Chapter 11
Growth, Employment and Structural Change: Punjab Versus 16 Major States of India

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11.1 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. It is termed as "jobless growth". There is emphasis in the policy debate that jobless growth has been responsible for the disappointing results in reducing poverty. However, according to an emerging economic thinking, emphasis should be placed not only on increasing employment levels per se but also on its sectoral composition (Wang and Szirmai 2008; Timmer and Szirmai 2000; Macmillan and Rodrik 2011; Aggarwal and Kumar 2012 for a detailed survey). The 'New Structural Economics', as it has come to be known as, emphasises that the basic cause of low growth–low growth circle is that the labour force is trapped into low-productivity sectors. An expansion of more productive and dynamic sectors can push the economy into a virtuous circle in which the growth of productive employment, productive capacities and earnings mutually reinforce each other to accelerate growth and reduce poverty. Thus, labour flows from low-productivity activities to high-productivity activities are a key driver of sustained economic growth and development. Following the emergence of this thinking, there has been growing interest in the analysis of structural change in the economy as a mechanism of sustained growth (Dietrich 2009; Cortuk and Singh 2011; Macmillan and Rodrik 2011). The advent of this thinking within the realm of the "New Structural Economics" has prompted a stream of empirical literature which focuses on systematically unpacking the relationship between economic growths on the one hand and, employment and structural change in employment on the other (see, for

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L. Singh and N. Singh (eds.), *Economic Transformation of a Developing Economy*, India Studies in Business and Economics,
DOI 10.1007/978-981-10-0197-0_11

instance, Gutiérrez et al. 2009).[1] This literature discards the traditional employment elasticity approach of analyzing the relationship between growth and employment (i.e. the percentage change in employment in response to 1 % change in output) because the latter says nothing about the changes in the structure of labour force. While contributing to this line of the literature, the present study uses Shapley decompositions to analyse the structural change in employment over the period from 1993–94 to 2011–12 and its contribution to economic growth in 16 major states with special reference to Punjab. By structural change in employment we mean inter-sectoral movement of labour.

The Indian economy has witnessed two different policy regimes since independence. The first policy regime which characterised the first 30 years of planning period, i.e. from 1950–51 to 1979–80 was associated with the "state-led growth model". The centerpiece of this model was the promotion of import-substitution-based industrialization with a particular emphasis placed on the basic and heavy industries. The public sector was assigned the commanding heights 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". Gradual reforms were introduced to de-regulate industries, foreign direct investment, technology transfers and imports. In the early 1990s, however sweeping reforms were introduced to assign the private sector commanding heights of the economy. It has come to be known as the "Liberalisation, Privatization and Globalization (LPG) regime". The present study focuses on the LPG regime and analyses the relationship between growth and structural change in employment across 16 major states for the period 1993–94 to 2011–12 with a special focus on Punjab. It also outlines the growth experience of 16 states in terms of GSDP and the changes in sectoral shares of GDP and investigates whether the structural change in employment is commensurate with that in GSDP.

The rest of the study is organized into three sections. Section 11.2 provides the theoretical underpinning for the analysis. Section 11.2 analyses economic growth and structural change in GSDP across 16 major states with a special reference to Punjab. It also focuses on employment growth and structural change in employment. Section 11.3 disentangles the relationship between growth and structural change in employment, and finally, Sect. 11.4 concludes the analysis and draws on policy implications.

11.2 Economic Growth and Structural Change in Employment: A Theoretical Framework

Economic growth in developing countries is intrinsically tied to dynamics of its production structures, which bring about growth through the expansion of value-added and employment in higher productivity sectors at the cost of lower

[1]See, Kucera and Roncolato (2012) and Aggarwal and Kumar (2012) for literature review.

productivity sectors. When labor and other resources move from less productive to more productive activities, the economy grows even if there is no productivity growth within sectors (Mcmillan and Rodrik 2011).[2] Structural change thus removes constraints from productivity growth. The primary sector is considered to be a low-productivity sector. Labour productivity gaps between different sectors are very large in developing countries. Typically, labour productivity in primary sector is relatively much lower than in non-primary sectors. Within non-primary sectors, manufacturing is typically more productive than services. It means that shifts from primary to non-primary sectors in particular manufacturing is growth enhancing. This type of structural change can also contribute significantly to poverty reduction by raising income levels of those absorbed in the more productive sectors. Moving out of the less productive sectors (generally primary sector) where poverty rates are often much higher to more productive sectors may also relieve some of the pressure put on agricultural productivity and have some direct poverty reducing effect through raising agricultural incomes. Such change in the structure of employment can have very large effects on poverty, as it may enable people to escape poverty traps. Economic growth accompanied by structural change in income and employment should therefore have positive effects on poverty reduction. Therefore, production structures should be the starting point for economic analysis and the design of appropriate policies.

It is instructed to note that the structural change in the economy (sectoral share of GDP) alone may not produce desired sectoral structure of employment. It may actually be associated with a rise in poverty unless it is matched by a desired structural change in employment. For instance, an expansion in the more productive sectors at the cost of the less productive sectors (in terms of value added) may result in a net reduction in employment. Where the displaced workers go can have an important impact on poverty outcomes. If it generates unemployment and informality, it can put downward pressure on wages. This in turn can have poverty enhancing effect in terms of both absolute and relative poverty. In an influential study McMillan and Rodrik (2011) show that since 1990 structural shifts in employment has been in favour of low productive sectors in Latin America and Africa. While in former the labour absorbing sectors have been non-tradable sectors such as personal and community services and wholesale and retail trade; in the latter, the employment share of relatively unproductive agriculture has increased significantly. In Asia on the other hand, there are indications of shift in the structural employment in favour of more productive sectors which is likely to have positive impact on poverty. Clearly, the structural change in GDP needs to be accompanied with critical expansion of the high-productivity sectors to have

[2]Timmer and Szirmai (2000) coined the term 'structural change bonus' for this (see also, Bosworth et al. 1995; Fagerberg and Verspagen 2002, 2007; Timmer and de Vries 2009). McMillan and Rodrik (2011) show that the bulk of growth in Asia and developing countries in Latin America and Africa can be explained by the contribution of structural change to overall labor productivity whereas the contribution of trend productivity growth to total productivity growth remains rather limited.

substantial impact on employment creation in these sectors. In so much as the labor market clears and higher productivity sectors have higher returns, this structural change in employment will ensure sustained growth and reduction in poverty. A large number of studies have appeared worldwide analysing structural change in employment as a mechanism of sustained growth (see for example, Islam 2004; Melamed et al. 2011; Mcmillan and Rodrik 2011; Naudé et al. 2014). The present study deals with the state-level analysis for the period 1993–94 to 2011–12.

