

Labour Productivity And Structural Change In India: A State Level Analysis

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Abstract

Growth of productivity of labour is a critical factor influencing economic growth. Gaps within productivity of labour across various sectors highlight the growth reducing allocative inefficiencies. However, a positive aspect of these allocative inefficiencies can be that they can be converted into potential engines of growth if labour shifts from low productivity to high productivity sectors. The growth caused by reallocation to high productivity sectors is caused by structural change. This study analyzes growth of productivity of labour in 16 major Indian states by decomposition of labour productivity into 'within sector' growth component and structural change component. The study finds that within sector productivity growth has been the major driver of productivity growth in India. Also, states experience a positive level effect of structural change on their productivity growth, however seven states namely Madhya Pradesh, Odisha, UP, West Bengal, Haryana, Rajasthan and J & K experience a negative growth effect of structural change, implying that labour allocation in these states has been from low productivity agriculture sector to other low productivity non-agriculture sectors.

Keywords: Labour Productivity, Shift Share Analysis, Structural Change.

INTRODUCTION

Productivity of labour is a major factor that determines and impacts economic growth. The Dual Economy models, most prominently the Lewis Model (Lewis, 1954), has highlighted productivity differences for various sectors. In the Lewis Model these were the traditional (or rural) sectors and modern (or urban) sectors. Gaps in productivity of labour highlight the inefficiencies of allocation that reduce labour productivity. However, a positive

aspect of these allocative inefficiencies is that they can be transformed into potential engines of growth. It could be achieved if labour is shifted from low productivity sectors to high productivity sectors. The stage development of a country has a major influence on determining the role and extent structural change and productivity. Developing countries have a greater scope for creating a structural change that enhances productivity of labour. This takes place as labour shifts from low productivity primary sector to high productivity

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secondary and tertiary sectors. However, the role in enhancing productivity growth in developed countries is less clear (Meehan, 2014)

An economy's growth therefore is closely associated to changes in structure of employment and production. Historically as the developed nations of today moved towards more rapid and sustained earnings, the resources were transferred from the dominant agriculture sector to first manufacturing and industrial sector and finally to services.

This study analyzes India's labour productivity growth by decomposing labour productivity growth into the 'within sector' growth component and growth in labour productivity due to reallocation labour (structural change). The study uses Shift-Share methodology is used to decompose labour productivity for 16 major Indian states.

The study also attempts to understand the nature and impact of structural change on labour. The study explores the factors which influence the within sector growth labour productivity and whether those states experienced more within sector growth which had already attained some degree of economic growth and structural change.

The study is divided as follows: Section 2 discusses theoretical background of structural change. Section 3 gives a brief overview of structural change in India. Section 4 describes the methodology and data used for analysis. Section 5 describes the results and findings. Section 6 takes a closer look into the impact & nature of structural change that has happened in India. Section 7 analyzes the factors influencing within sector growth. Finally, section 8 gives the conclusion and suggestions

1. STRUCTURAL CHANGE: A THEORETICAL PERSPECTIVE

In economic theory there are majorly two schools of how growth and sectoral composition are related. The neoclassical perspective argues that sectoral

composition is an unimportant byproduct of economic growth. However, an opposing stand is held by economists including Kuznets (1971), Rostow (1971), Chenery and Syrquin (1975) and Baumol et al. (1989) all of whom argue that sectoral composition impacts income per capita, growth rates, productivity and vice-versa (Echevarria, 1997). This study attempts to look closely into the second perspective highlighting the role sectoral composition and structural change on growth and productivity.

The most critical aspect of an economy's structural change is the shift in the composition of employment and output over time. In the beginning agriculture's share in both output and employment is very large. However, as industrialization proceeds, manufacturing sector's share in output and employment rises, while the share of agriculture falls. Subsequently at an advanced stage of development, the share of industrial sector in both output and employment falls while share of services increase. This classic pattern of structural change was formulated by Fisher (1935), Clarke (1940), Chenery (1960) and Kuznets (1966) based on the experience of developed countries in the west.

Nayyar (1994) makes an analytical distinction between three stages in process of structural change. Firstly, industrial sector absorbs the surplus labour from agriculture sector at existing levels of real wages and existing productivity (Lewis, 1954). This causes fall in share of agriculture and rise in share of industries, in output and employment composition. Nayyar calls it **labour absorption at the extensive margin**.

Secondly, resources transfer from low productivity agriculture to high productivity manufacturing and industries, increasing average labour productivity of both sectors. Thus, real wages in both sectors rise as well. The share of industries increases further whereas there is fall in share of agriculture, more in terms of output than in employment. Nayyar describes it as **labour use at the intensive margin**.

In the third stage, the share of agriculture continues to decline and the share of the industrial sector is maintained. However, the share of services increases gradually. But the share of the services sector increases at the cost of the industrial sector after a stage when labour is not available any longer for agriculture.

If structural change is perceived as an associative outcome of economic growth then, with the creation and expansion of new markets new demands are created which are followed by new production activities. Therefore, structural change takes place as the income elasticity of demand for services exceeds the income elasticity of demand for industrial output, whereas the income elasticity of demand for industrial goods is much higher than the income elasticity of demand for agricultural goods (Fisher, 1935; Clarke, 1940). Increased share of services in overall output can also be seen as a result of increase in relative prices of services. This is caused as services sector has slower productivity growth due to limited scope of capital accumulation and scale economies and technical progress (Baumol, 1993).

However, a structural change cannot be seen simply as an associated outcome of economic growth, as causation runs both ways, where structural change also acts as an economic growth driver (Schumpeter, 1942; Hirschman, 1958; Chenery, 1960). The Lewis model (Lewis, 1954) also makes this proposition where the labour transfer to the industrial sector from agriculture raises profits for capitalist entrepreneurs and higher capital accumulation leading to economic growth.

