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SECTORAL STRUCTURE OF INDIAN GROWTH: COULD BAUMOL EXPLAIN IT?

Abstract:

The GDP growth structure of India is dominated by the growth in service sector. The Baumol's theory predicts that the primary mover sector behind this growth pattern should have the highest productivity. The sector with highest productivity will pay highest wages. Hence, it will attract labour from low productivity sector; resulting in decline of the low productivity sectors. To prevent the labours to shift the job, the low productivity sector can pay higher wages, but then price of the commodities has to be increased. Unless these sector's demand is very little sensitive to price increase, the wage increase will not make these low productive sectors sustainable. This paper argues that Baumol's theory is inadequate to explain sectoral structure of the Indian growth. It is primarily because of domination of traditional service sector, like trade, transport etc in service sector growth, little linkages between wages and productivity and disintegrated labour market causing weak wage transmission mechanism across the sectors.

Keywords:

Growth, Services, India, productivity

JEL Classification: O14, O53, O40

The Indian economy is experiencing a reasonably high growth in last few decades. And it has many characteristics; one of them is very prominent. It is dominated by the service sector growth. According to the National Accounts Statistics for the year 2012-13, the service sector[i] contributed 58.78 per cent of the national GDP. The manufacturing sector has contributed only 15.76 per cent of the GDP. Industry that includes manufacturing, public utilities, construction and mining has constituted 27.27 per cent of the GDP. And Agriculture and allied, has contributed roughly around 13.95 per cent of the GDP.

Baumol's (1967) theory is one among the major theories available to us to explain the sectoral growth pattern. Baumol has tried to explain the changes in sectoral composition by two factors - differences in productivity and price and income elasticities of demand. According to him, with a sizeable degree of integrated labour market where increase in wage rate in one sector increases the wage rate of the other sector, the sector with higher labour productivity will grow and the sector with lower productivity will increasingly disappear if the price elasticity of demand for both the sector is unitary and the low productive sector is not highly income elastic. The sector with higher labour productivity will pay higher wages. The higher wages will not increase average unit cost of production only if productivity rises more than wage increase. If productivity increase is lower than wage increase, to prevent lowering of profit price has to be increased. But for this the demand for low productivity sector either has to be price inelastic or highly income elastic. So, Baumol's theory argues main driver of sectoral growth pattern is differences in productivity. But for reflection of it in the sectoral growth pattern; certain demand conditions and greater degree of labour market integration is required.

Economic history indicates that for developing countries at India's level of per capita income, economic growth has normally been led by the manufacturing sector. However, the leading sector in contemporary Indian economic growth has increasingly been services rather than manufacturing.

The objective of this paper is to examine the validity of the sectoral differences in productivity based explanation for Indian growth structure. Or in other words, we shall try to answer the question – Can Baumol's theory explains the sectoral growth pattern of Indian economy? To answer this question, we have essentially looked at the correspondence between difference in productivity and GDP's sectoral composition; correspondence between productivity and wages within the sectors and the strength of wage increase transmission among the sectors.

According to Baumol's theory for the given structure of Indian economy the following characteristics should exists-

1) Growth rate of productivity of services has to be greater than industries and agriculture. As a result, growth rate of wage in service should be higher than that of industries and agriculture. As a result, employment growth rate in

services should be higher than that of Industries and agriculture. And relative price of services vis. A vis industries and agriculture should have the declining trend

2) Productivity of Industries has to be greater than agriculture. As a result, growth rate of wage in industry should be higher than that of agriculture. Consequently, the employment growth rate of industries should be higher than agriculture and relative price of industries vis a vis agriculture should have a declining trend.

The objective of this paper is to examine the empirical existence of some of these predicted characteristics for India by the Baumol's theory. Since, according to this theory, the drivers of structural composition of growth are sectoral differences in productivity and its relationship with wages, we are limiting ourselves to examine empirically the sectoral pattern of productivities and wages.

There are few studies that have measured the total factor productivity (TFP) of agriculture, industries and services separately. A very well referred such study is Bosworth, Collins and Virmani (NBER Working Paper 2007). According to this study, in post-1980, the TFP is much higher for the service sector, followed by agriculture. And the industry is having lowest TFP. In India's GDP, for the last 30 years, the share of services is going up; share of industries has remained stagnated; share of agriculture is continuously declining. So in the ranking of the sectoral dominance in Indian Growth, Service comes first followed by the Industries. But in the ranking of total factor productivity, Agriculture comes second after the service sector.

