



POLICY

New Insights into the Relationship between Employment and Economic Growth in India.

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Foreword

During the last two decades there has been a significant improvement in India's economic performance. This progress, however, has occurred against a background of relatively weak employment performance. During 2005-2012 when the economy grew at an unprecedented rate of 8.3% per annum, employment grew at a meagre rate of 0.4% per annum, adding only 13 million new jobs in 7 years. There has thus been a growing concern among policymakers about "jobless growth". However, there is an emerging view among policy makers that policies should not be concerned with employment creation per se but with creating high quality *productive and remunerative* employment. Economic growth may create productive employment by means of a combination of rapid growth of output, innovation, productivity increases and a structural shift of employment towards more dynamic and high productivity sectors that provide jobs of better quality. Therefore when analyzing the relationship between growth and employment, an appropriate set of questions to ask is: i) how is growth reflected in employment generation and in changes in labour productivity, ii) how is growth reflected in the sectoral pattern of growth and employment generation iii) What are the sources of changes in labour productivity. Answers to these questions will help to understand whether the pattern or profile of growth observed is conducive to generating high quality employment. This study conducted at the Wadhvani Foundation Policy Research Centre addresses these questions in the Indian context. It provides a strong case for economic acceleration and a comprehensive "employment policy" which will encourage high quality job creation by strengthening productive capacities and economic restructuring on the demand side and improving the quality of labour by identifying and addressing skill gaps through vocational training, on the supply side.

At Wadhvani Foundation our mission is to contribute to job creation through entrepreneurship and skill development and it is striving to create enabling policy environment in this direction. I hope that this study will enhance the understanding of policy makers regarding the interaction between growth and labour market dynamics to devise appropriate policy responses.

Ajay Kela
CEO, Wadhvani Foundation

Abstract

This paper presents a quantitative analysis of the growth-employment linkages at the aggregate level and by sectors in India using NSS data 1972-73, 1983, 1993-84, 2004-05, and 2011-12. The study uses Shapley decompositions to disentangle the sources of GDP growth per capita into employment and labour productivity growth effects. Additionally, it also disentangles the sources of labour productivity growth into Total Factor Productivity (TFP) growth, movements of employment from one sector to another, and changes in the capital-labor ratio. The results suggest that growth per capita in India is being essentially driven by labour productivity growth. Employment effects have been small. Increase in labour productivity is largely attributed to increase in capital-labour ratio. With economic acceleration, TFP effects have also increased and significantly contributed to GDP growth per capita. However, it is worrisome that inter-sectoral shifts, in which workers move from low productivity to higher productivity sectors, have worsened over time. The paper strongly recommends acceleration in economic activity and the implementation of a National Employment Policy.

New Insights into the Relationship between Employment and Economic Growth in India

1. Introduction

There is a general consensus that the unprecedented growth in GDP in India in the post 1990 period has not been accompanied by commensurate growth in employment. This is termed as “jobless growth”. The policy debate emphasizes that jobless growth has been responsible for the disappointing results in achieving inclusive growth. However, according to an emerging economic thinking, emphasis should be placed not on increasing employment levels per se but on increasing high- quality, productive employment and improving the productivity of the labour through skill- development efforts (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; Pasinetti, 1981; Kendrick, 1984; Maddison, 1987; Notarangelo, 1999; Fagerberg, 2000; Montobbio, 2000; Verspagen, 2000; Echevarria 1997, Stamer 1998, 1999; Dietrich 2009; Macmillan and Rodrik, 2011; Kaloudis and Smith, 2005). This view emphasises that job- creation linked to increased productivity and social protection for employed people are central mechanisms, which can translate economic growth into increased incomes and improved social well-being for households. The advent of this thinking within the realm of “New Structural Economics” has prompted a stream of empirical literature which focuses on systematically unpacking the relationship between economic growth, productivity improvements, and employment (see, for instance, Gutiérrez et al. 2009 for a review)¹. This literature discards the traditional employment elasticity approach of analysing the relationship between growth and employment (i.e. the percentage change in employment in response to 1 percentage change in output) because it says nothing about the quality of new jobs created or the changes in the labour force. While contributing to this line of literature, the present study also goes beyond the traditional elasticity approach and uses Shapley decompositions to provide new insights into the relationship between economic growth and employment in the Indian context. It decomposes changes in GDP per capita into those linked to changes in employment and output per worker at the aggregate level and by sectors. In order to further understand the impact of growth on employment, we further disentangle the sources of output per worker growth into Total Factor Productivity (TFP) growth, movements of employment from one sector to another, and changes in the capital-labor ratio; and those of employment growth into employment rates and labour force rate changes. The aim of this methodology is to understand how growth is linked to employment, output per worker, labour force, capital, TFP and inter-sectoral movement of labour both at the aggregate and sectoral level. Our research questions are:

¹ See, David Kucera and Leanne Roncolato (2012) and Aggarwal and Kumar (2012) for literature review

- Is growth in per capita value added in India due to labour force growth, increase in employment rates, or higher output growth?
- Is growth correlated with increases in the quantity of jobs (job creation) or in the quality of jobs (increased productivity of existing jobs)?
- Are the changes in output per worker due to changes within sectors, or due to shifts of workers from low productivity to higher productivity sectors, i.e. changing employment structure in India?
- What are the sources of any increases in output per worker within sectors in India? Are they related to increases in Total Factor Productivity (TFP) due to innovation (better use of existing resources)? Or, are they due to increases in the ratio of capital to labour in firms (adding more resources)?

The analysis is based on the quinquennial NSS rounds on ‘Employment and Unemployment’ corresponding to the years: 1972-73, 1983, 1993-94, and 2004-05; and the latest round of 2011-12. It thus covers the entire period of India’s economic growth process for which comprehensive information on employment is available.

One of the objectives in the 12th Five Year Plan (GOI, 2012, p.130) of India is that the work created should be productive and with “decent work” conditions. However, there is little analysis of how economic growth has been linked to labour market changes and quality of employment in the country. Indeed, there is a plethora of studies on the relationship between economic growth and employment in the Indian context. But, essentially, the analysis remains focused on the employment elasticity of growth. The present study intends to look beyond employment elasticity and uses decomposition methodology to examine the relationship between economic growth and employment. Thus, it provides new insights on the relationship between growth and employment.

The rest of the study is organised into sections. Section 2 analyses economic growth and structural change in the Indian economy. Section 3 focuses on employment growth and structural change in employment. Section 4 disentangles the relationship between the two and, finally, Section 5 concludes the analysis and draws on policy implications.

2. Economic growth and employment

The Indian economy has witnessed four different policy regimes since independence. The first two policy regimes which characterised the first thirty years of the planning period, i.e. from 1950-51 to 1979-80, were associated with the “state-led growth model”. The centerpiece of this model was the promotion of import-substitution based industrialisation with a particular emphasis placed on basic and heavy industries. The public sector was assigned the commanding heights of the economy. The first 15 odd years of this period marked the first policy regime in which the focus had been on achieving high rates of growth through industrial promotion. In 1965-66, the second policy regime began. In this regime, the issues of social justice, income

equality, and poverty reduction dominated the attention of the policy makers; in order to achieve these objectives, government regulations were further tightened on almost every aspect of the economy. A turning point in the Indian economy occurred in 1980-81 when the “state-led model of growth” was abandoned in favour of a “market-led growth strategy”. The period of the 1980s marked the third policy regime of a cautious shift to market-led growth. Gradual reforms were introduced to de-regulate industries, and encourage foreign direct investment, technology transfers and imports. There were also isolated reforms related to the financial sector and capital markets (Virmani 2005). The fourth phase of the growth process started in the early 1990s when sweeping reforms were introduced to assign the private sector commanding heights of the economy. This regime which is still continuing can be clearly distinguished from the regime of the 1980s. It has come to be known as the “Liberalisation, Privatisation, and Globalisation (LPG) regime”. Since these four regimes are associated with very different growth and distributional policies, roles of the State, and crises and contingencies, they also produced very different growth, employment, and distributional outcomes. In what follows, we briefly analyse the patterns of growth and employment in each of these policy regimes.

2.1 Economic growth and structural composition of GDP

Economic growth

Table 1 depicts India’s growth rate and GDP at factor cost across the four policy regimes. These are 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 onwards. It may be observed that the average annual growth rate of around 4% attained during the first policy regime slumped to less than even 3% as the protectionist regime was tightened, marking the onset of the second policy regime. Not only that, the volatility of economic growth also increased as reflected by a larger value of standard deviation. In the 1980s, as the economy began to transition from the state-led to a market- led growth strategy, the growth rate jumped to about 5.4 percent and the volatility of growth declined. The LPG regime², which started from 1992-93, witnessed further economic acceleration with a reduced variability. However, it was in the post 2003-04 period that the economy witnessed unprecedented growth (Aggarwal and Kumar 2012). Many attribute this phenomenon, at least in part, to the global boom of 2003 that gave a major push to almost all economies of the world. Thus, within the fourth regime period two distinct periods of growth can be identified: 1992-93 to 2003-04 and 2004-05 to 2011-12.