Kaldor (1966) develops this causation further, suggesting that manufacturing is the driver of economic growth, emphasizing three crucial laws. Firstly, manufacturing growth and growth of GDP are strongly and positively related. Second; growth of manufacturing output leads to manufacturing sector's productivity growth and third; that manufacturing's growth in output causes an overall

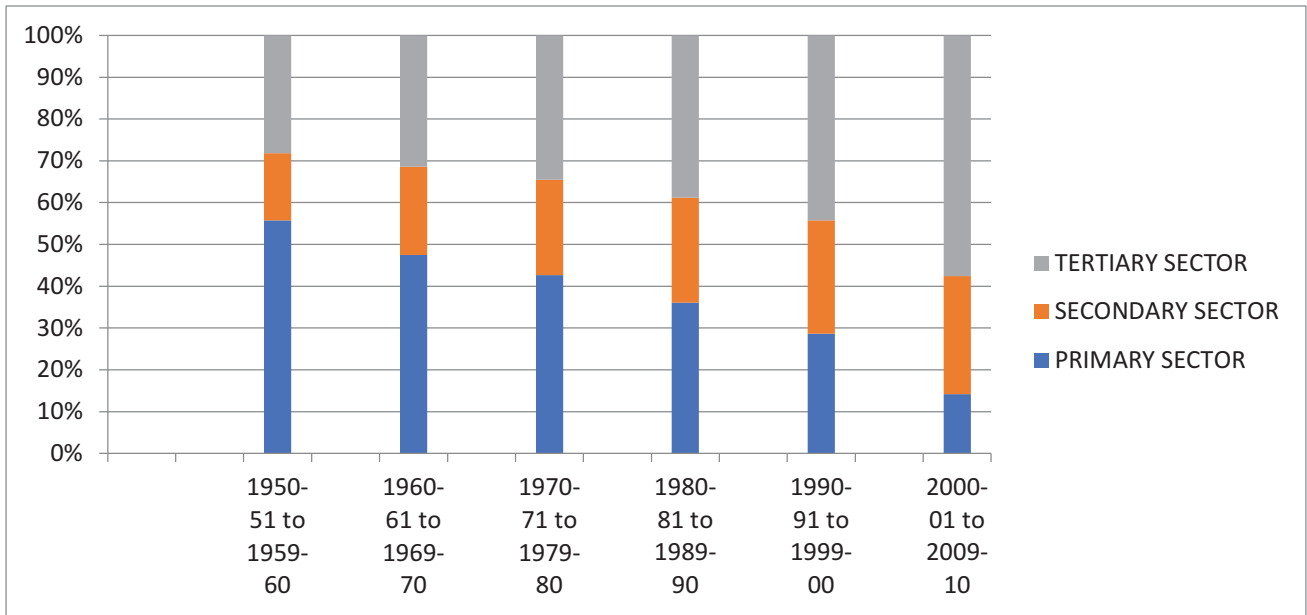
productivity increase in the economy due to spillover effects (Nayyar, 2013).

2. STRUCTURAL CHANGE IN INDIA: A BRIEF OVERVIEW

A dominant agriculture sector has always been a major characteristic of the Indian economy which has not changed significantly in the past decades. However, agriculture's contribution (and allied activities) as a share of GDP has declined substantially. After independence during the 1950's, around 56% of India's GDP was contributed by primary sector, whereas the secondary and the tertiary sector only contributed about 16 % and 28% of GDP respectively. Agriculture's share in GDP declined drastically from 56% to around 14 percent by 2009-10 whereas the share of industrial sector increased to approximately 28 percent. Services sector was around 58% in 2009-10 as compared to 28% in the 1950's (Figure 1).

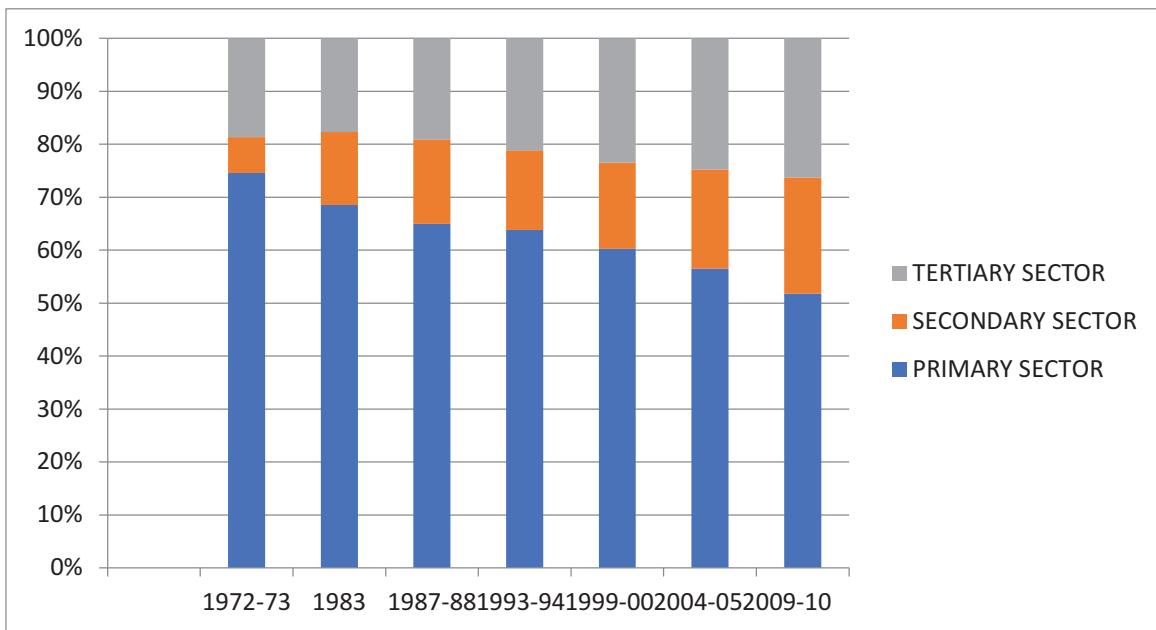
In terms of GDP India's structural transformation has been much faster on course where most developed countries entered the phase of high share of services in the GDP after going through a phase of industrialization. India's industry did not follow the same trajectory and rather arrived into service sector dominance straight away (Behera, 2015). In terms of employment the structural change has been much slower in the Indian economy. There has been a gradual fall in agriculture's share in employment. The total share of non-agricultural employment has increased from 25.42 percent in 1972 to 48.23 per cent by 2009-10. However, the it still remains the largest employment generating sector in Indian with a share of 51.76 percent whereas the share of industrial sector has risen to 21.93 % and share of services has increased to 26.3 percent (Figure 2).