The similar results have been reported by the RBI reports on "Estimates of Productivity Growth for the Indian Economy" Reserve Bank of India, 2014. The table 1 (quoted from this report) shows the total factor productivity growth is highest in the services and the total factor productivity of manufacturing is lower than the agriculture during the period of 1980-2008.

Table 1: Trend Growth Rate of Labour Productivity and Total Factor Productivity by Broad Sector, 1980 to 2008

Aggregate Production Possibility Frontier Value Added				
	Real Value Added per Person	A2	B2	C2
Agriculture, Hunting, Forestry, fishing	2.1	1.81	1.68	1.52

Mining and Quarrying	3.22	0.23	–0.17	–0.24
Manufacturing	5.43	1.74	1.3	0.73
Electricity, Gas and Water Supply	6.05	2.94	2.62	2.6
Construction	–2.48	–2.95	–3.31	–3.31
Services	3.56	2.59	2.07	1.84
Total Economy	4.04	2.42	1.74	1.4
Note: Alternative A2: TFPG computed using labour person and capital stock				
Alternative B2: TFPG Computed using labour input and capital stock				
Alternative C2: TFPG Computed using labour input and capital services				

Source: Table 7.4, pp77, "Estimates of Productivity Growth for the Indian Economy" Reserve Bank of India, 2014

What is further interesting is the trend growth rate in labour productivity (measured as real value added per person). This is highest in industries. The labour productivity growth rate is 6.05 per cent in Electricity, Gas and water supply. The labour productivity growth rate is 5.43 per cent in manufacturing, whereas, the labour productivity growth rate of services and agriculture is 3.56 and 2.1 per cent respectively. Given this structure of sectoral growth in labour productivity, the Baumol's theory should predict a sectoral growth structure of India dominated by Industries. But in reality, the service sector is dominating the Indian sectoral growth structure. According to this report, the interesting fact is manufacturing is having high labour productivity and low total factor productivity. It indicates high degree of capital deepening in relation to labour use. And in the service sector the process of capital deepening in relation to labour use at a lower level than manufacturing[ii].

The service sector in India is very heterogeneous. On one hand, it consists of highly modern knowledge based sectors and on the other hand there are service sector with primitive technology. So to understand how differently productive sector are contributing to overall service sector growth , we have separated the sector into a modern component that includes communications, finance, business services, education and medical care, and a traditional sector of trade, transportation, public and personal services. During the period of 2003-4 to 2009-10, the service sector has average annual growth rate of 10.25 per cent. And 5 sectors have contributed 8.81 percentage point of it. Two traditional low skill sector, trade and transport have contributed 3.14 and 1.24 percentage point respectively (Table 2). And three modern

sectors, communications, banking & insurance and business services have contributed 1.27, 1.71 and 1.42 percentage point respectively. So the high service sector growth cannot be entirely accounted for the growth of dynamic modern and highly productive sector. A little less than half of the service sector growth has come from the traditional sector and this sector constitute 56 per cent of the service GDP. In the previous decade of 1992-93 to 2002-03, the service sector has grown with average annual growth rate of 9.28 per cent. And the traditional service sector has contributed 5.62 percentage point of it. In other words, little more than 60 per cent of service sector growth has come from the traditional sector. But these are not sectors in which we would anticipate rapid productivity growth. In fact, the labour productivity of many these service sectors according to RBI report on productivity are reported below (Table 3), which shows most of the traditional sectors' labour productivity growth rate is lower than the modern sectors.

Table 2: Growth in various Service Sectors

	Modern						Traditional							
	Com-muni-cation	Bank & Insur-ance	Busi-ness Serv.	legal serv.	Edu. & med.	Sum	trade	Rail	Other Transp.	Stor-age	Pers. Serv-ices	Radio & TV	Other serv-ices	Sum
80-81 to 89-90	5.88	10.31	9.88	8.55	6.73		6.04	3.57	7.03	2.68	2.62	12.84	2.87	
1992-93 to 02-03	18.00	9.00	19.09	5.19	8.23		11.34	6.25	7.40	1.38	7.15	-4.65	3.95	
2003-04 to 09-10	25.07	14.79	18.21	6.87	6.87		9.20	9.22	9.09	5.92	6.29	-1.81	6.48	
Average Percentage Contribution to Total Service GDP														
1980-81 to 89-90	1.31	9.88	1.91	1.17	14.18	28.46	32.58	1.99	15.13	0.46	4.58	0.45	11.25	66.44
1992-93 to 02-03	2.00	13.80	3.80	1.06	14.49	35.14	32.61	1.35	14.40	0.24	3.41	0.50	7.72	60.23