² The pre-reform growth should be derived not from 1980-90 but 1980-92, since slow growth in 1990-92 was a consequence of the 1980s policies

Table 1: GDP growth rate: 1950-51 to 2011-12

Years	Average annual growth rate	Standard deviation
1950-51 to 1964-65	4.091	2.55
1965-66 to 1979-80	2.93	4.18
1980-81 to 1991-92	5.39	2.22
1992-93 to 2011-12	6.96	1.77
1991-92 to 2003-04	6.2	1.46
2004-05 to 2011-12	8.3	1.40

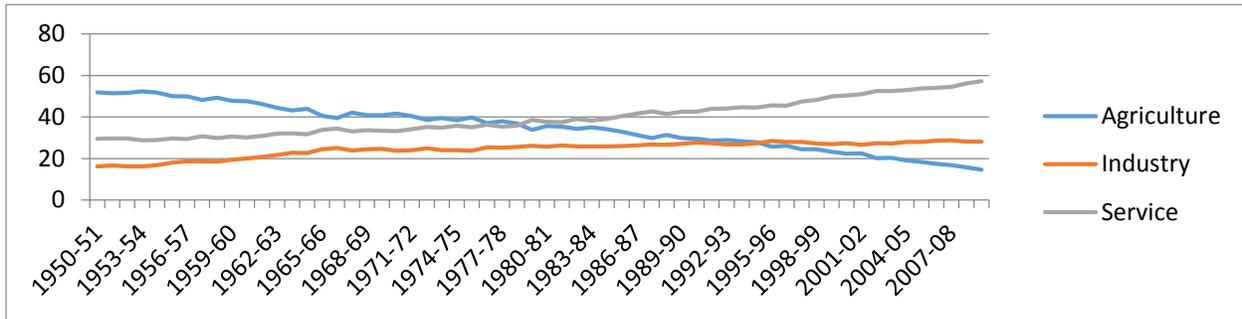
Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India database

Structural change in GDP

Shifts in the policy regime impacted not only on the rate of growth but also on the structural composition of GDP. Figure 1 depicts GDP shares of the three sectors: agriculture, industry, and services for a period of 62 years from 1950-51 to 2011-12.

- In the first decade and a half after independence (the first policy regime), there was a shift in the share of GDP generated in the agricultural sector to other economic sectors, namely industry and services. However, the share of industry in GDP rose faster than the service sector due primarily to a heavy emphasis given to industry by the government (as discussed above).
- Towards the late 1960s, the GDP structure started slowly shifting in favour of services. This was because the pace at which the industry sector was growing slowed down due to several economic and political factors (see Aggarwal and Kumar, 2012); and services, in particularly 'public administration, defense and community services", experienced fast growth consequent upon the two wars and the increasing focus on social justice and poverty alleviation programmes.
- The pace of the growth in service sector accelerated in the 1980s 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 managed to increase its GDP share by a meagre 2-3 % points.

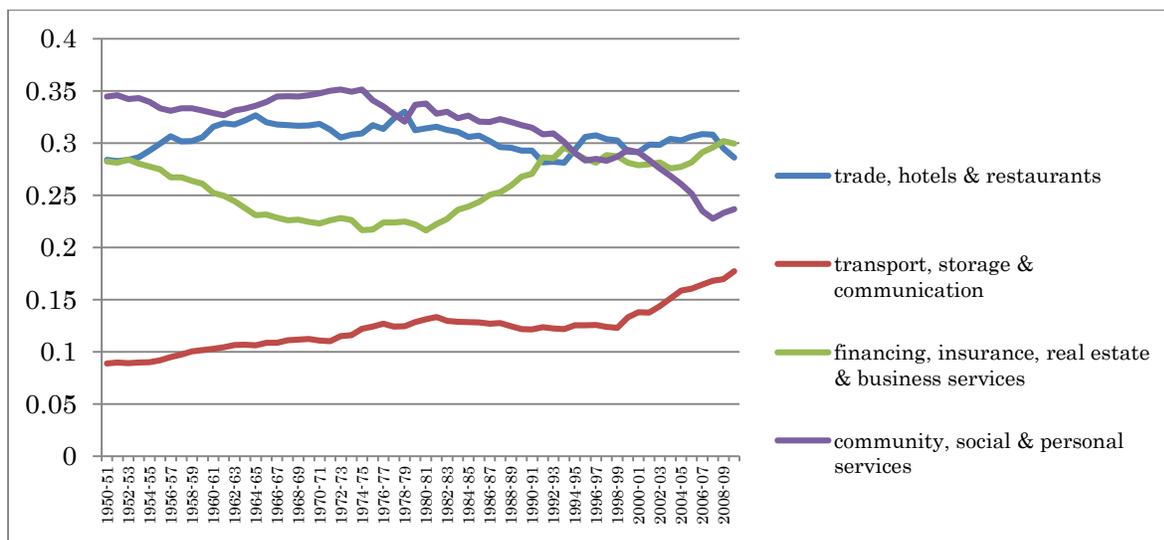
Figure 1: Composition of GDP: 1950-51 to 2011-12 (% share)



Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India database (Do you need to mark the y-axis as percentage of GDP?) (Also, the years after 2007-08 to 2011-12 can be added on the x-axis)

- Sectorally, the composition of the industrial sector has remained fairly stagnant with no significant changes in the shares of manufacturing, construction, mining, and utilities over the period after liberalisation. Within the service sector, as shown in Figure 2, early expansion (1950-51 to the late 1960s) was led by trade, hotels, and restaurants, which was directly related to the process of industrialisation. From the late 1960s to 1979-80, community services and public administration expanded most rapidly followed by trade. All these service sectors are usually termed as Baumolian stagnant sectors. Since 1980, however there has been a clear trend of shifts towards modern dynamic sectors such as transport and communication (in particular communication which grew at the annual average rate of 23% between 2004 -05 and 2010-11), and business (including ICT), and financial services. Clearly, while there has been retrogression in the structural change in the industry sector with manufacturing remaining almost constant, the composition of services has continued to change in favour of the dynamic services, namely communication, financial, and business (including the software and related) services; the traditional trade, hotels, community, and public administration services have shrunk in importance. Since 2004-05, communication, business services, and financial services have been driving the GDP growth in India.

Figure 2: Composition of the service sector: 1950-51 to 2011-12 (% share)



Source: Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India (name y-axis, and extend x-axis to 2011-12)

Overall, four major observations can be made:

- First, the post 1991 period particularly since 2004-05 has witnessed an unprecedented growth in the Indian economy. The economy has grown at an average annual rate of almost 7% during 1992-93 to 2011-12; the rate of growth had been as high as 8.3% during 2004-05 to 2011-12.
- Second, economic growth is accompanied by significant structural shifts in the composition of GDP. The service sector has grown at an impressive average rate of 8.6% per annum between 1992-93 and 2010-11. Growth in services has been matched by rapid erosion in the share of the agricultural sector. Industry has barely managed to increase its share in GDP by 2-3 percent points.
- Third, the composition of the industrial sector (mining, manufacturing, utilities, and construction) has also remained almost stagnant.
- Fourth, within services there has been a clear shift from the Baumolian stagnant sectors to modern sectors, in particular finance, business and communication services. These sectors have been the growth drivers of the economy particularly since 2004-05.

2.2 Employment and growth

Employment growth

Table 2 presents employment statistics based on the quinquennial NSS Rounds undertaken since 1972-73. These surveys provide the most comprehensive data on employment available in India.

In all, eight quinquennial rounds have been conducted so far. The 2011-12 survey is the latest round conducted recently based on a thin sample. The data corresponds to three policy regimes, namely the late 1960s to 1980, 1980-81 to 1991-92, and 1992-93 till date. While the rounds of 1972-73?, 1977-78, and 1983 cover the policy regime of the late 1960s and 1970s; the 1987-88 and 1993-94 rounds represent employment changes in the regime of 1980s. The rounds of 1999-00, 2004-05, 2009-10, and 2011-12 depict labour market developments during the liberalised policy regime.

We have applied the UPSS- based worker population (WPRs), labour participation, and unemployment rates to the population census data to arrive at the levels of work- force and labour- force and also to derive the growth rates. The population estimates are based on the compound annual population growth rates between the relevant census years. All the estimates are as on 1st March of the relevant round. To even out the fluctuations in the quinquennial rounds, we have presented the decadal analysis.

Table 2: Population and employment indicators: 1973 to 2012

As on 1 st March	% population			Absolute levels in million			Annual Increment in million			Annual Compound growth rates (%)			Employment elasticity
	Workforce Participation Rate	Labour-force Participation rate	Unemployment	Employment	labour force	Unemployment	Employment	labour force	Unemployment	Employment	labour force	Unemployment	
1973	41.3	41.98	1.6	236.3	240.2	3.9	-	-	=	-	-	-	-
1983	42.0	42.8	1.9	299.5	305.3	5.8	6.3	6.5	1.9	2.4	2.4	4	0.52
1994	42.0	42.8	1.9	376.9	384.2	7.4	7.0	7.2	1.6	2.1	2.1	2.2	0.47
2005	42.0	43.0	2.3	461.1	472.1	11	7.7	8.0	3.6	1.8	1.9	3.7	0.30
2012	38.6	39.5	2.2	474.8	485.9	11.1	2.0	2.0	0.1	0.4	0.4	0.1	0.05

Source: Authors calculations based on NSS rounds

The major employment growth patterns are as follows:

- In the 1970s, employment almost consistently grew at the compound annual rate of above 2% per annum. The growth rates had been 2.7% and 2.1% during 1973-78 and 1978-83 respectively.

