presents a more disaggregated picture. It shows that within services, productivity in community services grew most slowly while in industry, manufacturing and construction experienced little productivity growth.

**Figure 15A: Gross value product per worker: 1960-2010**



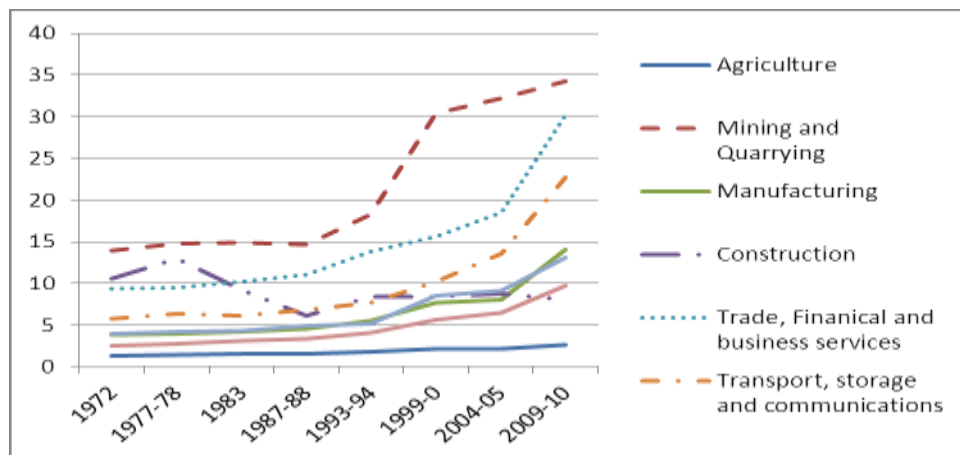
Source: Based on the Total Economy Database (TED)

**Figure 15B: Gross value product per worker by broad sectors : 1960-2010**



Sources: National Sample Surveys and National Accounts Statistics, Central Statistical Organisation

**Figure 15C: Gross value product per worker by disaggregated sectors: 1960-2010**



Sources: National Sample Surveys and National Accounts Statistics, Central Statistical Organisation

The effect of productivity performance within individual sectors can be ambiguous on employment and poverty, as it can displace employment. If displaced labor ends up in activities with lower productivity, economy-wide growth and poverty effects will suffer and may even turn negative.

To analyse the contribution of structural change in employment to growth, following Mcmillan and Rodrik (2011), we decompose productivity into two components.

$$\Delta Y_t = \sum \Delta \theta_{i,t} y_{i,t} + \sum \Delta y_{i,t} \theta_{i,t-k}$$

Within change    Structural change

$Y$  refers to aggregate labor productivity,  $y$  is sectoral labor productivity,  $\theta$  is employment share,  $\Delta$  is the first-difference operator,  $i$  indexes sectors,  $t-k$  and  $t$  stand for initial and final years. The first term in the decomposition is the weighted sum of productivity growth within individual sectors, where the weights are the employment share of each sector at the beginning of the time period. This is termed as the ‘within’ component of productivity growth. The second term captures the productivity effect of labor reallocations across different sectors. It is essentially the inner product of productivity levels (at the end of the time period) with the change in employment shares across sectors. This second term is called the ‘structural change’ term. The structural change component indicates how sectoral shifts in employment affect overall productivity. When changes in employment shares are positively correlated with productivity levels, this term will be positive, and structural change will increase economy-wide productivity growth.

The structural change effects have been positive in India, as results in Table 12 show, and labour displaced from agriculture is moving to more productive non-primary sectors. However these effects had been more prominent during the 70s and 1980s than in the later period. During the most recent period of 2004-05 to 2009-10, it explained only 5 percent of total productivity growth. Intra-sectoral productivity growth has been the primary source of productivity growth during this period. This presents evidence that while there has been structural change in employment towards more productive sectors, the movement is not in favour of the most productive sectors. Labour that is released from agriculture is being absorbed by the relatively less productive sector pulling down the structural change induced effects.

**Table 12: Contribution of structural change in employment to labour productivity**

	1972-73 to 1977-78	1977-78 to 1983-84	1983 to 1987-88	1993-94 to 1999-00	1999-00 to 2004-5	2004-05 to 2009-10
ROG-within effect	8.609	3.330	2.500	30.138	9.687	47.975
ROG-structural change	3.359	7.242	7.490	9.257	5.017	2.845
ROG-total productivity	11.967	10.571	9.990	39.394	14.704	50.819
Share of structural change	28.065	68.504	74.974	23.497	34.120	5.598
Share of within effects	71.935	31.496	25.026	76.503	65.880	94.402

Source: Source: Own calculations based on NSS surveys of relevant rounds

### *Productivity and real earnings*

If structural change in employment has not benefited the most productive sectors, it is likely that average daily wage earnings of labourers have not improved much either. Table 13 presents earning indices by sector relative to agriculture. Although everyone has gained in real terms, there is considerable inter-sectoral wage inequality and it has been growing over time. Real wages turn out to be the lowest in agriculture followed by trade, low tech manufacturing and transport. Financial and business services offer not only the highest salaries but have also witnessed the fastest growth in terms of earnings and salaries. Clearly, wages in skill-intensive modern sectors have increased fastest.<sup>37</sup>

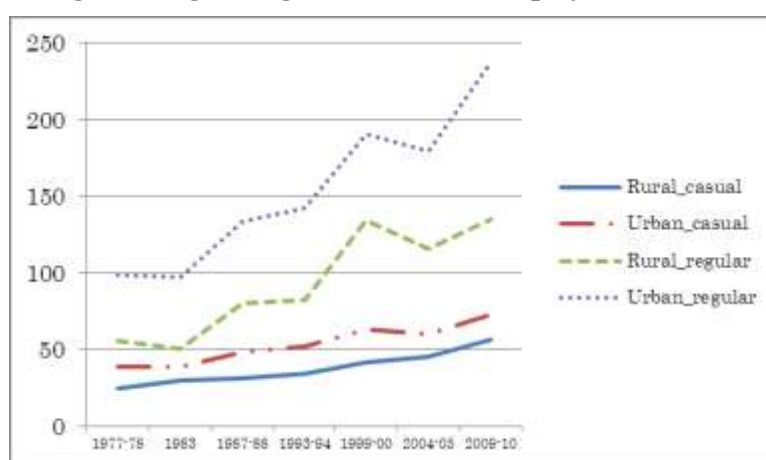
**Table 13: Earnings in 2009 and change from 2004-05**

	Earning index: Ag=100	Change in earnings Ag=100
Agriculture	100	100
Mining	311.4778	-7.40534
Low tech Manufacturing	140.3444	359.0328
Medium and high tech mfg,	254.8178	377.7238
Electricity,	394.3452	213.5522
Construction	231.2215	531.2555
Trade	133.9367	348.6688
Transport	235.835	308.8703
Financial and Business services	430.2683	498.3183
Community services	321.3136	343.225

Source: NSS Round 66, 2009-10

Average earnings of both regular and casual workers have risen sharply also (Figure 16). However, the rise has been highly unequal across the sectors classified by rural-urban location and formality. The NSS Employment Report provides estimates of average daily wage earnings received by regular and casual labourers by gender and rural-urban location. We adjust these figures for inflation by reference to the Consumer Price Index for Agricultural Labourers (CPIAL with base 2004-05= 100); for urban India this adjustment has been made by reference to the Consumer Price Index for Industrial Workers (CPIIW with base 2004-05=100). Figure 16 presents these figures for both regular and casual workers.

**Figure 16: Average earnings of regular and casual employees: 1977-78 to 2009-10 (Rs)**



Source: Own calculations based on NSS surveys of employment unemployment rounds

Earnings of regular workers have increased faster than those of casual employees in both rural and urban areas and the gap has been widening. Interestingly, the urban-rural difference in the wages of regular workers has been growing over time while the wages of casual workforce across rural and urban areas have been growing almost at the same rate. There has been no acceleration in wage appreciation for these

workers. Dutta (2007) observes that casual and regular workers are systematically different in their educational and other demographic characteristics. Casual workers are overwhelmingly rural, uneducated males engaged in the primary sector. In contrast, regular workers are predominantly urban males with high school and college degrees, with a majority being employed in services.

The phenomenon of increasing informalization of industrial labour is thus a serious issue of concern because if industrialization does not create many good jobs for people to shift from low productivity occupations, it cannot make a big contribution to economic development<sup>38</sup>. Available data show that wages and employment benefits received by casual workers are much lower than those of regular salaried/wage workers. Estimates made from unit-level data of National Sample Survey (NSS) 61st round employment/unemployment survey reveal that in 2004-05, the average wage earned per day by regular wage workers in organized manufacturing was about Rs 169 while that earned by casual workers was only about Rs 55. In unorganized manufacturing, the average wages earned per day by regular wage workers and casual workers, in 2004-05, were Rs 83 and 54 respectively. According to the estimates presented by Sundaram (2008), about 5 to 7 per cent of adult regular wage workers in various categories of manufacturing enterprises belonged to poor households in 2004-05, while the corresponding figure for adult casual workers was in the range of 17 to 27 percent. The casual workers not only get a significantly lower wage, they are also deprived of various benefits and social security (see Papola, 2008 also).

To conclude, these results together seem to suggest that structural change in GDP has indeed resulted into structural change in employment. But a large work force is still in agriculture. Furthermore, labour released from agriculture is not absorbed in the most productive sectors due to increasing capital intensity of these sectors and skill requirements. Also, within each sector, it is getting largely absorbed in the informal sector. Overall productivity increases are mainly the result of the intra-sectoral productivity growth and not reallocation of labour from low- to high-productivity activities. Labour reallocation among the broadly defined sectors, which measures the degree to which the mobility of workers directed towards higher-productivity sectors contributes to overall productivity growth, has been rather modest. The average earnings increase has been skewed in favour of skill intensive high productivity sectors. These patterns are likely to have impeded poverty reduction.

## V. STRUCTURAL CHANGE AND THE MANUFACTURING SECTOR

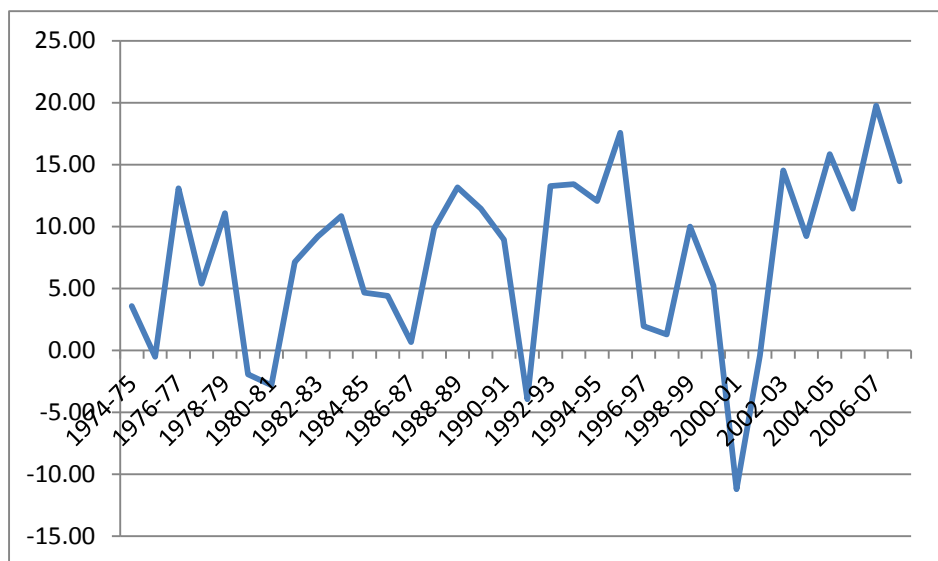
It has been observed above that the changing sectoral distribution of GDP has not been matched by a commensurate change in the distribution pattern of the labour force. The structure of employment has not adequately shifted towards the highest productivity sectors, despite growth of output. The present section focuses on the manufacturing sector and investigates how the degree and nature of structural change explains growth and productivity change in this sector. Four broadly defined segments can be identified in the manufacturing sector--the low tech, the medium-low tech, the medium-high tech, and the high tech, following the OECD classification (Hatzichronoglou 1997), that has been employed by a number of studies (e.g. Kumar and Siddharthan 1994, Aggarwal 2002).<sup>39</sup> Low tech industries are primarily processors of agricultural raw materials and other labour intensive industries with a low capital-labour ratio and possess small plants. Medium low industries are essentially mineral based infrastructure industries and are characterized by large plants and high capital-labour ratios. Medium high tech industries are chemical and engineering industries while high tech industries are science-based modern industries with a large percentage of the expenditure on R&D. It examines four aspects of change across them. First, changes in the share of each segment over the last thirty odd years are traced. Second, inter and intra segment changes in the employment patterns and the nature of job turnover are examined. Third, inter and intra segment productivity growth is analysed. Finally, the extent to which wage differentials across them have widened over time is examined.