Caption above table: Average Annual Growth Rate

2003-04 to 09-10	4.95	13.25	7.93	0.69	12.17	38.99	34.02	1.15	12.80	0.16	2.64	0.10	5.45	56.32
Average Percentage Contribution to Total Services Growth														
1980-81 to 89-90	0.08	1.08	0.19	0.10	0.96	2.41	1.97	0.07	1.06	0.01	0.11	0.09	0.31	3.63
1992-93 to 02-03	0.38	1.27	0.75	0.06	1.20	3.66	3.77	0.08	1.07	0.00	0.25	0.12	0.31	5.62
2003-04 to 09-10	1.27	1.71	1.42	0.05	0.85	5.30	3.14	0.10	1.17	0.01	0.17	0.01	0.34	4.95

Source: Basic data is from National Accounts Statistics, CSO

Table 3: Growth Rate of Labour Productivity, 1980-2008 (in per cent)

Traditional Sector	Trade	2.47
	Hotels & Restaurants	4.12
	Transport & Storage	3.08
Modern Sector	Post & Telecommunications	8.29
	Financial services	5.22

Source: Table 6.1, pp 55, "Estimates of Productivity Growth for the Indian Economy" Reserve Bank of India, 2014

In the Baumol's theory the other prominent mechanism is the productivity wages link. The wage rate in the most productive sector should grow most and this increase in wage rate of most productive sector will push up the wage rate in other sectors, which will increase the unit cost of production in these sectors. So this theory predicts strong productivity-wage linakage and substantial degree of labour market integration.

The data on wages directly collected from the working population of all sectors in India is collected by National Sample Survey in every 5 years. Such surveys are available for the year 1999-00, 2004-05 and 2009-10.

Graph1: Annual Real Wage Growth Rate of Male Regular Worker in Different Industry and Service Sector
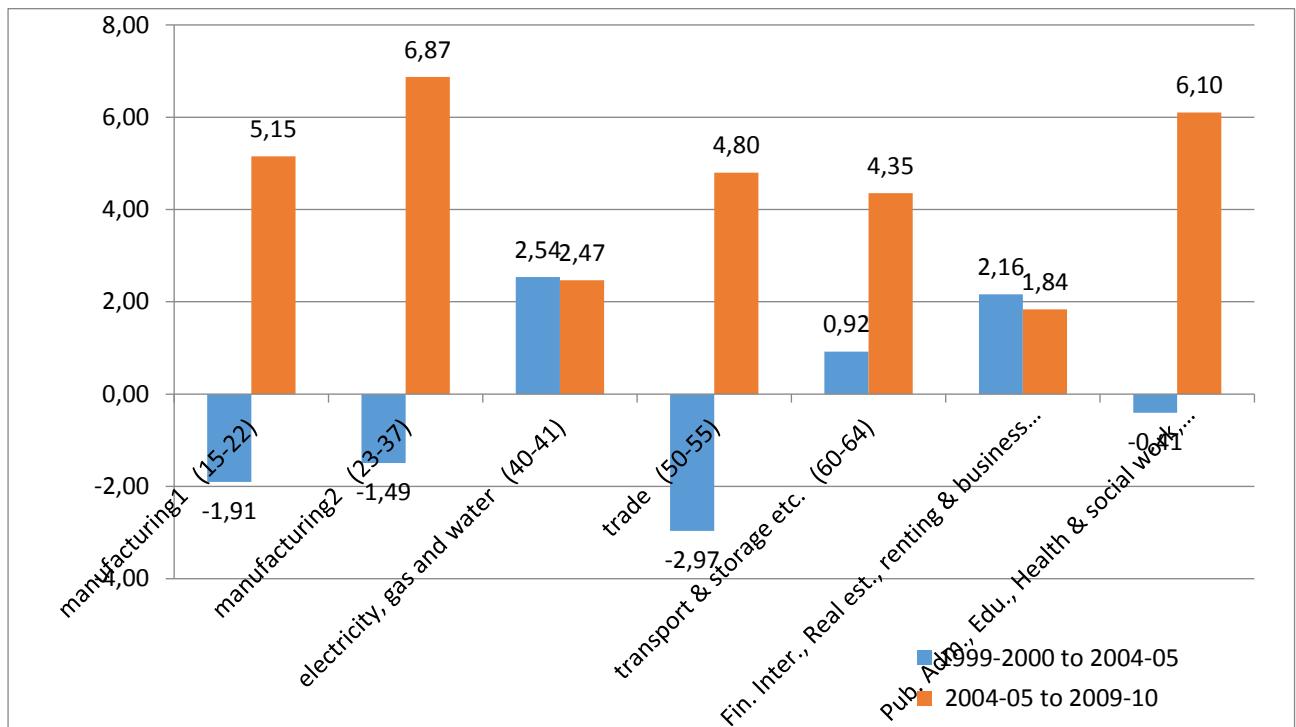
Source: NSSO Household Survey on Employment-Unemployment, 55th, 61st and 66th Round

