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Can Industry be the Key to Pro-poor Growth? An Exploratory Analysis for India

Arup Mitra

December 2013

DWT for South Asia and Country Office for India

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Preface

The International Labour Organization (ILO) is devoted to advancing opportunities for women and men to obtain decent and productive work. It aims to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue in handling work-related issues. As countries in the Asia and the Pacific region continue to recover from the global economic crisis, the ILO's Decent Work Agenda and the Global Jobs Pact provide critical policy frameworks to strengthen the foundations for a more inclusive and sustainable future.

This study by Prof. Arup Mitra is an important input into the discourse on the situation of the Indian manufacturing sector. Given the important role industry should play in the development process, there has been a long-running debate about the failure for manufacturing in India to take up a larger role in not just the growth story, but more importantly in job creation. The challenge is, therefore, to ensure that the sector can create more productive jobs that are accessible for men and women across India, which, in turn, will promote a more inclusive growth path. In this context, this research by Prof. Mitra goes a long way to understanding the current situation and prospects for different segments of the manufacturing sector.

This paper is part of the ILO Asia-Pacific Working Paper Series, which is intended to enhance the body of knowledge, stimulate discussion and encourage knowledge sharing and further research for the promotion of decent work in Asia and the Pacific.

Tine Staermose

Director, ILO DWT for South Asia and
Country Office for India

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Executive summary

The gross value added growth rate in India continued to be a little above 9 per cent per annum from 1998–99 to 2007–08. However, the employment growth rate, compared to the 1990s (prior to 1998–99), decelerated marginally to 2.6 per cent per annum, more so in the case of employees (other than workers). Labour productivity, defined as the value added per person employed, grew at almost 7 per cent per annum. Wages per worker remained almost stagnant while the remuneration per person shot up significantly, implying a substantial growth in the salaries per employee (excluding workers). Industries, which dominated in terms of employment share, did not necessarily generate a fast employment growth. There is a strong positive correlation between the average value added growth and total employment growth measured across all the three-digit manufacturing groups, implying growth is essential for employment generation.

For the aggregate manufacturing sector, the elasticity of total employment with respect to value added is 0.43. Industries, which recorded an employment elasticity of up to 0.4 are many, though only a handful of them had an employment elasticity of more than 0.55. These industries may be targeted for providing a boost to employment growth but given their modest share it is unlikely that they will succeed in raising the overall employment growth of the manufacturing sector in a significant manner as specified in the National Manufacturing Policy.

Since wages do not constitute a large component of the total cost a more careful analysis has to be pursued to identify what restricts industrial expansion and employment creation rather than simply blaming the labour laws. Mechanisms to initiate flexibility are already in motion even without labour market deregulation being carried out formally. Labour laws alone cannot be held responsible for sluggish employment growth: the unorganized manufacturing to which the labour laws are not applicable has been shrinking in relation to overall employment generation.

Regarding inter-industry linkages we may conclude that industrial deceleration in the heavy goods sector can reduce the input demanded from both labour- and capital-intensive sub-sectors. Thus, growth and employment in labour-intensive sub-sectors may suffer, which in turn may affect adversely the overall employment growth in the manufacturing sector. This may also have spill-over (negative) effects on the rest of the economy, the pace of employment generation and the effectiveness of the industrial sector in reducing poverty.

The index representing the difference between the skill level of the population and the workers is estimated at 73.11. In other words, the difference between the skill levels of the potential labour supply and those already working is sizeable. The inter-temporal skill mismatch index, as estimated from the distribution of workers in each of the activities across various skill levels, is again substantial, indicating that over time jobs in manufacturing are becoming more skill-biased. In the earnings function, higher returns to education are evident. Thus, those who are able to acquire skills are able to secure employment with higher levels of

earnings as demand exists for the skilled variety of labour due to rise in skill intensity of technology in the manufacturing sector.

Finally, the policy issues are highlighted in terms of (a) priority to be given to industries that can contribute to employment growth and (b) skill formation for improving the employability of the available labour force.

About the author

Arup Mitra is Professor of Economics, Institute of Economic Growth, Delhi. His research interest encompasses urban development, labour and welfare, industrial productivity and growth and gender disparities. He has written four books and more than hundred papers in various academic journals and edited volumes. His latest book *Insights into Inclusive Growth, Employment and Wellbeing in India* published by Springer covers a wide range of issues in development.

Abbreviations

ASI	Annual Survey of Industries
CPI	Consumer Price Index
CSO	Central Statistical Organisation
DIPP	Department of Industrial Policy and Promotion
DME	Directory Manufacturing Enterprises
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
ILO	International Labour Organization
NMIZs	National Manufacturing Investment Zones
NSQF	National Skills Qualification Framework
NDME	Non-directory Manufacturing Enterprise
NIC	National Industrial Classification
NSDC	National Skill Development Corporation
NSS	National Sample Survey
NSSO	National Sample Survey Organisation
OAME	Own Account Manufacturing Enterprise
OECD	Organisation for Economic Co-operation and Development
UNIDO	United Nations Industrial Development Organization
WPI	Wholesale Price Index

1. Introduction

India emancipated itself from the prolonged phase of conservative Hindu rate of growth almost a quarter century ago. However, given the vast labour supplies relative to demand, particularly for those who are less skilled and poorly endowed with human capital, the rate of growth of employment has been sluggish. More specifically, whether economic growth is able to generate employment opportunities on a large scale, especially for the unskilled, semi-skilled and the less-educated labour force, is an important question that has been bothering development economists for a while. Secondly, what impact the economic reforms in various sectors have made on the employment front is another important aspect that needs a thorough investigation. Accordingly a future strategy has to be developed, and sectors and policies that hold potentiality and prospects for employment growth need to be identified. After all, for economic growth to be inclusive or pro-poor, productive employment generation has to take place in a significant way.

It has been widely noted that growth alone is not sufficient to bring about any major improvement in economic and social well-being, particularly of those who are located at the lower echelons of the socio-economic ladder. Rapid growth in productive employment opportunities can distribute the benefits of growth among those who are deprived. In other words, employment growth at wages higher than the minimum subsistence level of consumption is crucial for poverty reduction and also to create a stable society that would be free from social turmoil and insurgency.

From the historical experience of the present-day developed nations we note that one important determinant of economic growth is industrialization. The role of industry is crucial in generating high-productivity employment and enhancing the standard of living of the population. In the process of development there takes place a structural shift, in both the value added and workforce composition, away from the primary sector, first towards the secondary and later towards the tertiary sector. This structural change is accompanied not only by a rise in per capita income but also an improvement in many other development indicators. It involves upward mobility of individual occupations and incomes and a shift in the rural–urban composition of the population (Kuznets, 1966). However, in the Indian context, the share of manufacturing in the total workforce has been dwindling at a low level of 11 per cent or so even after experiencing rapid economic growth in the last several years.

Szirmai and Verspagen (2011) in the context of developing countries point out that manufacturing since 1990 is becoming a more difficult route to growth than before. They also find interesting interaction effects of manufacturing with education and income gaps. Dellas and Koubi (2001) argue that the industrialization of labour is the main engine of growth during the early stages of economic development. Often equipment investment has played a less important role than non-equipment investment. Besides, it has proved growth enhancing when it either encountered a substantial industrial labour force or fostered a large increase in the share of industrial employment. These findings draw attention to the effects of investment on the composition of the labour force and, unlike recent claims emphasizing industrialization via equipment investment, suggest that employment industrialization policies may hold the key to success in developing countries.

The most important factor which aggravates the mismatch between the demand for and supply of labour is the sluggish employment growth in the high-productivity industrial sector. This could be due to the limited spread of the industry and/or the adoption of capital-intensive technology, leading to residual absorption of labour in the low-productivity informal sector with meagre earnings accruing to the workers and compelling them to reside in slums and squatter settlements. Globalization has compelled countries to enhance growth. Several growth-oriented strategies, which include trade

openness, foreign direct investment (FDI) inflows and capital mobility, including technology transfer, have been adopted in a significant way. The argument, which is usually given in favour of technology transfer, is that the wheel that has already been adopted need not have to be rediscovered if countries seek to be cost-efficient.[1] However, one important hypothesis in the context of sluggish employment growth in the industrial sector relates to the acquisition of capital-intensive technology imported from abroad.[2] The import of new technology, which is primarily capital-intensive and skill-intensive, results in increased demand for skilled workers and not for the less skilled ones (Wood, 1997).[3]

Another line of argument is based on labour market regulations. The policy circle usually believes that labour laws in the Indian context are extremely outdated and pro-employee which in turn tends to reduce labour absorption. Due to the lack of labour market flexibility, it is believed that economic growth and employment generation cannot receive an impetus in a sustainable manner. The advocates of economic reforms lay considerable emphasis on labour market deregulations. This is because globalization and shifts in production activities are expected have an impact on labour market outcomes such as wages and labour productivity. Secondly, and more importantly, for other reforms, in the area of trade for example, to be successful, labour market reforms are considered as essential prerequisites (Hasan, 2003). Scholars generally are of the opinion that labour markets in developing countries are rigid in terms of work practices, wages, hiring and firing policies, etc., and all this is attributed to the existing labour laws (Fallon and Lucas, 1991).[4] However, there are many other factors that affect investment, most notably, access to land, infrastructure and skilled workforce, among others.

A third line of argument, particularly from the supply side, refers to skill shortage, pointing to the poor employability of the vast sections of the labour force. The lack of skill forces many to get residually absorbed in low-productivity activities.[5]

This study focuses on the manufacturing sector in the Indian context. Though both components – organized and unorganized[6] – have been looked into, the emphasis is on the employment aspect of the organized manufacturing group so as to identify the sub-sectors which have the potentiality to grow and generate productive employment opportunities. Since the unorganized segment is often

[1] It is argued that countries further from the frontier have lower research and development (R&D) returns, implying that the cost of innovation is more in a poor country than in a rich country. Hence, it is still cheaper for a latecomer to buy the technology already invented by others than to reinvent the wheel, though it is widely noted that international technology does not come cheap (UNIDO, 2005).

[2] Research for various Latin American countries is indicative of the widening impact of trade on wage inequality and, more importantly, this is spearheaded by the notion of skill-biased technological change induced through trade (Hasan, 2003).

[3] Hasan and Mitra (2003) noted that trade is enhancing rapidly the premium attached to skills in developing countries due to the skill-biased production technologies embodied in imported inputs. Globalization raises capital flows from developed to developing countries, which means that even without technology imports, capital-output ratios in developing countries would rise and, given the complementary relationship between capital and skills, this would raise the relative demand for skilled labour (Mayer, 2000). Johanson (2004) argues that it is not possible to disentangle the interlinked factors responsible for changes in skill demands, but at least three main forces are at work in increasing the demand for skills worldwide—technological change, changes in work organization and trade openness. Rodrik (1997) further argued that trade, while generating more employment opportunities, may also diminish the bargaining power of workers, thus resulting in the deterioration of working conditions.

[4] The World Bank report on "Doing Business" in 2005 estimated that India is ranked 48th in terms of the "Rigidity in Employment Index" compared to China's rank of 30.

[5] See *The Times of India*, 22 April 2013.

[6] The organized manufacturing sector includes units that engage more than 20 workers irrespective of use of power and units, with 10 to 19 workers using power. The size of the organized segment in the manufacturing sector is around 60 per cent in terms of value added. We do not report the relative size in terms of employment because the definition of worker in the organized sector as given by the Annual Survey of Industries (ASI) and that given by the National Sample Survey Organisation (NSSO) for unorganized manufacturing are not comparable. The NSSO uses a very liberal definition of "worker" so as to include those who have been attached to the unit.

characterized by low productivity, generating meagre earnings, the policy focus has to be on reducing the vulnerability of these units. This paper is organized as follows. In the next section we briefly review some of the existing studies on manufacturing employment. Section 3 presents an empirical analysis of the organized manufacturing sector at a fairly detailed level of three-digit groups of industries. It analyses growth, employment, productivity and the capital–labour ratio across various industry groups. Remunerations to workers and the contractualization process are discussed against the backdrop of labour market regulation issues. Section 4 focuses on the unorganized manufacturing component. The inter-industry linkages are considered in section 5 using the input–output framework. Section 6 examines issues relating to skill shortage and the poor employability of the workforce. Finally, section 7 summarizes the major findings. The database of the study is drawn from three major sources: ASI on the organized manufacturing sector, National Sample Survey (NSS) data on unorganized manufacturing and the NSS data on employment–unemployment in order to throw light on skill issues.

2. Review of select studies

Industry's role as the engine of growth has been highlighted in the literature primarily because industry is expected to sustain growth and also contribute to the growth of other sectors, thus raising the overall output of the economy. Kaldor (1967) rationalized the structural transformation away from agriculture towards industry mainly in terms of growth in productivity in the latter. Several others have, however, argued in recent years that services can provide an alternative to manufacturing as a driver of economic growth based on India's development path (i.e. rapid growth of information technology [IT] and business process outsourcing). Dasgupta and Singh (2005) argue that the rapid expansion of the services sector in India has had an impact on the manufacturing sector as well.

In the context of employment generation, the displaced labour (without much skill) from the agriculture sector are expected to get absorbed in the industrial sector as there can be a susbstantial labour demand resulting from rapid industrialization. More importantly, there may not be a sizeable mismatch in terms of quality between labour available and labour required in the industrial sector though it can be a serious problem for the services sector. However, the observed outcomes have not been in line with the supposed result. In a large number of developing countries, the relative size of the industrial sector, both in terms of gross domestic product (GDP) and more so in terms of workforce, has remained negligible. Even if its income share has risen to some extent, the employment generating capacity of the industrial sector has remained insignificant because of the adoption of capital-intensive technology. Given ahead is a detailed review of some of the studies for India and other countries.