**Structural change in manufacturing valued added**

Growth of the organised manufacturing sector over the period 1974-75 to 2007-08 has been somewhat mixed. Although it expanded at an average annual growth rate of 7.4%, as Figure 17 shows, periods of high growth were followed by sharp declines.

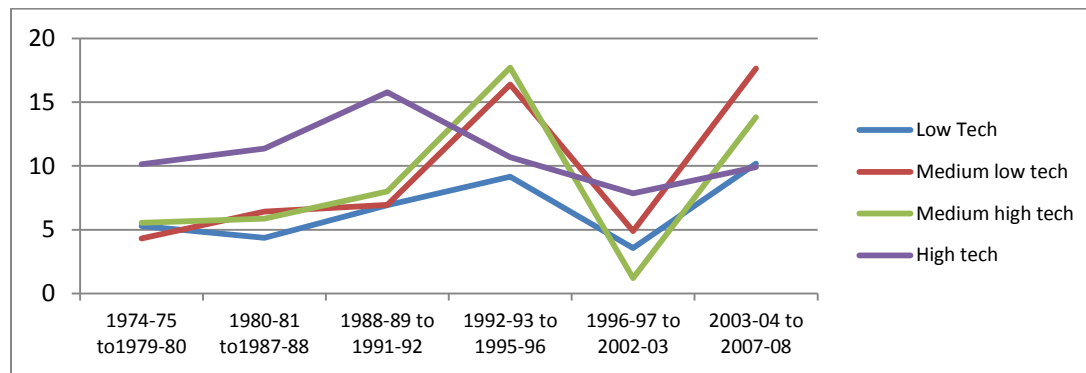
**Figure 17: Manufacturing growth rates: 1973-74 to 2007-08**



Source: Own calculations based on Annual Survey of Industries database

Six broad phases of growth can be identified, each covering a complete business cycle: 1973-74 to 1979-80; 1980-81 to 1987-88; 1988-89 to 1991-92; 1992-93 to 1995-96; 1996-97 to 2003-04; and 2003-04 to 2007-08. These periods are quite commensurate with the growth phases of GDP identified in section 3.

**Figure 18: GVA Growth rate: 1973-74 to 2007-08**



Source: ASI data 1973-74 to 2007-08; These calculations use the average annual growth rate of each segment over the sub- periods identified above to smooth the time series of growth rates for each segment

High tech industries, which had been the fastest growing segment of the manufacturing industry prior to 1990 have turned into the slowest growing, as shown in Fig 18. Indeed, high growth in this segment in the earlier period in part reflects a much lower starting point than the medium or low tech categories. But, a sharp drop in its growth rate cannot be explained in terms of the growing base as it still remains the

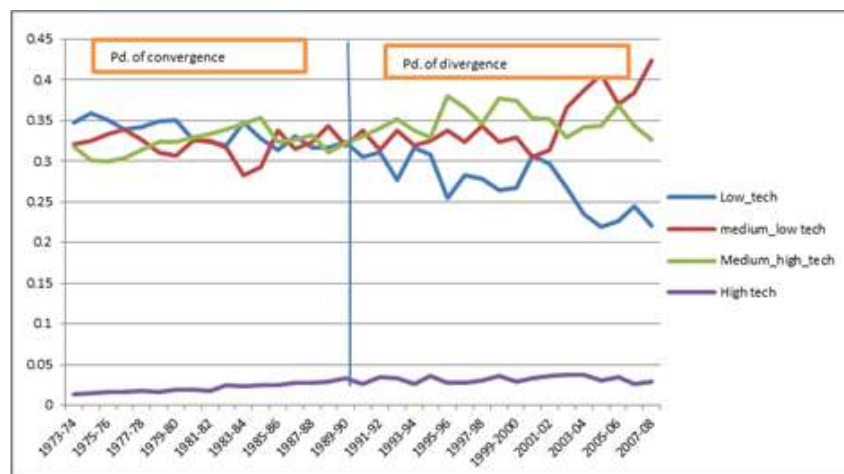


smallest segment of the manufacturing sector by a wide margin despite growth. Interestingly, the low tech segment which witnessed steady growth in the 1980s and early 1990s also suffered in the later period. During the boom period of 2003-07, it shows some recovery though. While both, the high and low-tech industries exhibit declining trends, comparative advantages have begun to emerge in medium tech industries in particular the medium low tech industries. These industries have grown sharply during the boom period of the 2000s with the latter growing faster than the former (Figure 18).

Although the medium high tech sector grew rapidly between the mid 1970s and the late 1990s eventually medium low tech industries driven by petroleum and steel products rose and captured over 40% of the total share in manufacturing. Almost three fourth of the Indian manufacturing sector in terms of value addition is currently accounted for by the medium tech segment, both medium low and medium-high tech. Up until the early 1990s, the science based high tech sector also increased its share steadily from 1.4% in 1973-74 to 3.5% by 1992-93. In the post 1992-93 period, however the trend reversed. This sector remains by a wide margin the smallest component of the manufacturing sector. This observation also explains the inability of India to make a mark in exports of high tech industries that are high-value adding and are fast growing, as observed by recent studies (see Kumar and Joseph, 2007).

Overall, India has moved towards scale-based capital intensive medium tech industries (low and high), and away from the labour-intensive low tech and science based high tech industries (Figure 19). Although prior to the early 1990s that there had been convergence in the industrial shares of medium and low tech industries, sectoral divergence in manufacturing has been underway the last two decades.

**Figure 19: Share of sectors classified by technology intensity.**



Source: Own calculations based on Annual Survey of Industries database

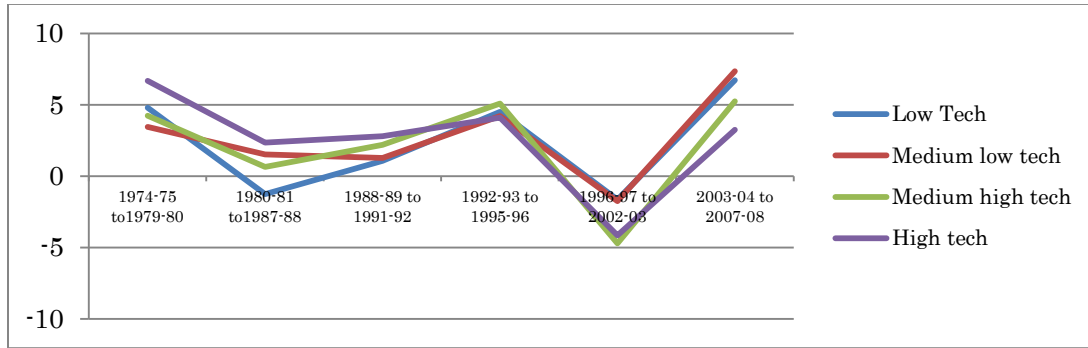
### *Shifts in employment in manufacturing*

The manufacturing growth of the early 1980s was not matched by increases in employment in this sector. Figure 20 depicts employment growth patterns by segment in Indian manufacturing for the period from 1973-74 to 2007-08. It shows that employment (and investment) growth rates declined in the early 1980s across all the four segments. This is consistent with the productivity growth observed in the 1980s.<sup>40</sup> However, since the early 1990s the expansion in employment and investment has been commensurate with the output growth. Segment-wise patterns are diverse. For instance, until the mid 1990s, the high tech segment witnessed the fastest growth in terms of both employment and investment. After that, employment growth in this industry was outpaced by other industries. It may be recalled that this sector shows decelerating patterns in terms of gross value added since the early 1990s. Medium high tech industries followed high tech industries in terms of employment patterns. In contrast, the low tech segment expanded rapidly after the early 1990s in terms of employment. Overall, the low tech sector maintains its share in overall manufacturing employment while both medium high tech and high sectors

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seem to have lost theirs (Figure 20). The employment share of the medium high tech sector on the other hand has increased but not appreciably.

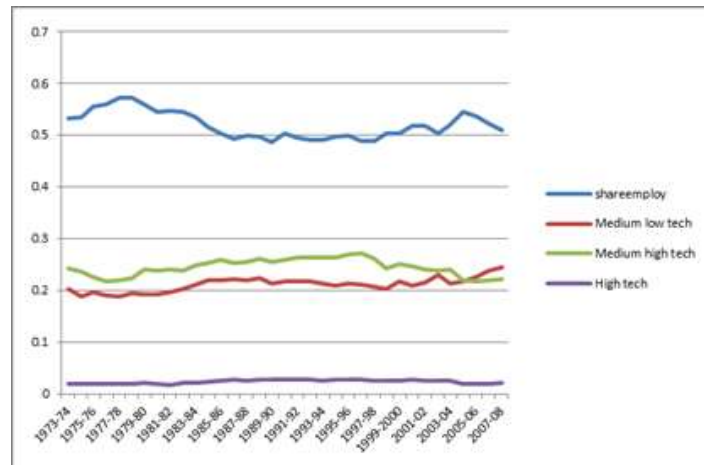
**Figure 20: Employment growth rates: 1973-74 to 2007-08**



Source: ASI data 1973-74 to 2007-08

Apparently, changes in the sectoral distribution of manufacturing value added did not translate into a commensurate change in the employment patterns. Low tech manufacturing, the value added of which has decelerated, continues to dominate employment, accounting for over 50 percent of total manufacturing employment. In contrast, there were no appreciable changes in the employment shares of medium low tech industries which have expanded their share of value added. Employment shares of medium high tech and high tech segments have also largely remained constant (Figure 21).

**Figure 21: Employment shares by segment: 1973-74 to 2007-08**



Source: based on ASI data base

A disaggregated analysis of the composition of the manufacturing output shows that it has changed substantially between 1973-74 to 2007-08 (Figures 22--24). Food beverages and tobacco, which constitute the largest component, has lost decline its share from over 26% to 16 per cent of manufacturing output. Textile has been the biggest loser. Among sectors whose share increased have been coke, petroleum and nuclear fuel, whose share rose from the average 4 per cent from the 1970s to over 12 per cent in 2007-08, and motor vehicles, which had a share of over 6.5 per cent during 2003-08.

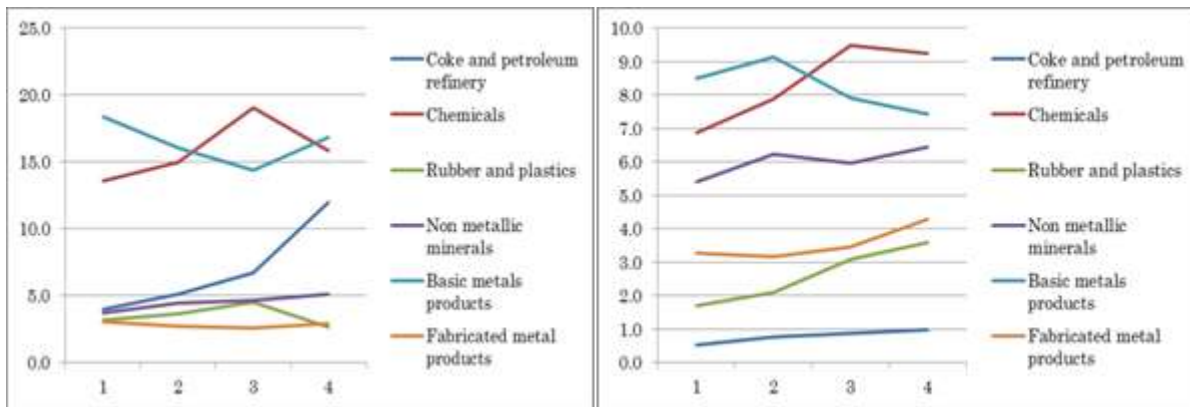
The composition of the manufacturing employment has hardly changed between 1973-74 and 2007-08. Employment share of textile industries declined sharply. In other industries the movement has been between 1-2 percent point in either direction.