- Between 1983 and 1988, the employment growth rate declined to 1.8%, but in the next five years it again rose to 2.39% ensuring a growth of over 2% during the cautionary reform regime of the 1980s.
- In 1991-92, India entered the globalised regime. From 1994 to 2000, there was a decline in the rate at which employment grew, but during 2000-2005 employment grew sharply and over 60 million jobs were added to the existing stock. Consequently, during 1993-94 and 2004-05 the annual growth rate was maintained at around 1.8%. A record 84.2 million jobs were added over this decade.
- What is worrisome is the fact that in the high economic growth phase of 2004-05 to 2009-10, employment growth rate declined sharply to 0.2% percent. Just 5.7 million jobs could be added. Employment could not pick up in the next two years and grew at just around 1%. Over the period of 2005-2012, only 13 million new jobs could be added at the rate of 0.4% per annum.

Thus, the most disturbing years from the employment perspective appear to be from 2004 onwards. This is even more disturbing considering the fact that this was the period of the highest average annual growth rate in India's growth history. Per capita income rose at the rate of above 6% during this period.

Further, it is also worrisome that there has been a continuous decline in employment elasticity. It declined sharply from 0.3 during 2000-2005 to 0.05 during 2005-12. Theoretically, acceleration in GDP growth of a labour- abundant country characterised by the market regime should push employment growth rate also. This is because greater trade openness in a market regime should propel labour-abundant countries to specialise in the production and export of goods that intensively utilise labour (Fosu, 2002). Empirical evidence however suggests that the impact of liberalisation on employment growth across countries is mixed, with a negative bias. In India also, most studies analysing the growth of employment point out to a drastic decline employment elasticity over time. Our study is no exception.

From the perspective of the workforce data, therefore, there is indeed a concern over the delinking of growth and employment ('jobless' growth) in the Indian economy. In what follows, we explore this issue further by examining the unemployment situation and labour force growth.

Unemployment

Table 2 indicates that only around 2% of the labour force remains openly unemployed in India. Apparently, the Indian labour market is typical of a low- income or low- middle income market with low unemployment. This is because most of the population has very low incomes, so they cannot afford to be unemployed. Instead, a large fraction of the working-age population gets absorbed in agriculture and other self-employment activities. Table 3 shows that over 50% of the work force is absorbed in self-employment, which is essentially in the informal economy. Casual

labour forms almost one third of the work force. Together, these categories account for the three-fourth of employment. The share of regular employment has been only 16% of the total jobs. It is therefore not surprising that the long term unemployment rate remains around 2%, which is close to the natural unemployment rate.

In 1973, the unemployment rate had been as low as 1.6%. This is not surprising considering the fact that this was the phase when the policy focus had been on inequality and poverty. Unemployment started increasing as the economy shifted from the state-led growth model to the market-led strategy. During the 1980s, the rate of unemployment rose to 1.9%. The first phase of the LPG regime, i.e. 1993-94 to 2004-05 witnessed further increase in the unemployment rate. Unemployment rate rose from 1.9% to 2.3% by 2005 and the number of unemployed persons increased from 7.4 million to 11 million. During 2005-2009, the unemployment rate dropped from 2.3% to 2%. Although it rose marginally to 2.2% in 2011-12, it remained less than that in the previous years.

Table 3: Distribution of usually employed by category of employment (UPSS) (%)

Years	Self-employed	Regular/wage Salaried	Casual labour
1993-94	50.77	16.03	33.09
1999-00	55.98	16.13	27.88
2004-05	51.89	16.39	31.71
2009-10	53.22	16.76	30.03

Sources: NSS Report No. 537: Employment and Unemployment Situation in India

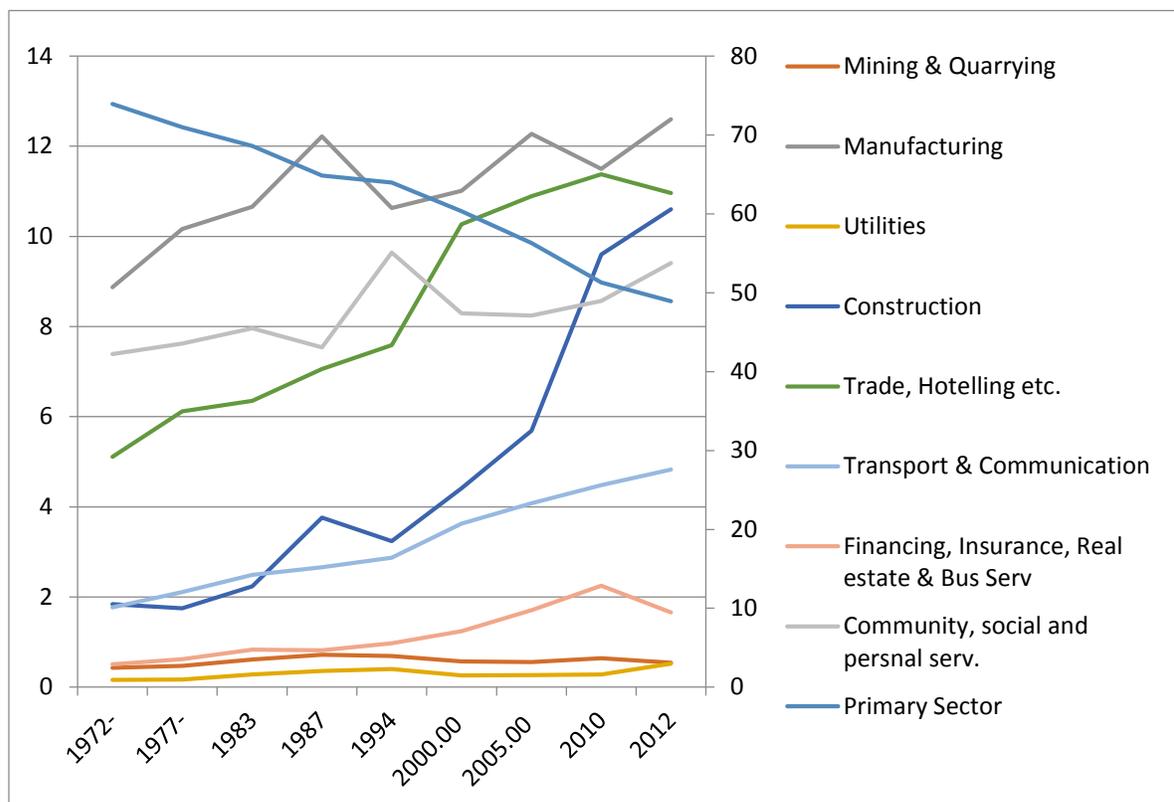
Apparently, during the high growth phase of 2005-2012, the slow growth in employment was accompanied by low unemployment rates. This means that the employment rate (work force to labour force ratio) actually increased. This does not fully substantiate the hypothesis of “jobless growth” and calls for a more rigorous analysis,

2.3 Sectoral Composition

Figure 3 presents the long term sectoral composition of the labor market starting from 1972-73. It shows that the growth process and a dramatic structural change in the composition of GDP, involving a shift from the primary sectors into services (see, Figure 1), has not entailed an equally dramatic change in the employment structure. Employment shifts lagged considerably behind the structural change in output. As shown in the figure, agriculture which contributes 14% of the GDP remains the largest employer absorbing almost half of the work force. On the other hand, services that contribute almost 58% of the GDP absorb only 26.6% of the workforce. Despite the rapidly growing shares of the dynamic services in GDP, most labour force is in Trade and Hotels and Community Services, the Baumolian

Stagnant sectors. The share of industry in employment more than doubled from 11.3% in 1972-73 to 24.6% in 2011-12, but essentially, it was due to increasing employment in construction. The share of construction in total employment increased from around 2% in 1972-73 to over 10.5% by 2011-12. Manufacturing, which remains one of the largest employers, maintains its average share at around 12% since the late 1980s. Over all, Manufacturing, Trade and Hotels, Construction, and Community Services are the major employers in the country.

Figure 3: Sectoral composition of workforce: 1972-73 to 2011-12



Source: NSS rounds

Table 4 provides the sector-wise employment and growth in India. The following observations may be made.

- The growth of employment in the primary sector, as expected, has been the lowest. It has, in fact, turned negative for the first time in the post 2005 period. This shift from agriculture is a good development given the fact that India Vision 2020 aims at becoming a middle-income, service-based economy. However, the sectoral shift in employment has been rather

slow. In 1972-73, the share of agriculture in employment was as high as 74% which declined slowly to 64% by 1993-94 (Table 4). This was despite the fact that the primary sector accounted for only 28% of the GDP at that time. This was the manifestation of a lack of employment opportunities outside agriculture in the economy. Over the next 200 years, the share of agriculture in GDP fell to a mere 14%, but there was no commensurate decline in the share of agricultural employment. Almost half the population still remains in this sector. The global patterns indicate that not more than 28% of the workforce should have been in this sector. Thus, around 21% of the work force (98 million persons) are disguisedly employed in this sector and need to be immediately withdrawn.