11.2.1 Economic Growth and Structural Composition of GDP in Punjab

While analysing the trend rates of growth of State domestic product from 1993–04 to 2011–12 of Punjab vis-à-vis 15 other major States, data on aggregate and sectoral GDP at the state level are drawn from the Centre for Statistical Organization (CSO), Ministry of Statistics and Program Implementation sources. For analysing the growth patterns of Punjab in the LPG regime, we identify two sub-periods within this regime: 1993–94 to 2004–05 and 2004–05 to 2011–12. While acceleration in growth started from 1992–3, it was in the post 2003–04 periods that the economy witnessed unprecedented growth (Aggarwal and Kumar 2012). While the period of 1993–94 is termed as a "moderate growth phase", the period thereafter is referred to as "high growth phase" in the rest of the analysis.

11.2.1.1 Economic Growth

Punjab achieved remarkable growth since independence and emerged as one of the richest states of India in terms of per capita income in the 1960s. This growth and prosperity are primarily the result of Punjab's adoption of new technology in agriculture. Its cultivators were the first to adopt the Borlaug seed-fertilizer technology during the mid-1960s. This could be because during the post-independence period Punjab was helped by a large inflow of resources from the national government for both rehabilitation and infrastructure development. This enabled Punjab to make substantial investments in infrastructure mainly in irrigation, power and communication which in turn might have enabled farmers to adapt the HYV technology to local conditions and exploit it successfully. Whatever may be the reasons, the state has become a symbol of green revolution in India and rapid growth of agriculture has had a large impact on the entire economy. Between 1961–62 and 1990–91 Punjab was in the topmost quartile, and it tended to move further and further away from the national mean.

However, it could not sustain this momentum and started slipping after liberalisation. In 1993–94 it ranked third (after Maharashtra and Haryana) in terms of per capita income among major Indian states; its rank slipped to 7 by 2011–12.

Table 11.1 Growth in income per capita: Punjab vis-à-vis other states

States	GSDP per capita (Rs)				Average annual growth rate (%)			
	1993–94	Rank	2011–12	Rank	1993–2005	Rank	2005–2012	Rank
Punjab	**24,024**	**3**	**55,780**	**7**	**8**	**8**	**8.8**	**15**
Maharashtra	27,598	1	70,363	1	7.2	11	13.4	2
Haryana	26,883	2	69,043	2	9.2	5	12.4	4
Kerala	21,965	4	60,293	5	7.4	10	10.9	7
Orissa	20,615	5	31,737	11	6.4	12	9.7	12
Himachal Pradesh	18,333	6	61,051	4	12.9	2	10.6	9
Gujarat	17,805	7	66,548	3	14.6	1	13.7	1
Andhra Pradesh	17,460	8	47,297	9	7.8	9	11.5	5
Karnataka	17,374	9	47,629	8	9.4	4	10.3	10
Tamil Nadu	16,871	10	58,694	6	11.4	3	12.9	3
West Bengal	15,088	11	37,556	10	8.5	7	9	14
MP	14,772	12	28,663	13	5	16	11.1	6
Rajasthan	13,976	13	31,079	12	8.6	6	9.7	13
Assam	12,080	14	25,866	14	5.1	15	7.2	16
Uttar Pradesh	11,946	15	22,370	15	5.5	14	9.8	11
Bihar	9,037	16	18,056	16	5.8	13	10.6	8

Source Central Statistical Organisation

Table 11.1 presents the GSDP per capita of the 16 major states. The growth rate of the combined GSDP of all 16 states taken together increased from 7.9 % during 1993–05 to over 11 % during 2005–12. In the moderate growth phase, the GSDP varied from a low of 5.1 % per year for Madhya Pradesh to a high of 12.9 % in HP, which gives a ratio of 2.6 between the highest and the lowest. In the high growth phase, the growth rate accelerated in all the states except Himachal Pradesh. The GSDP variation had been from a low of 7.2 % per year for Assam to a high of 13.4 % for Tamil Nadu, contracting the ratio to 1.6. Interestingly In this scenario, Punjab also improved its growth rate from 8 to 8.8 %. But this rate of growth pulled it down from the 8th to 15th rank in terms of growth rate. Two states at the upper end of the spectrum (in terms of growth), namely Gujarat and Tamil Nadu maintained high growth rates and their ranking over time. The growth rate accelerated in Haryana, AP, Kerala, Maharashtra, Bihar, Madhya Pradesh and UP so much so that their rankings in terms of growth of GDP also improved significantly. Punjab, HP, Karnataka, Rajasthan, West Bengal and Assam on the other hand slipped in terms of the rate of growth.

In terms of GSDP per capita, Punjab along with Orissa lost their rankings drastically. On the other hand, Gujarat, HP and TN significantly improved their rankings over time. Change in the relative ranking of other states had been marginal. Of the 5 BIMARU states namely, Bihar, Madhya Pradesh, Rajasthan and UP, the first two accelerated their growth rates and improved their ranking but growth was not high enough to push their ranking in terms of GSDP per capita.

11.2.1.2 Structural Change in GDP

Figure 11.1 depicts GSDP shares of the three sectors: agriculture, industry and services for the period of 18 years from 1993–94 to 2011–12 for each state covered in the analysis. It is observed that in all the states, there had been a shift in the share of GSDP generated in the agricultural sector to other economic sectors namely industry and services. It may be seen that Punjab has been the leader in terms of structural change in the economy away from primary to non-primary sectors. The share of agriculture in GSDP has declined by 20 % over the past two decades in Punjab. Orissa is the only other state which almost equaled the performance of Punjab in this regard.