**Figure 22: Output and employment share of major two-digit low tech manufacturing industries: 1973-74 to 2007-08**



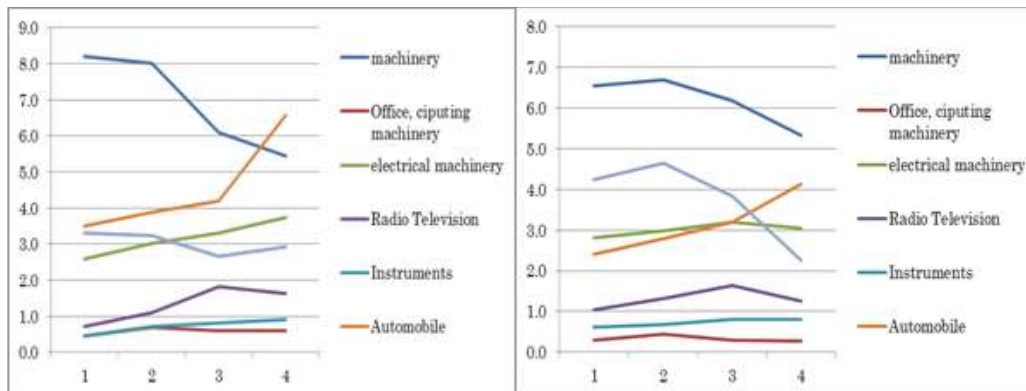
Note: 1: 1974-74 to 1979-80; II : 1980-81 to 1990-91; III: 1991-92 to 2002-3; IV: 2003-04 to 2007-08  
 Source: Own calculations based on Annual Survey of Industries database

**Figure 23: Output and employment share of major medium low tech manufacturing industries: 1973-74 to 2007-08**



Note: 1: 1974-74 to 1979-80; II : 1980-81 to 1990-91; III: 1991-92 to 2002-3; IV: 2003-04 to 2007-08  
 Source: Own calculations based on Annual Survey of Industries database

**Figure 24: Output and employment share of two digit technology intensive manufacturing industries: 1973-74 to 2007-08**



Note: 1: 1974-74 to 1979-80; II : 1980-81 to 1990-91; III: 1991-92 to 2002-3; IV: 2003-04 to 2007-08  
 Source: Own calculations based on Annual Survey of Industries database

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To capture the extent of structural change in value added and employment we use the index of Norm of Absolute Values (NAV, as discussed in earlier sections). It takes on a value of zero when no change occurs and 100 when 100 per cent of employment/ value added) is shifted from one group to another.

The calculations (Table 14) show that on average structural change annually accounts for 0.67 percent point change in value added and 0.41 percent point change in workers shifting within the manufacturing sector. The shift in shares in India over this thirty four year period is 23 percentage points of GVA and 14.5 percentage point of employment.<sup>41</sup>

**Table: 14 Structural change based on NAV in value added and employment**

<b>Value added</b>					
	Low tech	Med-low	Med-high	High	Total
1973-80	0.029	-0.119	0.052	0.038	0.239
1980-87	-0.147	0.070	0.016	0.061	0.295
1987-92	-0.188	-0.024	0.134	0.079	0.425
1992-96	-0.708	0.304	0.495	-0.091	1.598
1996-03	0.089	0.204	-0.360	0.067	0.720
2003-07	-0.470	0.573	-0.026	-0.076	1.146
<b>Employment</b>					
1973-80	0.234	-0.098	-0.019	0.023	0.374
1980-87	-0.480	0.210	0.084	0.041	0.815
1987-92	0.015	-0.041	0.102	0.012	0.170
1992-96	0.067	-0.034	0.072	-0.004	0.178
1996-03	0.026	0.119	-0.212	-0.018	0.375
2003-07	0.063	0.137	-0.165	-0.035	0.400

Source: Own calculations based on Annual Survey of Industries database

Clearly, there has been mismatch between structural change in value added and employment. A rapid transformation in the production structures in the post reform period was not matched by corresponding changes in manufacturing employment structures. The most prominent transformational changes in manufacturing value added occurred in the period after 1987; whereas those in manufacturing employment occurred during the period before, as shown in Table 14. The pace of change in employment picked up in the late 1990s but remains much smaller than that in value added.

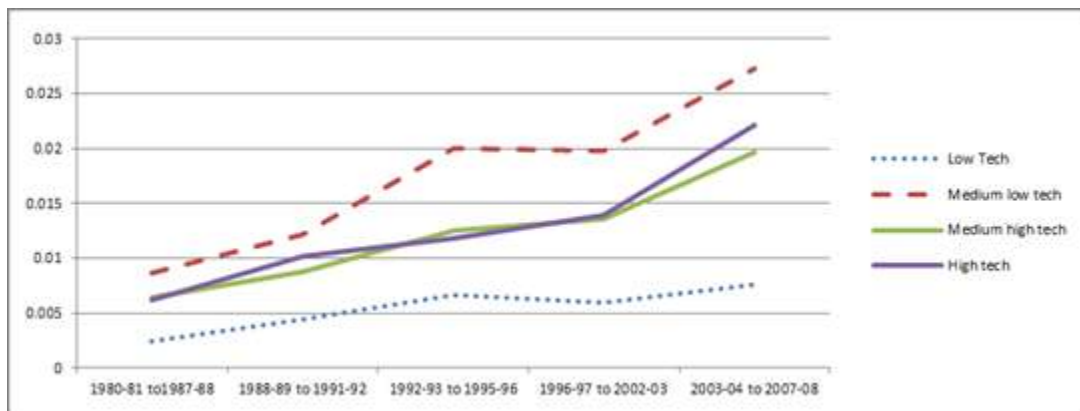
It is also important to note that the high tech segment experienced the least structural change in terms of both value added and employment. Inter-segment shifts essentially were confined between the low and medium tech industries. Interestingly, sectoral changes in the shares of value added and employment have not always gone in the same direction. The low tech sector which was losing share in value added gained in terms of employment shares except between 1980-87. On the other hand, the high tech segment has been losing its employment shares continuously since the early 1990s, despite a brief period of growth in its value added share. Medium tech industries have been increasing the value added shares rather rapidly but there is no tendency of employment share of these industries to rise.

Sectoral changes in value added share are clearly not associated with internal reallocation of employment across industries within the sector. The slow pace of structural change means that the low tech segment

remains by a wide margin the largest components of manufacturing employment in Indian economy. More than half of total manufacturing employment has been stuck in the low tech sector which accounts for a mere 22 percent of value added. On the other hand, the medium tech segment which captures slightly less than three fourth of the value added absorbs only 45 percent of employment.

In the absence of reallocation of employment from low to medium and high tech segments, growth in these manufacturing sectors was essentially driven by capital accumulation. Capital-labour ratios in each segment for each sub period presented in Figure 25 show an unmistakable increase in capital intensity. The capital intensity of production methods has risen across all the segments of Indian manufacturing but the rise is much sharper in capital intensive and science based sectors than the low tech industries. Thus despite the fall in share, low tech sector continues to absorb a large share of employment.

**Figure 25: Capital-labour ratio: 1973-74 to 2007-08**

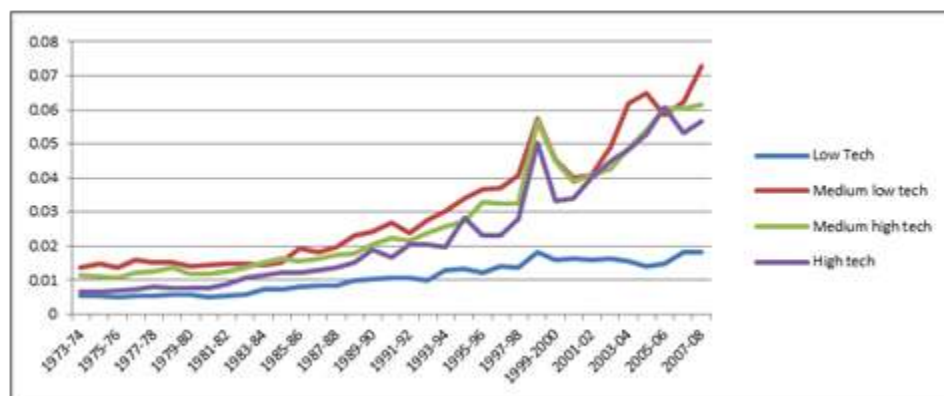


Source: Own calculations based on Annual Survey of Industries database

### ***Productivity growth***

There changing intra-sectoral patterns of GDP distribution across different segments of manufacturing distinguished by technology intensity have also not been matched by a commensurate change in the distribution pattern of the labour force. Figure 26 presents labour productivity levels in all the four segments of the manufacturing sector. It shows that the low tech segment remains the lowest productivity segment by a wide margin; productivity levels in other sectors is increasing much more quickly. Productivity has grown in all segments, but is particularly large in capital-intensive and science based high tech sectors. The low tech sector experienced only marginal growth in productivity.

**Figure 26: Labour productivity growth by technology based segment in India manufacturing: 1973-74 to 2007-8**



Source: Own calculations based on Annual Survey of Industries database

Overall labor productivity growth can be decomposed into two components following the methodology popularised by Rodrik and Macmillan (2011), described in the previous section. Within-sector productivity changes (also known as “intra-effect”) are distinguished from changes in the sectoral allocation of labour (structural-change effect), which is positive (negative) when labour moves from less (more) to more (less) productive sectors. It can therefore be used as an indicator for the success of structural transformation.<sup>42</sup> Typically, decompositions are carried out at the level of broad sectors. This paper however uses a more disaggregated level because aggregate trends in manufacturing might hide considerable variation at a lower level.

Decomposition results presented in Table 15 show that manufacturing productivity growth is mainly driven by intra-sectoral growth in productivity. Structural change effects have been marginal. More importantly, however, the structural change effect is not even positive for three out of six sub periods. A closer examination yields that it has been positive only in the 1980s and early 1990s. In fact, structural change in employment in the manufacturing sector has actually been growth reducing. Workers are increasingly absorbed into lower-productivity activities which can have negative effects on both growth and poverty in the long run/ dynamic terms.