Figure 1: Sectoral composition of India's GDP



Source: Own calculations based on data from NAS, CSO (Various issues)

Figure 2: Sectoral composition of employment in India



Source: Own calculations based on various rounds of NSS reports

Research Objectives

- To calculate labour productivity for 16 major Indian states and decomposing the labour productivity into within sector growth and structural change.
- To investigate the impact of structural change upon labour productivity growth.
- To examine the nature of structural change that has taken place in the Indian states.
- To explore the factors influencing the within sector productivity growth component of the aggregate labour productivity growth.

3. METHODOLOGY AND DATA

• **SHIFT-SHARE ANALYSIS**

The study uses Shift-Share Analysis decomposes aggregate labour productivity growth into within sector productivity gains and gains in labour productivity due to structural change. There's no standard approach to shift- share analysis. The approach by Rodrik and McMillan (2011) decomposes economy wide productivity of labour gains into the weighted sums of gains of productivity sector with share of employment of each sector at the beginning of time period used as weights. The 2nd term captures labour reallocations productivity effects of labour reallocations across different sectors; this is essentially the inner product of productivity levels (at the end of the time period),

with the change in employment shares across sectors. They call the 2nd term the structural change. When productivity levels are positively correlated to changes in share of employment, structural change term in that case will be positive and will increase economy wide productivity growth.

McMillan & Rodrik (2011)	$\Delta P_t = \sum L_{i,t-k} \Delta p_{i,t} + \sum p_{i,t} \Delta L_{i,t}$
Sharpe (2010)	$\Delta P_t = \sum L_{i,t-k} \Delta P_{i,t} + \sum (P_{i,t-k} - P_{t-k}) \Delta L_{i,t} + \sum (\Delta P_t - \Delta P)$
Meehan (2014)	$\Delta P_t = \sum L_{i,t-k} \Delta P_{i,t} + \sum (P_{i,t-k} - P_{t-k}) \Delta L_{i,t} + \sum (\Delta P_t - \Delta P)$
	$P_{t-k} \quad P_{t-k} \quad P_{t-k} \quad P_{t-k}$

The variant used by Sharpe (2010) and Meehan (2014) further decomposes the 2nd term into labour productivity growth due to level effect of reallocation and labour productivity due to growth effect of reallocation. In their version the within term if the first term on the right hand which gives the within sector aspect of labour productivity. The second term can be defined as the static shift effect which measures the impact on productivity which arises due to change in labour movements between sectors, given that productivity level in each sector remains unchanged. It gives the level effect of reallocation. The third term can be defined as the cross-term effect and gives the growth effect of labour. It measures the change in productivity and share of labour for every sector and gives the impact of reallocation of labour between sectors with different productivity growth rates

Table: 1 Summary of structural change and sectoral contribution; Reallocation 'level effect' and 'growth effect'

Reallocation Level Effect

	Low Productivity Levels Relative to aggregate ($P_{i,t-k} - P_{t-k} < 0$)	High Productivity Levels Relative to Aggregate ($P_{i,t-k} - P_{t-k} > 0$)
Decreasing Share of Employment ($\Delta L_i < 0$)	Positive Contribution	Negative Contribution
Increasing Share of Employment ($\Delta L_i > 0$)	Negative Contribution	Positive Contribution

Source: Meehan (2014)

Reallocation Growth Effect

	Productivity of labour Relative to aggregate ($\Delta P_i - \Delta P < 0$)	High Productivity Growth relative to aggregate ($\Delta P_i - \Delta P > 0$)
Decreasing Share of Employment ($\Delta L_i < 0$)	Positive Contribution	Negative Contribution
Increasing Share of Employment ($\Delta L_i > 0$)	Negative Contribution	Positive Contribution

Source: Meehan (2014)

If the cross-term effect term is positive it shows that the within-sector and shift-effects are complementary i.e. productivity growth is positive in expanding industries and negative in contracting the industries. However, if the cross-term effect term is negative it shows that within sector and shift effects are substitutes. (Molnar and Chalaux, 2015). A negative sign of the cross-term effect or reallocation growth effect component also indicates that an economy faces something similar to Baumol's cost disease that is the tendency of labour to move towards sectors with relatively small absolute increases in labour productivity. A negative reallocation growth effect at the aggregate level means that labour is moving to sectors with relatively smaller absolute labour productivity increases (Sharpe, 2010). The approach used by McMillan and Rodrik gives only a partial picture of the structural change as it does not distinguish between structural change due to 'level effect' and 'growth effect'.

To analyze and decompose labour productivity, this study uses the methodology used by Meehan (2014) and attempts to decompose productivity of labour for 16 major Indian states for the period 1999-00 to 2011-12. The study aims to investigate the extent and the impact of structural change on labour

productivity growth.

Labour Productivity is calculated by dividing the NSDP at constant 2004-05 prices by number of total workers. Sectoral labour productivity has been calculated by dividing the sectoral NSDP at constant 2004-05 prices by the sector-wise number of workers employed.

• DATA

In applying shift-share methodology, the study uses the sector wise Net State Domestic Product data for various states, taken from their respective State Domestic Product Reports and the EPWRF database. NSDP at constant 2004-05 prices has been used in all cases. The data for sectoral employment share is from the NSS 55th round report and NSS 68th round report. The data for total workers employed has been taken from Census 2001 report and Census 2011 report.

The study analyzes nine major sectors¹ namely:

- Agriculture & allied
- Mining and Quarrying
- Manufacturing
- Electricity, water etc.

1. The sectors have been created by carefully harmonizing the NIC codes used in the NSS 55th round which used NIC 1998 and NSS 68th round which uses NIC 2008 codes.

- Construction
- Trade Hotel and Restaurant
- Transport, storage, etc.
- Finance, insurance, Intermediation, real estate, other business etc.
- Public administration, education, health, other services etc.