Figure 11.2 presents the share of each sector in total structural change where the latter is estimated using the index of 'Norm of Absolute Values' (NAV). It is one-half the sum of the absolute value of the sectoral share differences of each sector between the beginning and ending year of the period, and captures the amount of value added shares transferred from declining to growing sectors during the period (Dietrich 2009). It takes on a value of zero when no change occurs and 100 when 100 % of share is shifted from one group to another. It is represented by

$$\mathrm{NAV} = 1/2\left(\sum_i Y_{it} - Y_{ik}\right)$$

where NAV is the index of 'Norm of Absolute Values' (NAV), Y_{it} and Y_{ik} represent the share of ith sector in GSDP in time t and k, respectively where $t > k$.

It shows that the decline in the share of agriculture in total structural change varies between 40 and 50 % in almost all states including Punjab. However, there

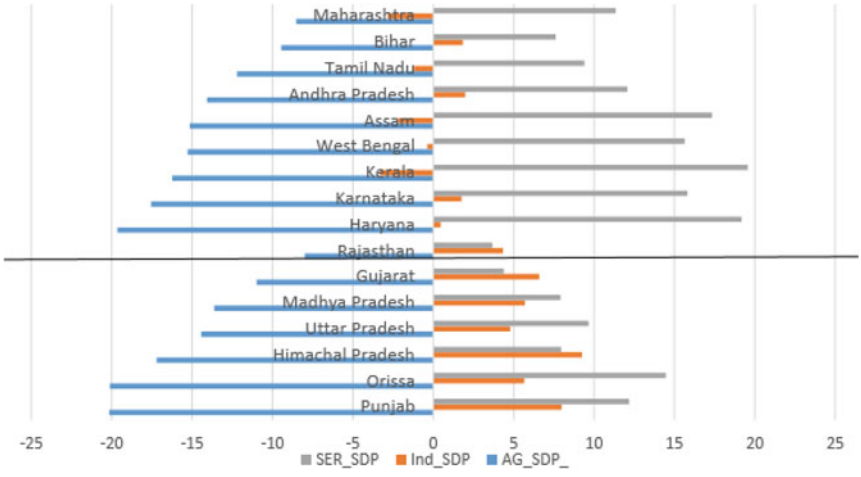

Fig. 11.1 Changes in the sectoral shares: 1993–94 to 2011–12 (*Source* Own calculations based on Central Statistical Organisation, Ministry of Statistical Planning and Implementation, India)

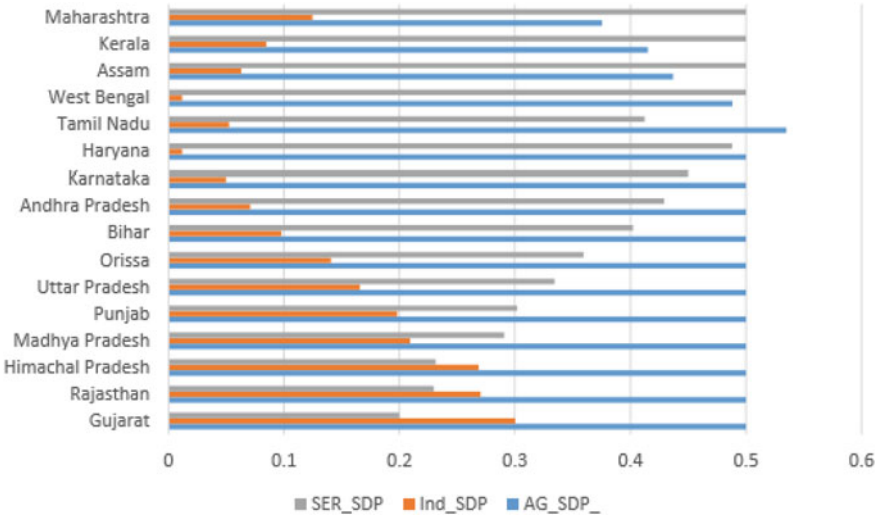

Fig. 11.2 Sectoral shares in structural change in income per capita: Punjab versus other states (*Source* Central Statistical Organisation)

are only six states where the share of non-agricultural shares was fairly distributed between industry and services. These are Gujarat, Rajasthan, HP, Punjab, MP and UP. Thus, Punjab witnessed a fairly balanced diversification of the economy. In 10 states structural shift in GSDP has been heavily biased in favour of services. In at least 5 states, the share of industry declined between 1993–94 and 2011–12 (Fig. 11.2). These are W. Bengal, Kerala, Maharashtra, Assam and Haryana. In the remaining 6 states, the share of both manufacturing and services rose but the former had been marginal.

Within industry, Punjab along with Gujarat has been the only state where both construction and manufacturing improved their shares. In Bihar, MP, TN, Karnataka and UP, it was the share of construction that rose significantly. In HP, Rajasthan and Orissa, manufacturing improved its share with that of construction remaining almost constant. In all other states, the composition of the industrial sector has remained fairly stagnant with no significant changes in the shares of manufacturing, construction, mining and utilities.

Within the service sector, there has been a clear trend of shifts towards transport and communication and business (including ICT) and financial services in most states. In Punjab, however all the service sectors witnessed expansion in their shares.

Clearly, Punjab emerges as one of the fastest diversifying economy in India. While it lagged behind in terms of growth acceleration (despite increase in the rate of growth) and hence slipped in relative ranking among Indian states, it emerged as a leader in terms of structural shifts in the composition of GDP. The share of agriculture declined sharply while that of the industry and services increased. Within industry the share of both manufacturing and construction grew while that

of utilities declined marginally. Within services, the share of all the sub-sectors increased. The distribution of structural change outside of agriculture is most highly diversified for Punjab among 16 states.

11.2.2 Employment Growth

Data on employment and labour force comes from three rounds of the National Sample Survey (NSS), 1993–94, and 2004–05; and the latest round of 2011–12 to cover the LPG regime.

11.2.2.1 Employment Growth

Figure 11.3 presents employment statistics based on the quinquennial NSS Rounds undertaken since 1993–94. The UPSS-based worker population (WPRs), labour participation and unemployment rates have been applied to the population census data to arrive at the levels of work- 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 population estimates are as on 1st March of the relevant round.