**Table 15: Productivity growth and decomposition of productivity growth**

Year	Low Tech	Medium low tech	Medium high tech	High tech	Productivity change due to Structural change	Intra-sectoral Productivity growth	Total Productivity growth
1974-75 to 1979-80	-0.137	0.159	1.195	2.552	-2.09	4.47	2.38
1980-81 to 1987-88	4.637	3.992	1.418	6.767	7.31	84.19	91.50
1988-89 to 1991-92	5.043	4.153	1.956	9.052	0.82	37.27	38.09
1992-93 to 1995-96	2.628	10.011	2.463	0.827	1.08	61.71	62.79

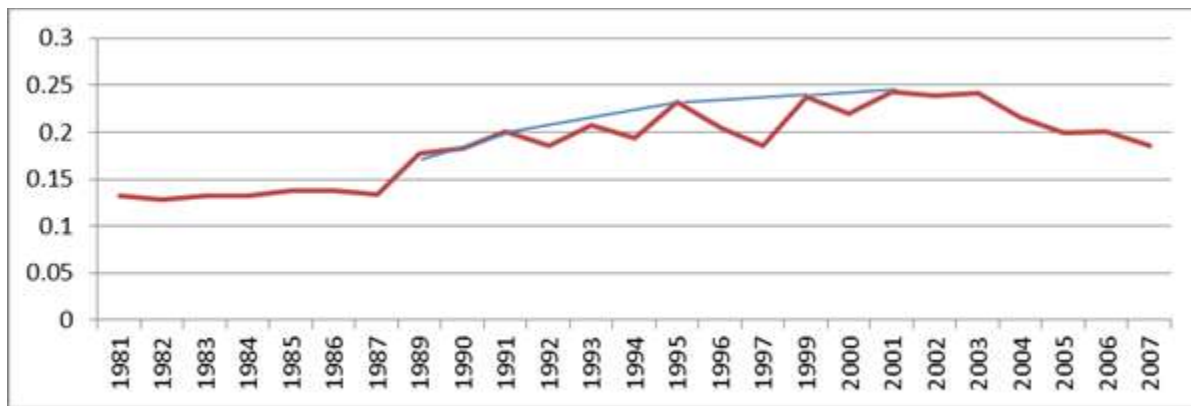


1996-97 to 2002-03	3.484	2.541	3.985	5.682	-3.53	66.62	63.09
2003-04 to 2007-08	1.483	6.996	5.320	4.012	-0.91	68.72	67.80

Source: Own calculations based on Annual Survey of Industries database

Distinguishing between formal and informal activities within the four broad segments of the manufacturing sector also has important consequences for understanding of the effects of structural change on manufacturing growth. Evidence of informalization of the organized manufacturing sector through greater use of subcontracting and increasing employment of contract and temporary workers is well documented<sup>43</sup>. The implication of these changes is that the bulk of the new jobs created in the formal sector of Indian manufacturing are of low quality, informal jobs. Figure 27 shows that the share of social protection benefits increased albeit slowly through the 1980s and 1990s. In 2000, it stagnated and in 2002 it started declining indicating increasing use of informal contract labour within the formal sector.

**Figure 27: Share of social security payments in wages and salaries**



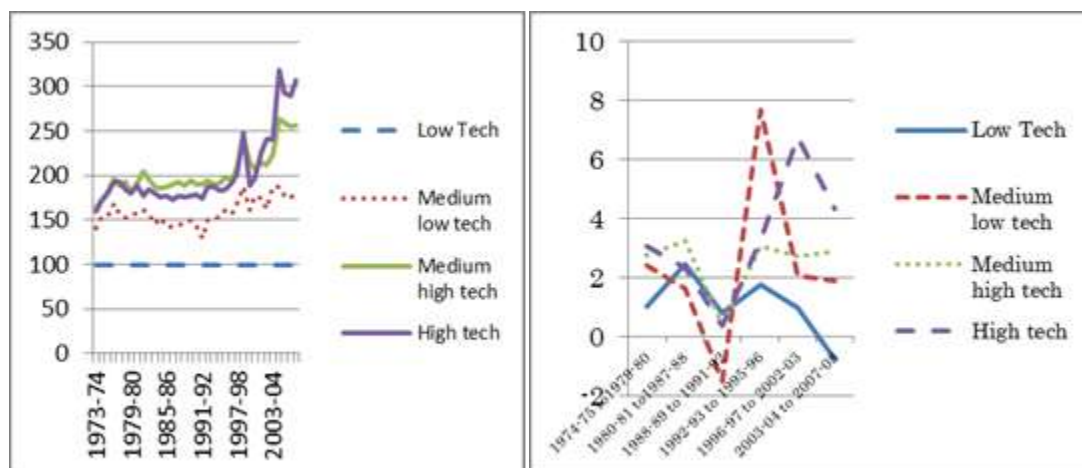
Source: Own calculations based on Annual Survey of Industries database

*Manufacturing wages*

The extent to which wages paid in different manufacturing sectors converge or diverge over time is important for understanding the poverty reducing effects of manufacturing growth. Equally important is the extent to which differences within the manufacturing sectors actually contribute to differences in average wages. In order to calculate wage differentials, average remuneration per worker is calculated from the Annual Survey of Industries for each segment between 1973-74 and 2007-08. The wage rate for the labour-intensive sector serves as the base (Table 16). The wage rate is deflated by the CPI-IW to get a series of real wage rate.

As might be expected, wage rates for each of the four manufacturing sectors are ranked in order of their technology intensity. Overall, the real wage has increased in all the sectors over time but there has been divergence in wage patterns with more technology intensive sectors experiencing a faster wage rise (Figure 28). The wage differentials between low tech industries and more sophisticated industries have risen sharply. The medium low sector, which starts from about the same relative position as the medium high and high tech sectors experienced slower growth in wages than the other two sectors. Interestingly, most of the increase in the wage gap is concentrated in the post 1991 period, coinciding with liberalization and high GDP growth rates. This apparent increase in wage dispersion may have inhibited poverty reduction, as it may have contributed to greater income inequality, which tends to slow poverty reduction (Ravallion and Chen, 1997).



**Figure 28: Wage patterns in manufacturing sector: 1973-74 to 2007-08**

Source: Own calculations based on Annual Survey of Industries database

Increasing openness in India seems to have induced an increase in the skill premium, similar in nature to what happened to other countries that globalized in the 1980s and 1990s. This fact, sometimes called the “skill premium puzzle” is often explained by exogenous technological shifts favoring skilled labor or increased investment in physical capital that is complementary with skilled labor. Regardless of what causes it, this skill premium has been associated with an increase in returns to education that has been inequality increasing in many countries. In India, most studies confirm that wage inequalities went up after the 1991 reforms (Dutta 2007; Chamraborty 2006; Kijima, 2006; Azam, 2009). Typically, it has been attributed to demand-supply mismatch in skilled labour. While demand shift occurred in favour of skilled labour caused by skills upgrading within-industries, the relative supply of tertiary graduate workers stagnated.

Estimates of Mincer-type wage equations [WDR 2006, OECD 2011] measure the skill premium and confirm wages of regular wage workers are significantly higher than casual workers and that urban workers are paid more highly than their rural counterparts, controlling for individual worker characteristics and industry characteristics.<sup>44</sup> Interestingly, the importance of the skill premium has changed in the post-reform period. It was not significant for any industry in 1999-00. But in 2004-05 it becomes significant in all the industries except for in medium low tech industries.

But the manufacturing wage differentials cannot be explained in terms of education alone. They also reflect profits and product market competition and in turn inter industry variation in rents and industry structure. One can observe an “industry premium” in the high tech segment, that leads to higher wages offers even after controlling the skill variable. High tech industries offer premium wages which are to attract the best talent in the country. This seems to have pushed the wages higher than what can be explained by economic factors. This increase in dispersion of wages in the manufacturing sector pushed up by expanding incomes in the most high skilled industries is consistent with experiences in a number of developing and developed countries over the last quarter century (OECD 2011).

To conclude, despite significant restructuring within the sector, overall the organised manufacturing sector has largely been stagnant in India as a proportion of GDP. As a result of its poor performance, it is not operating as an immediate alternative employer to workers stuck in agriculture. Nevertheless, it has been subject to internal restructuring as the distribution of value added and employment across industries has changed. Noticeably however changes in the sectoral patterns of employment are not commensurate

with those in value added. In terms of value added both the low tech and high tech sectors have experienced a decline while medium tech industries have grown in importance. Employment however remains stuck in the low tech industries. Medium and high tech sectors have not emerged as an alternative employer due to low growth rates. Further, even within the organised sector, informal employment has been on a rise. Earnings have been rising but so are wage differentials not only across industries but also within industries. These cannot be explained by difference in skills and schooling. There have been industry premiums exacerbating inequalities and poverty. This poses a serious challenge of bringing about the industrial restructuring that has poverty reducing effects in dynamic terms.

## VI. STRUCTURAL CHANGE AND POVERTY REDUCTION

A fundamental precondition for poverty reduction is a pattern of growth and structural change that generates productive employment and improves earnings for the poor population. India's pattern of growth has witnessed a change in the sectoral pattern of GDP, but lacked a commensurate change in the structure of employment. Agriculture and low productivity sectors characterised by low wages continue to dominate employment patterns. The nature of structural change in India, therefore has not been conducive for poverty reduction, particularly during the most recent period of liberalization and high growth.

### *Poverty trends*

In general, India's surveys on household consumption patterns carried out by National Sample survey Organization (NSSO) at an interval of five years are considered of high quality for a developing country. They have been carried out for a long enough time and with enough regularity. Yet poverty measurement has been a subject of debate.<sup>45</sup> Data on Indian poverty post-independence can be classified into three broad phases: from 1951-52 to 1972-73 when no official data is available; from 1972-73 to 1991-92 which we will consider the pre radical reform period for which poverty data is available; and from 1991-92 onwards which we consider the post radical reform period.

Even though no official poverty estimates are available for most of the pre-1970 period, there have been several studies by individual researchers based on NSS surveys for this period. Most these studies estimate poverty using the head-count index (H), which gives the percentage of the population who live in households with a consumption per capita less than the poverty line. These studies lack uniformity however as they treat minimum consumption expenditure differently and vary in how they update the poverty line used across time. Therefore their findings vary in the degree to which they find poverty either increased or decreased over the pre-1970 period.<sup>46</sup>

From the year 1972-73 onwards, the Planning Commission has estimated the proportion and number of poor separately for rural and urban India at national and state levels using a consistent set of poverty lines. Estimates for the poverty headcount, the poverty gap, and the squared poverty gap<sup>47</sup> are based on the NSS surveys data on household consumption expenditure are available for the years 1972-73, 1977-78, 1983-84, 1987-88, 1993-94, 1999-00, 2005-06 and 2009-10. The data available for selected years over 1973-74 to 2009-10 are presented in Table 16.

A sharp decline in all the poverty ratios during the welfare policy regime of the 1970s is clearly visible in the data. It is also often attributed to the 'green revolution' introduced in the late 1960s which increased agricultural productivity and hence rural income in India. Noticeably, the decline in absolute poverty continued in the following regime as well. Interestingly, the "Gini" coefficient, which measures inequality, also tended to decline suggesting an improvement in the distribution of income in the 1980s.<sup>48</sup>

In recent years, the poverty estimates have been subject to huge debate. The Planning Commission estimates for the post-reform period based on the Tendulkar Committee Report are presented in Table 17 below. The official estimates reveal that economic growth in the post radical reform period has indeed been accompanied by poverty reduction. Poverty rates declined during the 1990s; the deceleration continued in the early 2000s as well.<sup>49</sup> The trend seems to have reversed however over the past few years particularly due to changes in rural poverty. An examination of trends in the Gini coefficient however

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shows that inequality has increased in both rural and urban areas. For urban areas, the level of inequality is at its highest in 2004–2005, at 0.376.

**Table 16: Poverty estimates 1973-74 to 1993-94**

Year	Head count			Poverty gap			Squared Poverty Gap			Gini coefficient	
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1973-74	56.4	49	54.9	16.56	13.64	15.95	6.81	5.26	6.48	0.27	0.301
1983-84	45.7	40.8	44.5	12.32	10.61	11.96	4.78	4.07	4.61	0.3	0.33
Average annual difference	-1.07	-0.82	-1.04	-0.424	-0.303	0.399	-0.203	0.119	0.187	0.003	0.0029
1993-94	37.3	32.4	36	8.45	7.88	8.3	2.78	2.82	2.79	0.28	0.34
Average annual difference	-0.84	-0.84	-0.85	-0.387	-0.273	0.366	-0.2	0.125	0.182	0.002	0.001

Source: Data Table, Planning Commission <http://planningcommission.nic.in/data/datatable/index.php?data=datatab>

**Table 17: Poverty estimates: 1993-94 to 2009-10**

Year	Head count			Poverty gap			Squared Poverty Gap			Gini coefficient	
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1993-94	37.3	32.4	36	8.45	7.88	8.3	2.78	2.82	2.79	0.28	0.34
2004-05	28.3	25.7	27.5	5.8	6.2	5.8	1.76	2.0	1.76	.306	.376
Average annual difference	0.818	-0.609	-0.773	-0.241	-0.153	0.227	-0.093	0.075	0.094	0.002	0.003
2009-0	33.8	20.9	29.8								
Average annual difference	1.1	-0.96	0.46								

Source: Data Tables, Planning Commission, <http://planningcommission.nic.in/data/datatable/index.php?data=datatab>

On the other hand, there is evidence that the ratio of very poor population has declined sharply over this period. The ‘very poor’ in India are defined by those who are below 75 percent of the poverty line. According to the estimates of Dev and Ravi (2007), the poverty ratio for the ‘very poor’ declined from 28.3 percent in 1983 to 15.5 percent in 1993–1994, and to 10.3 percent in 2004–2005 (Table 18). Noticeably, the reduction in the percentage of the very poor has been more striking in rural areas than in urban areas, particularly during the period 1993–1994 and 2004–2005.