Kannan and Raveendran (2009) analysed organized industrial employment from 1981–82 to 2004–05 in India. For the period as a whole, as well as for two separate periods – the pre- and post-reform phases – the picture that emerges is termed by the authors as one of "jobless growth". Due to the combined effect of the two trends, which have cancelled each other out, no employment gain is perceived. One set of industries was characterized by employment-creating growth while another set by employment-displacing growth. Also, over this period, there has been acceleration in capital intensification at the expense of employment creation. A significant part of the resultant increase in labour productivity was retained by the employers as the product wage did not increase in proportion to output growth. The workers as a class thus lost in terms of both additional employment and real wages. The study by Das and Kalita (2009a) attempts to address the issue of declining labour intensity in India's organized manufacturing sector, particularly in the labour-intensive sectors. Using primary survey data covering 252 labour-intensive manufacturing–exporting firms across five sectors – apparel, leather, gems and jewellery, sports and bicycles – for the year 2005–06, the authors discern

the factors which constrain the generation of employment in labour-intensive firms. Several constraints that arise in the path of employment generation in the labour-intensive sectors include non-availability of trained skilled workers, infrastructure bottlenecks, low levels of investment, non-competitive export orientation resulting in infrastructural bottlenecks, and rigid labour rules and regulations.

Hijzen and Swaim (2007) looked at the implications of offshoring for industrial employment for 17 high-income countries of the Organisation for Economic Co-operation and Development (OECD). Their findings indicate that offshoring has no effect or a slight positive effect on sectoral employment. Offshoring within the same industry ("intra-industry off-shoring") reduces the labour intensity of production, but does not affect overall industrial employment. On the other hand, inter-industry offshoring does not affect labour intensity, but may have a positive effect on overall industrial employment. These findings suggest that the productivity gains from offshoring are sufficiently large. Casacuberta et al. (2004**)** analysed the impact of trade liberalization on labour and capital gross flows and productivity in the Uruguayan manufacturing sector. Though higher international exposure implied higher job creation, unionization dampened the process. Industry concentration mitigated the destruction of jobs, but could not actually contribute to the job creation process sizably.[7]

In relation to the import of technology from developed countries, mismatches are said to exist between the technological requirements of the developing countries and the technology available (Pack and Todaro, 1969). Technology innovated in the developed world is mainly labour-saving and skill-intensive as it has to suit the situation prevailing in the developed economies. On the other hand, developing countries are mainly labour-surplus and skill-scarce economies and hence the objective of employment growth along with economic growth gets defeated when technology is largely imported from the Western world. As Azeez (2006) points out distinctly, a new technology gets embodied in capital goods and, therefore, the import of capital goods is often considered to be an import of technology. Once imported, the capital good is put into operation and the technological progress realized in the country of origin will be incorporated into the production process (UNIDO, 2005). Hence, it is still cheaper for a latecomer to buy the technology already invented by others than to reinvent the wheel though it is widely noted that international technology does not come cheap (ibid.). Thus the debate relating to the nature of technology gets shifted to the import of capital goods. Though the import of technology from developed countries may be expected to enhance the productivity in developing countries, there are plausible doubts about this effect. Chakravarty (1987) noted that with imports of capital goods on a significant scale, domestic costs of production are unlikely to come down since developing countries might be importing expensive capital goods. Chandrasekhar (1992) argued further that in the Indian context imports of capital goods have acted as substitutes for domestic production of capital goods, imposing a social cost in the form of unutilized capacity. And this made the domestic firms operate at a high unit cost of production.

On the other hand, Hasan (2003) presents evidence from panel data on Indian manufacturing firms, suggesting that imported technologies have a significant effect on productivity. I believe the point regarding technology is crucial. Technologies (and management systems) are increasingly determined globally. Therefore, it is not surprising that manufacturing in India remains more capital-intensive as the newest assembly processes, for example, rely heavily on technology and skills. This has important policy implications: large-scale, low-cost labour-intensive manufacturing is unlikely to emerge because, to be competitive, India has to use these technologies (given the level of input costs in the country). Using data for 33 Indian manufacturing industries in India for the period 1992–2001, Pandit and Siddharthan (2006) show that technology imports, through joint ventures and participation of multinational enterprises (MNEs), influence employment positively. They noted that employment

[7] Given the stagnating industrial experience of Latin America, Brady et al. (2011), based on the data set for the period 1986–2006, observed the negative effects of various factors on job creation.

growth, production of differentiated products, skill intensity of the workforce and technological upgradation go hand in hand.

Another line of argument asserts that the adoption and adaptation of these international technologies are indeed costly because of tacit knowledge and circumstantial sensitivity of technology (Evenson and Westphal, 1995). Unless an importing country has significant technological capability, it cannot fully utilize the imported technology**.** Besides, imported technology may require more skilled than unskilled workers while developing countries are usually abundant in the latter. Acemoglu and Zilibotti (2001) argue that due to the difference in skill scarcity, technology in developed countries tends to be skill-intensive and is inappropriate for developing countries. Thus, the potential productivity of imported technology cannot be realized in developing countries. Berman and Machin (2000) empirically showed the skill-bias of technological change, especially in middle-income countries. Mitra (2009) and Kato and Mitra (2008) presented evidence from developing countries and India, respectively, to suggest that the possibility to import technology reduces labour intensity in the production process. Further, imported technology also tends to reduce technical efficiency as the new technology cannot be operated optimally.

If the import of technology enhances productivity as well as promotes employment, the choice is most desirable. Such a possibility, though empirically unprecedented, exists at least theoretically: for example, new technology, if accompanied by technological progress, can bring about an upward shift in production, which would mean higher levels of output for the given levels of inputs: both capital productivity and labour productivity may shoot up. Even if the new technology becomes more labour-intensive, the rise in the value added can still be more than the rise in employment, and hence labour productivity can actually shoot up along with an increase in labour demand. Further, if we presume expansion in the scale of production, which could be due to the wider applicability of the new technology, employment increase is assured. Even when labour productivity declines in response to labour-intensive technological progress, it may still be desirable to pursue as the new configuration of capital–labour may entail substantial decline in the cost of production. This is more likely to happen, particularly given the modest remuneration for labour in developing countries in comparison to the international standards. However, with developed countries being mostly characterized by labour shortage, the new technology innovated by them is of a labour-saving type, which can contribute to growth without generating employment opportunities.

As reviewed by Das and Kalita (2009b), the period of the 1980s is often called the decade of "jobless growth" in Indian manufacturing, since the revival in output growth during this period was not accompanied by the adequate generation of employment. Only 484,000 new jobs were generated in India's registered factory sector or organized sector between 1979–80 and 1990–91 (Thomas, 2002). One of the explanations put forward was that of difficulty in labour retrenchment after the introduction of job security regulations in the late 1970s, which forced employers to adopt capital-intensive production techniques (Fallon and Lucas, 1991). According to another view, the slowdown in employment growth resulted from a strategy of capital deepening pursued by the firms, an important reason for which was the increase in the real cost of labour in the 1980s in India (Ghose, 1994**).** A study undertaken by the World Bank (1989) also asserted that the sharp deceleration in employment growth in the factory sector in the 1980s could be explained by the acceleration in product wages, attributed to union-push. Papola (1994), Bhalotra (1998) and Nagaraj (1994) have highlighted that during the 1980s there was faster growth of industries with low labour intensity and slower growth of industries with high labour intensity in India and indicated a more intensive use of the workforce in the 1980s, resulting in the slowdown of employment growth.

From 1990–91 to 1997–98, Nagaraj (2000) pointed out that faster employment generation in the organized manufacturing sector in India (as highlighted by Goldar, 2000 and Thomas, 2002) was due

to the investment boom during that decade. In his later study, Nagaraj (2004) argued that faster employment generation in the organized manufacturing sector was restricted mainly to the first half of the 1990s. As the boom went bust, there was a steep fall in employment during the second half of the 1990s. The relative cost of labour did not seem to matter in employment decisions, as the wage-rental ratio declined steadily (Das and Kalita, 2009a).

Goldar (2011a) argues that employment in India's organized manufacturing sector increased in recent years at the very rapid rate of 7.5 per cent per annum between 2003–04 and 2008–09. He further rationalizes it in terms of labour market deregulation contributing to manufacturing employment growth. The value added growth also picked up to a double-digit figure during the same period (13.7 per cent per annum). However, as argued by Nagaraj (2007), the fine print of exemptions and loopholes built into the labour laws provide sufficient flexibility to the industrial firms and hence labour regulations could not be the cause of deceleration in employment growth in the past. By the same logic, labour market deregulation, therefore, could not be treated as responsible for rapid employment growth in the recent period. He argues that the recent manufacturing employment boom could be merely a recovery of employment lost over the previous nine years. He also points out that the correlation coefficient between employment elasticity and the labour reforms index across states is not statistically significant (Nagaraj, 2011). Another way of rationalizing this employment boom could be in terms of change in the regional distribution of industrial employment growth. Some of the states, which have not been industrialized, registered a rapid employment growth rate during the recent period. States like Chhattisgarh, Haryana, Punjab, Goa, Jammu and Kashmir, Himachal Pradesh, Orissa and Uttarakhand witnessed double-digit employment growth whereas most of them (except Goa) experienced either sluggish or negative employment growth in previous years (from 1998–99 to 2003–04).

However, in response to Nagaraj (2011), Goldar (2011c) observed that first and foremost all employment growth in India from 2003–04 to 2008–09 was accompanied by a sharp rise in value added too. This sort of steep rise in value added was also experienced during the 1980s (from 1980–81 to 1989–90) and 1990s (from 1992–93 to 1996–97) but those phases of growth were accompanied by negligible employment growth. The rise in employment growth in organized manufacturing in recent years is not due to a shift in the industrial structure in favour of labour-intensive industries, as the structure has remained by and large constant. On the other hand, the share of private limited companies, which reveal higher employment intensity than the public limited companies or factories classified as individual proprietorships, has increased during this phase and has possibly contributed partly to this rapid employment growth. On the other hand, Goldar (2011b) also notes the contribution of labour market reforms to employment growth. Though in the Indian context labour market reforms have not been carried out explicitly, informal channels have been followed for its implementation. The index of labour market reforms calculated across states tends to explain the differences in the employment growth rates across states.

With this background we now turn to the empirical analysis of the three-digit industry groups in the organized manufacturing sector. The period under consideration is from 1998–99 to 2007–08. Since the National Industrial Classification (NIC) 1998/2004 is very different from the earlier one, involving a comparability problem relating to various industry groups, the past data has not been considered in the present study. However, based on our previous study (Mitra and Bhanumurthy, 2006) we present a snapshot of the earlier phase ending in 1997–98.

3. Empirical analysis: Organized manufacturing sector (ASI sector)

3.1 Performance till 1997–98

The performance of the organized manufacturing sector in India in terms of the growth rate in gross value added showed marked improvement in the 1990s compared to the earlier period (table 1). Whether this growth had also resulted in faster employment elasticity or not has been a matter of serious concern. In terms of mere growth rates of course, both the number of workers and total persons increased from a mere 1 per cent per annum during the deregulated regime (from 1984–85 to 1990–91) to around 3 per cent per annum over the 1990s, though this growth has been only marginally above the growth rate that was experienced during the regulated regime (from 1973–74 to 1984–85). Man-days per worker and man-days per person grew negligibly during the 1980s and 1990s. For employees (other than workers) it is not a matter of serious concern because they are full-timers. But for the "workers" category, man-days per worker is an important determinant of earnings, and hence the stagnancy in man-days per worker may have serious implications in terms of workers' income as it may have resulted from the decline in full-time jobs to the workers in the organized industrial sector. However, the constancy of man-days per worker or person may also have resulted from a rise in outsourcing and subcontracting and the assignment of jobs on piece-rate basis. Also, it could be an outcome of exhaustion of scope to utilize labour more intensively (Bhalotra, 1998; Nagaraj, 1994). For example, the contract workers were already utilized to the optimum and there was hardly any scope for further increase in the man-days per worker. Since the scope to utilize labour more intensively was possibly exhausted, firms were forced to employ additional workers in the 1990s, which was reflected in a higher employment growth rate.

The increase in the employment growth rate in organized manufacturing in the 1990s, particularly between 1990–91 and 1995–96, could also be explained by the huge expansion that took place in the early reform period. Both domestic and foreign investors made large investments during this period, with an over-expectation about future prospects in the Indian economy, leading to expansion in capacity. This possibly led to an increase in the employment growth rate in organized manufacturing, particularly in the private and joint sectors. But, as output started declining or stagnating in the late 1990s, this resulted in capacity underutilization, which might have resulted in job losses (Nagaraj, 2004).[8] Despite this downturn, some argue that employment growth in organized manufacturing has increased in the 1990s compared to the 1980s (Goldar, 2000).

Wages per worker shows a fall in the growth rate, marginal though, during the 1990s. (This fall in growth of wages may also be one of the reasons for increase in the employment growth in the 1990s [ibid.].) However, emoluments per person did not reveal such a trend (table 1). Clearly, the earnings of the skilled–educated employees (other than workers) seem to have increased faster than those of the workers from 1990–91 to 1997–98.[9]

[8] Nagaraj argues that in the second half of the 1990s, the organized manufacturing sector lost 15 per cent of workers across states and industry groups, mostly due to the voluntary retirement scheme (VRS) in the public sector and retrenchments and lay-offs in the private sector, followed by relaxed labour laws in the country.