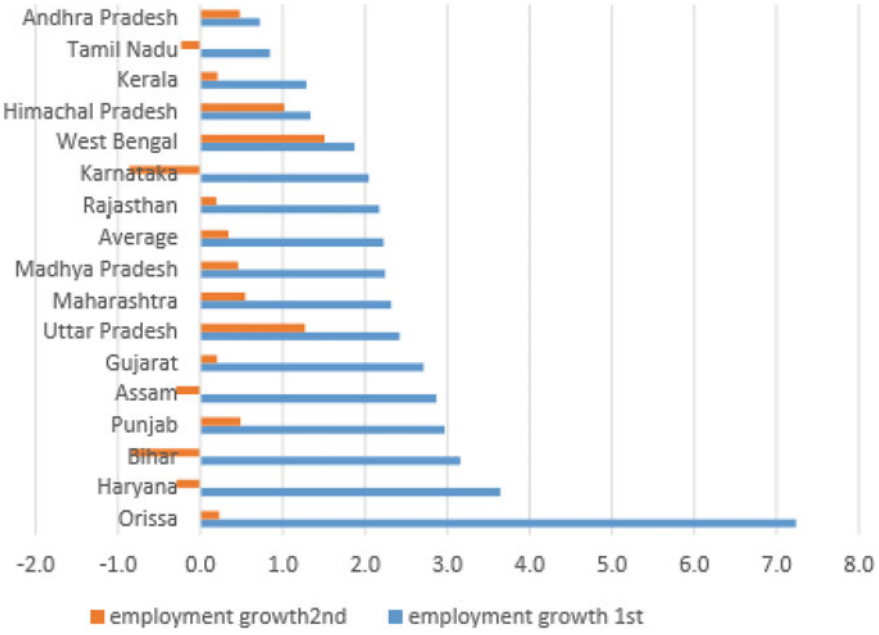

Fig. 11.3 Employment growth rates: Punjab versus other states (*Source* Authors calculations based on NSS rounds)

It may be observed that in the first phase of moderate growth, employment grew at a compound annual rate of above 2.2 % per annum for the 16 major states combined. In the high growth phase of 2004–05 to 2011–12, the employment growth rate declined to 0.5 %.

The employment growth rate declined in all the states with no exception. In Punjab, employment grew at the above average rate of 3 % in the first phase; it declined to 0.5 % in the second phase. This means the decline of 2.5 % point in the employment growth rate. The states which witnessed more pronounced fall in employment growth rate are: Orissa, Haryana, Bihar, Assam and Karnataka. This means that Punjab has been among the top six states where decline in employment growth has been the most pronounced. However, it is encouraging that the employment growth still remained positive and slightly above the average of the 16 major states covered under the study.

11.2.2.2 Structural Change in Employment

Table 11.2 shows that the composition of employment has changed markedly over the past two decades in Punjab. In the early 1990s, 51 % of the workers worked in the agricultural sector of the economy; another 17 % were employed in the secondary sector consisting of mining, manufacturing, electricity, water and gas, and construction; and about 31 % were employed in services. Over time as the economy developed the share of agriculture declined to 36 % while that of industry increased to 31 %. Interestingly, the share of services increased marginally to 32 %. The rising importance of non-primary sectors in employment and the relative decline of

Table 11.2 Employment growth by sector: Punjab versus other major states (%)

	Growth rate between 1993–94 and 2011–12		Share in 1993–94		Share in 2011–12	
	Punjab	15 major states combined	Punjab	15 major states combined	Punjab	15 major states combined
Agriculture	−0.088	0.04	50.8	63.0	36.5	49.8
Mining	–	−1.41	0.0	0.8	0.0	0.5
Manufacturing	5.778	2.81	11.3	10.6	16.8	12.5
Utilities	1.837	2.10	1.6	0.4	1.5	0.5
Construction	15.810	15.87	4.7	3.5	13.2	10.6
Trade and hotels	1.759	4.21	11.8	7.8	11.3	10.8
Transport and communication	3.146	3.69	4.2	3.1	4.8	4.0
Financial and business services	8.712	6.91	1.2	1.0	2.2	1.8
Community services	1.665	1.39	14.5	9.8	13.7	9.6
Overall	2.063	1.52	100.0	0.0	100.0	0.0

Source NSS Rounds 1993–94 and 2011–12

primary sector is a natural consequence of economic growth, an experience shared by most other states. However, it is interesting to note that in Punjab almost entire labour force released from agriculture was absorbed in the secondary sector. The service sector employment remained almost stable. In 15 states combined, the share of services also grew though marginally.

Further, within the secondary sector (Fig. 11.4), construction has emerged as a major absorber of employment. Its share in total employment increased from 4.7 % in 1993–94 to 13.2 % by 2011–12. This experience was shared by most other states. However, unlike most other states, in Punjab manufacturing also increased its share substantially by 6 % points from almost 11 to 17 %.

Finally, within services, financial services recorded an impressive growth in Punjab, a pattern that is shared by other states as well (Fig. 11.5). This was followed by transport and communication. Other sectors showed only marginal changes. For the combined 15 states, increase in employment share was recorded in all the services except community services. In Punjab, however financial services, and transport and communication recorded a marginal increase in employment shares which was almost offset by the declining share of other services. Overall, the share of services in employment remained almost stable.

In sum, while GDP growth is highly diversified across sectors in Punjab, employment was created essentially in construction and manufacturing. However, as a result of the structural change, the Punjab economy which was least diversified in 1993–94 improved its diversification index significantly both in employment and GSDP. GSDP has been more diversified than employment but the gap is reducing. Overall, while inter-sectoral changes have been taking place in 16 major economies of the country, Punjab emerges as a leader in particular in employment diversification (Fig. 11.6).