To analyze whether within sector labour productivity growth has taken place in states which had already achieved some level of economic growth as well as structural change, the study looks at the impact of initial per capita NSDP level of the states collected from the respective State Domestic Report, the initial share of agriculture in total employment

collected from NSS report 55th round and the initial level of urbanization collected from Census 2001 report.

4. RESULTS AND FINDINGS

The study takes into account 16 major Indian states. As table 2 shows that during 1999-00 to 2011-12. Himachal Pradesh experienced highest productivity growth in Trade, transport and other services. Economy wide as well Himachal experienced the highest labour productivity growth during 1999-00 to 2011-12 whereas Bihar experienced the lowest productivity growth in absolute terms.

Table 2: States with maximum and minimum sectoral labour productivity (in absolute terms)

SECTOR	Maximum Sectoral Labour Productivity Growth		Minimum Sectoral Labour Productivity Growth	
	State	Labour Productivity Growth	State	Labour Productivity Growth
		(In Rs.) *		(In Rs.) *
Agriculture and allied	Punjab	25106.16	Karnataka	4253.28
Mining and Quarrying	Odisha	234408.20	Uttar Pradesh	-368922.69
Manufacturing	Haryana	94606.97	Himachal Pradesh	-25242.47
Electricity, water etc.	Gujarat	1805207.86	Odisha	-370742.13
Construction	Madhya Pradesh	382686.96	Odisha	-77342.24
Trade Hotel and Restaurant	Himachal Pradesh	647354.06	Madhya Pradesh	6753.28
Transport, storage, etc.	Himachal Pradesh	606209.97	Karnataka	34495.32
Finance, Intermediation, real estate, business etc.	Haryana	507289.33	Madhya Pradesh	-119155.89
Public administration, education, health, other services etc.	Himachal Pradesh	198159.38	Bihar	10253.83
Economy wide	Himachal Pradesh	120981.44	Bihar	17461.71

Source: Own calculation of labour productivity using state wise sectoral NSDP (at 2004-05 constant prices) data and state wise sectoral employment data.

Note: The calculations are for the period from 1999-00 to 2011-12. *All terms in INR (Rs.).

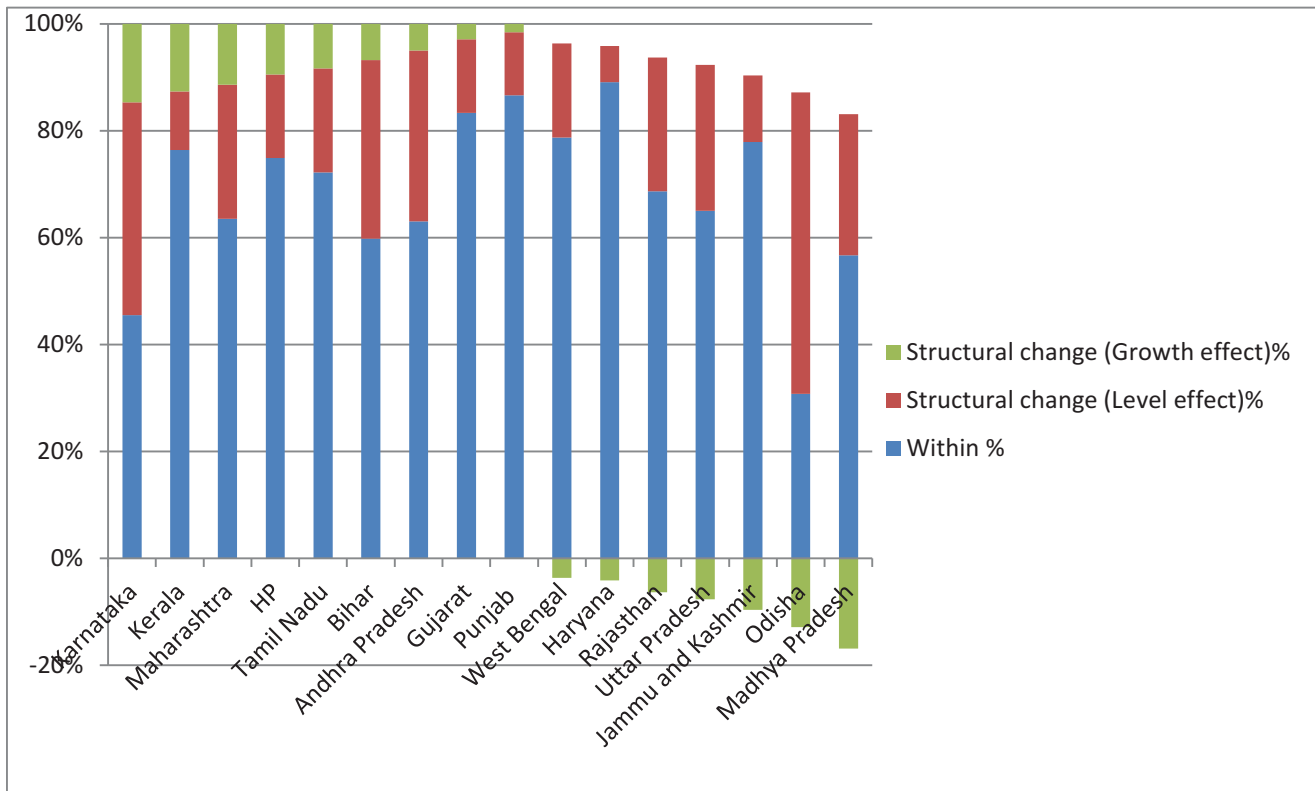
Table : 3 The decomposition of total change in productivity of labour into within sector effect and reallocation effect