[9] Reforms were initiated in July 1991 in India.

Table 1. Growth rate of select variables (% per annum)

Variables	1973–74 to 1984–85	1984–85 to 1990–91	1990–91 to 1997–98
Gross value added	6.4	7.9	9.4
Gross output	7.6	8.4	8.6
No. of workers	2.8	1.1	3.1
Man-days per worker	1.9	0.2	0.2
No. of persons employed	2.9	1.1	3.2
Man-days per person employed	1.7	0.3	0.2
Wages per worker	3.0	3.2	2.7
Emoluments per person employed	2.4	2.9	3.3
Fixed capital	7.1	6.4	10.8

Notes: 1.Gross output and value added have been deflated by the wholesale price index of the corresponding product group, and fixed capital, by the combined price index of machinery and metal products with 1981–82 as base.

2. Persons include workers and other employees inclusive of administrative and managerial staff.

Source: Annual Survey of Industry Data (compiled by the Economic and Political Weekly Research Foundation).

From 1973–74 to 1997–98, the employment elasticity in the organized manufacturing sector was seen to be quite different from what was noted in other studies.[10] However, the overall level of employment elasticity (measured particularly in relation to workers and not employees) was on the low side considering the fact that the Indian economy did not yet appear to have crossed the so-called 'Lewis turning point' in the labour market. On the other hand, although the employment elasticity with respect to value added declined at the aggregate level in the reform period, the extent of decline was nominal. This picture at the disaggregated level of industry groups is quite different though: while around one-fifth of the industries at the three-digit level experienced rising elasticity, in the rest it remained either very low or stagnant and the reforms have had no impact on elasticity. However, there are industries which are characterized by high labour intensity and they also have experienced reasonably high employment elasticity (0.5 or more) and fast growth in value added for a period of almost three decades: country liquor (223), tobacco (226), bleaching of silk (246), bleaching of jute and mesta (257), textile garments (265), footwear (291), wearing apparel (292), leather (293), man-made fibres (308), bicycles (376), bullock carts (378), and jewellery articles (383).

If we keep aside the criterion of employment elasticity and consider industries which are highly labour-intensive and have shown fast growth rates in value added over the decades, the list is as follows: grain milling (204), bicycles (376), country liquor (223), bidi (226), textile garments (265), footwear (291), wearing apparel (292), weaving and finishing of cotton khadi (232), weaving and finishing of cotton textiles on power-loom (234), preparatory operations (253), manufacture of wearing apparel of leather and substitutes of leather (292), manufacture of consumer goods of leather and substitutes of leather (other than apparel and footwear) (293), manufacture of bullock-carts, push-carts and hand-carts (378), manufacture of jewellery and related articles (383), and manufacture of sports and athletic goods (385). This list overlaps considerably with the former. These industry groups are important indeed from the point of view of policy as they seem to meet the objectives of pro-poor

[10] Majumdar and Sarkar (2004) find that employment elasticity has dropped from 0.99 in 1974–80 to 0.33 in 1986–96, although in the intermittent period (i.e. between 1980 and 1986) it was -0.16.

growth. Another conclusion that emerges from this analysis is that the theoretical wage–employment relation is not very important in manufacturing. This could be due to the existing institutional mechanisms in wage fixation.

3.2 Findings from 1998–99 to 2007–08

Since economic reforms in the Indian context were initiated in 1991, it would have been reasonable to consider the entire period from 1990–91 till date in our empirical analysis. However, till 1997–98 the ASI data followed the NIC-1987 which is not comparable with the classification followed thereafter. Since NIC-1998 and NIC-2004 are by and large the same, a comparable series of various three-digit groups could be generated for the period starting from 1998–99 to 2007–08. However, after 2007–08 we could not consider the figures because of the comparability problem again, arising from the latest NIC-2008.

In our data set, the nominal variables have been converted into real terms: the value added figures have been deflated by the wholesale price index (WPI) (1993–94 base) of the closest commodity group, the detail of which is provided in table A.1 in the appendix. Fixed asset is deflated by the price index of machinery and machine, and the real wages and salaries are derived on the basis of the consumer price index (CPI) for industrial workers (1993 base).

Gross value added growth rate continued to be a little above 9 per cent per annum from 1998–99 to 2007–08 (table 2). However, the employment growth rate, which was already low from 1990–91 to 1997–98, decelerated marginally, more so in the case of employees (other than workers).[11] As a result, labour productivity, defined as the value added per person employed, grew at almost 7 per cent per annum. Wages per worker remained almost stagnant while the remuneration per person shot up significantly, implying a substantial growth in the salaries per employee (excluding workers). It is again the fixed capital, the growth rate of which decelerated to almost half, resulting in a sluggish growth in capital–labour ratio. Since Indian entrepreneurs had already accumulated a huge stock of capital evident from sustained growth in fixed capital over the preceding period (table 1), the decline in the growth rate over the recent phase (from 1998–99 to 2007–08) does not come as a surprise.

The distribution of value added and employment across various three-digit industry groups seems to be evenly spread out with a few exceptions (table A.1 in the appendix). For example, only each of the following industry groups—153, 154, 160, 171, 181, 241, 242, 269, 271 and 291—accounted on an average for nearly 3 per cent or more of the total manufacturing employment. Many of these industries and a few more (232, 292 and 341) also accounted for a 3 or more percentage share in value added terms. Interestingly, not too many of them recorded a rapid employment growth rate of 4 or more per cent per annum from 1998–99 to 2007–08 (i.e. 181, 232 and 269). As an opening remark, industries, which dominated in terms of employment size, did not necessarily unravel a fast employment growth.

[11] The employment growth rate in the organized manufacturing sector from 1998–99 to 2007–08 according to ASI data is, however, higher than the total employment growth rate shown by the NSS employment–unemployment survey from 2004–05 to 2009–10, though the ASI growth rate is quite close to the NSS estimate from 1999–2000 to 2004–05.

Table 2. Growth rate of select variables (% per annum): 1998-99 to 2007-08

Variables	Rate of growth (% p.a.)
Gross value added	9.45
No. of workers	2.98
No. of persons employed	2.58
Wages per worker	0.20
Emoluments per person employed	5.31
Fixed capital	4.34
Labour productivity (Value added per person employed)	6.87
Capital-Labour ratio (Fixed capital per person)	1.75

Source: Annual Survey of Industry Data (compiled by Economic and Political Weekly Research Foundation).

Over this phase, several industries grew rapidly in terms of value added (table 3). The poorly performing industries have been, in fact, very few in number.[12] In addition, another group of six industries reported a positive but less than 4 per cent per annum growth rate in value added.[13] Total employment growth in all these industries, with sluggish growth in terms of value added, has been either negative or sluggishly positive (table 3). Overall, industries not performing well in terms of value added did not perform well in terms of employment either.

There is a strong positive correlation between the average value added growth and total employment growth measured across all the three-digit manufacturing groups (0.77), implying growth is essential for employment generation. However, rapid value added growth has, not necessarily, resulted in faster employment growth. In spite of the fact that many industries grew rapidly in value added terms, total employment increased only at around 2.6 per cent per annum at the aggregate level from 1998–99 to 2007–08. However, during the sub-period 2003–04 to 2008–09, as Goldar (2011b) pointed out, the employment and value added both grew sizably.

[12] The worst performing industries with a negative value added growth rate are 243 (manufacture of man-made fibres), 313 (manufacture of insulated wire and cables), 333 (manufacture of watches and clocks) and 241(manufacture of basic chemicals).

[13] 151 (production of meat, fish, fruit, vegetables, etc.), 152 (manufacture of dairy products), 251 (manufacture of rubber products), 160 (manufacture of tobacco products), 154 (manufacture of other food products) and 353 (manufacture of aircraft and spacecraft).

Table 3. Growth rates in poorly performing industries (negative or positive value added growth, but less than 4% per annum)

Ind. Code	Workers	Employees other than workers	Total persons engaged	Value added
243	-4.04	-6.35	-4.53	-14.00
313	-0.09	-4.04	-1.21	-0.98
333	-6.08	-12.30	-7.55	-0.57
241	-1.68	-3.35	-2.24	-0.12
151	3.12	0.40	2.44	0.32
152	3.34	-1.14	1.81	0.94
251	1.29	-0.53	0.87	2.29
160	-0.88	-0.91	-0.88	2.49
154	0.47	-1.22	0.13	2.66
353	4.30	-0.36	2.37	3.59

Note: Industries entered in the ascending order in terms of value added growth rate.

Source: Annual Survey of Industries, (ASI).

The list of industries with a rapid employment growth rate (i.e. of at least 4 per cent per annum) and a rapid value added growth rate (i.e. of at least 7 per cent per annum) from 1998–99 to 2007–08 includes 155 (manufacture of beverages), 369 (manufacturing n.e.c.), 332 (manufacture of optical instruments, etc.), 372 (recycling of non-metal waste and scrap), 312 (manufacture of electricity distribution and control apparatus) , 191 (tanning and dressing of leather, handbags), 273 (casting of metals), 252 (manufacture of plastic products), 361 (manufacture of furniture), 371 (recycling of metal waste and scrap), others, 289 (manufacture of other fabricated metal products), 181 (manufacture of wearing apparel), 343 (manufacture of parts for motor vehicles and their engines), 173 (manufacture of knitted and crocheted fabrics), 172 (manufacture of other textiles), 281 (manufacture of structural metal products, tanks, etc.), 319 (manufacture of other electrical equipment), 300 (manufacture of office, accounting and computing machinery), 232 (manufacture of refined petroleum products), 182 (dressing and dyeing of fur, etc.), 269 (manufacture of non-metallic mineral products), 192 (manufacture of footwear, etc.) (see box 1).

Box 1: Industries with rapid value added growth and employment growth

More than 7 per cent growth in value added (in ascending order)

223, 210, 261, 155, 242, 351,361, 181, 369, 202, 342, 322, Total , 272, 323, 271,291, 172, 269,289, 292, 315, 182,343, 319, 371 , 332, 314, 359,331, 173, 281, 311,, 312, 231,Others, 341, 300, 232, 372

More than 4 per cent employment growth rate (in ascending order)

273, 191, 361, 155, 252, 232, 182, 332, 269, 312, 300, 281, 192, 289, 319, Others, 343, 369, 371, 181, 173, 172, 372

Source: Annual Survey of Industry Data (compiled by the Economic and Political Weekly Research Foundation).

Decomposing total employment in terms of workers and employees (other than workers), several industries are seen to have experienced a negative growth rate for the latter though value added growth in these industries has been more than 5 per cent per annum (table A.2 in the appendix). Rise in capital intensity and skill intensity in the organized manufacturing sector in India is a widely noted phenomenon. Against this backdrop, the sluggish growth of 1.3 per cent per annum in the number of employees (other than workers) constituting administrative, managerial and other skilled workers comes as a major surprise. Possibly, the firms had to cut down the number of skilled workers as they are increasingly becoming expensive with the rise in the skill premium, almost catching up with the international standards. A weak correlation, though positive, observed between the growth in employees (other than workers) and the growth in salary per employee is possibly indicative of this fact. There is in fact a great deal of literature to suggest that the skill premium in developing countries is very high, which has resulted in increasing inequality in terms of remunerations for different categories of labour (Mitra, 2013).

Industries, which recorded negative growth in terms of total employment, also witnessed negative growth in terms of employees (other than workers) with the exception of 201 (saw milling, etc.) (see table A.3 in the appendix). The growth rate in terms of workers has also been negative in most of these industries.[14] The correlation between the growth rates in workers and employees (other than workers) turns out to be high at 0.91.

Among the industries, which grew sluggishly (0 to 2 per cent) in terms of total employment, several witnessed a negative growth rate in terms of employees (other than workers) but positive in terms of workers. And among them many again reported a rapid value added growth rate (table A.4 in the appendix).

In industries, which experienced employment growth of 2 to 4 per cent (or marginally higher than that) per annum, growth in workers is seen to be mostly greater than the growth in employees (other than workers). Also, the value added growth has been highly impressive in a number of industries in this category (see table A.5 in the appendix).

Among the rapidly growing industries, i.e. more than 4 per cent in terms of total employment, growth in workers has been substantially higher than the growth in employees (other than workers) (table A.6 in the appendix).[15] Also, the value added growth rate has been fast in most of the industry groups in this category.

Four clusters are discernible from tables 4 and 5: (a) low employment and low value added growth; (b) low employment but high value added growth; (c) moderate employment and high value added growth; and (d) high employment and high value added growth (also see figures 1 and 2).

[14] Except 291 (manufacture of general purpose machinery) and 359 (manufacture of transport equipment). Interestingly, the value added growth rate has been positive except in the case of 333 (manufacture of watches and clocks), 243 (manufacture of man-made fibres), 241 (manufacture of basic chemicals) and 313 (manufacture of insulated wire and cables).

[15] The exceptions are 182 (dressing and dyeing of fur, etc.), 332 (manufacture of optical instruments, etc.), others, 369 (manufacturing n.e.c.), 371 (recycling of metal waste and scrap), 181 (manufacture of wearing apparel), 172 (manufacture of other textiles) and 372 (recycling of non-metal waste and scrap).