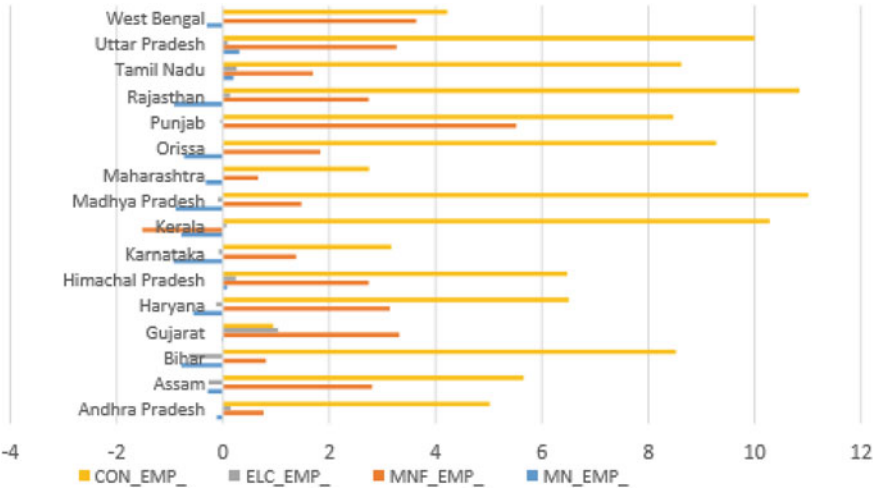

Fig. 11.4 Structural change in industry employment: Punjab versus other major states (*Source* NSS Rounds 1993–94 and 2011–12)

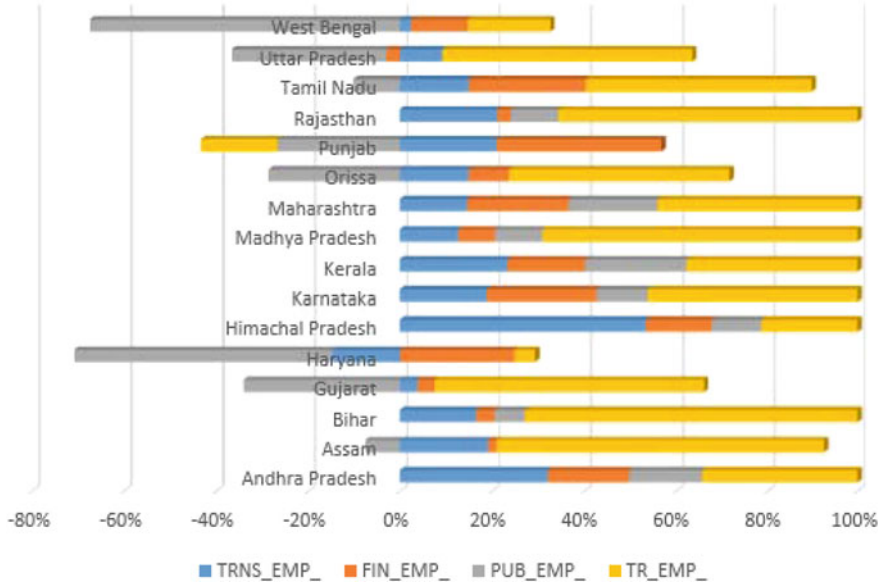

Fig. 11.5 Structural change in service employment: Punjab versus other major states (*Source* NSS Rounds 1993–94 and 2011–12)

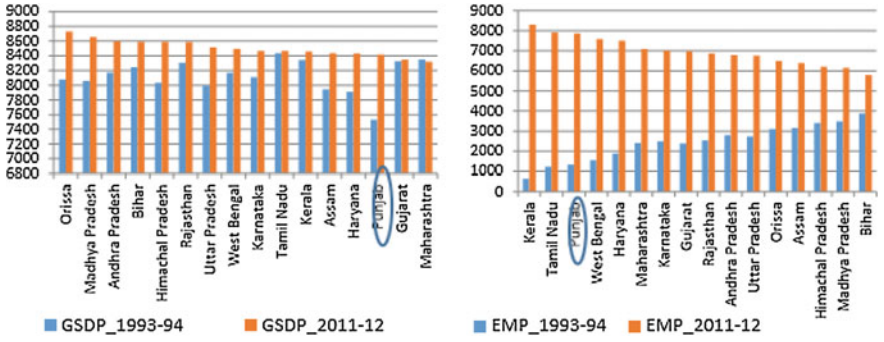

Fig. 11.6 Diversification index of GSDP and employment: Punjab versus other major states (*Source* Central Statistical organisation and National Sample Surveys)

11.3 Decomposition: Understanding the Employment Profile of Growth

11.3.1 The Methodology

To understand how growth has been 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

$$\frac{Y}{N} = \frac{Y}{E} * \frac{E}{N}. \tag{11.1}$$

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 labour productivity or labour productivity, and 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

$$\frac{E}{N} = \frac{E}{L} * \frac{L}{N}. \tag{11.2}$$

In (11.2) 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:

$$\frac{Y}{N} = \frac{Y}{E} * \frac{E}{L} * \frac{L}{N}. \tag{11.3}$$

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

$$\Delta y = \bar{\omega} * \Delta y + \bar{e} * \Delta y + \bar{a} * \Delta y \tag{11.4}$$

while $\omega * \Delta y$ represents growth linked to productivity change, $e * \Delta y + a * \Delta y$ is the employment effect on growth. $\omega * \Delta y$ will reflect the amount of growth that would be consistent with a scenario in which labour productivity, 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

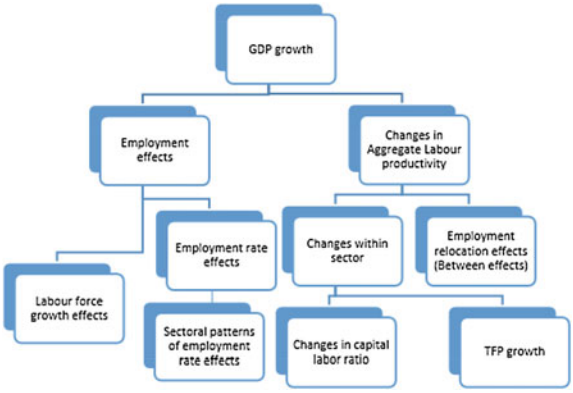

Fig. 11.7 Decomposition of GDP per capita (*Source* Author's conceptualization based on the Shapley decomposition)

labour productivity 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.

Each component of Eq. 11.4 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 Fig. 11.7.