**Table 18: Poverty ratios for the very poor: 1983-84 to 2004-05**

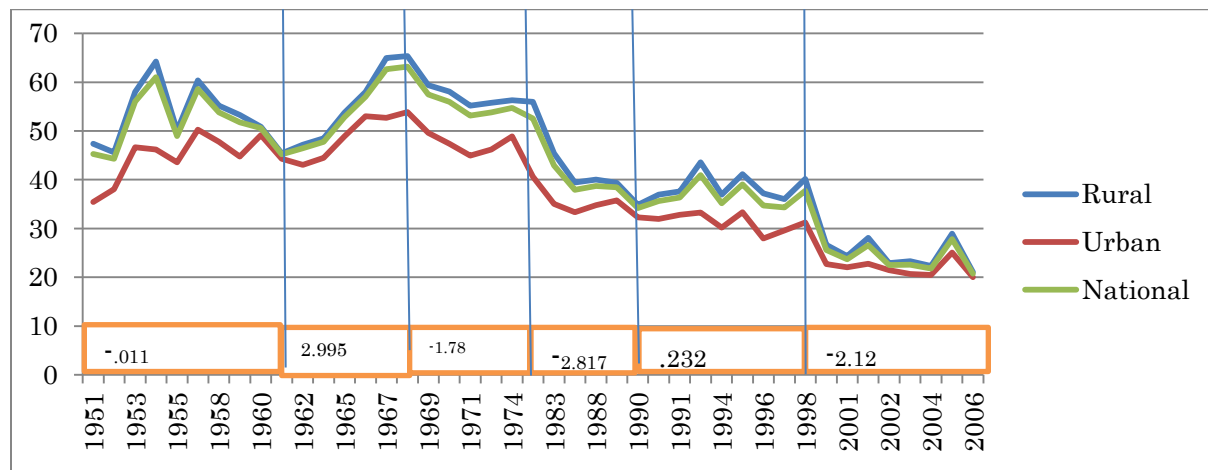
	Rural		Urban		All	
	Poor	very Poor	Poor	very Poor	Poor	very Poor
1983-84	45.76	25.52	42.27	22.45	44.93	24.79
1993–94	37.26	29.18	32.56	16.00	36.02	15.54
2004–05	29.18	9.64	26.02	12.00	28.27	10.32

Source ADB, 2011, P. 46

The difference between trends in the official poverty headcount and the “very poor” headcount highlight the fact that measurement of poverty in India will depend entirely on where the poverty line is set, and what criteria are used to set it. An enormous literature and a host of international agencies have tried to address these questions, and these debates continue to inform national discussion of what poverty in India means.<sup>50</sup> Nonetheless, taken together it is clear that growth in India can and has reduced poverty, particularly among the poorest, but that increases in inequality may threaten to mute the effect of poverty on growth. To further examine how the pace of poverty reduction may have changed according to the phase of structural transformation underway in the country, we use a long series of poverty estimates based on the Indian official poverty lines, but estimated for all years that NSS data is available.

Using the longest, most comprehensive set of Indian poverty estimates available (Datt and Ravallion, 2010), we calculated annual average decline in poverty for five periods as depicted in Figure 29. It is observed that quite in line with the official estimates, their figures also show deceleration in average annual decline in poverty rates after the 1990 reforms. This is despite the fact that the trend poverty rates have been higher for the post reform period.

**Figure 29: Poverty rates (HCR): 1951-2006**



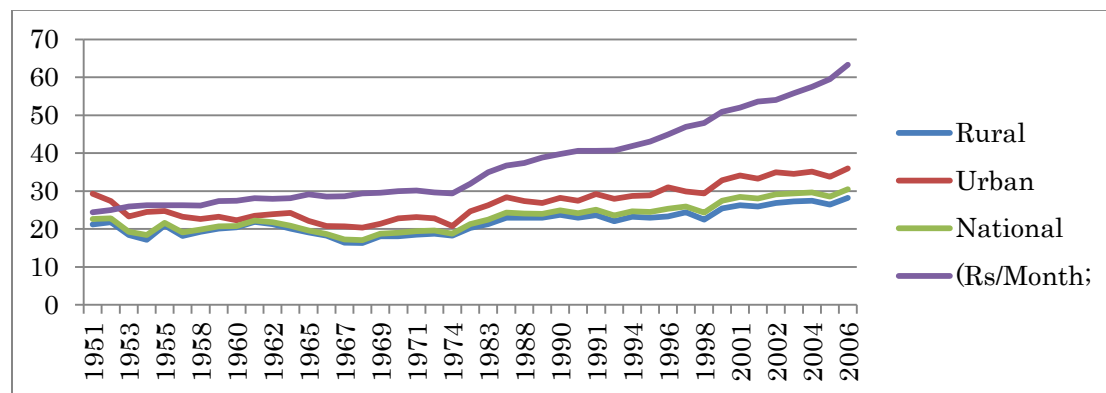
Source: Based on Datt and Ravallion (2010)

Further support to the hypothesis that poverty has been on decline in India is found in the consumption data. Interestingly national accounts (NAS) consumption figures are much higher than the NSS

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consumption figures and that the difference been growing over time (Figure 30). Even so, both sets of data indicate that there has been impressive growth in consumption expenditure in both rural and urban areas. Figure 30 reports mean per capita monthly consumption expenditure based on NAS and NSS data.

**Figure 30: Average monthly consumption expenditures based on NAS and NSS: 1951-2006**



Source: Datt and Ravallion (2010)

A general picture of poverty reduction over the last half-century in India emerges, that shows that while the growth phase of the first and a half decade of planning had an adverse effect on poverty despite high growth rates, the welfare phase of the state driven growth model is associated with sharper poverty reduction. This led to a fierce debate on trade-off between growth and poverty. In a more recent period, while growth rates accelerated in the early 2000s, poverty reduction rates decelerated, leading once again to concerns about the sustainability of growth with poverty reduction. Poverty seems to have further aggravated in the post 2007 period. The upshot is that the growth pattern did affect the poverty rates in India but the rate of poverty reduction remains low and highly variable over time. A sizeable population continues to remain below the poverty line.

### *Structural change and poverty*

Structural transformation that leads to industrialization, quality job creation and improved productivity matters for the country-wide rate of poverty reduction. Structural transformation towards high-productivity sectors improves earnings and hence has poverty reducing effects. The level of urbanization which accompanies growth and structural change is also viewed as a positive factor in promoting rural non-farm economic growth and reducing poverty.<sup>51</sup> However, factor market distortions impede urban-rural equality and in turn may have adverse effects on poverty reduction through non-farm economic growth. This is likely to happen if rural workers who move to the city do not get jobs, and face unemployment, or turn to relatively low-paid urban informal sector activities. Greater labor market dualism (as measured by the inter-sectoral wage differential or by the size of the informal labor force) means that there will be less growth, and that less of the growth that does occur will benefit the poor.

Poverty will decline only if the organized industry can absorb on a large scale the semi-skilled and unskilled labour released from the agriculture sector, which has not been the case in India.<sup>52</sup> Hence it is not merely industrialization in terms of value added rather it is the poor vis-à-vis the employment generated in the organized manufacturing, which is crucial for reducing poverty. Similarly, a rise in industrial productivity translating into a rise in the income of the workers would have implications in terms of a decline in poverty (Mitra, 1992). On the whole, both the industrialization of value added and of the work force resulting in a rise in productivity – the former being faster than the latter – would help to reduce poverty.

The relationship between structural change of employment and poverty reduction also relies on the degree to which initial conditions make output gains more or less pro-poor. One of the important factors that influences the links between structural transformation and poverty is the inequality, not merely in terms of income but also asset distribution, education and urbanisation.

While many studies have looked at the relationship between the sectoral composition of growth and poverty reduction.<sup>53</sup> Here we make an attempt to analyse how the structural change in GDP has impacted on poverty reduction at the national level.

To model the effects of structural change on aggregate (urban and rural) poverty measures, the poverty measure is regressed on per capita income, structural change and the government transfer payments. While the per capita income captures growth, structural change as measured by NAV (see sections 3 and 5) reflects the change in sectoral composition of GDP. Government transfer payments is used as a proxy for the welfare programmes of the government. The poverty ratios are not expected to be stationary at level. Therefore we began by testing unit root using the Dicky Fuller test. As expected, the null of a unit root could not be rejected. We therefore used the first difference in poverty for the analysis. In our basic model, this is regressed on three sets of variables representing: growth, welfare and structural change. Thus the model used is:

$$POVCH = a_1 + a_2 * GRTH + a_3 * STRCH + a_4 * WELFARE_i + a_5 * PRICEIN + \theta_j + \mu_i$$

where, PRICEIN is the GDP deflator used as a proxy for general inflation. The other three sets of variables are presented in Table 19.

**Table 19: List of variables**

Poverty	Growth variables	Structural change	Welfare policy
NAPOVCH: Change in the national poverty rates	PCYROG: the rate of growth of per capital income	NAV: half of the Absolute value of change in the share of three broad sectors	SHARETP: Share of transfer payment in government expenditure
URPOVCH: Change in the urban poverty rates	AGROG: Agricultural growth rate	CHAGSHARE	TPROG: Annual growth rate in transfer payment
RURPOVCH: Rural poverty rate change	INDROG: Industrial growth rate	CHINDSHARE	
	MFGROG: Manufacturing growth rate	CHSERSHARE	
	SERROG: Service growth rate		

Source: The model for poverty reduction

To capture the effects of other time trended variables, we included four time dummies ( $\theta_j$ ): 1951-52 to 1959-60; 1960-61 to 1969-70; 1970-71 to 1983-84; 1983-84 to 1993-94; 1993-94 to 2007-08 also. Table 20 presents the results of the Dicky-Fuller test for all the series. All the variables in the form of first difference and are stationary at 1% level of significance.

Table 21 summarizes the results in testing the poverty impact of the structural change in GDP. Model 1 incorporates the basic variables of per capita income growth, structural change (NAV) and the growth of transfer payments. In addition it also includes an interactive term between per capita income growth and structural change (PCYNAV) to capture the market oriented policy regime which signifies rapid growth and structural change. The aggregate per capita income having significant negative impact on poverty in Model 1 suggests that growth is good for the poor as in the literature. As expected, the growth in transfer



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payments also appears to have poverty dampening effects. Structural change is insignificant but appears with a correct sign. However the interactive term between growth and structural change indicates that the high growth rate with structural change exacerbates poverty in India. Clearly, after controlling the effects of other variables, high growth associated a rapid structural change seems to have led to higher poverty. Section 3 has shown that the high growth rate is driven by the service growth in India, thus these results imply that the service led growth is not conducive for poverty reduction.

**Table 20: Results of the Dicky Fuller test**

Variable	Description	Estimated statistic
URPOVCH	Urban poverty rate	-7.410
RURPOVCH	Rural poverty rate	-7.304
NAPOVCH	National poverty rate	-7.101
CHAGSHARE	Change in the share of agriculture in GDP	-8.041
CHINDSHARE	Change in the share of industry in GDP	-6.308
CHSERSHARE	Change in the share of service in GDP	-8.579
PCYROG	Rate of growth of PCY	-5.186
TPROG	Rate of growth of central government transfer payments	-6.405
AGROG	Agricultural growth rate	-8.297
MFGROG	Manufacturing growth rate	-5.936
SERROG	Service growth rate	-8.613
NAV	Norm of absolute value	-6.542

Note: Critical values are -3.655 at 1%; -2.961 at 5% and -2.612 at 10%.