- Employment growth in the secondary sector, consisting of mining, manufacturing, electricity, water and gas, and construction, has been relatively high; in fact, it is the highest among the three sectors. Even during 2004-05/2009-10, when overall employment virtually stagnated, the secondary sector employment grew at around 3.5 per cent. Within the secondary sector, 65% of the incremental employment came from construction alone during 1994-2012. Construction has thus emerged as a major employer. Manufacturing, the share of which remained stagnant in GDP, increased its share in employment slowly but not steadily and contributed 33% of the incremental jobs during the period of liberalisation. Given a low level of employment, utilities did not show perceptible changes, while mining has experienced a continuous decline in terms of the rate of growth of employment since 1993-94.

Table 4: Sector-wise Employment and growth in India (UPSS) (CAGR)

Sector	Employment (Million)		CAGR (%)				Elasticity (%)	
	1973	2012	1973-83	1983-94	1994-2005	2005-2012	1973-83	2005-12
Primary Sector	174.7	232.2	1.64	1.47	0.67	-1.58	0.45	-0.40
Mining & Quarrying	1.0	2.6	6.04	3.26	-0.06	-0.10	0.88	-0.03
Manufacturing	21.0	59.8	4.30	2.08	3.19	0.80	0.79	0.09
Utilities	0.4	2.5	8.29	5.48	-1.73	10.28	1.06	1.53
Construction	4.3	50.3	4.43	5.59	7.20	9.75	1.44	1.11
Trade, Hoteling etc.	12.1	52.0	4.65	3.78	5.25	0.51	0.81	0.06
Transport & Communication	4.2	22.9	5.96	3.44	5.16	2.87	0.89	0.24
Financing, Insurance, Real estate, business services	1.2	7.9	7.51	3.57	7.24	-0.01	1.28	0.00
Community, social and public administration	17.5	44.7	3.16	3.90	0.41	2.34	0.68	0.32
Total	236.3	474.9	2.40	2.11	1.85	0.42	0.52	0.05

Source: NSS data on employment and unemployment

- Employment growth in the tertiary sector lagged considerably behind the service sector GDP growth. Service sector employment grew at a meagre rate of 3% compared to 6% growth in the secondary sector employment. Within services, trade and hotels followed by transport made the largest contribution to the increase in employment. While telecommunication GDP rose at the average annual rate of over 23% in the post 1999 period, employment grew slowly from 1.35 million to 1.82 million in 2004-05 and then to 1.85 million. Financial services recorded a high employment growth rate in the 1990s that considerably slowed down in the 2000s. On the other hand, employment growth of “public administration and community services”, which considerably slowed down in the 1990s due to structural adjustments carried out in the 1990s, witnessed upward movements in terms of employment in the 2000s.

In sum, labour market restructuring was not commensurate with the restructuring of the GDP. While GDP has been driven by business services, financial services, and communication, employment was created in construction, trade and hotels, community services, and transport. The employment profile of India remains very similar to that of low-income countries and is characterised by high employment in agriculture and other low productivity sectors such as construction, and trade and hotels. These sectors account for over 70% of the total workforce in India. While the share of dynamic services increased in value addition employment creation remained laggard in these sectors.

3. Decomposition: Understanding the employment profile of growth

3.1 The Methodology

To understand how growth has translated into increases in productivity and employment at the aggregate level and by sectors (or regions), we use Shapley decompositions of per capita GDP growth. Using this methodology, we decompose growth in GDP per capita into growth associated with changes in productivity and growth associated with employment changes. Employment effect is further decomposed into labour force and employment rate effects. Thus,

$$\frac{Y}{N} = \frac{Y}{E} * \frac{E}{N} \dots \dots \dots (1)$$

where Y is total Value Added, E is total employment, and N is total population. Thus, Y/N is GDP per capita, Y/E is total output per worker, E/N is the share of workforce in population (workforce

participation rate). While the former represents the productivity effect, the latter is the employment effect. But,

$$\frac{E}{N} = \frac{E}{L} * \frac{L}{N} \dots\dots (2)$$

In (2) L is the labour force. Thus, E/L is the employment rate, i.e. the share of work force in total labour force and L/N is the labour force participation rate.

This means that GDP per capita can be decomposed into three components: growth associated with GDP per worker, growth associated with changes in employment rates, and growth associated with changes in the size of the labour force. Per capital income $Y/N=y$ can thus be expressed as:

$$\frac{Y}{N} = \frac{Y}{E} * \frac{E}{L} * \frac{L}{N} \dots\dots (3)$$

This can be rewritten as,

$$y = \omega * e * a$$

This implies that the total change in per capita GDP will be the sum of the growth attributed to each of its components ω , e , and a , i.e.

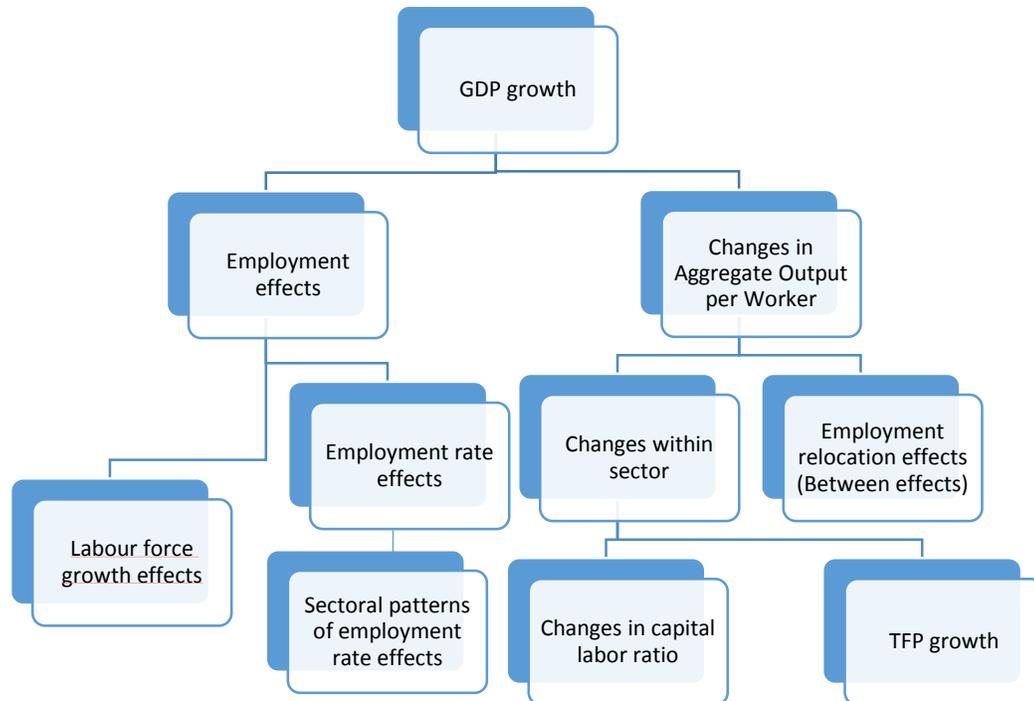
$$\frac{\Delta y}{y} = \bar{\omega} \frac{\Delta y}{y} + \bar{e} \frac{\Delta y}{y} + \bar{a} \frac{\Delta y}{y}$$

Or

$$\Delta y = \bar{\omega} * \Delta y + \bar{e} * \Delta y + \bar{a} * \Delta y \dots\dots\dots (4)$$

While $\omega * \Delta y$ represents growth linked to productivity change, and $e * \Delta y + a * \Delta y$ is the employment effect on growth. $\omega * \Delta y$ will reflect the amount of growth that would be consistent with a scenario in which output per worker had changed as observed, but employment rate and the share of labour force a had remained constant. In the same way, $e * \Delta y$ will be the amount of growth consistent with a scenario in which output per worker ω , and the share of labour force in population a , remains 'unchanged'. The amount of per capita growth linked to labour force changes will be $a * \Delta y$. There may be several ways in which this equation can be estimated depending upon the assumption regarding the base year of the three parameters. Shapley decomposition considers all possible alternatives and then makes a weighted average of each.

Figure 4: Decomposition of GDP per capita



Source: Author's conceptualisation based on the Shapley Decomposition

Each component of equation 4 can further be disaggregated. For instance, $\omega^*\Delta y$ can be disaggregated into the productivity growth due to inter-sectoral relocation of labour and intra-sectoral changes in capital labour ratio or total factor productivity. Similarly, employment effect can also be disaggregated at the sectoral level. The decomposition plan used in the study is presented in Figure 4.

3.2 Employment and growth: Decomposition results

Table 5 shows the decadal change in Value Added per capita and its components. It may be observed that each of the successive periods after 1973-1983 exhibits a higher annual compound growth rate in all monetary variables (GDP, GDP per capita, and output per worker); and a lower growth rate in all physical variables (population, employment, and labour force). Further, it may be observed that the growth in employment rate has been negative in all but the last time period.

The opposite is true for the labour force growth rate. It is instructive to recall that each successive period is characterised by increased liberalisation and globalisation. In what follows, we present our decomposition results.