11.3.2 Employment and Growth: Decomposition Results

11.3.2.1 Decomposition of Growth in Per Capita Income

Figure 11.8 shows results for the Shapley decomposition of per capita growth into two main components: one, growth linked to labour productivity; two, growth linked to employment changes at the aggregate level. It shows that the labour productivity has been the dominant driver of growth per capita value added across all the states. However, its contribution to growth has varied across states. It varied between as high as over 200 % for Orissa to 78 % for Punjab. Interestingly Punjab had the lowest contribution of labour productivity to its growth in the moderate growth phase of 1993–94 to 2004–05 among 16 Indian states. On the other hand, employment contributed 27 % point to growth which was the highest among 16 states. In the high growth period of 2005–12, the contribution of labour productivity to growth increased significantly for all the states including Punjab. Punjab improved its relative ranking also. On the other hand, the employment effect turned

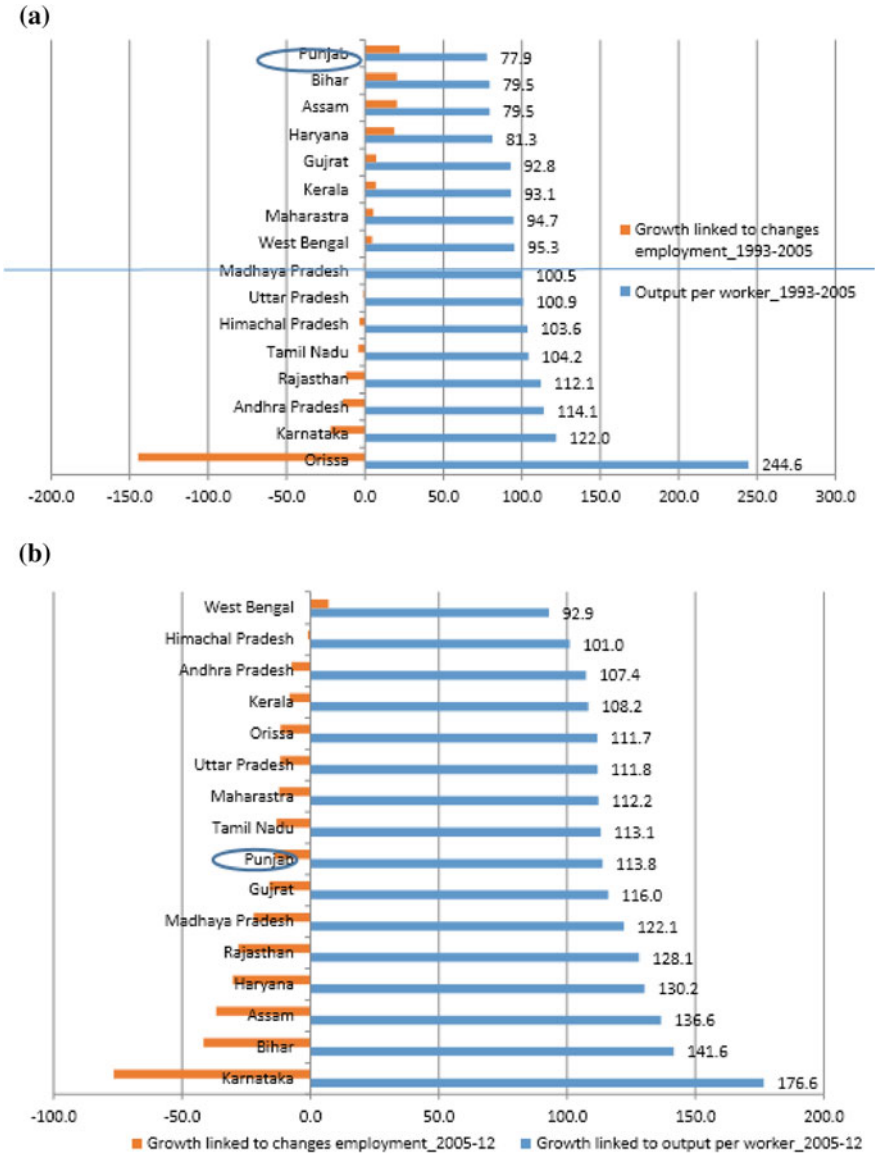

Fig. 11.8 Decomposition of growth in per capita value added: **a** 1993–05 and **b** 2005–12 (*Source* NSS surveys and Central Statistical Organisation)

negative. Punjab was not alone. The employment induced effects turned out to be negative in all the states with the only exception of West Bengal during this phase. Clearly, the growth-employment (work-force) link weakened with increasing liberalisation of the economy. This substantiates our earlier findings.

11.3.2.2 Decomposition of Labour Productivity

To further explore the employment-growth link, we decomposed the employment effect into: employment rate effect and labour force effect in Fig. 11.9. It may be seen that a large positive labour force effect was instrumental in a positive employment effect in Punjab during 1993–05. This experience was shared by most other states during this period with the only exception of Assam, Bihar, and Madhya Pradesh and to some extent Gujarat. As the growth accelerated in the post 2005 period, the employment rate effect became positive along with a few other states, namely Kerala, Orissa, Andhra Pradesh, Himachal Pradesh, Gujarat and Maharashtra. However, as it happened in all other states, the negative labour force effect more than offset the positive employment rate effect leaving the overall employment effect negative. West Bengal remains the only exception where both employment rate and labour force effect remain positive during the high growth period.

11.3.2.3 Decomposition of the Employment Effect

Theoretically, during the low income growth phases, labour force is likely to expand as more and more people; in particular, females enter the work force to earn livelihood. This is because at low levels of income, survival instincts dictate that the women work gainfully. As income increases, women feel less pressured to work and therefore withdraw from the workplace. 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 LFPR and the level of development (Boserup 1970). Our analysis shows that in India, the female participation rates have exhibited a tendency to decline since the early 1980s affecting the labour force participation rates. This is manifested in the contracting labour force effect.