Source: own calculations

Additionally, the results suggest that industrial growth can be poverty reducing and that structural change needs to be accompanied with distributional policies to make a dent on poverty. Model 2 incorporates two interactive terms: the first is between structural change and the rate of growth of transfer payments (TPNAV) while the second is between growth and transfer payments (TPPCY). While the latter is insignificant, the former is turns out to be significant with a negative sign. Model 3 includes the rate of growth in manufacturing to show that the role of transfer payments is reduced once the effect of manufacturing growth is controlled. Models 4 and 5 explicitly show that the increase in the share of industry is poverty-reducing while services and agriculture are poverty-neutral.



**Table 21: Regression results based on OLS: National poverty model**

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
PCYROG	-148.8 <sup>a</sup>	-2.55	-157.3 <sup>c</sup>	-1.77	-142.2 <sup>c</sup>	-1.67	-28.01	-1.44	-28.01	-1.44
MFGROG					-217.8 <sup>b</sup>	-2.32				
NAV	-1.55	-1.28	-0.98	-0.82	-0.66	-0.65				
CHINDSHARE							-2.48 <sup>c</sup>	-1.87	-3.53 <sup>c</sup>	-1.62
CHSERSHARE							1.05	0.8		
CHAGSHARE									-1.05	-0.8
TPROG	-11.76 <sup>c</sup>	-1.69					-13.35	-1.88 <sup>c</sup>	-13.35 <sup>c</sup>	-1.88
PCYNAV	48.42 <sup>b</sup>	2.18	48.69 <sup>b</sup>	2.03	47.56 <sup>b</sup>	2.27				
TPPCY			43.65	0.18	15.45	0.06				
TPNAV			-4.83 <sup>b</sup>	-2.2	-3.64	-1.49				
PRICEIND	-0.64	-0.64	-0.61	-0.57	-0.57	-0.56	-0.75	-0.8	-0.75	-0.8
CONS	5.87 <sup>c</sup>	1.8	4.49	1.41	3.73	1.31	2.02	1.25	2.02	1.25
F-test	3.02 <sup>a</sup>		3.33 <sup>a</sup>		3.91 <sup>a</sup>		2.80 <sup>a</sup>		2.18 <sup>a</sup>	
R2	0.17		0.17		0.24		0.16		0.16	
NOB	40		40		40		40		40	

Note: Superscript a: significant at 1%, b: significant at 5% and c: significant at 10%

Source: Based on own estimations

Looking at the results of the same regressions on urban poverty and rural poverty shows that growth is central to urban poverty reduction while industrialisation, in particular manufacturing emerges a key variable affecting rural poverty. Tables 22 and 23 depict the impact of structural change on poverty reduction in the Indian context. While the broad patterns remain the same there are some noticeable differences in the results across rural and urban areas. In an earlier paper, Mallick (2012) has also shown that an increase in non-agricultural GDP reduces rural poverty.

In the initial phases of growth, structural change seems to have had a poverty reducing effects in particular in urban areas. However, structural change that occurred in high growth rate period has been poverty enhancing in both rural and urban areas but more prominently in urban areas. As discussed earlier, this period witnessed structural change in employment as well. But most workers released from agriculture get absorbed in low quality informal or low productivity sectors. This seems to have influenced the process of poverty reduction adversely.

**Table 22: OLS based estimates of urban poverty model**

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.		Coeff.	t-stat	Coeff.	t-stat
PCYROG	-130.22 <sub>a</sub>	-3.37	-96.49 <sup>c</sup>	-1.65	-91.97 <sup>c</sup>	-1.63	-33.78 <sub>b</sub>	-1.98	-33.78 <sub>b</sub>	-1.98
CHINDSHARE							-0.96	-1.19	-1.37	-0.94
CHSERSHARE							0.41	0.44		
CHAGSHARE									-0.41	-0.44
MFGROG					-65.26	-0.81				
NAV	-1.31 <sup>b</sup>	-2.06	-0.70	-1.13	-0.61	-1.12				
PCYNAV	39.01 <sup>a</sup>	3.04	35.41 <sup>a</sup>	2.60	34.98 <sup>a</sup>	2.68				
TPROG	-12.90 <sup>b</sup>	-2.24					-12.76 <sub>b</sub>	-2.13	-12.76 <sub>b</sub>	-2.13
TPPCY			-151.96	-0.78	-169.61	-0.89				
TPNAV			-4.01 <sup>c</sup>	-1.58	-3.64	-1.34				
PRICEIND	-0.48	-0.96	-0.54	-1.02	-0.53	-1.02	-0.52	-1.11	-0.52	-1.11
CONST	5.87 <sup>a</sup>	2.62	3.77 <sup>b</sup>	2.06	3.52 <sup>b</sup>	2.05	2.37 <sup>b</sup>	1.85	2.37 <sup>b</sup>	1.85
F-test	4.07 <sup>a</sup>		3.78 <sup>a</sup>		2.93 <sup>a</sup>		2.39 <sup>a</sup>		2.35 <sup>a</sup>	
R2	0.27		0.27		0.28		0.19		0.19	

Source: Based on own estimations

**Table 23: OLS based estimates of rural poverty model**

	Model 1		Model 2		Model 3		Model 4		Model 3	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.		Coeff.	t-stat	Coeff.	t-stat
PCYROG	-153.1 <sup>b</sup>	-2.2	-175.4 <sup>c</sup>	-1.7	-157.5 <sup>c</sup>	-1.6	-27.0	-1.2	-27.0	-1.2
MFGROG					-259.3 <sup>b</sup>	-2.3				
NAV	-1.6	-1.1	-1.0	-0.8	-0.7	-0.6				
CHINDSHARE							-2.9 <sup>b</sup>	-1.9	-4.1 <sup>c</sup>	-1.7
CHSERSHARE							1.2	0.8		
CHAGSHRE									-1.2	-0.8
PCYNAV	50.4 <sup>b</sup>	1.9	52.0 <sup>b</sup>	1.9	50.3 <sup>b</sup>	1.9				
TPROG	-11.4	-1.4					-13.4 <sup>c</sup>	-1.7	-13.4 <sup>c</sup>	-1.7
TPPCY			107.3	0.4	37.1	0.1				
TPNAV			-5.1 <sup>b</sup>	-2.2	-3.6	-1.4				
PRICEIN	-0.7	-0.6	-0.6	-0.5	-0.6	-0.5	-0.8	-0.8	-0.8	-0.8
CONS	5.9	1.5	4.7	1.3	3.8	1.1	1.9	1.0	1.9	1.0
F-test	2.2 <sup>a</sup>		2.8 <sup>a</sup>		3.2 <sup>a</sup>		1.7 <sup>c</sup>		1.7 <sup>c</sup>	
R2	0.1		0.2		0.2		0.2		0.2	

Source: Based on own estimations

The present analysis indicates that poverty has indeed declined after the 1990 reforms but the average rate at which it declined decelerated. In the initial phases structural change that occurred did have a poverty reducing effect but the period of high growth and rapid structural change appear to have had a poverty enhancing effect. Interestingly, this period also witnessed acceleration in structural change in employment. But as discussed in the previous sections, shifts in sectoral distribution of employment have not been in favour of high productivity sectors. Labour that is released from agriculture gets absorbed in low productivity sectors where wages are significantly low. This seems to have inhibited the poverty reducing effects of growth. Our results show that the expansion in the share of industry in particular manufacturing can have large poverty reducing effects. These effects are more significant in rural areas. Lanjouw and Murgai (2009) and World Bank (2009) argue that India's urban economic growth has exerted a pull on the rural economy through rural nonfarm diversification. Thus the expansion of industry remains the key determinant in poverty reduction. It is also observed that growth remains an important driver of poverty reduction, both in rural and urban areas. It underscores the fact that growth is a precondition for poverty reduction even while different growth episodes have different effects on it. Finally, the role of redistributive policies is found to have a positive impact on poverty reduction.

## VII. CONCLUDING REMARKS

Structural change, defined as the reallocation of GDP and labour across sectors features prominently in the literature on economic development. Following the recent resurgence of structural economics it has been increasingly recognized that as labour and other resources move from traditional into modern economic activities, overall productivity rises, incomes expand to accelerate growth and reduce poverty. New Structuralists argue that the nature and speed with which structural transformation takes place is

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considered one of the key factors that differentiate successful countries from unsuccessful ones (McMillan and Rodrik, 2011). The nature of structural change can have implications for the effect that the ensuing growth will have on poverty reduction. A structural transformation that leads to creation of more jobs in more productive sectors can be expected to have larger poverty reduction impact than one creating jobs in low productivity sectors. A structural transformation that pulls unskilled workers or relatively lower skilled workers out of low productivity primary sectors to relatively higher productivity non-primary sectors is likely to have greater poverty reduction potential. Therefore, production structures should be the starting point for economic analysis and the design of appropriate policies (Lin, 2011). The production structure need to continuously shift further and further away from low productivity production to higher and higher productivity activities shedding the former to nations further down in the hierarchy. This is a dynamic process and not a static one.

The present study analyses the growth-structural change-poverty linkages within the framework of the New Structural Economics using Indian data. It finds that the Indian economy has recorded substantial improvement in its GDP growth performance over the past three decades with average rates of growth going up and fluctuations coming down. The growth of the economy has been accompanied by a changing sectoral distribution of GDP towards high productivity sectors in particular services. Thus the structural transformation taking place in India has been a 'service-oriented transformation' unlike the 'industry-oriented transformation' that characterizing the East Asian countries like Japan, Republic of Korea, and later in China. With this the changing sectoral distribution of GDP has not been matched by a commensurate change in the distribution pattern of the labour force, as the agricultural sector and other low productivity sectors continue to dominate employment. Significantly, India's pattern of growth has not been characterised by a change in the structure of employment towards manufacturing, with the share of this sector in total employment stagnating, and recently declining, despite growth of output. Even within this sector, the resource and labour intensive low tech sectors remain the largest employers. Indeed movement out of agriculture has occurred but the resulting labour force is not automatically absorbed into this sector. Instead, workers move disproportionately into the informal employment or low productivity services and even manufacturing activities, where the scope for sustained growth in productivity and improvements in incomes is limited. Thus two patterns emerge: First, despite the reasonable growth performance of the Indian economy, employment remains dominated by low-productivity activities; Second, permanent wage employment exists only for a small fraction of workers. Precarious forms of employment have grown and provide the bulk of employment opportunities. The mismatch between the sectoral patterns of value added and employment has led to wide wage differentials across sectors. This raises an important question about the impact of growth on poverty. This is because growth is poverty reducing only if it 'enables the poor to actively participate in and significantly benefit from economic activity' (Kakwani and Pernia 2000). The present study finds that growth has indeed been accompanied by important reductions in poverty levels, but sizable population still remains stuck in poverty. The lack of structural change in the right direction seems to have impeded the poverty reducing effects of growth. We have shown that job creation by industrial expansion is clearly the way forward along with redistributive policies to solve poverty problems.

We argue that the government policy is critical for generating a pattern of structural change that creates employment and reduces poverty. Government policy will need to address the insufficiency of labour demand together with the poor quality of existing employment. It is crucial, then, that the development trajectory allows for employment-intensive growth, if an expansion of productive employment and decent work for all is to be attained and that specific measures are taken and implemented regarding social protection. This will necessitate targeted or focused industrial policy that seeks to promote manufacturing and ensures that increased investments translate into changes in the patterns of employment.

A strategy of public investment in infrastructure and in human development can aid private investment and growth. The emphasis on rural-based policies towards industrialisation will reduce poverty more

rapidly. Improving access to formal credit markets in rural areas is crucial to encourage or 'crowd in' private investment, growth and poverty reduction.

Unfortunately, the growth debate in India has been revolving around policy reforms while the focus needs to be on investing heavily on industrial growth and infrastructural development both in rural and urban areas, creation of human capital and generating strong linkages between the rural and urban areas. A sole focus on further liberalization with a huge neglect of necessary supportive industrial strategies is misguided. While a less restrictive macro environment is a necessary it is not a sufficient condition for creating productive employment and decent living standards for all.