Table 5: Employment, Output, Output Per Worker and Population. India 1993-94-2011-12 (% change)

?	1972-73 to 1983	1983 to 1993-94	1993-94 to 2004-05	2005-2012
GDP (value added) growth	4.26	4.58	6.30	8.45
Total population	2.23	2.11	1.85	1.64
Labour force	2.43	2.11	1.89	0.41
Total number of employed	2.40	2.11	1.85	0.42
GDP per capita growth	2.19	2.42	4.36	6.70
Output per worker	2.24	2.42	4.36	8.00
Employment rate	-0.03	-0.002	-0.04	0.01
Labour force participation rate	0.08	0.001	0.02	-0.5

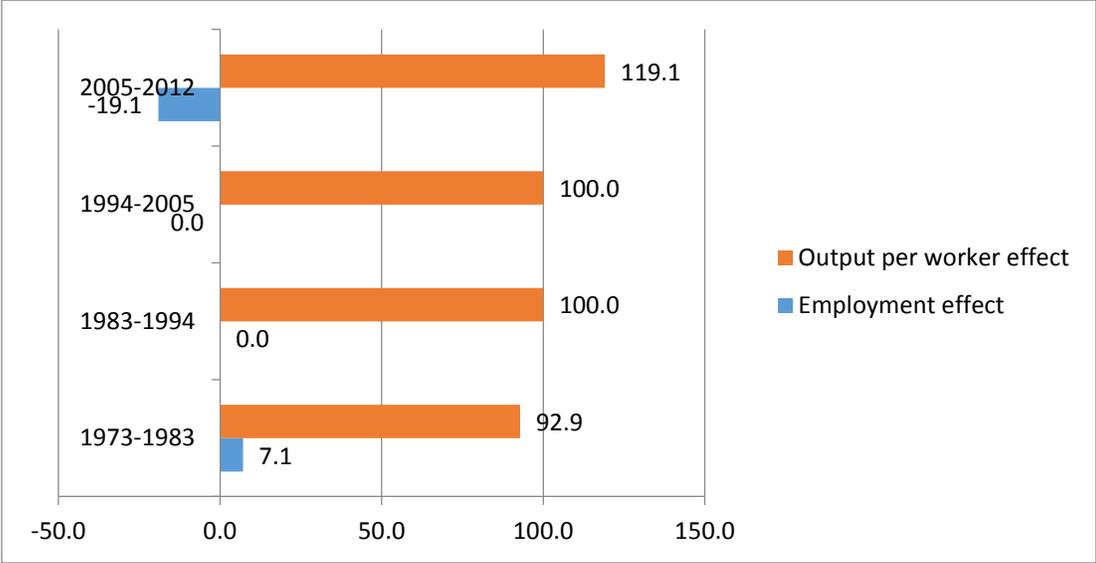
Source: Author's calculations based on NSS Rounds

Decomposition of growth in GDP per capita

Figure 5 shows results for the Shapley decomposition of per capita growth into two main components: one, growth linked to output per worker; two, growth linked to employment changes at the aggregate level. It shows that the output per worker has been the dominant driver of growth per capita value added across all time periods. Its contribution to growth increased continuously from 92% during the protective regime of 1972-83 to over 100% by 2005-12. The employment induced growth also exhibited a systematic relationship with the growth phases. During 1972-73 to 1983-84, the observed growth was associated with a positive employment effect. This could be attributed to the protectionist regime which focused on redistribution and social justice. However, as the economy transitioned to a high growth trajectory, the employment effect almost vanished. In the high growth period of 2005-12, employment effect

turned negative. Clearly, the growth-employment (work-force) link weakened with increasing liberalisation of the economy. This substantiates our earlier findings.

Figure 5: Decomposition of Growth in per capita Value Added



Source: Author’s estimates based on NSS data

Employment Effects

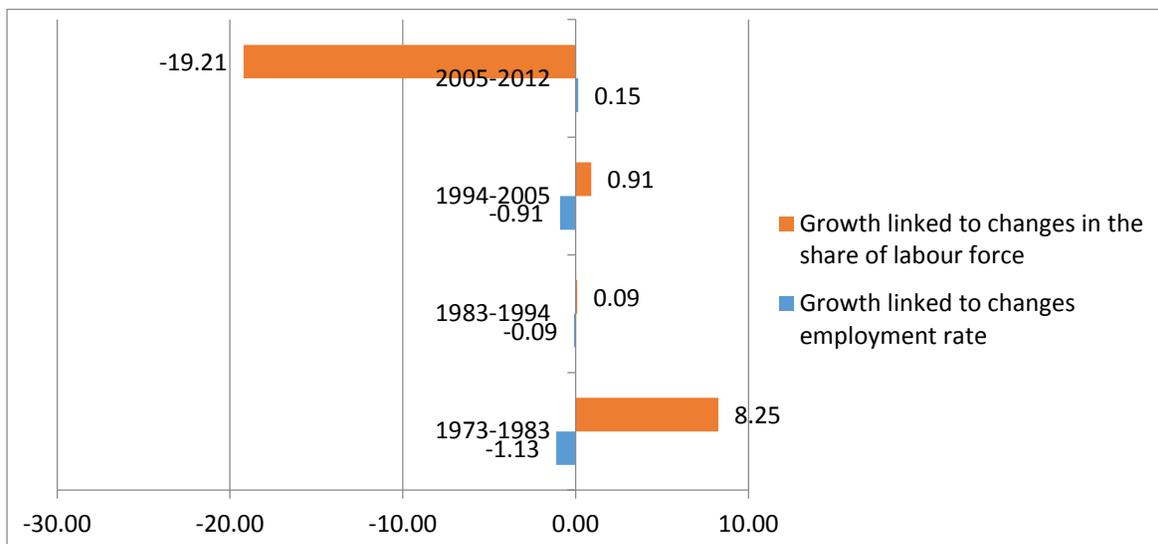
Decomposition of the employment effect: To further explore the employment-growth link, we decomposed the employment effect into: employment rate effect and labour force effect in Figure 6. Contrary to the expectation, the employment rate effect increased as the economy shifted from a low- growth trajectory to a high- growth trajectory. It was negative during 1973-83 with a contribution of -19.1% to GDP per capita. It increased during the subsequent periods but remained negative in the 1980s and 1990s. It was in 2005-06 that it turned positive contributing 0.15% point to growth.

The negative employment rate was more than offset by a large positive labour force effect during the low growth regime, ensuring a positive labour effect. In the 1980s and 1990s the negative

employment rate effect was fully offset by the positive labour force effect. But in the high- growth phase of 2005-12, the large negative labour force effect could not be offset by a small employment growth rate effect. The negative labour effect in the 2005-12 period was due to contraction in labour force that could not be offset by a small positive employment rate effect. Clearly, the declining employment effect could be attributed to the contracting labour force effect.

Theoretically, during the low- income growth phase labour force is likely to expand as more and more people, in particular, females enter the work force to earn a livelihood. This is because at low levels of income, women’s entry into the work force is dictated by survival instincts. As income increases, women feel less pressured to work and therefore withdraw from the workplace. In the Indian context, this could also be due to family status purposes (Bhalla and Kaur, 2011; Olsen and Mehta, 2006). As a family’s income improves, it tends to withdraw its women from manual labour. Typically, in developing countries there is a U-shaped relationship between women’s Labour Force Participation Rate (LFPR) and the level of development (Boserup, 1970). Our analysis shows that in India, the female participation rates have exhibited the tendency to decline since the early 1980s, thereby affecting the labour force participation rates. This is manifested in the contracting labour force effect. During 1983-94 and 1994-2005, (positive) labour force effects were offset by (negative) employment rate effects. In the last period, however, a large negative labour force effect offset the positive employment rate effect resulting into a negative employment effect. During this period, labour force contraction reduced growth in per capita by almost 20 % points. Much of the contraction in the labour force could be explained by a sharp decline in female participation, both in the rural and urban areas. Clearly, the employment effect turned negative due to labour force effects; the employment rate effect increased over time.

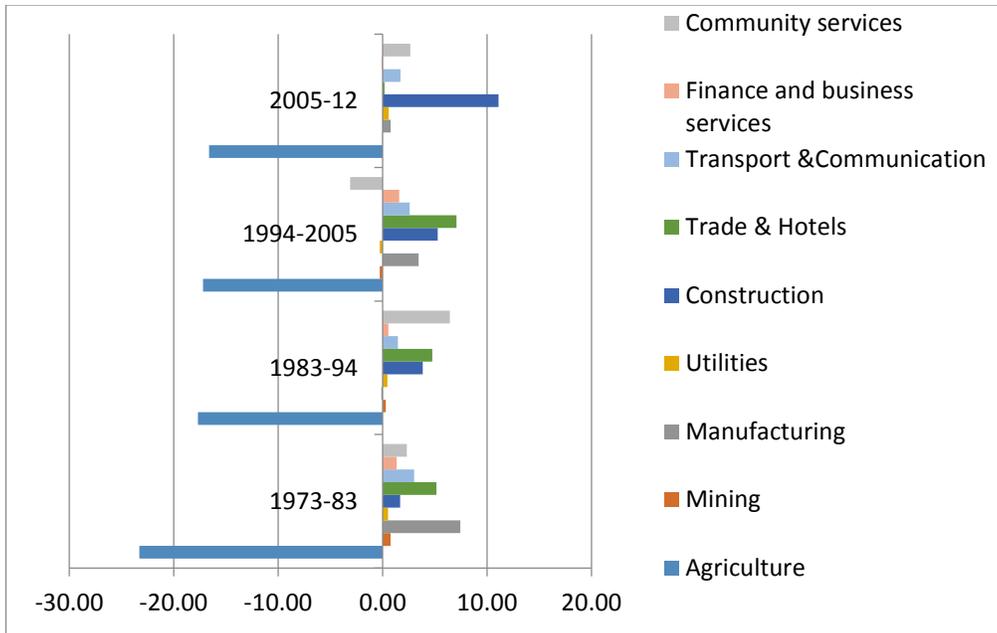
Figure 6: Decomposition of the employment effect: 1972-73 to 2011-12



It is however worrisome that after the income levels reach a certain high level and women re-enter the work force commensurate with their family status, there will be an increasing demand for high quality jobs.