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

Labour productivity is decomposed into two components.

$$\Delta \frac{Y}{E} = \sum i \Delta \Theta_{it}\, y_{it} + \sum i \Delta y_{it}.\Theta_{it}, \Theta_{i,t-k}$$

Y/E refers to aggregate labour productivity, y is sectoral labour productivity, θ is employment share, Δ is the first-difference operator, i indexes sectors, $t - k$ and t stand for initial and final years. The first term in the decomposition is the weighted sum of productivity growth within individual sectors, where the weights are the employment share of each sector at the beginning of the time period. This is termed as the 'within' component of productivity growth. The second term captures the productivity effect of labor relocation across different sectors. It is essentially the

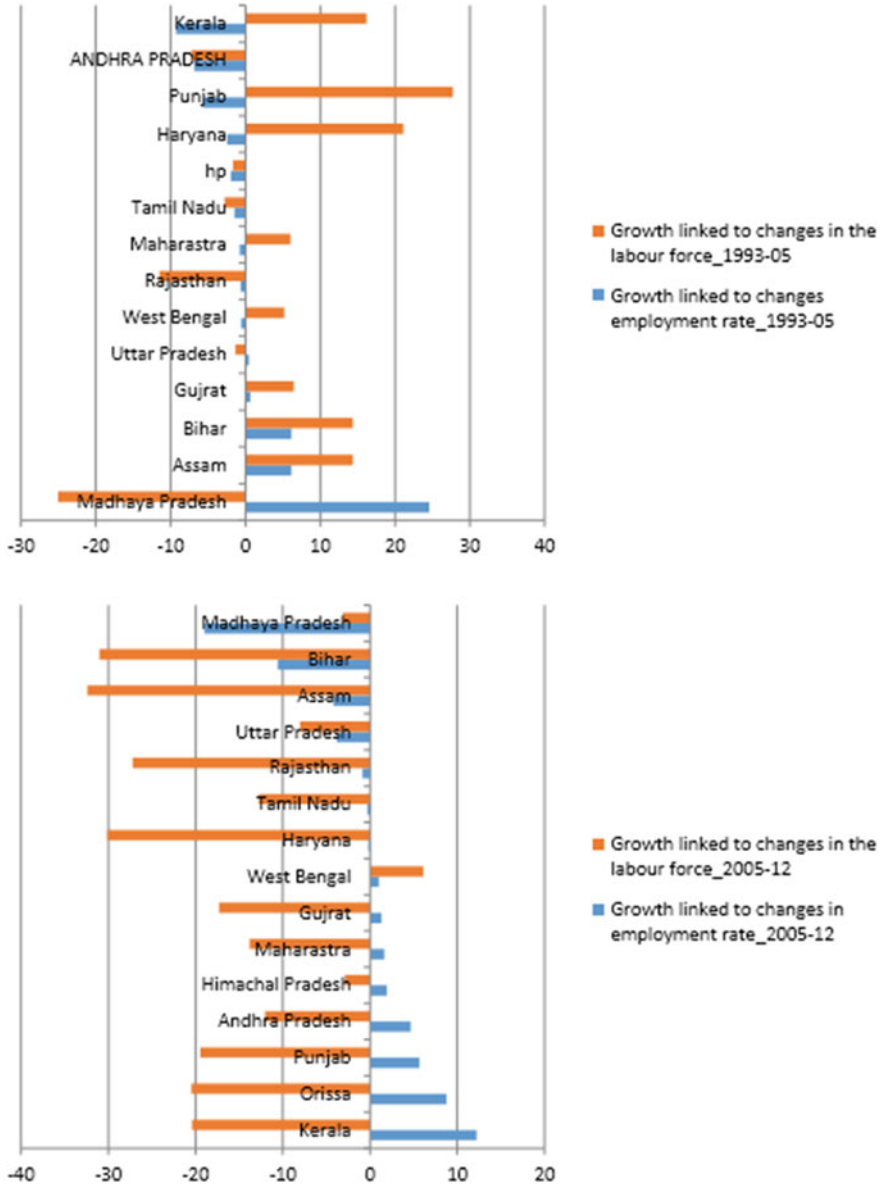

Fig. 11.9 Decomposition of the employment effect: **a** 1993–05 and **b** 2005–2012 (*Source* Author's calculations based on the NSS data)

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 11.10 presents decomposition results of the productivity effects. It may be observed that intra-sectoral productivity dominated the productivity effects in Punjab in both the periods. Interestingly its contribution to total labour productivity also remained at over 91 %. However, Punjab's relative ranking changed as the inter-sectoral productivity effects declined in other many states. It is a manifestation of retrogression in the inter-temporal movement of labour in other states vis-à-vis Punjab. In Punjab, that inter-sectoral shifts in labour continued to have positive effect on GSDP per capita. This implies that labour released from agriculture is being absorbed by higher productivity sectors in particular manufacturing.