	Relative Change in Labour Productivity	CONTRIBUTION TO LABOUR PRODUCTIVITY			Structural Change (Level + Growth)
		Within-Sector Effect	Reallocation: 'Level Effect'	Reallocation: 'Growth Effect'	
Haryana	1.56	1.51	0.11	-0.07	0.05
Gujarat	1.28	1.06	0.18	0.04	0.21
Tamil Nadu	1.10	0.79	0.21	0.09	0.31
Kerala	1.01	0.77	0.11	0.13	0.24
Maharashtra	0.97	0.62	0.24	0.11	0.35
Bihar	0.94	0.56	0.31	0.06	0.38
Andhra Pradesh	0.91	0.57	0.29	0.05	0.33
Rajasthan	0.73	0.57	0.21	-0.05	0.16
Karnataka	0.73	0.33	0.29	0.11	0.40
Punjab	0.73	0.63	0.09	0.01	0.10
West Bengal	0.68	0.58	0.13	-0.03	0.10
Himachal Pradesh	0.68	0.51	0.11	0.06	0.17
Odisha	0.58	0.24	0.44	-0.10	0.34
Madhya Pradesh	0.66	0.57	0.26	-0.17	0.10
Jammu and Kashmir	0.56	0.54	0.09	-0.07	0.02
Uttar Pradesh	0.52	0.40	0.17	-0.05	0.12

Source: Own calculations using sector wise NSDP data from State Domestic Product Reports of 16 major states and sectoral employment data from NSSO 55th and 68th round and Census 2001 and 2011 reports for the period 1999-00 to 2011-12.

Table 3 represents the labour productivity growth decomposed into 'within' and reallocation level effect and growth effect. It is seen that Haryana experiences the highest labour productivity growth (relatively) during the period 1999-00 to 2011-12, whereas Uttar Pradesh experiences lowest productivity growth.

Figure 3: % share of 'within' sector growth, 'level effect' and 'growth effect' of reallocation on labour productivity growth



Source: Own calculations using sector wise NSDP data from State Domestic Product Reports of 16 major states and sector wise employment data from NSS 55th and 68th round and Census 2001 and 2011 reports for the period 1999-00 to 2011-12.

Note: The figure shows the percentage share of 'within' sector growth, 'level effect' and 'growth effect' of reallocation (structural change) on the total labour productivity growth. States ranked based on the percentage share of 'growth effect' of reallocation (structural change) in total state's labour productivity

Majority of states have a higher component of 'within' sector growth contributing to their total growth in labour productivity, except for Odisha and Karnataka, where a higher component of structural change is contributing to overall productivity of labour growth. What is unusual is that although both states have a high component of structural change, Odisha has a negative growth effect of reallocation whereas Karnataka has a positive growth effect of reallocation. This warrants a deeper look into the sectoral output and employment composition of these 2 states.

Another unusual case is that of Madhya Pradesh which has the highest negative growth effect of structural change, despite having a substantial level effect (figure 3).

Apart from Madhya Pradesh and Odisha, West Bengal, Haryana, Rajasthan, Jammu and Kashmir and Uttar Pradesh all experience a negative growth effect of reallocation, implying that these states suffer from Baumol Cost disease implying that labour is being reallocated to stagnant sectors.

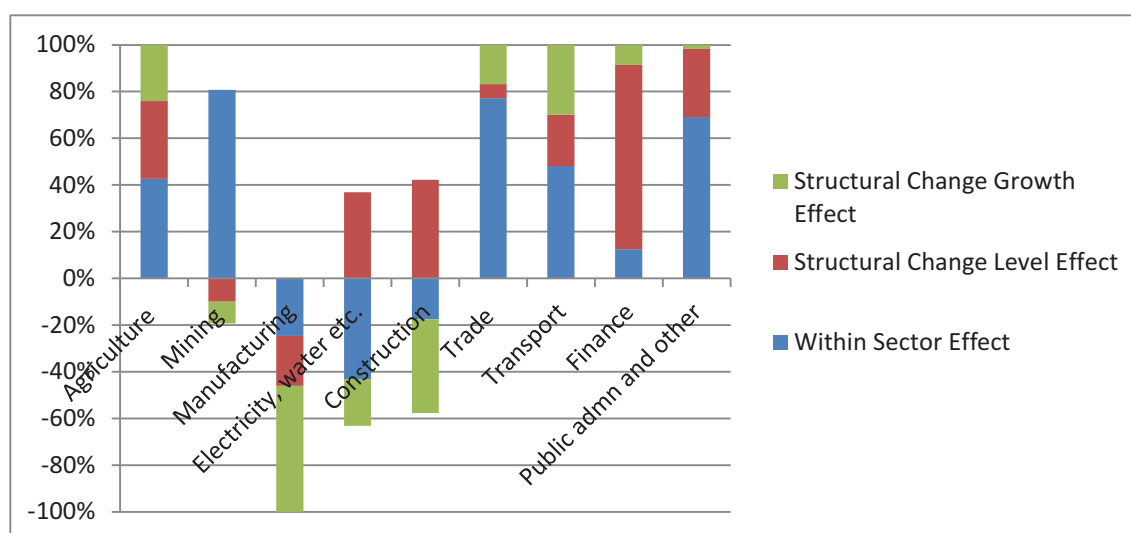
5. NATURE OF STRUCTURAL CHANGE

• Odisha's case

The Curious Case of Odisha and Madhya Pradesh
Both Odisha and Madhya Pradesh present a unique situation where both states have a high positive level effect but a negative growth effect. To understand the factors influencing such a phenomenon the study looks into the sectoral decomposition of labour productivity of both Odisha and Madhya Pradesh.

During 1999-00 to 2011-12 Odisha experienced a negative growth effect of structural change in mining sector, manufacturing, electricity water and gas and construction sectors. A decreasing share of employment in mining, a high productivity sector, and conversely an increasing share of labour in low productivity sectors such as electricity and gas, construction and manufacturing has led to a negative growth effect. (Table 4)

Figure: 4 Decomposition of sectoral labour productivity growth in Odisha



Source: Own calculation of labour productivity using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and NSS 68th round for the period 1999-00 to 2011-12

Table: 4 Sectoral change in share of employment and productivity growth in Odisha

ODISHA Sectors	Change in share of Labour employed (ΔL_i)	Change in Productivity growth ($\Delta P_i - \Delta P$)
Agriculture and allied	-0.146	-15890.58
Mining & quarrying	-0.001	212663.33
Manufacturing sector	0.010	-22923.81
Electricity, water etc.	0.001	-392487.00
Construction	0.077	-99087.11
Trade, hotels, restaurant etc.	0.026	31422.08
Transport and storage	0.017	62375.77
Finance, insurance, real estate etc.	0.005	68938.93
Public admn, education and other services	0.011	3684.48