Decomposition of the employment-rate effect: Figure 7 presents decomposition of the growth effects of employment rate e in each phase by sector. It shows the contribution of sectoral employment changes to growth in total per capita GDP. A common feature across all sub- periods is the negative growth effect of employment rate in agriculture. A negative employment rate effect in agriculture is offset by positive employment rate effects in other sectors. In the first period of 1972-78, the positive growth effect of employment rate was widely distributed across manufacturing, construction, trade and hotels, and transport and community services. However, in the successive periods, this effect started getting concentrated in selected sectors. In the 1980s, for instance, three sectors, namely construction, trade and hotels, and community services and to some extent transport and communications drove the employment rate effect. In the 1990s, construction, trade and hotels, and manufacturing were driving the employment rate effect on per capita income. However, in the unprecedented growth phase of 2005-12 employment rate effect was largely driven by the Baumolian stagnant sectors, namely construction, transport (not telecommunication), and community services. Employment in other sectors contributed little to GDP growth per capita. There is thus sectoral retrogression in the employment rate effects on GDP growth in the high growth phase of 2005-12. While employment rate had been positive, it was largely due to increasing absorption of labour in construction.

Figure 7: Decomposition of employment-rate effect by sector: 1972-73 to 2011-12



Source: Author's estimates based on NSS data

Productivity effects

Decomposition of output per worker: As discussed above, changes in labour productivity can be the result of two sources: increase in 'within- sector' productivity and increase in productivity due to relocation of labour from low productivity to high productivity sectors.

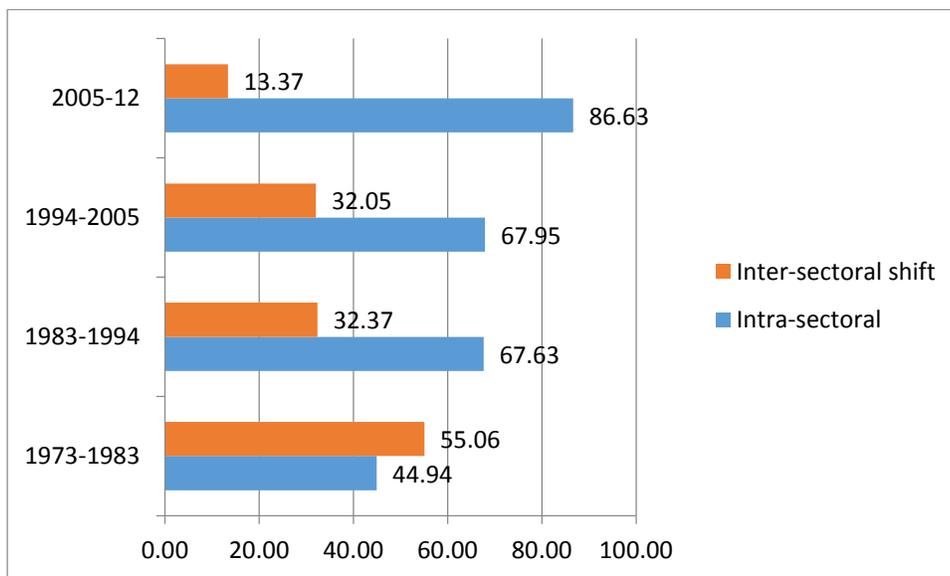
$$\Delta \frac{Y}{E} = \sum_i \Delta \theta_{it} y_{it} + \sum_i \Delta y_{it} \cdot \theta_{i,t-k}$$

Y/E refers to the aggregate output per worker, y is sectoral output per worker, θ is employment share, Δ is the first-difference operator, i indexes sectors, and $t-k$ and t stand for initial and final years respectively. 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 factor productivity effect of labor relocation 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. Relocation of jobs from bad jobs sectors (low productivity) to good jobs sector (high productivity) is productivity enhancing, while the opposite is true for the shift of labour from good to bad sectors.

Figure 8 presents decomposition results of the productivity effects. It may be observed that during 1973-83, the slow growth phase, intra-sectoral productivity growth contributed slightly

above 40% to the productivity growth effect. The rest 60% contribution came from the labour relocation effects. Since the 1980s, the contribution of intra-sectoral productivity effects started increasing. In the high growth period of 2005-12, over 85% of the productivity growth effect could be attributed to intra-sectoral productivity growth.

Figure 8: Decomposition of productivity effect: 1972-73 to 2011-12



Source: Author's estimates based on NSS data

Apparently, intra-sectoral productivity increased much more rapidly than the structural change effects. As a matter of fact, the latter actually worsened due to retrogression in the inter-temporal movement of labour. As shown above, labour released from agriculture is being absorbed by low productivity sectors such as construction, transport, and community services sectors. High productivity sectors have not grown rapidly enough to absorb labour released from the contracting sectors. It could also be that the labour released from the primary sector is not equipped to get absorbed in the dynamic high productivity sectors. This has also resulted into astronomical increases in the wages of skilled labour, while those of unskilled labour remained rather low.

Decomposition of intra-sectoral productivity growth

Intra-sectoral productivity growth comes from two sources:

- increases in capital-labor ratio and
- increases in Total Factor Productivity (TFP), net of intra-sectoral changes

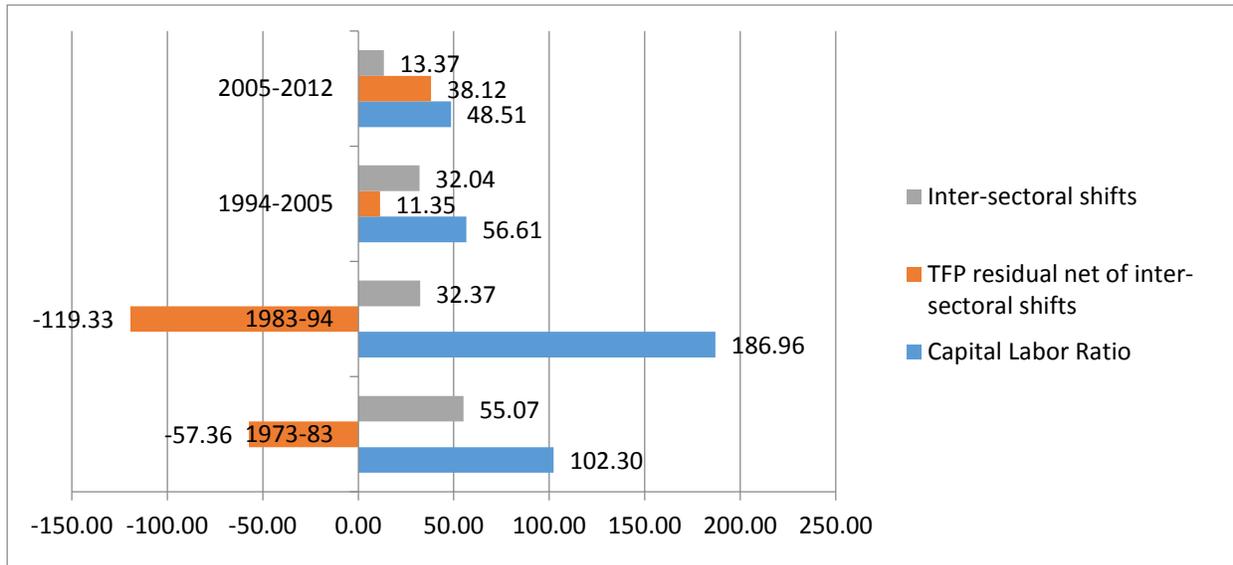
Figure 9 depicts the decomposition of productivity linked growth. It is interesting to note that the TFP contribution to GDP per capita was negative in the slow growth phase of the 1970s. The

positive effects of capital labour ratio, however, more than offset the negative TFP effects to ensure positive productivity effect. There is evidence that during the protective regime, the process of growth was essentially driven by capital deepening; the contribution of factor productivity growth remained rather low (see, Aggarwal and Kumar 2012 for a detailed discussion). The negative TFP effect during this period was attributed to extensive controls and inward-looking policies adopted by the government (Bhagwati, 1993); ad hocism and incoherence in government policies (Virmani,2009; Dhar,1990; Shetty, 1988); and restrictions on technology imports and FDI (Aggarwal, 2001).

The economy-wide TFP growth rate was expected to increase once the economy transitioned to the market- oriented regime. Our analysis however depicts that the TFP growth (net of inter-sectoral relocation effect) remains negative even in the 1980s. Apparently, cautious reforms did not affect TFP significantly.

It was during 1994-2005 that the TFP linked growth effect became positive. However, it still remained short of the capital-labour ratio effects. In the high growth phase of 2005-12, the contribution of TFP to growth per capita enhanced further.