Note: CPI-UNME and CPI-IW are used as the price deflator for the service sector and Industries respectively

The real wage rate of male regular workers in urban industries and service sector has a mixed trend. All of them have witnessed positive growth during the period 2004-5 to 2009-10. But Most of them during the period 1999-2000 to 2004-05 has witnessed negative growth rate. This indicates the positive association between productivity growth and increasing wages is not holding for both the period. Further, the average annual real wage growth rate of male regular workers in urban industries for the period 2004-5 to 2009-10 is 4.83 per cent is higher than 4.28 per cent, the average annual wage growth rate of male workers in urban service sector. On contrary, in the period of 1999-2000 to 2004-05, the real wage growth rate of male regular workers for both urban industries and service sector were low. But for industries it was negative. All these figures do not give a story which is consistent with productivity wage linkage story of Baumol to explain the structure of Growth.

Further, the share of wages in organised manufacturing sectors' value addition is coming down over the years. So the importance of difference in share of wages to influence the sectoral structure should come down. In a nutshell, the sectoral growth structure does not have one-to one correspondence with sectoral differences in productivity; the existence of productivity wage transmission mechanism and wage

transmission mechanism among the sectors are weak. As a result, it is unlikely that Indian growth structure is following Baumol's theory of growth structure.

Table 4: Trend Growth Rate of Labour Productivity and Annual Average Wage Rate (at 1999-2000 prices) **Broad Sector, 1980 to 2008**

	Real Value Added per Person	Annual Average Wage Rate	Gap between growth in wage and productivity
Agriculture, Hunting, Forestry, fishing	2.1	1.9	-0.2
Mining and Quarrying	3.22	2.83	-0.39
Manufacturing	5.43	3.18	-2.25
Electricity, Gas and Water Supply	6.05	4.35	-1.7
Construction	–2.48	0.5	2.98
Services	3.56	2.89	-0.67
Total Economy	4.04	3.45	-0.59

Source: Table 7.4, pp77, "Estimates of Productivity Growth for the Indian Economy" Reserve Bank of India, 2014. Annual Average Wage Rate (wage bill/ no. of person employed) is calculated by the author from the database provided by this RBI Report. The wage rate reported in the table is crucially depends upon the method used in the report for calculating labour's share in India's output.

The RBI report on "Estimates of Productivity Growth for the Indian Economy" has estimated the annual average wage rate of various sector of Indian economy by incorporating various approximation and indirect methods of estimations. Here, without getting into the details of their methodology, we shall discuss their estimated wage rate reported in the table 4. The Table 4 clearly shows the growth rate of labour productivity is higher than wage rate growth in service, industries and agriculture. So the productivity-wage gap is widening in all these sectors. This fast widening gap is highest in industries followed by the services. Whereas, the only exception is in construction where wage growth rate is stagnant and the labour productivity is fallen. Since, it is a growing sector, we can infer that it is providing shelter to those who either are dropped out of other sectors or is addition to the labour force. But since substantial demand is there for this sector the wage rate is not declining.