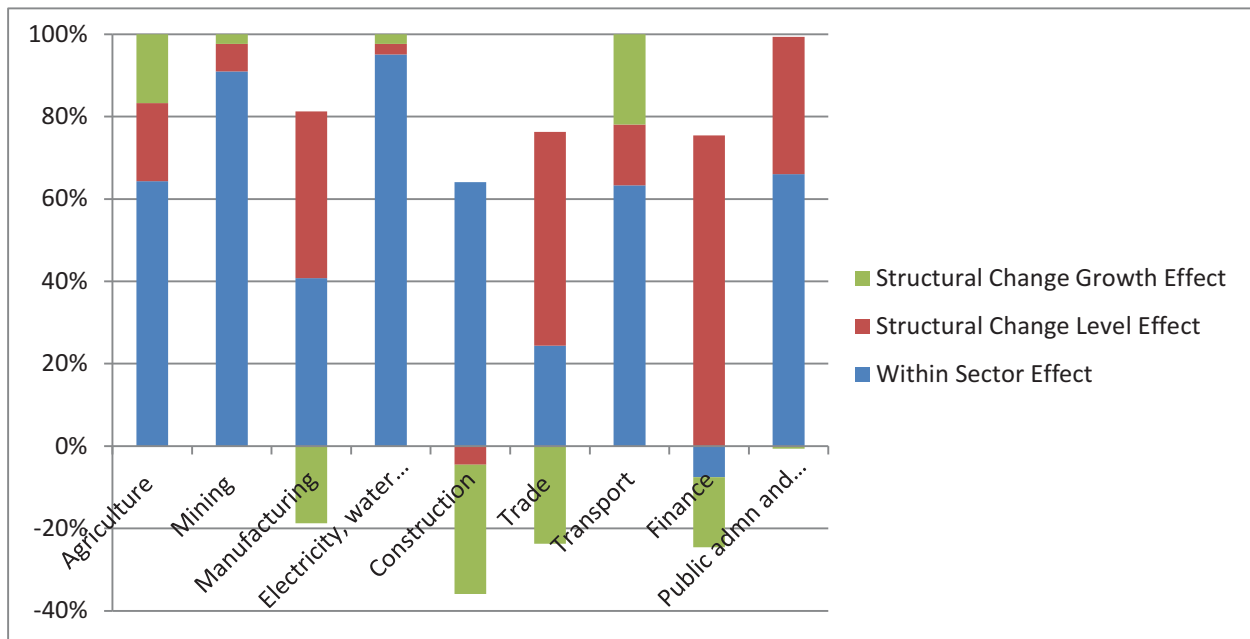
Source: Own calculation using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

Odisha therefore experiences labour absorption at the extensive level, i.e. there is a decline in labour share in agriculture, however the labour use at intensive doesn't occur as labour reallocates to low productivity sector sectors such as manufacturing, construction and electricity and gas. Also, a decline in the share of employment of the high productivity mining sector leads to a negative growth effect in Odisha. Hence, labour has not shifts from low productivity sectors to high productivity sectors but have rather moved to stagnant and low productivity non- agriculture sectors.

• **Madhya Pradesh's case**

Like Odisha, Madhya Pradesh also experiences a negative growth effect of structural change. In Madhya Pradesh's case a negative sectoral growth effect during the period 1999-00 to 2011-12 is observed in manufacturing, construction, trade, finance and public administration and other business services sector. The real estate, finance, insurance and other business in fact sees a high-level effect of reallocation but a negative within-sector growth as well as 'growth effect' of reallocation.

Figure: 5 Sectoral decomposition of productivity of labour into within sector effect, level effect and growth effect for Madhya Pradesh



Source: Own calculation of labour productivity using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

Table: 5 Sectoral change in share of employment and productivity growth in Madhya Pradesh

MADHYA PRADESH Sectors	Change in share of Labour employed (ΔL_i)	Change in Labour productivity growth ($\Delta P_i - \Delta P$)
Agriculture and allied	-0.067	-17872.0
Mining & Quarrying	00	64102.23
Manufacturing	0.016	-15709.13
Electricity, water etc.	0.000	210994.59

Construction	-0.016	358508.78
Trade Hotel and Restaurant	0.027	-17424.90
Transport, storage, etc.	0.012	43334.82
Finance, Intermediation, real estate, business etc.	0.010	-143334.06
Public admn, edu , health , other services etc.	0.018	-788.50

Source: Own calculation using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

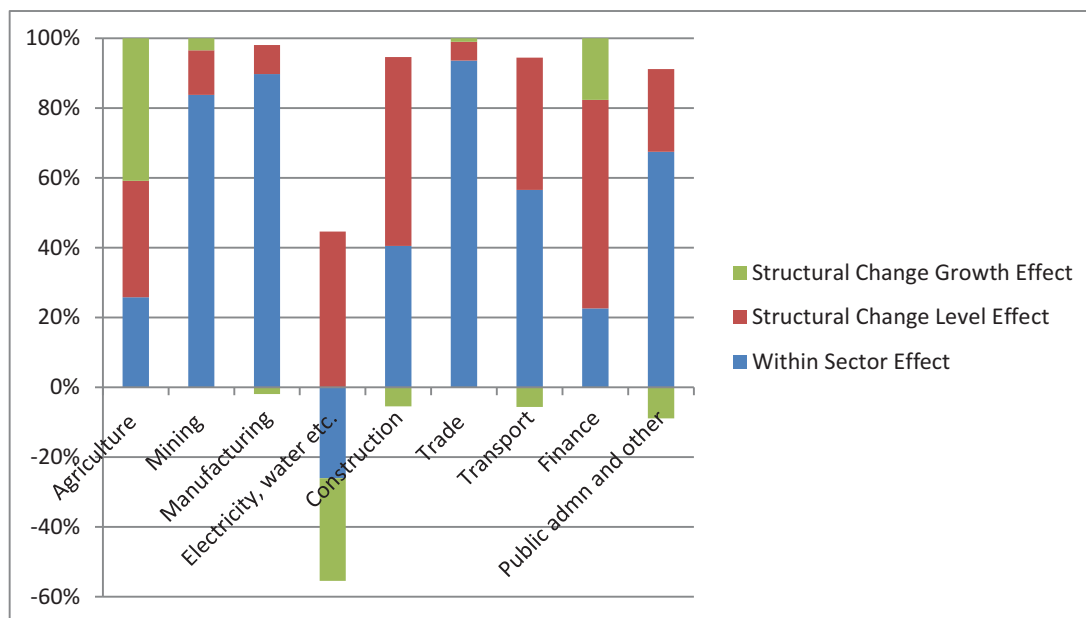
The negative growth effect in construction is observed due to a declining share of employment in construction which is a high productivity sector. Whereas increased share of employment in low productivity sectors such as manufacturing, trade and hotel, finance and business and public administration and other services leads to an overall negative growth effect of reallocation in Madhya Pradesh (Table 5)