Figure 9: Decomposition of productivity linked growth



Source: Author's estimates based on NSS data

Growth effects by sector

Table 6 gives the growth effects (net of labour force effects) by sector during 1972-2012. It shows that growth drivers of the Indian economy have changed over time. During 1972-83, agriculture, manufacturing, and trade and hotels contributed to over 55% of the total growth per capita net of labour force effects. In the 1980s agriculture was replaced by "Finance and Business services". These three sectors contributed 57% of the total growth (net of labour force effects) during 2005-2012. It is also noteworthy that over time the contribution of the secondary sector to growth declined, while that of services increased. Since 1983, services have been contributing over 65% points to the growth per capita. Within this sector, trade and hotels were the biggest contributor to growth during 1972-78. It was followed by finance and business services, community services, and transport and communications. Over time, the contribution of all these sectors grew in importance but that of the "Finance and Business services" grew most rapidly. During 2005-12, it turned out to be the largest sector in terms of contribution to growth. It was followed by trade and hotels, transport and communication, and community services, in that order. Clearly, the contribution of Baumolian stagnant services such as community services, and trade and hotels diminished while that of the dynamic services increased.

In the secondary sector, mining and utilities have had a relatively low contribution to India's growth. Their contribution further declined. It was largely (not fully) offset by an increased share of construction. Construction increased its contribution from a mere 2% in the first period to over 9.5% points in the last period. Manufacturing, which was contributing almost one-fifth of growth in per capita GDP during 1973-83, reduced its contribution to 16% over time. This is worrisome. The manufacturing sector has the strongest backward and forward linkages with the rest of the

economy (Aggarwal, 2013). It is therefore a critical sector. Slow growth in this sector can have a long term implication for the economy.

Table 6: Growth Effects by sector: 1972-2012

Sectors	1972-83	1983-94	1994-2005	2005-2012
Agriculture	17.88	5.09	2.99	8.70
Mining	4.77	4.33	2.18	1.13
Manufacturing	17.52	14.10	16.19	19.44
Utilities	3.00	4.40	1.89	1.87
Construction	2.01	6.29	9.40	9.61
Trade & Hotels	15.24	14.70	21.70	21.44
Transport & telecommunications	7.86	7.08	13.34	16.25
Finance, Real estate and Business Services	12.11	27.10	17.09	27.19
Community services	11.37	16.83	14.32	13.57
Total	91.75	99.91	99.09	119.21
Labour force effect	8.25	0.10	0.90	-19.20

Source: Based on the CSO data

Decomposition of growth by sector

During 1972-83, the growth effect of all service sectors operated through employment rate and labour relocation effects (i.e. quantitative and qualitative effects of employment). However, over time their contributions declined, while that of “within sector value added per worker” increased. The contribution of employment rate effect declined from almost 11.8% to 4.4% points, while that of labour relocation came down sharply from 26.6 % to 2.3% points. Clearly, jobs are not being created in the high productivity segments of the sectors. However, the contribution of output per worker to overall productivity effect increased in all services from 8% points to 38% points in the 1980s and 1990s. In the 2000s, output per worker in services contributed 78% points to overall productivity effects.

In the secondary sector, construction sector has largely operated through employment-rate effect. Its productivity effect has been negative in all the sub- periods. Thus, the large employment effect of this sector may have little implication for the poverty reducing effect of employment generation. The productivity effects of growth increased in manufacturing sector due to increasing productivity of the sector. However, the employment effects diminished over time. Labour relocation effects were also negligible due to slow expansion of the sector.

Agricultural contribution to growth has declined largely due to negative employment effect. Table 7 shows that the employment shift from agriculture to other sectors has a productivity enhancing effect. It enhances the productivity of agriculture itself. It is driven by positive labour relocation effect and increased inter-sectoral productivity. Thus, there is a vast potential for increasing agricultural productivity in India. In the high growth phase, when employment actually

declined in this sector, its productivity further increased. The increased productivity in agriculture follows the government's programmes of promoting R&D in the sector and labour movements out of agriculture.

Table 7: Decomposition of GDP growth per capita by sector

	Output per worker effect				Employment rate effect				Contributions of Inter-sectoral Shifts (%)			
	1972-83	1983-94	1994-2005	2005-2012	1972-83	1983-94	1994-2005	2005-2012	1972-83	1983-94	1994-2005	2005-2012
Agriculture	30.4	13.5	9.8	13.7	-23.3	-17.7	-17.2	-16.6	10.8	9.3	10.3	11.6
Mining	0.9	2.9	3.6	1.3	0.8	0.3	-0.3	0.0	3.2	1.2	-11	-0.1
Manufacturing	6.6	14.3	11.7	18.5	7.4	-0.1	3.5	0.8	3.5	0	1	0.2
Utilities	-0.3	1.8	3.9	-1.1	0.5	0.5	-0.3	0.6	2.8	2.1	-1.7	2.4
Construction	-4.0	-3.2	0.8	-1.1	1.7	3.8	5.3	11.1	4.4	5.6	3.3	-0.4
Trade & Hotels	4.9	6.3	10.7	21.2	5.2	4.7	7.1	0.2	5.2	3.6	3.9	0.1
Transport & telecommunications	1.4	4.3	8.1	12.6	3.0	1.5	2.6	1.7	3.5	1.4	2.6	1.9
Finance, Real estate and Business Services	-5.7	20.4	0.2	28.3	1.3	0.5	1.6	-0.1	16.4	6.2	15.3	-1
Community services	7.6	7.4	19.2	9.7	2.3	6.4	-3.1	2.6	1.5	3.1	-1.7	1.3
Total	41.7	67.6	68.0	103.2	-1.1	-0.1	-0.9	0.1	51.1	32.4	32	15.9

Source: Author's estimates based on the NSS data

4. Concluding Remarks

The growth rate of GDP per capita increased as the economy transitioned from the state-led growth regime to a market-oriented regime. It further increased after radical reforms were introduced in the 1990s. However, it was the period of 2004-05 to 2011-2012 which witnessed unprecedented growth in the Indian economy. We used decomposition analysis to analyse the relationship between employment and growth per capita. Table 8 summaries the aggregate results. It shows the following:

Table 8: Decomposition of growth per capita 1972-2012: Summary results

Year	Contribution of capital-labour ratio (%)	Contribution of changes in TFP (%)	Contribution of changes in Employment rate (%)	Contribution of changes in labour force (%)	Contributions of Inter-sectoral Shifts (%)	Total
1973-1983	95.01	-53.28	-1.13	8.25	51.15	100
1983-1994	186.96	-119.33	-0.09	0.10	32.37	100
1994-2005	56.61	11.35	-0.91	0.90	32.05	100
2005-2012	57.77	45.39	0.13	-19.20	15.92	100

Source: Author's estimates based on NSS surveys

- The labour force component contributed 8.25% points to growth in the 1970s. Over time however, its contribution declined. During 2005-2012, it accounted for a large negative proportion (19.1%) of all the change. As growth per capita accelerated, the female labour force contracted, thereby reducing the labour force effect.
- Employment rate effect accounted for a small negative contribution to growth until the early 2000s. During 2005-12, its contribution became positive but remained rather small at 0.1%.
- Growth in output per worker drove growth over all the sub-periods. Its contribution to growth increased in successive periods. This has direct implication for the poverty reducing effect of employment generation.
- During 1972-83, the inter-sectoral shifts in employment dominated the contribution of GDP per worker effect. However, the scenario changed in the subsequent periods. There has been a conspicuous decline in the productivity enhancing effects of labour movement. This calls for a continuous upgrading of economic activities within each sector, increasing skill development and creation of opportunities in the high productivity sectors.
- While the employment relocation effect has been worsening over time, the contribution of “within sector productivity” has shown a continuous improvement. But, in the slow growth phases, labour productivity effects were dominated by capital deepening. Over time, the contribution of TFP increased due to increased efficiency and competitiveness in the economy.

5. Policy Recommendations

For effective tackling of both growth and employment problems, the policy makers have to work simultaneously on sustaining high Gross State Domestic Product (GSDP) growth rates and increasing employment elasticity of growth without affecting labour interests. It is proposed that the state should implement a comprehensive “employment policy” with the following pillars:

- Acceleration of growth
- Transformational changes in education
- Promotion of entrepreneurship
- Effective labour market management
- Expansion of employment information systems

1. Acceleration of growth:

Employment creation is positively related to growth. It is seen that the employment rate increases with acceleration in growth. Economic acceleration is an essential condition for employment expansion. It needs to have the following policy components:

- **Improving Infrastructure:** The provision of reliable and affordable transport is identified as key to enabling the urban poor to access the best opportunities, while good rural roads and reliable electricity and water supplies are essential for accessing off- farm employment in rural areas.
- **Improving investment climate related issues:** A host of policies and institutions which act as constraints to job creation and productivity need to be addressed to improve the investment climate. These include the legal and regulatory hurdles to business entry, operation, and exit.
- **Promoting the formal economy:** Efforts need to be made to switch from informal to formal economy through stronger incentives (such as progressive taxation, improved access to social security, etc.).
- **Promoting technology- driven, high growth Micro, Small and Medium Enterprises (MSMEs):** Young, high- growth MSMEs have a high potential for employment generation. In OECD countries, 60-70% of the net job creation occurs in MSMEs. The focus should be on promoting these enterprises.

2. Strengthening the education system:

- **Improve access to and the quality of education and training:** In doing so, it must be ensured that the employers are involved so as to reduce skill mismatches and shortages.
- **Improve the quality of the educational systems:** Education, in its various guises, is often a crucial precondition for adjustment of labour market towards more profitable economic activities. It is necessary for enabling participation in more technologically- advanced sectors. There is a need for stronger links between training institutes and private sector sources of demand, as a means of increasing market relevance of the labour force.