The empirical literature of post-reform period points out towards the disjoint between labour productivity and wage rates. Goldar&Banga (2005) argues that there has been a widening gap between labour productivity and wage rates. Sundaram (2001) argues that despite labour productivity has increased substantially in most sectors with the exception of construction, it has not translated into increased growth in real wages, particularly for casual workers. According to Karan &Sakthivel (2008), during the period 1993-94 to 2004-05, the average labour productivity growth rate in India is above 4 per cent and average real wage growth rate is less than 2.5 per cent. Further they have argued that Indian labour market is segmented. Guha &Tripathy (2014) has shown that there is a lack of integration in the rural labour market. This rural labour market separation is mainly between the rural skilled non-farm and unskilled non-farm and farm labours. There is no statistically significant wage transmission mechanism between the skilled non-farm , unskilled non-farm and farm sector. Chatterjee and Chowdhuri (2011)[iii] has studied the sectoral wage convergence within the manufacturing sector. They found the evidence of wage convergence among the large number of manufacturing sector by accommodating two sector specific structural breaks. And according to them, these structural breaks have occurred primarily for the technological change. Without accommodating these two structural breaks the evidence of wage convergence would not have existed. However, this paper is silent about the wage convergence between manufacturing and non-manufacturing sector.

Another mechanism that Baumol had visualised is that employment will be more where the wages are higher. This may be true for an economy which is completely capitalist economy where there is no surplus labour and economy is largely operating at its natural rate of unemployment. However, India is a labour surplus economy. The surplus labour is heavily concentrated in agricultural sector. In 2009-10, agriculture and allied activities had employed 238 million of India's 459 million workers (52% of India's total workforce). At the same time, the contribution of agriculture and allied activities in India's GDP declined substantially from 51.0% in 1951-52 to 14.6% in 2009-10. In post-reform period of 1993-94 to 2009-10, persons employed in the primary sector declined by 1.8 million even as the total employment in the country increased by 84.7 million. Only between the period 2004-05 to 2009-10 an absolute fall in the numbers of persons engaged in agriculture and allied activities was witnessed in India. The question is where these labour that has been released from agriculture has been absorbed, in the high wage growing sector as predicted by Boumol.

The manufacturing sector, which has witnessed a large increase in the wage rate during 2004-5 to 2009-10 has actually experienced an absolute decline of 3.7 million in the total manufacturing employment in the country. Of the 86.5 million new non-agricultural jobs created in India between 1993-94 and 2009-10, only 9.2 million were in the manufacturing sector. In 2009-10, India's manufacturing sector employed a total of 52 million workers, which included both the organised and unorganized sector workers. The employment in India's factory sector, which broadly represents the organised manufacturing sector, numbered 11.8 million in the same year.

	1983 to 1993-94			1993-94 to 2009-10			2004-05 to 2009-10		
	Growth Rate (%)		Net Increase (mill.)	Growth Rate (%)		Net Increase (mill.)	Growth Rate (%)		Net Increase (mill.)
	GDP	Employment		GDP	Employment		GDP	Employment	
Agriculture and Allied	20.5	45.6	32.4	11.0	-2.1	-1.8	9.0		-21.1
Manufacturing	14.5	10.7	7.6	14.9	10.9	9.2	18.7	-16.6	-3.7
Construction	7.3	7.5	5.3	8.4	37.8	32.0	8.6	81.2	18.1
Trade, Hotels, transport and Communication	18.7	17.7	12.6	25.3	35.3	29.9	30.0	17.5	3.9
Financing, Real Estate and Business Services	15.6	2.3	1.6	16.8	7.8	6.6	22.9	10.3	2.3
Community, Social and Personal Services	14.8	16.3	11.6	13.3	11.0	9.3	13.0	3.1	0.7

Source: Table 14 and 5 in Thomas (2012); NSSO and NAS of Govt. of India

The sectoral composition of labour absorption in service sector reveals that labour are being primarily absorbed in low skill, low wage sectors. During the 1980s, approximately 12 million new jobs were created in India in the broad category "community, social and personal services". Two sub-sectors "Public administration and defense services" and "education, scientific and research services" are within this broad category, and they had created 2.5 million and 1.8 million jobs respectively.This is also the sector, where the Government has a large presence, where salaries are indexed with inflation and routinely revised upward. However, in 1990s, a substantive changes has occurred in the nature of employment under the community, social and personal services rubric. The number of jobs in public administration and

defenceservices category has actually declined after 1993-94. However, community, social and personal services recorded a major increase in employment growth during the first half of the 2000s (6.7 million jobs during these five years), a substantial part of these new jobs were that of female domestic help, which is again a low job, low productive, low skilled job.