Table 4. Value added and total employment growth (% per annum)

Employment growth rate	Value added growth rate			
	Negative/sluggish (less than 4% p.a.)	Moderate (4% and above but less than 7% p.a.)	High (7% p.a. and above)	Total
Negative/sluggish (less than 2% p.a.)	152, 154, 160, 241, 243 ,251, 313, 333	153, 171, 201, 221, 293, 352	223, 261, 272, 291, 311, 314, 322, 323, 341, 351, 359	25
Moderate (2% and above but less than 4% p.a.)	151, 353	222, 321	202, 210, 231, 242, 271, 292, 315, 331,342, Aggregate	14
High (4% p.a. and above)	0	191, 192, 252,273	155, 172, 173, 181, 182, 232, 269, 281, 289, 300 ,312, 319, 332 343, 361, 369, 371, 372,others	23
Total	10	12	39	61

Figure 1. Scatter of growth rate in value added and total employment (grintotp)

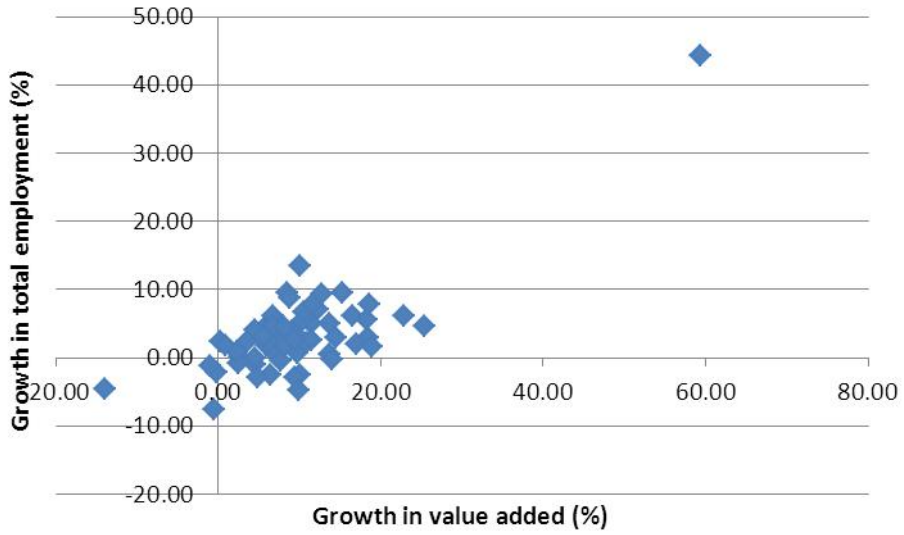
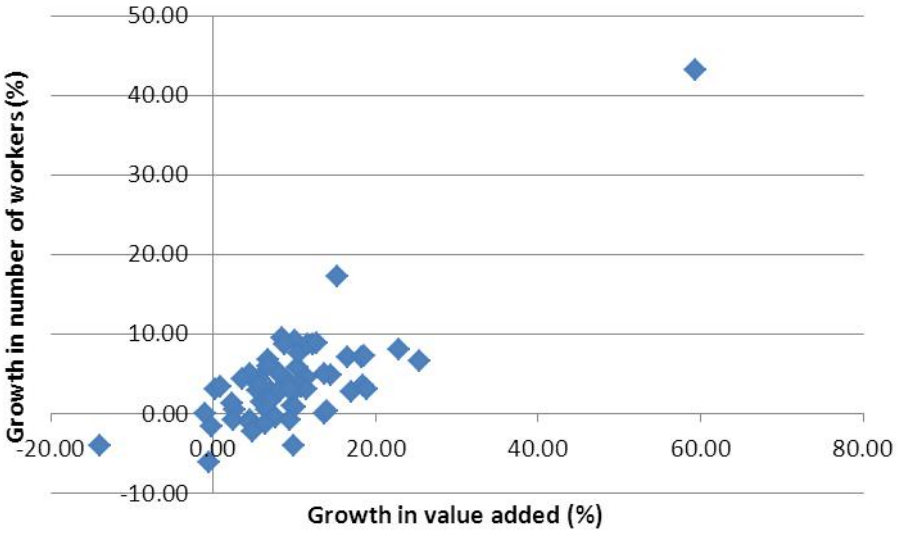


Table 5. Value added and workers growth rate (% per annum)

Growth rate in workers	Value added growth rate			
	Negative/sluggish (less than 4% p.a.)	Moderate (4% and above but less than 7% p.a.)	High (7% p.a. and above)	Total
Negative/sluggish (less than 2 % p.a.)	154, 160 , 241, 243, 251, 313, 333	153, 171, 201, 221, 293, 352	223, 261, 272, 291, 314, 322, 323, 359	21
Moderate (2% and above but less than 4% p.a.)	151, 152,	222, 321,	202, 210,231, 242, 271, 292, 311, 315, 341, 351, Aggregate	14
High (4% p.a. and above)	353	191, 192,252, 273,	155, 172, 173, 181, 182, 232, 269, 281, 289, 300, 312, 319, 331, 332, 342, 343, 361, 369, 371, 372, others	26
Total	10	12	39	61

Figure 2. Scatter of growth rate in value added and workers (grinwo)



On the whole, we observe that for the entire period under consideration (1998–99 to 2007–08) value added growth has been fast in a number of industries. However, employment growth has not necessarily been impressive in these industries though rapidly growing industries in terms of employment witnessed faster value added growth as well. In fact, in some of the industries with marginal or sluggish employment growth, value added still has grown sizably notwithstanding a strong positive correlation between the value added and employment (average) growth rates across industries. Particularly, the growth scenario of employees (other than workers) represents a gloomy picture since many industries showed a negative growth rate. This comes as a bit of surprise, particularly keeping in view the popular belief about a favourable job market for the ones who are highly skilled. Usually greater concern has been expressed for the unskilled workers as they are characterized by poor employability. Two reasons may be considered to explain this: (a) because of high salaries for employees (other than workers), their absorption rate has been sluggish; and (b) as mentioned in the previous section, the recent phase of industrialization is partly because of the rapid spread of industries in the states which were less industrialized earlier and hence this spur has been accompanied by a rise in the demand for shop-floor workers. Nevertheless, there are a sizeable number of industries that have experienced rapid growth both in terms of value added and total employment both.

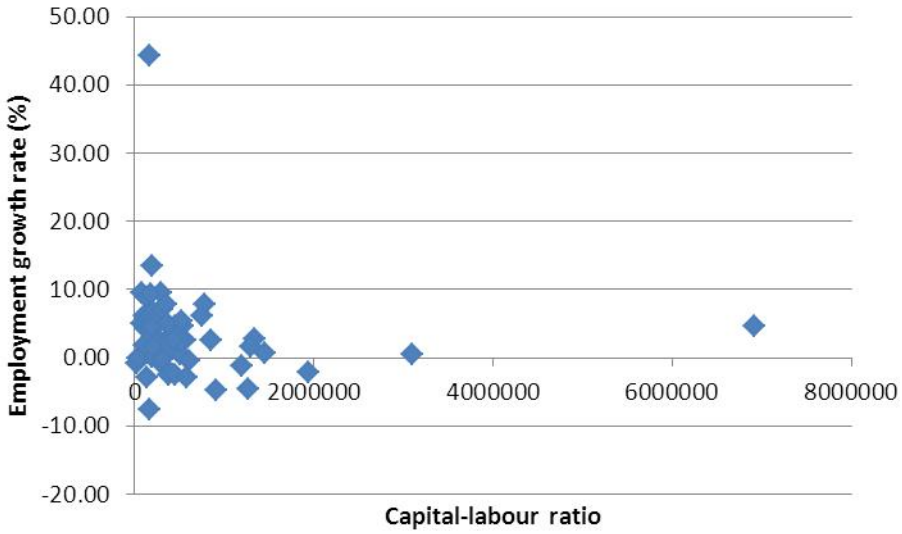
An important question, which needs to be addressed, is whether the so-called labour-intensive industries have been generating significant employment. Fixed capital and employment growth show a strong positive correlation of 0.82 across various industry groups. There is a positive relationship between the rate of growth in capital–labour ratio (i.e. total persons engaged) and employment growth, implying both the factors of production can increase simultaneously, though capital may be increasing at a faster pace than labour (table 6). We also note that the higher the level of capital–labour ratio, the lower the employment growth rate, though the relationship is not statistically significant, implying that while some labour-intensive industries may be experiencing rapid employment growth, others tend to grow sluggishly (see figure 3).

Table 6. Employment and capital growth

Dependent variable	Independent variable	Coefficient (t-ratio)	R2
Employment growth	Rate of growth in capital–labour ratio	0.32 (2.46)*	0.08
Employment growth	Capital–labour ratio	0.0000006 (-0.77)	0.009

Note: The average rate of growth in employment from 1998–99 to 2007–08 has been regressed on the average rate of growth in capital–labour (total employment) ratio and also the average capital–labour (total employment) ratio. Number of observations is 62.

Figure 3. Capital–labour (total employment) ratio and employment growth rate



However, there are several labour-intensive industries, which showed a rapid employment growth rate. Among the 32 industries placed at the bottom in terms of capital–labour ratio (i.e. total persons engaged), nearly half reported a faster employment growth rate of more than 4 per cent per annum[16]: 181, 182, 192, 191, 369, 281, 372, 371, 172, 361, 273, 289, 312, 173, 319, 343 (in ascending order of capital–labour ratio).

3.2.1 Econometric estimation of employment elasticity

Employment elasticity is defined as the proportionate change in employment due to proportionate change in value added. This, however, needs to be estimated econometrically after controlling for remuneration to human capital. On the whole, we are able to observe the partial elasticity of employment with respect to growth and that with respect to remuneration rate.

The employment elasticity function has been estimated separately for total persons engaged and workers (table A.7 in the appendix). The logarithm transformation of total persons engaged (and

[16] Similarly, among the top 20 capital-intensive industries, 269, 155, 300, others, and 232 registered a rapid employment growth rate of more than 4 per cent per annum.

separately for workers) has been regressed on logarithm transformation of total value added and emoluments per person (and wages per worker in the specification for workers). Both the growth elasticity and wage–remuneration elasticity have been estimated to assess the growth and wage sensitivity of employment. For the aggregate manufacturing sector, the elasticity of total employment with respect to value added is 0.43 and the elasticity of workers with respect to value added is 0.35. On the other hand, the impact of remuneration per employee (or wages per worker) on total employment (or workers) is not statistically significant. Also, for a number of industries, the elasticity of total employment with respect to growth does not turn out to be statistically significant.[17] Industries which recorded an employment elasticity of up to 0.4 are many[18] though only a handful of them had an employment elasticity of more than 0.55 (given in ascending order): 342 (manufacture of bodies for motor vehicles, etc.), 289 (manufacture of other fabricated metal products), 371 (recycling of metal waste and scrap), 223 (reproduction of recorded media), 273 (casting of metals), 192 (manufacture of footwear, etc.), 182 (dressing and dyeing of fur, etc.), 359 (manufacture of transport equipment), 269 (manufacture of non-metallic mineral products), 372 (recycling of non-metal waste and scrap), 331 (manufacture of medical appliances and instruments), 173 (manufacture of knitted and crocheted fabrics), and 172 (manufacture of other textiles). Though one may argue that these industries may be targeted for providing a boost to employment growth, it is unlikely that they will succeed in raising the overall employment growth of the manufacturing sector in a significant manner as specified in the National Manufacturing Policy.

3.2.2. Decomposition of value added: Productivity and employment

Decomposition of value added growth in terms of employment growth and productivity growth is carried out to delineate the contribution of labour to value added growth vis-à-vis capital-intensive technology (table A.8 in the appendix). Only a handful of industries are seen to have experienced rapid growth in productivity of at least 5 per cent per annum and employment growth of at least 4 per cent per annum simultaneously.[19] Though there is no huge trade-off (in terms of a negative correlation) between growth in productivity and employment across industries, the positive correlation across industries is highly negligible, i.e. 0.08. In other words, capital-intensive technology has been adopted in several industries, leading to rapid value added growth and labour-

[17] 152 (manufacture of dairy product), 154 (manufacture of other food products), 155 (manufacture of beverages), 160 (manufacture of tobacco products), 201(saw milling and planing of wood, etc.), 202 (manufacture of products of wood, cork, etc.), 243 (manufacture of man-made fibres), 252 (manufacture of plastic products), 261 (manufacture of glass and glass products), 292 (manufacture of special purpose machinery), 293 (manufacture of domestic appliances), 311 (manufacture of electric motors, generators and transformers), 313 (manufacture of insulated wire and cables), 314 (manufacture of accumulators, primary cells and batteries), 315 (manufacture of electric lamps, etc.), 319 (manufacture of other electrical equipment), 321 (manufacture of electronic valves and tubes, etc.), 322 (manufacture of television and radio transmitters), 333 (manufacture of watches and clocks), 343 (manufacture of parts for motor vehicles and their engines), 351 (building and repair of ships & boats), 352 (manufacture of railway and tramway locomotives), 361 (manufacture of furniture), and others.

[18] 231 (manufacture of coke oven products), 332 (manufacture of optical instruments, etc.), 353 (manufacture of aircraft and spacecraft), 232 (manufacture of refined petroleum products), 153 (manufacture of grain mill products, etc.), 221 (publishing), 191 (tanning and dressing of leather, handbags), 242 (manufacture of other chemical products), 323 (manufacture of television and radio receivers, recording apparatus), 151 (production of meat, fish, fruit, vegetables, etc.), 300 (manufacture of office, accounting and computing machinery), 222 (printing and service related to printing), 312 (manufacture of electricity distribution and control apparatus), 272 (manufacture of basic precious and non-ferrous metals), 291 (manufacture of general purpose machinery), 369 (manufacturing n.e.c.), 251 (manufacture of rubber products), 171 (spinning, weaving and finishing of textiles), and 181 (manufacture of wearing apparel).