3. Supporting the return to self-employment:

- India needs to make a transition from wage economy to entrepreneurial economy where the youth is not looking for jobs, but is encouraged to indulge in creativity and self-employment.
- The proposed Employment Policy should have elaborate incentives to promote self-employment.
- We also recommend implementation of an “Entrepreneurship Policy” as part of the Employment Policy. The guidelines will have special provisions for the training and monetary support required for promoting self-employment. Efforts will need to be made to promote public-private partnership in these areas by involving social entrepreneurs who have been engaged in entrepreneurship development.

4. Labour market management:

- **Manpower planning:** Manpower planning is indispensable for solving the problem of unemployment. Hence, economic planning should be integrated with manpower planning. There is a mismatch between demand and supply. There is excess supply of skilled labour in certain sectors and shortages in other sectors. There is need to assess the skill requirements and plan skill development programmes to address the supply constraints.
- **Strengthen labour market policies that address labour market rigidities:** There is a need for conceptualising new models of labour management systems without compromising the income security of workers. The country needs to introduce a system that combines flexibility in labour market with income security for workers and providing assistance for their retraining and relocation. The Flexicurity system of Denmark has been recognised as one of the best practices in labour management. It has been adapted by many countries to suit their local conditions. It is a *leitmotiv* of the European employment strategy. It entails a “golden triangle” with three principles:

Flexibility in the labour market combined with -

- Social security;

- Comprehensive, lifelong learning strategies; and
- An active labour market policy with rights and obligations for the unemployed.

5. Promotion of informational channels and creation of a better data base:

Expansion of employment services and search assistance, in particular E-Systems, plays a potential role in overcoming informational barriers in the labour market. The labour market is a system in continual movement. Counts of employment, unemployment, and people outside the labour force give only still pictures at a point in time; this is inadequate. Much of what is going on is not revealed. To shed light on the factors that underlie net changes in stocks, figures are wanted of gross as well as net flows between the count dates or periods.

Further, the demand for skills has been rapidly changing over the past decades. Understanding the extent of “mismatch” between the qualifications held by workers or their skills proficiency, and the qualifications or skills required in jobs is crucial for policy makers. There is a need thus to develop a system to continually update figures of job creation, structural change in employment and skill requirements and availability.

The draft National Employment Policy is yet to be implemented. Our study shows that there is an urgent need for the implementation of the policy with suitable changes to develop a more specific and focused framework.

References

Aggarwal A. and Kumar N. (2012) Structural Change, Industrialization and Poverty Reduction: The Case of India, ESCAP SOUTH AND SOUTH-WEST ASIA OFFICE, Development paper 1206.

Aggarwal, A. (2001) Technology Policies and Acquisition of technological Capabilities in the Industrial Sector: A Comparative Analysis of the Indian and Korean Experiences, *Science, Technology and Society*, 6 (2): 255-304.

Aggarwal A., G. Johnes, R. Freguglia, and G. Spricigo (2013) Education And Labour Market Outcomes: Evidence From India IJLE.

Bhagwati, J. (1993). *India in Transition*, Radhakrishnan Lectures, Clarendon Press: Oxford.

Bhalla, S. and R. Kaur (2011) Labour force participation of women in India: some facts, some queries. Working Paper, 40. Asia Research Centre, London School of Economics and Political Science, London, UK.

Boserup, Ester. *Woman's Role in Economic Development* (London: George Allen and Unwin Ltd, 1970).

Carree, 2002(?), Carree, M.A., (2002). "Industrial restructuring and economic growth," Open Access publications from Maastricht University urn:nbn:nl:ui:27-3942, Maastricht University.

Chen S., Gary H. Jefferson, and J. Zhang (2011) Structural change, productivity growth and industrial transformation in China, *China Economic Review* 22 (2011) 133–150.

D.K. Das, S. Aggarwal and A.A. Erumban (2011) Productivity Growth in India under the guidance of B. N.Goldar India-KLEMS Project LA KLEMS Meeting 17-18 November 2011, Rio De Janeiro, Brazil.

David Kucera and Leanne Roncolato (2012) STRUCTURE MATTERS: Sectoral drivers of growth and the labour productivity-employment relationship, ILO Research Paper No.3, December 2012. International Labour Office

Dhar, P. N. (1990), 'Constraints on Growth: Reflections on the Indian Experience', Fourth VT Krishnanmachari Memorial Lecture, 1989, delivered at the Institute of Economic Growth, Oxford University Press, 1990.

Dietrich, A. (2009). "Does Growth Cause Structural Change, or Is it the Other Way Round? A Dynamic Panel Data Analyses for Seven OECD Countries," *Jena Economic Research Papers* 2009-034, Friedrich-Schiller-University Jena, Max-Planck-Institute of Economics

Echevarria, (1997). A three-factor agricultural production function: The case of Canada," *Working Papers. Serie AD* 1997-12, Instituto Valenciano de Investigaciones Económicas, S.A. (Ivie)

Fagerberg, J. (2000). "Technological Progress, Structural Change and Productivity Growth: A Comparative Study," *Working Papers* 5, Centre for Technology, Innovation and Culture, University of Oslo.

Föllmi R. and J. Zweimüller, (2004). "Inequality, market power, and product diversity," *Economics Letters*, Elsevier, 82(1): 139-145, January.

Fosu, Augustin Kwasi, 2002. "Economic Volatilities and Growth in Latin America: Comparative Evidence with Sub-Saharan Africa on Export Versus Capital Instability," *Economia Internazionale / International Economics*, Camera di Commercio di Genova, vol. 55(1), pages 1-16.

Gutierrez, C., Orecchia, C., Paci, P. and **Serneels, P.** (2009) 'Does Employment Generation Really Matter for Poverty Reduction?' in Kanbur R. and Svejnar, J. (eds) 'Labor Markets and Economic Development', Routledge.

Kaloudis, A. & Smith, K. (2005), Structural change, growth and innovation: the roles of medium and low tech industries, 1980-2002., in 'Conference Low-tech as misnomer: the role of non-research-intensive industries in the knowledge economy'.

Kendrick, J. W. (1984). Improving company productivity. Baltimore: Johns Hopkins University Press.

Kiliçaslan, Y. & Taymaz, E. (2004), Structural change, productivity and competitiveness in MENA countries. Technical report, Ankara: Middle East Technical University.

Lucas, R.E. Jr. (1993). Making a Miracle, *Econometrica*, 61(2): 251-272.

McMillan, M., and D. Rodrik (2011). Globalization, structural change, and productivity growth; NBER working paper 17143. Cambridge: NBER.

Maddison, A. (1987). "Growth and Slowdown in Advanced Capitalist Economies: Techniques of Quantitative Assessment," *Journal of Economic Literature*, American Economic Association, 25(2): 649-98, June.

Matsuyama, K. (2002). "The Rise of Mass Consumption Societies," *Journal of Political Economy*, University of Chicago Press, vol. 110(5): 1035-1070, October.

Pasinetti, L.L. (1981), *Structural Change and Economic Growth Dynamics of the Wealth of Nations*, Cambridge: Cambridge.

A Theoretic

Shetty, S. L. (1978) "Structural Retrogression in the Indian Economy Since the Mid-sixties," *Economic and Political Weekly*, 13 (6-7), Annual Number.

Silva E. G. and A.C. Teixeira, (2008), "Surveying structural change: Seminal contributions and a bibliometric account," *Structural Change and Economic Dynamics*, 19(4): 273-300.

Stamer, M. (1998) Interrelation between subsidies, structural change and economic growth in Germany, a vector autoregressive analysis. *Konjunkturpolitik*, 44 (3) (1998), pp. 231–253.

Stokey, N.L. (1988). Learning by doing and the introduction of new goods. *Journal of Political Economy* 96:701-717.

Tendulkar S.D. and T.A. Bhavani (2005). "Productivity Performance in Developing Countries, Country Case Studies, India", Working paper, United Nations Industrial Development Organisation, Vienna, 2005.

Timmer M.P. and A. Szirmai (2000). "Productivity growth in Asian manufacturing: the structural bonus hypothesis examined," *Structural Change and Economic Dynamics*, Elsevier, 11(4): 371-

392, December.

Varum C. A., Bruno C. A. Morgado, J. Costa (2009). R&D, structural change and productivity: the role of high and medium-high technology industries *Economia Aplicada* 13 (4) Ribeirão Preto Oct. /Dec. 2009.

Verspagen, B. (2000). "Growth and structural change: trends, patterns and policy options," Eindhoven Center for Innovation Studies (ECIS) working paper series 00.08, Eindhoven Center for Innovation Studies (ECIS).

Virmani, A. (2005) *Institutions, Governance and Policy Reform: A Framework for Analysis*, *Economic and Political Weekly*, 40 (22): 2341-235.

Virmani, A. (2006) *India's Economic Growth History: Fluctuations. Trends, Break Points and Phases*, *Indian Economic Review*, 41 (1) January-June 2006: 81-103. (<http://www.ierdse.org/>).

Virmani, A. (2009). *The Sudoku of India's Growth*: BS Books, New Delhi, 2009.

Lili Wang & Adam Szirmai, 2008. "Productivity growth and structural change in Chinese manufacturing, 1980–2002," *Industrial and Corporate Change*, Oxford University Press, 17(4): 841-874, August.