The Case of Karnataka and Kerala's Structural change

Both Karnataka and Kerala experience a high structural change contribution in their overall labour productivity growth. However, unlike Odisha, Karnataka and Kerala experience a positive growth effect. To investigate the nature of structural change in these states, the study attempts to analyze the sectoral decomposition of labour productivity in Karnataka and Kerala.

- Karnataka's case
- In Karnataka's case growth effect is positive due to the decreasing share of employment in agriculture and the increasing share of employment in the high productivity finance, intermediation and also business sector as increasing share of employment in trade, hotel etc.

Figure: 6 Sector wise decomposition of labour productivity into within sector effect, level effect and growth effect for Karnataka



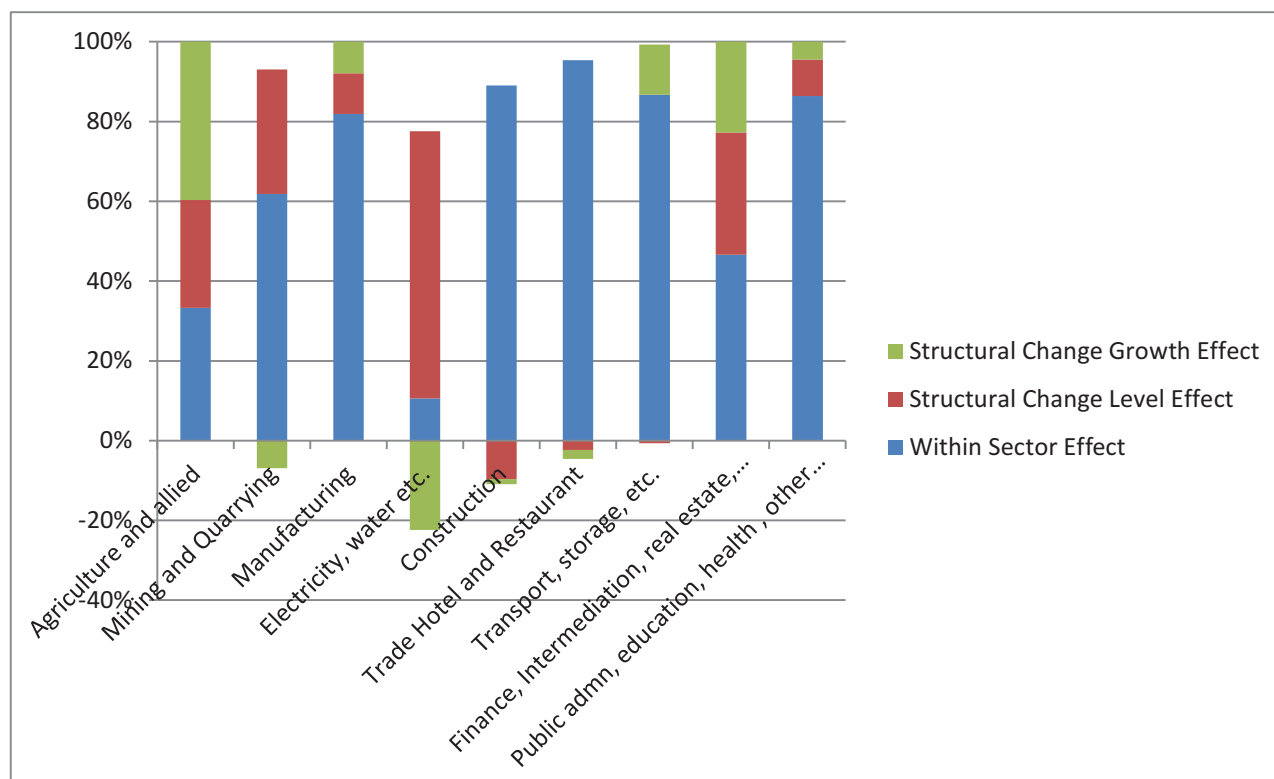
Source: Own calculation of labour productivity using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

Table: 6 Sectoral change in share of employment and productivity growth in Karnataka

KARNATAKA Sector	Change in share of Labour employed (ΔL_i)	Change in productivity of labour growth ($\Delta P_i - \Delta P$)
Agriculture and allied	-0.127	-33265.189
Mining and Quarrying	-0.003	-2761.663
Manufacturing	0.020	-3775.006
Electricity, water etc.	0.002	-246511.491
Construction	0.022	-7054.353
Trade Hotel and Restaurant	0.016	2884.212
Transport, storage, etc.	0.036	-3023.152
Finance, Intermediation, real estate, business etc.	0.017	129927.789
Public admn, education, health, other services etc.	0.017	-13166.231

Source: Own calculation using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

- Kerala's Case

Figure: 7 Sector wise decomposition of labour productivity into within sector effect, level effect and growth effect for Kerala

Source: Own calculation of labour productivity using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

In Kerala's case as well, the growth effect of reallocation is positive due to the reallocation of labour from agriculture which experiences a decreasing share of employment to high productivity sectors namely transport and storage and finance and intermediation. Also, there is a declining share of employment from manufacturing which is a low productivity sector which causes a positive growth effect of reallocation.