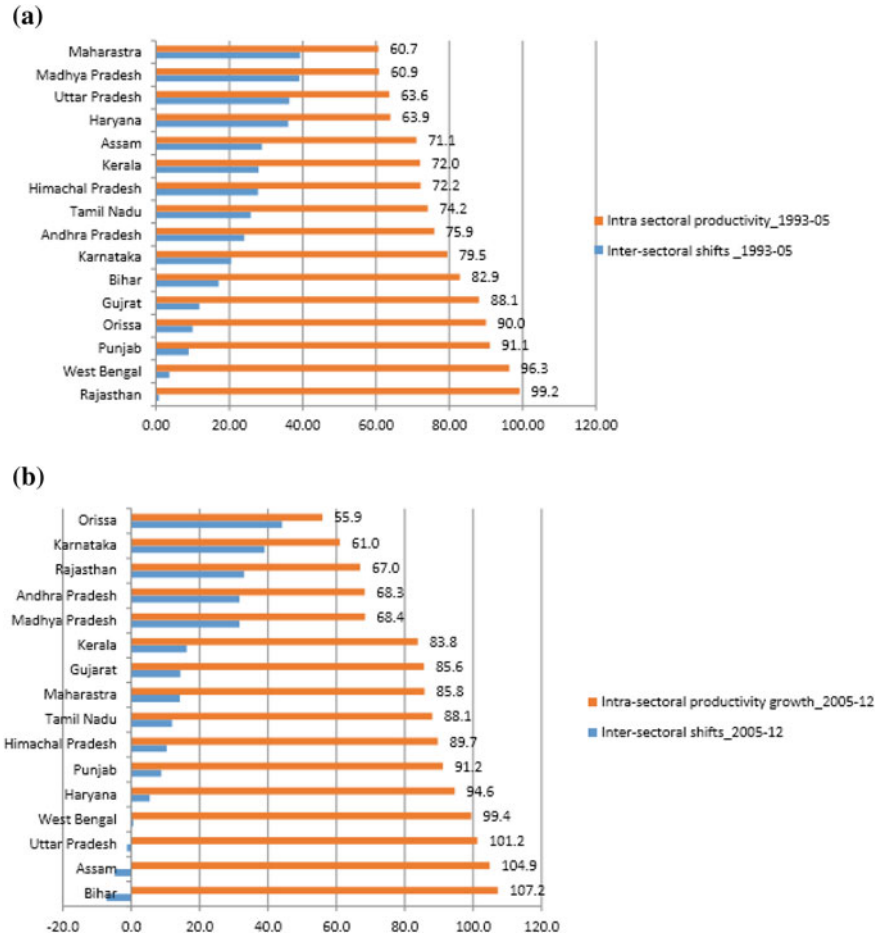

Fig. 11.10 Decomposition of productivity effect: **a** 1993–05, **b** 2005–12 (*Source* Author's estimates based on NSS data)

Table 11.3 Decomposition of labour productivity into intra- and inter-sectoral

Sector	Change in employment share (% points)	Inter-sectoral productivity 1993–05	Intra-productivity 1993–05	Change in employment share (% points)	Inter-sectoral productivity 2005–12	Intra-productivity 2005–12
Agriculture	−0.07	46.8	25.1	−0.076	63.5	19.2
Mining	0	0.0	0.0	0.000	0.0	0.0
Manufacturing	0.023	13.7	9.4	0.032	13.3	22.5
Utilities	−0	−12.4	5.2	0.003	6.9	1.1
Construction	0.026	−8.5	5.9	0.059	−48.9	−1.1
Trade and hotels	0.029	−18.0	14.5	−0.034	3.0	20.4
Transport and communication	0.021	−7.6	10.2	−0.015	−10.3	13.1
Business service	0.005	98.8	3.1	0.005	62.3	13.0
Community services	−0.03	−12.8	26.5	0.026	10.1	11.9
Total		100.0	100.0		100.0	100.0

Source Author's estimates based on NSS and CSO data

11.3.2.4 Decomposition of Inter-and Intra-Sectoral Productivity Effects by Sector

Inter-sectoral productivity effects: Table 11.3 shows that the shift in employment from agriculture to other sectors has a productivity enhancing effect. It has enhanced the productivity of agriculture itself. Shifts of labour in favour of construction have also been negatively related with productivity growth. A massive increase in construction employment has had a negative effect on GDP per capita growth. Government initiated programmes which create employment opportunity in this sector appear to have a negative effect on productivity and hence growth and poverty. Apparently, a shift of labour from agriculture to construction will have dampening effects on productivity growth in the Punjab economy.

Trade is another sector which appears to be a low-productivity sector in Punjab. A shift in employment away from this sector too seems to have productivity enhancing effects in Punjab. In all other sectors employment rate changes are positively related with productivity growth. As a matter fact, any shift of labour from agriculture to manufacturing and finance and business services can result into substantial increase in productivity in Punjab.[3]

Intra-sectoral productivity growth: In the first period, productivity growth was essentially concentrated in agriculture, trade and community services; it was diversified in the second period. Thus manufacturing, transport and communication, and financial services also made substantial contribution to productivity growth in the second period. The economy seems to be moving to higher value addition activities in these sectors. Enhanced within—sector productivity in agriculture is notable in the context of Punjab.

11.4 Conclusions

In the 1990s, sweeping reforms were introduced in the Indian economy. However, the growth impact of these reforms in the 1990s was moderate. It was the period of 2004–5 to 2011–2012 which witnessed unprecedented growth in the Indian economy. Our state-level analysis indicates that almost all the states contributed to this growth experience. Punjab was no exception but its growth was outpaced by other states pushing its relative ranking down in terms of GSDP per capita. The employment growth was not impressive either, in a comparative framework.

However, Punjab economy witnessed unprecedented structural change in GSDP and employment. The share of agriculture declined significantly by 20 % point in GSDP and 14 % point in employment. While the decline in the share of agricultural GSDP was offset by a diversified incremental changes in other sectoral shares, that in agricultural employment was absorbed essentially in manufacturing and

[3]As a matter of fact, this is noticed in most states with a few exceptions.

construction. Increasing share of manufacturing has been a notable feature of the economy which it shares with Gujarat, Rajasthan, and Himachal Pradesh. More importantly, these changes resulted into a well diversified structure of GSDP and employment in Punjab in a comparative framework of 16 states.

Economic diversification has paid off in terms of productivity and economic growth gains in the economy. Both inter- and intra-sectoral productivity effects have contributed to the productivity effects of growth. Inter-sectoral productivity has been complemented by intra-sectoral productivity in most sectors. In general, intra-sectoral productivity has increased in all the sectors except construction. Inter-sectoral productivity has also been positive through all the sectors except construction indicating that labour relocation in favour of construction has had productivity–reducing effects. The social programmes on employment creation that focus on construction sector may have growth reducing effects. It may be noted, however that shifts of labour away from agriculture and trade and hotels has had productivity enhancing effects.

Labour can be limited in its ability to move between sectors due to adjustment costs as it moves across the economy. Costs are associated with acquiring new skills and qualifications, relocation and finding new employment. Sometimes, displaced workers take on lower paid jobs as they move across sectors, particularly if the cost of vertical movement is high. Well-designed labour market policies can facilitate adjustment by reducing the costs of labour mobility across occupations. This requires improved access to quality education and training. Education is often a crucial precondition for adjustment of labor market towards more profitable economic activities. Further, the state needs to make a transition to entrepreneurial economy which is driven by entrepreneurship and innovation. Finally, there is a need to conceptualize new models of labour management systems to address labour market rigidities. The state needs to introduce a system that combines flexibility in labor market with income security of workers and assistance in their retraining and relocation.

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