[19] 173 (manufacture of knitted and crocheted fabrics), 182 (dressing and dyeing of fur, etc.), 232 (manufacture of refined petroleum products), 281 (manufacture of structural metal products, tanks, etc.), 300 (manufacture of office, accounting and computing machinery), 312 (manufacture of electricity distribution and control apparatus), 319 (manufacture of other electrical equipment), 332 (manufacture of optical instruments, etc.), 372 (recycling of non-metal waste and scrap), and others.

productivity growth. This is also reflected in the growth in capital–labour ratio across various groups that witnessed a growth rate of more than 4 per cent per annum.[20]

The correlation between the average growth in workers' productivity and wages is again negligible (0.07). Table 7 lists the industry codes, which registered rapid growth rates in workers' productivity (value added per worker, at least 5 per cent per annum), worker (at least 4 per cent per annum) and wages (at least 2 per cent per annum). The following observations are pertinent:

1. Only 182 (dressing and dyeing of fur, etc.), 332 (manufacture of optical instruments, etc.), 372 (recycling of non-metal waste and scrap) and 'others' show rapid growth in terms of all the three characteristics simultaneously.

2. Industries in which rapid growth took place simultaneously in terms of labour productivity (value added per worker, at least 5 per cent per annum) and wage per worker (at least 2 per cent per annum) are 201 (saw milling and planing of wood, etc.), 272 (manufacture of basic precious and non-ferrous metals), 323 (manufacture of television and radio receivers, recording apparatus) and 359 (manufacture of transport equipment).

3. Industries in which rapid growth took place simultaneously in terms of worker (at least 4 per cent per annum) and wage per worker (at least 2 per cent per annum) include 172 (manufacture of other textiles), 181 (manufacture of wearing apparel), 353 (manufacture of aircraft and spacecraft), 369 (manufacturing n.e.c.) and 371 (recycling of metal waste and scrap). However, the correlation between the growth rate in workers and the wage rate per worker across industries is not negligible (0.54).

4. Industries with rapid growth in value added per worker (at least 5 per cent per annum) and worker (at least 4 per cent per annum) include: 232 (manufacture of refined petroleum products), 331 (manufacture of medical appliances and instruments), 332 (manufacture of optical instruments, etc.), 372 (recycling of non-metal waste and scrap), and others. The correlation between the growth rates of these two variables across industries turns out to be only 0.12, indicating productivity growth led by capital accumulation.

Table 7. Industries with rapid productivity, worker and wage growth

Value added per worker (5% and more)	Worker (4% and more)	Wage (2% and more)
171, 182, 201, 202, 221, 223, 231, 232, 242, 261, 271, 272, 281, 291, 292, 293, 300, 311, 312, 314, 315, 322, 323, 331, 332, 333, 341, 351, 352, 359, 372, Others, Total	155, 172, 173, 181, 182, 191, 192, 232, 252, 269, 273, 281, 289, 300, 312, 319, 331, 332, 342, 343, 353, 361, 369, 371, 372, Others	172, 181, 182, 201, 251, 272, 323, 332, 353, 359, 369, 371, 372, Others

[20] In ascending order of magnitude: 160 (manufacture of tobacco products), 261 (manufacture of glass and glass products), 292 (manufacture of special purpose machinery), 273 (casting of metals), 153 (manufacture of grain mill products, etc.), 243 (manufacture of man-made fibres), 352 (manufacture of railway and tramway locomotives), 231 (manufacture of coke oven products), 351 (building and repair of ships & boats), 154 (manufacture of other food products), 311 (manufacture of electric motors, generators and transformers), 281 (manufacture of structural metal products, tanks, etc.), 221 (publishing), 353 (manufacture of aircraft and spacecraft), 173 (manufacture of knitted and crocheted fabrics), 359 (manufacture of transport equipment), 314 (manufacture of accumulators, primary cells and batteries), 201 (saw milling and planing of wood, etc.), 323 (manufacture of television and radio receivers, recording apparatus) , 291 (manufacture of general purpose machinery), 182 (dressing and dyeing of fur, etc.), 300 (manufacture of office, accounting and computing machinery), 322 (manufacture of television and radio transmitters), others, 372 (recycling of non-metal waste and scrap), and 371 (recycling of metal waste and scrap).

3.3 Labour market flexibility and wages and salaries from ASI data

3.3.1 Background

Sluggish employment growth or the absence of significant positive effects of economic growth on living standards through productive employment generation is viewed as an outcome of strict labour market regulations. Some of the studies indicate that flexibility in the labour market and reforms in other sectors of the economy are expected to raise employment and also the real wages in the long run, if not in the short run (Fallon and Lucas, 1991). Hence, there has emerged a strong case for speedy reforms in the labour market together with reforms in other segments of the economy. But it is a well-known fact that in the process of economic reforms there are certain social costs, particularly for the existing labour force, and any such reforms without addressing these costs would only have an adverse impact on the labour market. Further, the ILO–SAAT study (1996) emphasizes that although labour market reforms could reduce the social costs of structural adjustments, it cannot minimize the social costs of stabilization. Though deregulation might be desirable in the context of increasing integration of a particular economy with the global economy, any reform in the labour market, the study argues, needs to be a gradualist one and it has to be accompanied by appropriate social safety nets and some institutional innovations that help the job losers in the process of labour reallocation. Hasty reforms would only reduce the social welfare. Moreover, as the organized labour market in several developing countries like India account for only a small fraction of the workforce, "it is legitimate to wonder if labour market reform can be of much consequence in such a context" (ibid.).

Goldar and Agarwal (2005) noted an accelerated fall in the income share of labour in the manufacturing sector in India during the post-reform period.[21] Hasan et al. (2003) noted that labour demand elasticities increase with reductions in protection, and further that Indian states with more flexible labour markets[22] witnessed larger increases in labour demand elasticities in response to reductions in protection, highlighting the importance of institutional factors. In fact, in his study of 48 developing countries, Hasan (2003), using panel data, argues that trade liberalisation is more likely to have a beneficial impact on employment when labour markets are flexible and vice versa. More regulated and rigid labour markets, he noted, are associated with higher real wages, which, however, come at the expense of employment. The bargaining power provides strong support only to those who are employed in the formal sector of the economy, constituting an insignificant component of the workforce. Thus, according to him, bargaining power does not support expansion of employment opportunities. Evidence on limited benefits from trade liberalisation for the typical worker largely refers to the Latin American experience. And some argue that trade does have the potential to benefit workers at large, though the nature of labour market regulations actually plays an important role in giving a tangible shape to these benefits (Edwards and Edwards, 1994). Hence, one important view, as mentioned above, is that with the presence of a regulated labour market, the overall impact of economic policy may not necessarily have a positive impact on employment generation. Besley and Burgess (2004) show that Indian states that amended the Industrial Disputes Act in a pro-worker direction experienced lowered output, employment, investment and productivity in organized manufacturing. Bhattacharjea (2006), on the other hand, criticizes the widely used index of state-level labour regulation devised by Besley and Burgess (2004), and the econometric methodology they use to establish that excessively pro-worker regulation led to poor performance in Indian manufacturing. On the whole, while there may be a case for removing labour market rigidities by discouraging the political patronization of the unions and relaxing the strict labour laws that prohibit employment growth, attention also needs to be given to labour welfare issues.

[21] Also see Datta (2003) and D'souza (2008).

[22] In their study a state is said to have a flexible labour market if the state had undertaken anti-employee amendments in the Industrial Disputes Act.

Since much of the focus on labour market deregulation lies on introducing wage flexibility or, in other words, removal of downward stickiness of wages so as to expand employment opportunities in the high-productivity sector, we may like to know how responsive employment is in relation to wages in the manufacturing sector. Mitra (2013) noted that the elasticity of employment with respect to wages across many countries is quite low even when it takes the right sign (negative). This piece of evidence may be taken to suggest that deregulation in terms of wage flexibility does not have a strong standing across countries. In other words, raising employment substantially through wage reduction does not seem to be promising in a majority of developing countries.

Those who support labour market deregulation believe that the cost of labour is too high, thus urging that in the context of globalisation firms need to become more competitive by cutting costs. In this sense, high labour cost is thought to be one of the major sources of inefficiency. Labour rules and strong unions are believed to push the wage rate artificially much above the market clearing wage rate, which in turn is said to reduce employment (Fallon and Lucas, 1991). Hence, labour market deregulation is expected to reverse the attitude of employers against expanding employment since it empowers them to hire and fire labour depending on requirement and offer wages which allow product prices to remain competitive.

Using manufacturing sector data for India, Ahsan and Pagés (2009) bring out the economic effects of legal amendments on two types of labour laws: employment protection and labour dispute resolution legislation. Laws that increase employment protection or the cost of labour disputes substantially reduce registered or organized sector employment and output or the share of value added that goes to labour. Labour-intensive industries, such as textiles, are the hardest hit by amendments that increase employment protection. On the other hand, capital-intensive industries are affected by laws that increase the cost of labour dispute resolution. These adverse effects, particularly relating to employment, are not alleviated by the widespread and increasing use of contract labour. Besley and Burgess (2004) also showed that Indian states, which amended the Industrial Disputes Act in a pro-worker direction, experienced lowered output, employment, investment and productivity in the organized manufacturing.

Mitra (2013) examined the possibility of any connection between labour absorption in the manufacturing sector and labour market regulation across countries.[23] World Development Indicators report the percentage of managers indicating labour regulations as a major business constraint and the percentage of managers indicating labour skill as a major business constraint for various countries. The higher the percentage, the higher is the probability that labour market regulations and the skill factor affect employment adversely. We have tried to relate these skill- and regulation-specific responses to the ratio of labour to real value added estimated from data for the aggregate manufacturing sector from the United Nations Industrial Development Organization (UNIDO). The coefficients in the estimated equations, however, turn out to be highly insignificant. Even when we control for real wage rate in the manufacturing sector, gross domestic product per capita at the national level and the share of manufactures in total imports taken as a proxy for imported technology, neither the labour skill variable nor labour market regulation turns out to be significant. Alternate estimates of labour absorption (or dependent variable) have been tried in the equation, i.e. the rate of growth of employment in the manufacturing sector from UNIDO data. Interestingly, the skill factor is seen to affect employment growth in the manufacturing sector negatively. In other words, the higher the percentage of managers who feel skill has been affecting business adversely, the lower the rate of growth of employment in the manufacturing sector. This implies that poor skill base of the workforce in developing countries reduces the pace of labour absorption as labour demand is possibly rising only

[23] Berg and Cazes (2007) point out the serious conceptual and methodological problems associated with the World Bank's Employing Workers Index of the Doing Business indicators and risks of formulating policies on the basis of these indicators.

for the high-skilled variety. However, the effect of labour market regulation is not statistically significant on the alternate form of the dependant variable. Though the sample is quite small, at least this much is evident that labour market regulations do not retard labour absorption. The International Labour Organization's (ILO's) data on the percentage of workers registered with the unions can be tried as a proxy for labour market conditions though this is far from straightforward.[24]

In the next section we present certain broad patterns emerging from the ASI data for India.

3.3.2 Wages and salaries: Evidence (1998-99 through 2007-08)

Wage share, salary share and total emolument share have been worked out for each of the industries on year-to-year basis (table A.9 in the appendix). The average emolument share at the aggregate level is around 20 per cent, with 50 per cent each to workers and employees (other than workers). In a large majority of the industries it is below 30 per cent.[25] Since wages do not constitute a large component of the total cost, a more careful analysis has to be pursued to identify what restricts industrial expansion and employment creation rather than simply blaming the labour laws.

The wage–salary inequality is evident from table A.9 in the appendix. The average ratio of wage per worker to salary per employee (other than worker) is only around 0.3 at the aggregate level: at the disaggregated level, in almost two-thirds of the industries the ratio turns out to be more than 0.4.[26] On the other hand, the worker-to-employees (other than workers) ratio is almost 3.4 times at the aggregate level. All this indicates that wages are not necessarily placed at a high level, which in turn could result in sluggish industrial employment for relatively less skilled labour, as popularly believed. Hence, the arguments for labour market deregulation and reduction in wages may not turn out to be effective in boosting employment sizably. In fact, the wage elasticity of workers (i.e. elasticity of workers with respect to wage rate) turns out to be negative and significant only in a group of 16

[24] The ratio of trade union members as a percentage of total paid employees has been calculated by the ILO Department of Statistics.

[25] Only corresponding to the following industries has it been more than 30 per cent: 152 (manufacture of dairy products), 154 (manufacture of other food products), 191 (tanning and dressing of leather, handbags), 192 (manufacture of footwear, etc.), 201 (saw milling and planing of wood, etc.), 221 (publishing), 222 (printing and service related to printing), 243 (manufacture of man-made fibres), 273 (casting of metals), 333 (manufacture of watches and clocks), 342 (manufacture of bodies for motor vehicles, etc.), 343 (manufacture of parts for motor vehicles and their engines), 351 (building and repair of ships & boats), 352 (manufacture of railway and tramway locomotives), 353 (manufacture of aircraft and spacecraft), 361 (manufacture of furniture), 371 (recycling of metal waste and scrap), and 372 (recycling of non-metal waste and scrap). Among them most are, however, below 40 per cent with the exception of a few.