Table: 7 Sectoral change in share of employment and productivity growth in Kerala

KERALA Sectors	Change in share of Labour employed (ΔL_i)	Change in Labour productivity growth ($\Delta P_i - \Delta P$)
Agriculture and allied	-0.078	-44531.70
Mining and Quarrying	-0.009	12324.81
Manufacturing	-0.021	-21954.81
Electricity, water etc.	0.001	-46181.13
Construction	0.063	-1287.18
Trade Hotel and Restaurant	-0.012	27677.12
Transport, storage, etc.	0.015	142067.10
Finance, Intermediation, real estate, business etc.	0.016	232089.19
Public admn, education, health , other services etc.	0.025	15162.93

Source: Own calculation using sectoral NSDP (at 2004-05 constant prices) data and sectoral employment data from NSS 55th and 68th rounds for the period 1999-00 to 2011-12

In case of both Karnataka and Kerala, the labour absorption at extensive level has taken place with the share of agriculture in employment declining and the share of employment in other sectors gradually increasing. Increasing share of employment in finance and intermediation and other business sector has caused positive overall growth effect of reallocation. Therefore, the second stage of structural change i.e. The movement of labour from low productivity to high productivity sectors has also taken place to some extent in these states.

6. FACTORS INFLUENCING WITHIN SECTOR GROWTH

This section examines the factors that influenced the 'within sector' component of labour productivity growth and tries to establish if the within sector

growth takes place in states that had already attained some level of economic growth and structural change.

To analyze the impact of the initial economic development level and structural change on within sector labour productivity, the per capita NSDP for the year 1999-00, the level of urbanization in the year 1999-00 (initial level of urbanization) and agricultural share in employment in the year 1999-00 are regressed on the within sector productivity growth in model 1. Model 2 analyzes the impact of per capita NSDP change and urbanization rates change during 1999-00 to 2011-12.

Table: 8 Regression results of factors influencing within sector labour productivity growth component

Dependent Variable	Within Sector Productivity Growth		
	Model 1	Model 2	Model 3
Independent Variables			
Log of Initial Per Capita NSDP	0.101 (t= 0.33)		
Initial Level of Urbanization	0.0032 (t=0.34)		
Initial agricultural employment share	0.00914 (t= -1.03)		-0.012* (t= -1.56)
Change in Log of Per Capita NSDP		0.00373* (t= 1.82)	0.0041** (t= 2.12)
Change in Urbanization rate		0.00387 (t= 0.58)	-0.018 (t= -0.94)
Constant	0.106 (t= 0.03)	0.0195 (t= 0.08)	0.8817* (t= 1.52)
R squared	0.2613	0.3477	0.444

Note: Robust t statistics in parenthesis: * at 10% significance level, **at 5% significance level, ***at 1% significance level

The study finds that significant relationships exist between change in log of per capita NSDP and within sector productivity growth (Model 3) implying that the change in per capita NSDP of the state has positively influenced the within sector productivity of labour growth. Also, the initial level of economic growth and structural change in the state was not found to have a significant impact on within sector productivity growth.

7. CONCLUSION AND SUGGESTIONS

Decomposition of labour productivity changes into those resulting from within sector changes and those resulting from reallocation 'level effect' and 'growth effect' highlights productivity of labour growth trends in India.

Firstly the 'within' sector productivity gain has been the major driver of labour productivity growth in India compared to structural change. This could be due to the new methods and an increased flow of foreign capital in India within this period. From the regression analysis it was found that within sector growth wasn't significantly impacted by the level of economic growth and structural change but was rather was influenced by change in per capita level of NSDP during the period 1999-00 to 2011-12. Therefore, as economic growth was rising in the state, the 'within' sector component of labour productivity also increased.

Secondly, the study looks at the impact of structural change on the labour productivity growth in the economy. The structural change component which is further decomposed into the 'level effect' and

'growth effect' explains how much of labour productivity growth has been contributed by the movement of labour from low productivity to high productivity sectors. We see that the overall level effect or shift effect of structural change is contributing positively to the overall labour productivity growth for all the states. However, the growth effect for seven states (West Bengal, Rajasthan, Haryana, Jammu and Kashmir, Madhya Pradesh, Odisha and Uttar Pradesh) is negative thereby reducing the labour productivity growth (Figure 3)

Based on this analysis, it becomes imperative to differentiate between the natures of structural change that has taken place in the Indian states. The study finds that the 'level effect' and 'growth effect' work in complementary terms when labour moves out of lower productivity sectors (such as declining agricultural share of employment for all the states) or when labour moves into high productivity sectors (increasing employment share of finance, intermediation and other business in case of Karnataka and Kerala). However, the level effect and growth effect exert opposing forces when labour moves out of high productivity sectors (such as mining in case of Odisha and Construction in case of Madhya Pradesh) or when labour moves into low productivity sectors (such as finance and intermediation in case of Madhya Pradesh and Construction in case of Odisha). In such a scenario, we may have a very high 'level effect' of structural change, as was seen in the case of Odisha and Madhya Pradesh, due to labour shifting out of agriculture, but we have a negative 'growth effect' of structural change due to labour reallocating into low productivity sectors with stagnant growth. This causes Baumol Cost Disease Effect as described by Sharpe (2010). The negative growth effect then reduces the overall productivity growth for these states (seen in figure 3). Hence the level effect and growth effect give a clearer picture about the impact and nature of structural change that has taken place.

Given this above analysis, this study therefore

concludes that there is scope of raising labour productivity due to structural change, if labour is reallocated from lower productivity sectors to high productivity sectors.

Structural change in India is taking place when we consider the decline in agricultural employment in favour of non-agricultural employment, however as Binswanger-Mkhize terms it; the structural change is 'stunted' because it is primarily generating informal employment without any security. The employment creation is taking place mainly in rural non-farm low productivity jobs rather than the high productivity jobs.

The majority of Indian work force is semi-skilled and unskilled which cannot be absorbed in the high productivity 'modern' services which include financial services, banking, real estate, business services etc. as these sectors require highly educated and trained workers and the Indian workforce is not particularly well educated. India has high illiteracy rates by international standards and there is a shortage of group of well educated (university educated) work force. The quality of the education system is also significant challenge. Therefore, there is a need to increase the supply of well educated workers and at the same time an increase in demand of workers with more modest skills (Berry, Bosworth and Panagariya, 2007)

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