A recent analysis based on product space maps has shown that for India, opportunities exist for fostering industrialization by pursuing a path of strategic import substitution (Freire 2012). In particular the attempt to foster industrial development could leverage the domestic market size in a number of sectors that now exists and can sustain world scale manufacturing plants. Such opportunities exist in sectors such as electronic hardware, power generation equipment, telecommunication equipment. The burgeoning imports in these sectors are straining the balance of payment situation besides not allowing the country the benefit from their productive job creating potential. By prematurely signing the WTO's Information Technology Agreement in 2000, India has lost some of the policy spaces for providing the local manufacturing in some of these areas infant industry protection. Yet the recent experience of developing clusters of firms producing mobile handsets in the country suggests that it is possible to develop such pioneering industries leveraging the large local market size. The government may take lessons from experiences of other countries like Malaysia in targeting foreign direct investment for developing pioneer industries through special incentives (Kumar and Joseph 2007).

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## ENDNOTES

1. The first generation structural theorists (Rosenstein-Rodan, 1943; Chang, 1949; Nurkse, 1953; Lewis, 1954; Myrdal, 1957; Hirschman, 1958) highlight the centrality of capital in the growth process and place the shift of resources from labour to capital intensive modern sectors at the core of the growth process.

2 A new wave of structuralist literature has been underway. It is being promoted by a prominent group of economists such as Dani Rodrik, Ricardo Hausmann, Andres Velasco, Philippe Aghion, Michael Spence, Ann Harrison, Célestin Monga, and Ha Joon Chang among several others and has come to be known as the New Structural economics.

<sup>3</sup> Based on the observation that, beginning with the Industrial Revolution, technological change took place mainly in the manufacturing sector, authors like Kaldor (1970) and Cornwall (1977) have also asserted that the expansion of this sector is a driving force for economic growth (see Verspagen, 2000).

<sup>4</sup> Early works which promoted this line of thinking are Akamatsu, *inter alia*, (1935, 1962) and Hoffman (1931, 1958). For example, Akamatsu's flying geese paradigm depicts the late industrializing economy in terms of intra and inter-industry restructuring and diversification (Kasahara, 2004 for details; Kumar, 2001a for empirical analysis)

<sup>5</sup> See for instance, Rosenstein-Rodan (1943, 1961); Nurkse (1953); Rostow (1960) and Hirschman (1958).

6 One stream of literature within this framework has been strongly influenced by Joseph Schumpeter (1939). Drawing on historical experiences, it draws attention to the disequilibrium processes by which new technologies are generated 'in waves' which in turn propel economic growth. Another stream would however argue against a cyclical interpretation of economic growth and view technology-growth linkages from an evolutionary perspective. According to this stream of literature, technological change is a key factor in economic growth which continuously adds to the variability of trend growth rate (Versapagen, 2000 for excellent survey of literature).

<sup>7</sup> See for instance, Bernard Jones, 1996a, 1996b, 1996c; Gouyette and Perelman, 1997; Carree et al, 2000; Rodrik, 2011)

<sup>8</sup> Rodrik (2011) in a highly disaggregated analysis documents a highly robust tendency towards convergence in labour productivity in manufacturing activities, regardless of geographic location and country-level.

<sup>9</sup> See, Chenery et al 1986; Rodrik, 2009; Temple and Woessman, 2006; Timmer and de Vries, 2010; van Ark and Timmer, 2003.

<sup>10</sup> Sophisticated models have emerged to show that there is a two-way causality between economic growth and structural change both at the sectoral and industrial levels (Matsuyama 1991, 1997 for survey). Several authors have studied how the economy may succeed or fail in such structural change (See, e.g., Stokey, 1988, Lucas, 1993; Matsuyama, 2002; Föllmi and Zweimüller, 2004; Chen et al, 2011; Silva and Teixeira, 2008; Varum et al., 2009; Wang and Szirmai, 2008, Fagerberg, 2000, Timmer & Szirmai, 2000, Carree, 2002, Kiliçaslan and Taymaz, 2004; Singh, 2004).

<sup>11</sup> Timmer and Szirmai (2000) coined the term 'structural change bonus' for this (See also, Bosworth, Collins and Chen 1995; Fagerberg and Verspagen 2002, 2007; Timmer and de Vries, 2010). McMillan and Rodrik (2011) show that the bulk of growth in Asia and developing countries in Latin America and Africa can be explained by the contribution of structural change to overall labor productivity whereas the contribution of trend productivity growth to total productivity growth remains rather limited.

<sup>12</sup> In his seminal paper of 1967, Baumol (1967) put forward the idea of 'structural burden' of tertiarisation. He argues that employment share of the service sector tends to grow faster and becomes high in the developed countries because productivity growth in the service sector is generally slower than that in manufacturing sector.

<sup>13</sup> While analyzing the convergence process at the sector level, Bernard and Jones (1996a, 1996b, 1996c) and Gouyette and Perelman (1997) reject the Baumol's hypothesis. They observe that convergence at the inter country level of GDP per capita has not been caused by productivity convergence in the manufacturing sector but instead by convergence in the service sector.

<sup>14</sup> This view of immiserizing growth is almost always associated with increasing inequities and poverty and was widely prevalent during the 1950s and 1960s, which led a move towards greater egalitarianism in many developing countries (Cornia, 2005).

<sup>15</sup> This literature emerged in the 1990s. A large of studies appeared worldwide analyzing the employment generation potential of growth (See for example, Islam, 2004; Melamed et al, 2011). They often find poverty reduction to be lower than what it potentially should have been due to the low employment intensity of growth and, with few exceptions, low overall growth itself.

<sup>16</sup> At the time of independence, the structure of Indian economy was agrarian in nature. In 1950-51, more than half of GDP was constituted by agriculture, while almost 30% came from services. The share of industry was a mere 16%. Further, 70% of total capital stock was concentrated in the service sector followed by agriculture which accounted for the rest of it. The share of the industry was almost negligible.

<sup>17</sup> The effective marginal tax on income from capital (including wealth tax) rose to nearly 100% in the mid-seventies (Virmani, 2005)

<sup>18</sup> While the ZA test yields only one break point, the CMR test locates a maximum of two breakpoints at a time. The Bai-Perron test (1998) can yield multiple structural breaks in any series but the test is found to be sensitive to base year changes, marginal extension of time series, and alteration of the length of the partition (Dholakia and Sapre, 2011).

<sup>19</sup> Using the Bai Perron test, Rodrik and Subramaniam (2004) date the Indian growth transition in 1979. Hausmann and Rodrik (2008) find that the single break point occurs in 1982; Wallack (2003) uses an F-test analysis to show the existence of a break in 1980 ( see also, Sinha and Tejani, 2004).

<sup>20</sup> Cortuk and Singh (2011) also use the BP test to find evidence for a break in 1988.

<sup>21</sup> This decomposition exercise was conducted for each sector on yearly basis and then combined by the four distinct sub-periods as shown above: 1950-51 to 1964-65; 1964-65-1979-80; 1980-81 to 2003-04; and 2003-04 to 2009-10.

<sup>22</sup> In 1958, the Scientific Policy Resolution was announced. It aimed at ensuring an adequate supply of research scientists and promoting scientific research for expanding the scientific base within the country (Aggarwal, 2001). Massive public expenditure was incurred on the promotion of higher education (Aggarwal et al, 2011). University and professional education institutions were expanded to generate scientific,

engineering and technical manpower. From about twenty-five universities in 1947, the number increased to eighty in 1969 (Krishna, 2001). The number of engineering colleges increased from thirty-eight (with 2,940 seats) to 138 in 1970 with a capacity of 25,000 seats.

<sup>23</sup> See for instance, Bagchi, 1970; Bhagwati and Desai 1970; Narayana and Srinivasan, 1977, Bhagwati and Srinivasan, 1984; Chakravarty, 1984; Raj, 1984; Dhar, 1988; Nagaraj, 1990; Bhargava and Joshi, 1990; Mitra, 1977; Ahluwalia, 1985; Chandrashekar, 1988; Shetty, 1978; Bhagwati, 1993; Nayyar, 1994; Virmani, 2004, 2006; Acharya, 2006.

<sup>24</sup> A high degree of disproportionality in investment patterns favoring the industrial sector resulted in stagnation of the agricultural sector which had an adverse effect on demand for industrial products. Agriculture also was the dominant supplier of what constituted the 'wage basket' in a poor country like India. Stagnation in agriculture which set off an inflationary spiral also squeezed demand for industry. It forced the government to opt for deflationary policies aimed at holding the price line which further curtailed demand. Clearly, stagnation in agriculture had both direct and indirect effects on demand for industrial products.

<sup>25</sup> There is almost consensus in the literature that productivity growth rates had been marginal during this period. It was attributed to the extensive controls and inward-looking policies (Bhagwati, 1993); ad hocism and incoherence in government policies (Virmani, 2009; Dhar, 1990; Shetty, 1978); and restrictions on technology imports and FDI (Aggarwal, 2001).

<sup>26</sup> During the decade from 1965-66 to 1975-76, while income originating in public administration and defense increased by 103 per cent (consequent upon two wars with Pakistan and one with China), that originating in commodity producing sectors rose by 41 per cent.

<sup>27</sup> There has been intense literature on the factors driving the service sector growth and its impact on growth in India (Ghani 2010; Eichengreen and Gupta, 2011, 2009; Banga 2006; Singh, 2006; Dasgupta and Singh, 2006 among several others). Some argue that a process towards increasing specialisation and vertical disintegration which has entailed focusing on core competencies and outsourcing of peripheral activities (Stigler, 1956) is the engine of services growth and, by the same token, decline of industry. Others suggest that with the increasing monetisation of the economy, a major chunk of household activities is outsourced from the market. The measured growth of national income is, therefore, biased upward. Nagaraj (2009) cautions that the output of services might be overestimated due to (i) the inflated estimate of the growth of the private corporate sector, (ii) a slower rise in the services deflator, and in particular (iii) of an overstatement of the decline in the prices of communications services. His calculations show however that the adjustment may not really alter the current scenario.

<sup>28</sup> See, Cortuk and Singh, 2011 for similar results.

<sup>29</sup> Papola (1992) for instance finds that the magnitude of unemployment doubled during 1956-1972 from 5 million to 10 million and unemployment rate from 2.6% to 3.8%.

<sup>30</sup> Past studies including Bosworth, Collins and Viramani (2007), Sivasubramoniam (2004), and Das et al. (2011) also reach the same conclusion.

<sup>31</sup> This tendency has not gone unnoticed in the literature. But, most existing studies confine themselves to a comparison between two surveys at a time which may be misleading (Sundaram, 2004 for 1993-94 to 1999-00; Shubhanil for 2004-05 to 2009-10; see also Bhalla and Kaur, 2011). A longer period comparison from the 1970s attempted in the present study shows that labour participation rates have been declining since 1983. The year of 2004-05 was the only exception when this trend reversed.

<sup>32</sup> Boserup (1970) originally put forward this hypothesis in her seminal book titled 'Woman's Role in Economic Development'. Since then it has been subject to empirical examination by several experts ( see Bhalla and Kaur, 2011 for India)..

<sup>33</sup> In the Indian context, there is a possibility that this could also be due to family status purposes ( Bhalla and Kaur, 2011; Olsen and Mehta, 2006).

<sup>34</sup> See for example, Dholakia, 2002; Sivasubramoniam, 2004; Virmani, 2004; Jorgenson and Vu, 2005; Bosworth, Collins and Virmani, 2007; Bosworth and Collins, 2008; Bosworth and Maertens, 2010

<sup>35</sup> Tendulkar and Bhavani (2005) observe a steep rise in capital-labour ratio in all the sectors including agriculture during the period 1994-2000. Das et al. (2011) confirm the principal role of capital deepening in the sectoral growth.

<sup>36</sup> In a multinomial analysis on occupational choices, Aggarwal et al (2011) observe that over the period after liberalisation, probability of being unemployed has declined after controlling the other effects. Correspondingly, the probability of being manual worker or manual self employed worker has increased. This suggests that an increasingly large number of workers are being absorbed in manual works which may primarily be casual in nature.