[26] In ascending order: 152 (manufacture of dairy products), 272 (manufacture of basic precious and non-ferrous metals), others, 351 (building and repair of ships & boats) , 372 (recycling of non-metal waste and scrap), 371 (recycling of metal waste and scrap), 231 (manufacture of coke oven products), 221 (publishing), 361 (manufacture of furniture), 153 (manufacture of grain mill products, etc.), 291 (manufacture of general purpose machinery), 353 (manufacture of aircraft and spacecraft), 172 (manufacture of other textiles) and 201 (saw milling and planing of wood, etc.). On the other hand, the number of workers is almost three times that of the salary-holders in very many industries: 155 (manufacture of beverages), 271 (manufacture of basic iron & steel), 222 (printing and service related to printing), 343 (manufacture of parts for motor vehicles and their engines), 201 (saw milling and planing of wood, etc.), 151 (production of meat, fish, fruit, vegetables, etc.), 289 (Manufacture of other fabricated metal products), 251 (Manufacture of rubber products), 202 (Manufacture of products of wood, cork, etc.), 153 (Manufacture of grain mill products, etc.), 333 (Manufacture of watches and clocks), 359 (manufacture of transport equipment), 273 (casting of metals), 315 (manufacture of electric lamps, etc.), Total (all-industries combined), 351 (building and repair of ships & boats), 210 (manufacture of paper and paper products), 243 (manufacture of man-made fibres), 231 (manufacture of coke oven products), 369 (manufacturing n.e.c.), 172 (manufacture of other textiles), 154 (manufacture of other food products), 173 (manufacture of knitted and crocheted fabrics), 261 (manufacture of glass and glass products), 372 (recycling of non-metal waste and scrap), 269 (manufacture of non-metallic mineral products), 191 (tanning and dressing of leather, handbags), 342 (manufacture of bodies for motor vehicles, etc.), 371 (recycling of metal waste and scrap), 192 (manufacture of footwear, etc.), 182 (dressing and dyeing of fur, etc.), 171 (spinning, weaving and finishing of textiles), 181 (manufacture of wearing apparel), and 160 (manufacture of tobacco products) (in ascending order).

industries, as noted from table A.7 in the appendix, which reports the partial elasticity of workers with respect to value added and wages.

Wage share can be interpreted as the wage rate-labour productivity ratio. Rise in wage share would, therefore, mean a greater increase in the wages compared to labour-productivity growth. An increase in wage share over time can be interpreted as a rise in inefficiency. However, while interpreting this as a rise in inefficiency we need to be careful if, to begin with, wages were placed at a too low level.

The following are the industries in which we witnessed a more than 1 per cent increase in real wage rate which has also been more than the growth rate in value added per worker: 151, 251, 172, 369, 181, 353 and 371.[27] These industries are, however, too few in number, implying that the argument of wages being pushed to a high level that exceeds worker productivity and introduces inefficiency into the system cannot be held strongly against the Indian manufacturing sector. Even if we take simply the ratio of wages per worker to labour productivity, not a single case is seen where the numerator has been more than the denominator. Thus, the popular views on unionization and inefficiency are apparently exaggerated.

3.3.3 Regular workers to contractual workers

The process of contractualization is on the rise even at the aggregate level, as brought out by the NSS data. The percentage of workforce engaged as casual workers shot up in 2009–10 compared to 2004–05. Even within the ASI sector, the proportion of contractual workers to total workers (directly employed plus those appointed through the contractors) has increased steadily over time. Secondly, in many industries the proportion has been extremely high. The third observable pattern relates to the ratio of female to male workers in the category of directly recruited workers, which is significant in a group of industries (see figure 4). Since female wages are usually believed to be lower than that of the males, feminization of the workforce may be treated as an indicator of labour market flexibility that the employers have chosen as a means to reduce labour cost. The following industries showed more than 200 female workers per 1,000 male workers in 2007–08 (see box 2).

Box 2: Industries which showed more than 200 female workers per 1,000 male workers in 2007–08

191 (tanning and dressing of leather, handbags), 322 (manufacture of television and radio transmitters), 300 (manufacture of office, accounting and computing machinery), 210 (manufacture of paper and paper products), 151 (production of meat, fish, fruit, vegetables, etc.), 332 (manufacture of optical instruments, etc.), 182 (dressing and dyeing of fur, etc.), 315 (manufacture of electric lamps, etc.), 242 (manufacture of other chemical products), 321 (manufacture of electronic valves and tubes, etc.), 201 (saw milling and planing of wood, etc.), 223 (reproduction of recorded media), 173 (manufacture of knitted and crocheted fabrics), 192 (manufacture of footwear, etc.), 154 (manufacture of other food products), 333 (manufacture of watches and clocks), 160 (manufacture of tobacco products), and 181 (manufacture of wearing apparel).

At the aggregate level, for the year 2007–08, the ratio of workers appointed through contractors to those directly employed by the firms turned out to be 0.44, which increased steadily from 0.36 in 2004–05, implying rapid contractualization within a short time span. In the following industries the ratio has been more than 0.5 in 2007-08 (see box 3).

[27] In ascending order of wage growth rate.

Box 3: Industries in which the ratio of workers appointed through contractors to those directly employed has been more than 0.5 in 2007-08

289 (manufacture of other fabricated metal products), 293 (manufacture of domestic appliances), 315 (manufacture of electric lamps, etc.), 312 (manufacture of electricity distribution and control apparatus), 313 (manufacture of insulated wire and cables), 152 (manufacture of dairy products), 300 (manufacture of office, accounting and computing machinery), 273 (casting of metals), 271 (manufacture of basic iron & steel), 321 (manufacture of electronic valves and tubes, etc.), 343 (manufacture of parts for motor vehicles and their engines), 241 (manufacture of basic chemicals), 153 (manufacture of grain mill products, etc.), 151 (production of meat, fish, fruit, vegetables, etc.), 182 (dressing and dyeing of fur, etc.), 352 (manufacture of railway and tramway locomotives), 322 (manufacture of television and radio transmitters), 155 (manufacture of beverages), 281 (manufacture of structural metal products, tanks, etc.), 269 (manufacture of non-metallic mineral products), 342 (manufacture of bodies for motor vehicles, etc.), 351 (building and repair of ships & boats), 232 (manufacture of refined petroleum products), 160 (manufacture of tobacco products), and 372 (recycling of non-metal waste and scrap).

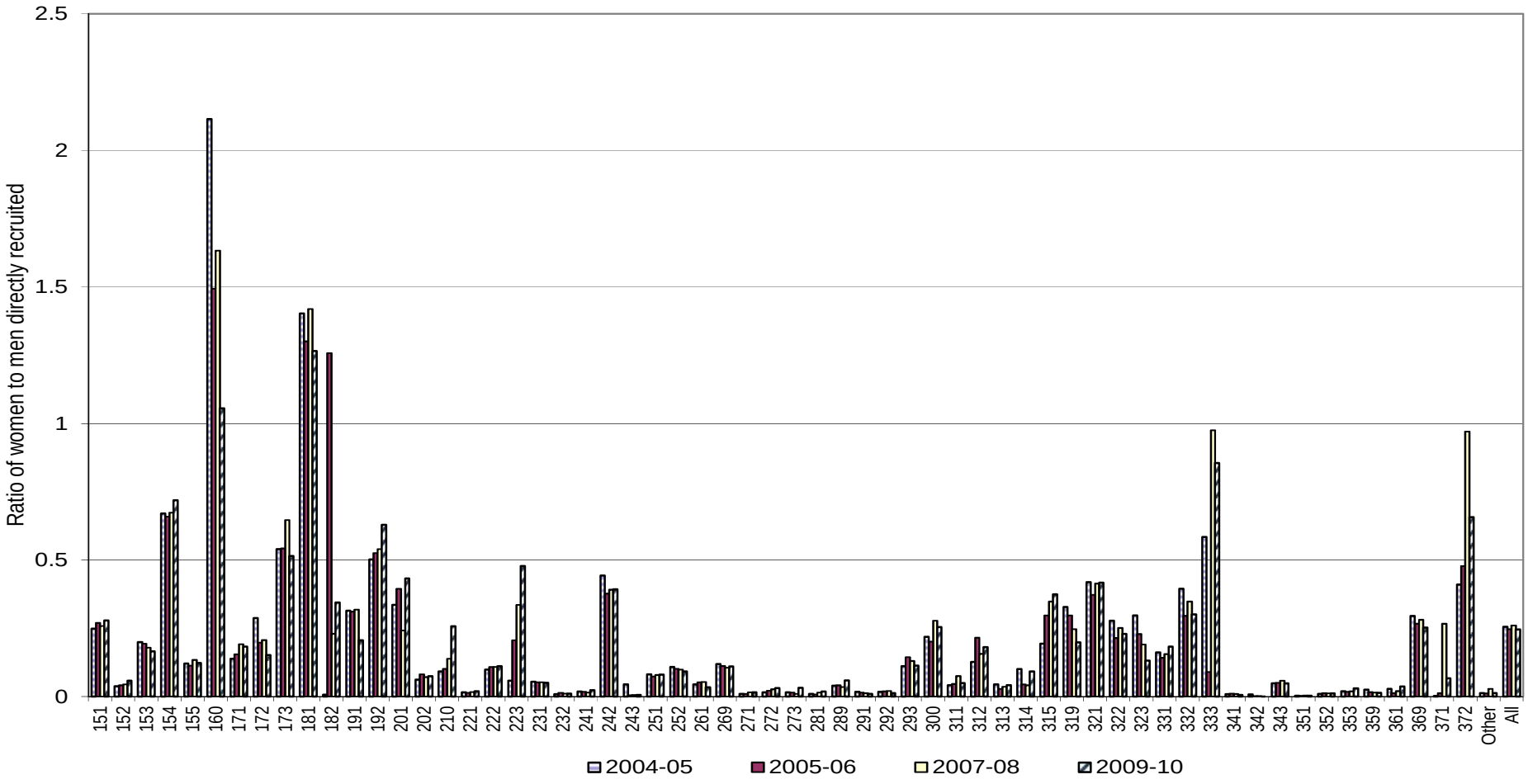
In fact, in some of the industries[28] the ratio of contractual workers to directly recruited workers was more than unity, implying that the percentage of contractual workers in the total was more than 50 per cent in 2004-05, and then going up to almost 73 per cent in 2007-08 (see figure 5). It is important to know if the industries, which recorded a relatively higher proportion of contractual workers in general, also experienced a faster growth in total employment or total workers. In a couple of industries we observe that the growth in workers has been more than 4 per cent per annum from 1998–99 to 2007–08 and, at the same time, the contractual-to-directly employed workers ratio has been more than 0.5 (i.e. the percentage of contractual workers being more than one-third of the total workers) in 2007–08 (see box 4): Since the number of such industries is not too large, a strong case cannot be made for contractualization as a key to higher employment growth rate. Also, the wage elasticity of employment (i.e. the responsiveness or the elasticity of workers with respect to wage per worker) is found to be high only in a few cases (see appendix table A.7), again indicating that wage flexibility in the downward direction need not raise employment substantially. As D'souza (2008) points out, even without deregulating the labour market the employers already have the freedom to choose from the mix of regular and contractual workers, which enables them to control labour and reduce the wage cost in a significant manner.

Box 4: The percentage of contractual workers being more than one-third of the total workers) in 2007–08

155 (manufacture of beverages), 182 (dressing and dyeing of fur, etc.), 232 (manufacture of refined petroleum products), 269 (manufacture of non-metallic mineral products), 273 (casting of metals), 289 (manufacture of other fabricated metal products), 300 (manufacture of office, accounting and computing machinery), 312 (manufacture of electricity distribution and control apparatus), 342 (manufacture of bodies for motor vehicles, etc.), 343 (manufacture of parts for motor vehicles and their engines), and 372 (recycling of non-metal waste and scrap).