During the period of 1993-94 to 1999-2000, trade, hotels, transport and communication together generated 13.4 million jobs, or close to 60% of the net increase in non-agricultural employment during that decade. However, from 1999-2000 to 2009-10, construction has become the major source of employment generation in the country. Persons employed in construction increased by only 5.3 million during the 10 years between 1983 and 1993-94, but by 18.1 million during the five-year period from 2004-05 to 2009-10, which accounted for almost all of the new employment opportunities that emerged in India's rural areas, even as rural jobs were being lost in some other sectors, mainly manufacturing. Hence, the major source of services sector employment in India shifted from community, social and personal services during the 1980s, to trade during the 1990s.And the construction sector become the major source of employment during the 2000s. During the 1980s, the construction sector contributed a little over 7% each to total GDP growth and to total employment growth in the Indian economy. During the post-1990 years, the contribution made by construction to India's GDP growth hardly changed: 8.6% only even between 2004-05 and 2009-10. On the other hand, construction accounted for 38% of all new employment created in India between 1993-94 and 2009- 10, and 81% of all new non-agricultural employment generated between 2004-05 and 2009-10.These changes were accompanied by a reduction in the productivity resulted in aincreasing de-link between sectors that produces and sectors that provide jobs.

Hence, the sectors that has dominated the growth not necessarily having high productivity growth. High productivity growth has not necessarily resulted in high wage rate growth. And high wage rate growth has not been accompanied with high employment growth. Hence, the capacity of high wage in one sector to push up the wages in other sector is being limited. As a result, we are not witnessing the sectoral transformation of India, as it could have conjectured following Baumol's theory of sectoral transformation. It is primarily because India as an economy with labour surplus and dual structure of the economy, where the non-firm sector too is dominated by small scale, low productive, unorganisedsector and the modern sector has a very limited capacity to generate employment.

Conclusion

In a nutshell, the sectoral growth structure does not have one-to one correspondence with sectoral differences in productivity; the existence of productivity wage transmission mechanism are weak. Further, wage transmission mechanism among the sectors are weak because of weak relation between wages and employment. As

a result, it is unlikely that sectoral structure of Indian growth can be explained by theBaumol's theory of growth structure. These leaves us with two more options to explain the sectoral structure of Indian growth- first, by Kaldor's theory of engine of growth and second, how the final demand structure both in domestic consumption market and in exports market are influencing the sectoral growth structure of Indian economy. However, exploring these two options are beyond the scope of this paper.

References

Barry Bosworth & Susan M. Collins & Arvind Virmani, (2007). "Sources of Growth in the Indian Economy," NBER Working Papers 12901, National Bureau of Economic Research.

Baumol W.J. (1967) "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis" The American Economic Review, Vol. 57, No. 3, pp. 415-426

Chatterji, Monojit&Homagni Choudhury (2011) "Are real wages per worker converging between Indianindustries? Time series evidence with two structural breaks"Paper prepared for presentation at the Development Studies Association (DSA)Conference, hosted by the Economics Department, University of Dundee, Dundee (UK).

http://www.devstud.org.uk/downloads/4dd618ac29a85_paper_dsa_homagni1.pdf

Goldar, B. and Banga, Rashmi, (2005), "Wage-productivity relationship in organised manufacturing in India: A state-wise analysis", in The Indian Journal of Labour Economics, Vol. 48, No. 2, Apr.-June.

Guha and Tripathy (2014) "Link Between Food Price Inflation and Rural Wage Dynamics",Economic & Political Weekly,xlIXnos 26 & 27, June 28,

Sundaram, K. (2001). "Employment and poverty in the 1990s: Further results from NSSO 55th Round

Employment and Unemployment Survey, 1999–2000", in Economic and Political Weekly, Vol. 36, No. 32. 11 Aug.

Karan, Anup K and SakthivelSelvaraj (2008): "Trends in Wages and Earnings in India: Increasing Wage Differentials in a Segmented Labour Market", Asia Pacific Working Paper Series, ILO, New Delhi.

Reserve Bank of India, (2014), Report on "Estimates of Productivity Growth for the Indian Economy",http://www.rbi.org.in/scripts/PublicationReportDetails.aspx?UrlPage=&ID=785

Thomas, Joyan (2012), "India's Labour Market during the 2000s Surveying the Changes", Economic & Political Weekly,December 22, 2012 volxlviI no 51, Pp 39-51

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[i] Excluding construction sector
[ii] This is separately noted by this RBI report on its detailed (26 sector) sectoral analysis
[iii] " Are real wages per worker converging between Indianindustries? Time series evidence with two structural breaks" by MonojitChatterji&Homagni Choudhury, Paper prepared for presentation at the Development Studies Association (DSA)Conference, hosted by the Economics Department, University of Dundee, 20 May, 2011,Dundee (UK).