<sup>37</sup> This is a pervasive finding in the literature. This shift has been attributed to trade induced skill-biased technological change (Ramaswamy, 2008; Kijima 2006); indigenous skill based technical change not influenced by trade (Berman et al, 2009); increased foreign direct investment (FDI) and deregulation in general (Chamarbagwala, 2006), and capital-skill complementarities (Berman et al, 2009); and trade openness in general (Acharya, 2006). Mehta and Hasan (2012) however attribute the increase in wage inequality to changes in industry wages and skill premiums that they observe cannot be empirically linked to liberalization. Further, there is evidence of intra-sectoral wage inequalities as well. Labour market dualism has been widely documented (Sen, 1994; Sundaram and Tendulkar, 2003; Das, 2003; Goel 2009) with wages varying across different segments of the labour market in each sector (Sen, 1998).

<sup>38</sup> Many scholars (e.g., Dutta, 2003; Ramaswamy, 2003; Sharma, 2006; Gupta et al., 2008; Ahsan and Pagés, 2009 Maiti and Marjit (2009) and Sen et al. (2010)) argue that the use of contact workers provides a means of getting around the labour regulations, particularly the Industrial Disputes Act (IDA), and industrial enterprises have actually been adopting this means on a wide scale. There is a strong possibility that increased informalisation is associated with heightened competition. This is because the lower wages of informal workers and saving of expenditure on worker benefits when such workers are employed help in reducing cost and thus improving competitiveness (Sen et al. (2010, and Pradhan (2006) for empirical evidence)

<sup>39</sup> Table A1 provides the classification of 2- digit industry and information on the basic industry characteristics of the four segments. These include plant size and capital-labour ratios.

**Table A1: Industrial classification**

Tech intensity	Code	Fixed capital per unit of output (Scale)	Capital-labour ratio
Low	15-22,36	325.09	4.943
Medium low	23,25,26,27,28	803.33	17.623
Medium high	24,29,31,34,35	745.19	12.784
High	30,32,33	889.04	11.248

Source: ASI surveys

<sup>40</sup> Several studies have found that this period was marked by increasing productivity (Trivedi et al, 2011) and efficiency (Majumdar, 2007). This pattern is quite in line with these studies.

<sup>41</sup> The NAV index was calculated over an average of annual changes in employment/GDP shares for each of the sub periods specified between 1973-4 and 2007-8.

<sup>42</sup> See e.g. Bosworth and Collins, 2008; McMillan and Rodrik, 2011

<sup>43</sup> According an estimate (Goldar and Aggarwal, 2010), workers employed through contractor (hereafter, contract workers) as percentage of total workers employed in organized manufacturing has increased from 14% in 1995-96 to 29% in 2005-06. The ratio of contract workers to total persons engaged in organized manufacturing has increased from 11% in 1995-96 to 22% in 2005-06.

<sup>44</sup> We estimate Mincer-type regressions with the log monthly wage of each worker explained by individual worker characteristics for two NSS round surveys: 1999-00 and 2005-06. The equation takes the following standard form:

$$\text{Log } W_{ij} = a * \text{SKILL}_{ij} + X'_{ij}b + \theta_j + u_{ij}$$

Subscript *i* denotes individuals, and *j* the industry of employment. We estimate separate equation for each year. The monthly wage is given by *w<sub>ij</sub>*. We define skilled workers as those with a high school diploma or more. The coefficient of Skill measures the skill premium, that is, the percentage difference in wages of skilled workers relative to unskilled workers. We control for individual characteristics in the vector *x* and for industry characteristics through dummy variables ( $\theta_j$ ). The controls included are age and age squared, whether the individual works full-time or part-time, a dummy for individuals in rural areas, and industry-specific dummies. To investigate whether wage differentials can be explained by skill premium differential in different segments of industries, we expand the previous model as below.

$$\text{Log } W = a * \text{SKILL} + \text{SKILL} * \text{LTECH} + \text{SKILL} * \text{MHTECH} + \text{SKILL} * \text{MLTECH} + X'_{ij}b + \theta + u$$

The results are presented in Table A2.

**Table A2: Regression results explaining wage differentials**

	1999-00				2004-05			
	Model 2		Model 1		Model 2		Model 1	
	Coeff	t-stat			Coeff	T stat		
SKILL	0.664	6.72	0.744	41.930	1.719488	8.03	0.468	6.09
SKILLTECH	-0.031	-0.3			-1.37603	-6.01		
SKILMLTECH	0.138	1.32			-0.61056	-1.43		
SKILMHTECH	0.081	0.77			-1.10996	-4.36		
LTECH	-0.424	-5.39	-0.445	-8.51	-0.47079	-4.94	-0.895	-3.47
MLTECH	-0.283	-4.21	-0.295	-5.56	-0.40803	-4.29	-0.788	-3
MHTECH	-0.168	-2.59	-0.156	-2.92	-0.55916	-5.5	-0.954	-3.59
URBAN	0.247	16.4	0.272	19.66	0.104473	2.49	0.116	2.74
AGE	0.072	24.87			0.079265	2.6	0.075	2.44
AGE2	-0.00072	-18.4			-0.00136	-2.25	-0.001	-2.07
SOCIAL CLASS	-0.0795	-5.05	-0.082	-5.17	0.038481	0.9	0.032	0.73
REGULAR	0.295	3.96	0.262	3.92	0.193685	2.24	0.182	2.12
_CONS	4.35	33.59	5.304	61.93	0.624763	1.58	1.089	2.35
F STAT	450.32				21.56		10.31	
R2	0.37				0.161		.14	
NOB	11417				691		691	

<sup>45</sup> See for discussion, Sundaram and Tendulkar, 2001; Ravallion, 2000, 2003; Sen, 2005; Deaton and Kozel, 2005; ADB, 2011

<sup>46</sup> Dandekar and Rath (1971) Ahluwalia (1978); Bardhan (1974); Bhatti (1974); Minhas (1974) and Rudra (1974). Vaidyanathan (1974). Mukherjee and Chatterjee (1974); Ahluwalia (1978); Tendulkar and Jain (1995).

<sup>47</sup> In addition to head-count index (H), the Commission also provides two other measures of poverty: poverty gap index (PG), and squared poverty gap index (SPG). The poverty gap index (PG) is the mean distance below the poverty line expressed as a proportion of that line, where the mean is formed over the entire population, counting the non-poor as having zero poverty gap. It is termed as a measure of the depth of poverty. The squared poverty gap index (SPG), introduced by Foster et al. (1984), is the mean of the squared proportionate poverty gaps.

<sup>48</sup> These findings have been supported by several independent scholars (Dubey and Gangopphay, 1998; Tendulkar, 1998; Minhas et al 1988; Sen, 1996; Pant and Patra, 1998). In an excellent survey of poverty literature up until 1991, Pradhan and Saluja (1998) conclude that

- Rural poverty in India shows a slow decline in the 1970s and a faster decline in the 1980s till 1990-91. The poverty reduction of the 1980s was due to a stable growth rate of agriculture.
- Second, urban poverty indicates an increase between 1970-71 and 1973-74 before showing a steady but a much slower decline than the rural poverty between 1977-78 and 1986-87. It remained unchanged between 1986-87 and 1990-91. It has been explained in terms of the



advent of green revolution in agriculture and sustained productivity growth in manufacturing Rodrik and Subramanian 2004; Aghion et. Al. 2008)

<sup>49</sup>As of September 2011, the government uses a new definition of poverty: people spending Rs 32 (64 cents) in cities or Rs 26 (52 cents) in the villages are not poor. With this yardstick, now there are 407.4 million poor in India.

<sup>50</sup>**Government reports:** Various committees led by economists have come up with different ways to measure the extent of poverty. A government committee headed by NC Saxena committee extended the definition of deprivation and estimated that 50% Indians need to be given the "below poverty line (BPL) status as against the Planning Commission's 2006 figure of 28.5%. In 2007 the Arjun Sengupta Commission identified 77% of Indians as "poor and vulnerable". Following the Kelkar Committee report the government accepted a broader definition of poverty which covers health and education expenditure. Using this definition, the 2010 data reveal that 32.7% people live in poverty as compared to 37% (25.7% urban and 41.8% rural) obtained from 2005 data. It replaces the 27% figure obtained from the older calorie based poverty line.

**Individual studies:** There exists a plethora of individual researchers' studies analyzing poverty during this period (Sundaram, 2001, 2007; Sundaram and Tendulkar, 2003, 2005, 2006; Himanshu, 2007; Deb and Ravi, 2007; Deaton and Dreze, 2002). According to Sundaram and Tendulkar (2003) following the economic reforms in India since 1991, growth has been accompanied by a reduction in poverty on a scale, which on an average is seen to be larger than the corresponding decline in the eighties (see, also other studies by these experts). Sundaram (2007) however notices deceleration in poverty reduction between 1999-00 and 2004-05. Deaton and Dreze (2002) analysed poverty using three survey rounds: 1987-88; 1993-94 and 1999-00. They adjusted the data for changes in survey designs and prices and found that poverty has declined substantially between 1987-88 and 1999-00 from 39 in to 26.3 percent in rural areas and 22 percent to 12 percent in urban areas. They find that between 1993-94 the rate of poverty reduction accelerated.

**International agencies** such as the UNDP, World Bank and Asia Development Bank also came up with much higher figures than the official figures.. The World Bank's PPP estimate of Indian poverty. While the figures are higher than the official figures, unlike the latter they show a continuous reduction in the poverty rates.

**Table A3: The World Bank poverty estimates for India: 1978-2010**

Poverty ratio	1978	1983	1988	1994	2005	2010
Poverty gap at \$1.25 a day (PPP) (%)	23	17	16	14	11	7
Poverty gap at \$2 a day (PPP) (%)	45	38	37	34	29	24
Poverty headcount ratio at \$1.25 a day (PPP) (% of population)	66	56	54	49	42	33
Poverty headcount ratio at \$2 a day (PPP) (% of population)	89	85	84	82	76	69
Poverty headcount ratio at national poverty line (% of population)	..	..	..	45	37	..
Poverty headcount ratio at rural poverty line (% of rural population)	..	..	..	50	42	..
Poverty headcount ratio at urban poverty line (% of urban population)	..	..	..	32	26	..

Source: World Development Indicators, Online database

The Asian Development Bank (2008) arrived at a poverty figure of almost 55%. ADB uses a higher Asian poverty line of \$1.35 per day per person, and also makes an attempt to improve upon the World Bank by adjusting the price data used by the World Bank. Unlike latter, ADB does not report detailed inter-temporal trends in poverty. The result from ADB is that in 2005 India had the second highest poverty ratio (54.8%) in 2005 among all the Asian countries studied, next only to Nepal (55.8%). An inter-temporal comparison however shows that it signifies a decline in poverty ratio from 62% in 1993.

The UNDP's Multidimensional Poverty Index (online) also finds the proportion of the poor to be 53.7% in 2005. In addition, 16.4% population is found to be vulnerable to poverty. Of the poor, 28.6% population is in severe poverty.

<sup>51</sup> Tendulkar and Jain (1994) argue that since urbanization reflects better access to markets and infrastructure, one can expect that (other things being equal) the poor will be able to benefit more from non-farm growth when they live in a more urbanized area.

<sup>52</sup> Ravallion and Datt (1999) outline a simple dual economy model to analyse the relationship between structural change and poverty. Poverty reduction in this model takes the form of absorption of poor farm-sector workers into the non-poor non-farm sector. The model assumes that any farm worker who wants to participate in the non-farm sector incurs a cost in doing so. This cost increases the equilibrium earning differential between the farm sector and the non-farm sector and reduces labor absorption into the non-farm sector, thus implying a higher poverty rate. This cost in turn depends on the initial conditions prevailing in the economy.

<sup>53</sup> Pant and Patra 1998; Sen, 1996; Tendulkar and Jain 1994; Tendulkar et al 1993; Tendulkar et al 1996), Pradhan and Sahoo 1999; Datt and Ravallion, 1996,2002,2011.; Mallick, 2010) Pradhan and Sahoo (1999) Ravallion and Datt (1996) Ravallion and Datt,1999). Mallick (2010)