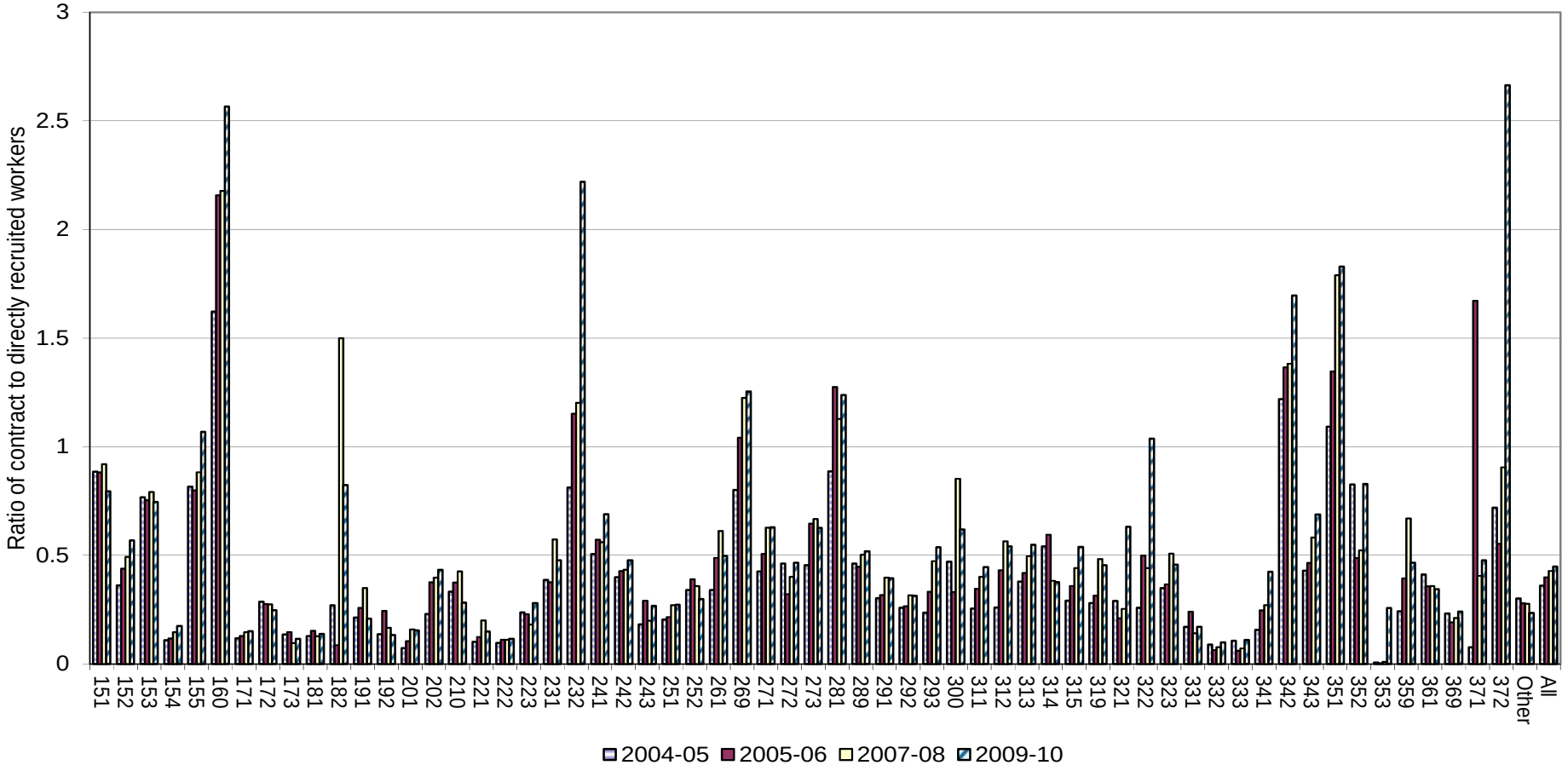
[28] 322 (manufacture of television and radio transmitters), 155 (manufacture of beverages), 281 (manufacture of structural metal products, tanks, etc.), 269 (manufacture of non-metallic mineral products), 342 (manufacture of bodies for motor vehicles, etc.), 351 (building and repair of ships & boats), 232 (manufacture of refined petroleum products), 160 (manufacture of tobacco products), and 372 (recycling of non-metal waste and scrap).

Figure 4. Female to male workers among the directly recruited ones (female/male in 2004–05, 2005–06, 2006–07 and 2007–08)



Source: Based on ASI data.

Figure 5. The ratio of contract to directly recruited workers (contract/direct in 2004–05, 2005–06, 2006–07 and 2007–08)



Source: Based on ASI data.

4. Performance of unorganized manufacturing

In this section we turn to the unorganized manufacturing sector and analyse its performance from 1989–90 to 2005-06, and from 2005–06 to 2009–10. No time series information is available on unorganized manufacturing enterprises except the point estimates available from the special surveys conducted by the NSSO. The unregistered manufacturing sector, which is taken as an operational synonym for the unorganized manufacturing sector, includes units, which employ less than ten workers, and units, which employ ten to 19 workers but are not using electricity or power. The unregistered manufacturing as per the National Accounts Statistics of the Central Statistical Organisation (CSO) accounts for around 34 per cent of the total manufacturing value added.

The units within the unorganized manufacturing sector have been divided into three types: own account manufacturing enterprises (OAMEs), which use only household or family labour; non-directory manufacturing enterprises (NDMEs), which employ one to five workers of which at least one is hired; and the directory manufacturing enterprises (DMEs) in the unregistered manufacturing sector, which include units with six to nine workers irrespective of using power, and units with ten to 19 workers without using power. However, the definition of workers in the surveys on unorganized manufacturing enterprises by the NSSO is very broad. No distinction is made between full-time and part-time workers and, more importantly, no time dimension is used in defining a worker. In other words, anyone attached to the unit, in whatever way possible, is defined as a worker. The interpretation of employment-related concepts in this sector, therefore, has to be made very carefully. Further, we may note that the recent survey (2010–11) on unorganised sector enterprises has not provided the data for NDMEs and DMEs separately—all being clubbed under establishments.

4.1 Growth in employment and output

Growth in employment and output are undoubtedly two important indicators of the performance of the industrial sector. It would be useful therefore to compare growth rates in employment and output attained in the reform period.

Table 8 presents a comparison of growth rates in terms of employment, output and number of enterprises for OAMEs, NDMEs and DMEs—the three segments of the unorganized manufacturing component. It is seen that growth in the reform period has been relatively faster in the NDME segment compared to the other two segments, particularly in terms of employment and number of enterprises. However, for aggregate unorganized manufacturing, the growth in employment has been extremely sluggish.

An analysis of output growth in unorganized manufacturing by major industry groups shown in Table 8 reveals that textiles and leather, non-metallic mineral products, basic metals, metal products, and machinery and transport equipment achieved relatively faster growth in real value added compared to the other sectors during the post-reform period. However, employment growth turned out to be as high as 2 per cent per annum only in textiles, chemicals, metal products and transport equipment (table 8).

Almost uniformly, growth in urban areas is found to be faster. The only exception is growth in real value added in NDMEs and DMEs—the growth rate in rural areas exceeded that in the urban areas though the total value added growth in the unorganized manufacturing sector has been higher in urban areas than in rural areas. Faster growth in the number of enterprises in urban areas could be due to the

change in the location of the enterprises, which could be an outcome of both promising enterprises shifting actually to urban areas and the reclassification of rural areas as urban over time.

Table 8. Growth rates of employment, real value added and number of enterprises in unorganized manufacturing, 1989–90 to 2005–06 (% per annum)

Sector	Employment	Real value added	No. of enterprises
OAME	0.24	2.11	0.88
NDME	1.71	3.97	1.62
DME	1.32	5.77	1.48
Total unorganized manufacturing	0.65	3.96	0.97

Source: Computed from NSS data on unorganized manufacturing enterprises.

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Table 9. Growth in real value added in unorganized manufacturing, 1989–90 to 2005–06 (% per annum)

Industries	OAME	NDME	DME	Unorg. Mfg
Food products, beverages and tobacco	0.83	1.91	7.25	2.58
Textiles and leather	6.81	6.07	6.57	6.53
Paper & products	6.44	0.26	2.10	2.00
Chemical and chemical products	3.98	-0.49	0.20	0.47
Non-metallic mineral products	1.60	7.04	8.30	5.99
Basic metals	6.30	1.33	5.36	4.81
Metal products	4.04	7.67	10.40	8.53
Machinery and equipment	1.30	2.65	8.32	5.48
Transport equipment	2.69	5.41	4.26	4.41
Other manufacturing incl. wood	-1.18	4.46	3.69	1.56
All industries	2.11	3.97	5.77	3.96

Source: Computed from NSS data on unorganized manufacturing enterprises.

An important point that comes out clearly from tables 9 and 10 is that the growth rate in value added in unorganized manufacturing has been much faster than the growth rate in number of workers and number of enterprises during 1989–90 to 2005–06, which broadly corresponds with the reform period. The implication is that value added per worker as well as value added per enterprise has grown rapidly, particularly in the rural areas. However, the employment growth rate was extremely sluggish for which the productivity growth rate has been quite fast in the post-reform period and this needs to be interpreted carefully. Besides, the measurement of value added in the NSS surveys on unorganized manufacturing has possibly undergone major improvements over time and, if so, the growth rates in value added are not strictly interpretable. Similarly, the definition of employment in these surveys, to begin with, has been quite loose and is not comparable with the NSS employment–unemployment surveys, as mentioned above. Part of the decline in the employment growth rate over time in the unorganized manufacturing sector can be attributed to improvements in estimating the number of workers more rigorously.

Over the more recent period, i.e. 2005–06 to 2010–11, employment growth has been mostly negative in the own account enterprises (table 11). However, in the establishments it was a little below 2 per cent per annum though across industry groups large variations are discernible. The aggregate employment figure for all establishments and own account enterprises turns out to be negative from 2005–06 to 2010–11.

Table 10. Employment growth in unorganized manufacturing, 1989–90 to 2005–06 (% per annum)

Industries	OAME	NDME	DME	Unorg. Mfg
Food products, beverages and tobacco	0.94	-0.35	0.98	0.80
Textiles and leather	2.18	3.72	2.18	2.42
Paper & products	4.12	-0.93	0.76	1.43
Chemical and chemical products	3.26	0.17	1.12	2.06
Non-metallic mineral products	-2.24	-0.12	0.30	-1.21
Basic metals	3.07	1.23	-0.24	0.86
Metal products	1.32	3.71	2.04	2.26
Machinery and equipment	-3.19	-1.17	-0.37	-1.58
Transport equipment	-1.76	0.99	3.19	2.07
Other manufacturing incl. wood	-2.40	2.41	1.55	-1.35
All industries	0.24	1.71	1.32	0.65

Source: Computed from NSS data on unorganized manufacturing enterprises.

Table 11. Growth in employment and gross value added in unorganized manufacturing, 2005–06 to 2010–11

Industry	OAME		Establishment		All	
	Workers	GVA	Workers	GVA	Workers	GVA
Food products, beverages and tobacco	-6.77	2.12	-3.39	-1.29	-5.94	0.35
Textiles and leather	2.48	15.14	0.46	9.84	1.79	12.07
Paper & products	-13.35	-4.04	15.53	23.45	-0.64	17.29
Chemical and chemical products	-17.36	-4.70	-2.04	4.59	-10.99	2.95
Non-metallic mineral products	-4.91	2.01	11.27	9.03	3.97	7.67
Basic metals	13.34	19.06	-2.30	-12.92	2.52	-9.10
Metal products	-3.69	9.65	4.77	1.47	1.82	2.54
Machinery and equipment	-26.19	-14.44	-8.65	-5.70	-12.64	-6.60
Transport equipment	-5.64	15.63	-7.70	4.20	-7.52	4.70
Other manufacturing incl. wood	-1.32	12.79	4.43	7.77	0.89	9.47
All Industries	-2.45	9.58	1.85	5.25	-0.86	6.72

GVA = gross value added

Note: GVA is in Rs. Crore (in 2004-05 prices)

Source: NSSO; see Table 10.

One important structural change that has been occurring for a while in Indian manufacturing is the decline in the share of household enterprises: the share of household enterprises in manufacturing employment declined from 55 per cent in 1961 to 32 per cent in 1981 and further to 23.7 per cent in 1991 (Ramaswamy, 1994). This trend seems to have been arrested to a large extent in the post-reform period, though not entirely. The household enterprises are covered under the OAME segment of unorganized manufacturing. The share of OAME employment in the total unorganized manufacturing sector employment declined by 4.4 percentage points, from 69.4 per cent to 65.0 per cent between 1989–90 and 2005–06. There was an increase in the share of NDME within unorganized manufacturing in terms of employment (table 12). On the other hand, the share of DMEs in terms of both employment and value added rose over the same period. Two broad conclusions have been drawn by looking at the data for rural and urban areas separately (Goldar et al., 2011): (a) in rural areas, the share of OAME in value added declined in general, between 1989–90 and 2005–06, except in paper and chemicals; (b) in urban areas, the share of DME in value added has generally improved except in non-metallic minerals and transport equipment.

Table 12. Share of OAME, NDME and DME in employment and value added in unorganized manufacturing, 1989–90 and 2005–06 (%)

Sector	Employment		Value added	
	1989-90	2005-06	1989-90	2005-06
OAME	69.4	65.0	42.7	32.0
NDME	13.4	15.9	24.1	24.1
DME	17.2	19.1	33.3	43.8
Unorg. Mfg.	100.0	100.0	100.0	100.0

Source: Computed from NSS data on unorganized manufacturing enterprises.

4.2. Growth in labour productivity

Growth in labour productivity (defined as real gross value added per worker) turns out to be positive in all the three sectors – OAME, NDME and DME (1989–90 to 2005–06, table 13). In both NDMEs and DMEs, chemical and chemical products recorded a negative growth in labour productivity in the 1990s. As a result, the combined unorganized manufacturing growth rate in this industry group turned out to be negative. In industries like basic metals, transport equipment and other manufacturing, productivity growth has been above average. In recent years (2005–06 to 2010–11), labour-productivity growth has been very fast in the unorganized manufacturing sector (i.e. at almost 8 per cent per annum) since employment growth has been almost negative. Usually, in the unorganized manufacturing sector, the decline in employment is expected to be accompanied by a proportionate decline in value added as labour-intensive technology is used extensively. However, this does not seem to have happened. Is it because the redundant labour has been retrenched without causing any negative effect on value added or is it because labour-saving technology is being pursued even in the unorganized component? Table 10 indicates that the value added growth even in the OAMEs, which are believed to be more vulnerable compared to the establishments (NDME and DME), has been substantial. If these units are not expected to have access to modern technology, the retrenchment of redundant labour and/or improvement in the definition of worker used in the survey must be the cause of decline in employment growth which has not been accompanied by decline in value added growth. However, there could be a third line of argument as well: the unorganized manufacturing units now cater to many organized sector units through contractors. And from our micro surveys we have observed that work consignments are large in number, but at the same time the large units are particular in terms of quality-specificity. In other words, the unorganized sector enterprises are now conscious enough to manufacture quality products for which they have to appoint relatively better quality labour with higher productivity in the place of too many unskilled workers. Also, the fact that

the payment system is now more piece-rate means the enterprises have had to become more competitive by appointing better-performing workers.

Table 13. Labour-productivity growth in unorganized manufacturing (% per annum)

Industries	Unorganized Manufacturing				
	1989–90 to 2005–06			2005–06 to 2010–11	
	OAME	NDME	DME	ALL	ALL
Food products, Beverages and tobacco	-0.11	2.26	6.21	1.77	6.68
Textiles and leather	4.53	2.26	4.29	4.01	10.11
Paper & products	2.23	1.20	1.33	0.55	18.04
Chemical and chemical products	0.70	-0.66	-0.91	-1.56	15.66
Non-metallic mineral products	3.93	7.16	7.97	7.30	3.56
Basic metals	3.13	0.10	5.61	3.92	-11.33
Metal products	2.69	3.81	8.20	6.13	0.71
Machinery and equipment	4.63	3.86	8.72	7.17	6.92
Transport equipment	4.52	4.37	1.04	2.29	13.21
Other manufacturing incl. wood	1.25	2.01	2.12	2.95	8.51
All industries	1.87	2.21	4.39	3.38	7.65

Source: NSS data, see Table 12.

Table 14. Growth rate in wages per worker in unorganized manufacturing, 1989–90 to 2005–06 (% per annum)

Industries	Unorganized manufacturing		
	NDME	DME	Combined
Food Products, beverages and tobacco	6.91	7.98	7.48
Textiles and leather	6.31	6.26	6.33
Paper & products	4.54	4.30	4.86
Chemical and chemical products	4.58	1.80	2.52
Non-metallic mineral products	11.18	7.08	7.72
Basic metals	4.49	4.28	4.38
Metal products	8.35	10.43	9.85
Machinery and equipment	8.87	6.52	7.65
Transport equipment	7.57	3.96	4.90
Other manufacturing incl. wood	4.41	2.75	3.50
All industries	6.19	5.48	5.88

Source: NSS data, see table 12.

Wages or emoluments per worker grew at a fast rate in the unorganized manufacturing sector (table 14). It may be useful to examine the wage–productivity relationship in order to reflect on the relative efficiency of workers: wage growth vis-à-vis productivity growth. Wage elasticity with respect to productivity, which is defined as the ratio of the rate of growth in wages to the rate of growth in productivity, calculated from 1989–90 to 2005–06, is extremely high in unorganized manufacturing at the aggregate level (table 15). Even across various groups of industries it turns out to be unity or more than unity, implying wage growth has been more than the productivity growth. However, we need to recognize the fact that the base year wage in the unorganized sector has been much lower than that in the organized sector and, therefore, a higher growth rate corresponding to the unorganized manufacturing sector does not come as a surprise. Notwithstanding these explanations we may note that globalization has resulted in a higher degree of mobility across activities and regions, and in an

attempt to prevent a high labour turnover cost it is natural for employers to offer higher wages. Hence, a part of the rapid growth in wages in the unorganized sector is in response to the changing economic environment. Also, subcontracting from large units is believed to have raised the supply of work consignments in the unorganized sector, which possibly contributed to rapid wage growth. Subcontracting from the large units requires quality control which can be assured partly through improving the tenure of the workers, i.e. by reducing the labour turnover rate and introducing regularity in the informal or unorganized sector. This is possible only through wage increase.

Table 15. Elasticity of wages with respect to productivity in unorganized manufacturing (1989–90 to 2005–06)

Industries	Unorganized manufacturing		
	Growth rate	Growth rate	
	Wages (% p.a.)	Productivity (% p.a.)*	Elasticity
Food products, beverages and tobacco	7.48	4.32	1.73
Textiles and leather	6.33	3.37	1.87
Paper & products	4.86	1.50	3.23
Chemical and chemical products	2.52	-0.81	-3.10
Non-metallic mineral products	7.72	7.83	0.99
Basic metals	4.38	4.43	0.99
Metal products	9.85	6.29	1.57
Machinery & equipment	7.65	7.13	1.07
Transport equipment	4.90	1.86	2.64
Other manufacturing incl. wood	3.50	2.05	1.71
All industries	5.88	3.52	1.67

* Only for NDM and DME, to be consistent with the estimated growth rate in wages.

Source: NSS data, see table 12.

5. Inter-industry linkages

In order to understand the inter-industry input–output linkages within the manufacturing sector we have considered the Social Accounting Matrix (SAM) prepared by Pradhan et al. (2013). The SAM for 2007–08 has 49 sectors and is based on input–output (I-O) table 2006–07. From this we have extracted the manufacturing component, which has 14 sub-sectors in total. In this study, we focus only on the intra sub-sectoral dependence within the manufacturing sector and not the inter-sectoral relationships such as agriculture and manufacturing or manufacturing and services. Though there is a great deal of evidence on growing interlinkages between manufacturing and services (Banga and Goldar, 2004; Dasgupta and Singh, 2005; Mitra and Schmid, 2008), this study confines itself to the manufacturing sector. Kant (2013), in fact, presents an estimate of the multiplier effect of every job created in the manufacturing sector, which is around three jobs created in the tertiary/services sector.

The column total in table A.10 adds up to one indicating the inputs drawn from various sub-sectors (the same and others) for the production of one unit of output of a given sub-sector. On the other hand, in table A.11, the row total adds up to one giving the distribution of one unit of output of a given sub-sector across various sub-sectors used as inputs. It may be noted that inputs to and inputs from sectors other than manufacturing are excluded in the analysis. The findings are as follows.

In deciding whether the input drawn from a sub-sector is sizeable or not we have taken 5 per cent as the benchmark. Petroleum and chemicals are some of the key industries which provide inputs to the production of goods in most industries. Particularly the consumer goods and light goods industries, such as food, beverages, textiles, wood, paper, leather, etc., are mostly dependent on these products. However, as we move on to other groups such as fertilizer, chemicals, cement, metal and machinery, we observe that their dependence on each other is quite significant in addition to the two key inputs, petroleum and chemicals. The transport goods sub-sector, for example, depends on a number of sub-sectors such as wood, paper, rubber, chemicals, metal, metal products, non-electrical machinery and electrical machinery (Table 16). This suggests that any deceleration in the labour-intensive light goods sectors does not necessarily impact on the heavy goods sector adversely.

Table 16. Major inputs used

Food Depends on	**Beverages Depends on**	**Textiles Depends on**	**Other Textiles Depends on**	**Wood Depends on**	**Paper Depends on**	**Leather Depends on**	**Rubber Depends on**	**Petroleum Depends on**
Petroleum Fertilizers Chemicals	Petroleum Fertilizers Chemicals	Petroleum Fertilizers, Chemicals	Petroleum Fertilizers	Petroleum Fertilizers	Petroleum Fertilizers, Chemicals	Food Chemicals	Rubber petroleum Non-electrical Machinery Trans Other	other Textile Wood Petroleum Transport
Fertilizers Depends on	**Chemicals Depends on**	**Cement Depends on**	**Non-Met Depends on**	**Metals Depends on**	**Metal Prod Depends on**	**Non-Electrical Depends on**	**Elect Mach Depends on**	**Trans Depends on**
Petroleum Chemical Metal products Non-electrical Machinery Transport	Petroleum Chemical Non-metal Metal Non-electrical	Rubber Petroleum Chemical Metal	Petroleum Chemical Metals Non-electrical	Food Paper petroleum Chemicals Non-electrical	Food Beverage Paper Rubber, Chemical	Textile Petroleum Chemical	Textile Other Textile Chemical Non-electrical	Wood Paper Rubber Chemical Metal Metal prod Non-electrical Electrical
Other Mfg Depends on								
Paper Chemical								

Source: Pradhan et al. (2013)

On the other hand, from table A.11, which presents the distribution of one unit of output of a specific sub-sector across various sub-sectors in terms of input-use, we observe that items such as food and beverages are used as inputs in those very sub-sectors. However, in the remaining cases the utilization of products across sub-groups other than the same one is quite distinct. Hence, we may conclude that some of the labour-intensive industries do not have strong inter-industry linkages whereas some others, like textiles, do, implying that industrial deceleration in the heavy goods sector can reduce the input demanded from the labour- as well as capital-intensive sub-sectors (Table 17). Thus, growth and employment in the labour-intensive sub-sectors may suffer, which in turn may affect adversely the overall employment growth in the manufacturing sector. This may also have a cascading effect on the rest of the economy, the pace of employment generation and the effectiveness of the industrial sector in reducing poverty.

Table 17. Sector of use as inputs

Food is Used in	Beverage is Used in	Textile is Used in	Other Tex is Used in	Wood is Used in	Paper is Used in	Leather is Used in	Rubber is Used in	Petroleum is Used in
Food Beverage	Beverage Chemical	Textile Other Textile	Textile Other Textile Chemicals Electrical	Food Paper Chemicals Non-electrical Electrical	Food Paper Chemical Electrical	Other Textile Leather Electrical Transport	Beverage Rubber Chemicals Non-electrical Electrical Transport	Food petroleum Fertilizers Chemicals Non-metal Metal
Fertilizers is Used in	**Chemicals is Used in**	**Cement is Used in**	**Non-Met is Used in**	**Metals is Used in**	**Metal Prod is Used in**	**Non-elec is Used in**	**Elect Mach is Used in**	**Trans is Used in**
Food Fertilizers Chemicals	Rubber Chemicals Electrical	Chemicals Non-metal	Cement Non-metal Metal Electrical Non-electrical	Metal Metal-products Electrical Transport	Metal Metal-products Non-electrical Electrical Transport	Other Textile Non-electrical Electrical Transport	Non-electrical Electrical Transport	Metal Transport
Other Mfg is Used in								
Electrical Other								

Source: Pradhan et al. (2013)

6. Productivity, skills and innovation

Skill formation is an indispensable prerequisite for labour productivity as well as total factor productivity growth. Even if jobs can be generated in the process of growth they may require certain skills and knowledge, which the available labour may not provide. Hajela (2012) argues that a shortage of skills is making more people unemployable in India. There are 17 central government ministries that offer skill development initiatives through school education, institutes of higher learning and specialized vocational training institutes. China, with a similar scale of population and training structure to that of India, has higher labour productivity, indicating higher skills. She argues that India lacks sufficient skilled workers as its existing vocational training system does not target the casual or informal workforce, which constitutes a sizable percentage of India's working population. Froumin et al. (2007) urged that only 16 per cent of Indian manufacturing firms offer in-service training, compared with 92 per cent in China and 42 per cent in the Republic of Korea. The Indian firms that do provide in-service training are 23–28 per cent more productive than those that do not.

The National Skill Development Corporation (NSDC) in India was formed to achieve the target of skilling/up-skilling 150 million people by 2022 by fostering private sector initiatives in the skill development space. To support its various initiatives, NSDC is looking to create an enabling environment by developing a robust research base for skilling. It conducts studies to understand the geographical and sector-wise skill requirements and on various subjects that can influence and enable the skilling environment in India. NSDC reports are prepared for a wide range of sectors such as auto and auto components, banking, tourism, infrastructure and also the unorganized sector. Several studies across countries highlight the mismatch between skill requirement and the quality of labour available. Richardson (2007) suggests the following scheme for classifying skills shortages:

- Level 1 shortage: There are few people who have the essential technical skills who are not already using them and there is a long training time to develop the skills.
- Level 2 shortage: There are few people who have the essential technical skills who are not already using them but there is a short training time to develop the skills.

- Skills mismatch: There are sufficient people who have the essential technical skills who are not already using them, but they are not willing to apply for the vacancies under current conditions.
- Quality gap: There are sufficient people with the essential technical skills who are not already using them and who are willing to apply for the vacancies, but they lack some qualities that employers consider are important.

Comyn (2012) reports on recent research into enterprise skill profiles and workplace training practices in Bangladesh's manufacturing industry. Based on data from 37 enterprises across eight manufacturing groups, collected during a study for the International Labour Organization (ILO), he analysed enterprise and sectoral skill intensity and identified key skill issues. This helps prioritize sectors for project-based investments in workplace training and industry skill development. Particularly at a time of significant expansion, any negligence of research and training can affect performance adversely. The research also illustrates the difficulties of using generalized approaches to classifying and comparing skills at the enterprise and sectoral levels. Whilst the concept of skill intensity and the use of occupational classifications may be interesting it does not talk about the relevance of the acquired skill in a particular occupation across other occupations. Without a skill, which has greater applicability across a number of sectors, the bargaining power of the workers and consequently occupational mobility tend to change sluggishly.

Desjardins and Rubenson (2011) throw light on the potential causes of skill mismatch, the extent of skill mismatch, the socio-demographic make-up of skill mismatch, and the consequences of skill mismatch in terms of earnings as well as employer-sponsored adult education/training. The authors have made a distinction between *skill mismatch* and *education mismatch*. Two key findings are as follows. First, including supply and demand characteristics in an earning function, it reveals that labour-demand characteristics are more important than labour-supply characteristics in explaining earnings differentials. In other words, skills matter for earnings but only if they are required by the job. Second, the skill content of jobs seems to be an even stronger determinant of participation in employer-supported adult education/training than educational attainment or literacy proficiency. On the whole, they argue that skill formation is not just a supply side issue; it is just as much a function of work tasks and work organization on the demand side. Policies on skill formation have to take into account both supply and demand. Identifying the mechanisms that help to foster the optimal utilisation of the existing skill base is essential. Otherwise, many workers, even with high qualifications, may lose their skills due to a lack of use, which is an erosion of any investment in education.

In the context of small versus large firms and skill acquisition, Bishop (2012) points out that due to certain characteristics inherent to their small size, small firms generally display greater informality in their learning processes. They cannot normally be expected to learn in the highly formalized and structured ways more often pursued by their larger counterparts. But small firms, too, can and do benefit from formal training. Bishop deals with the concept of "learning architecture" to illuminate the connection between firm size and learning processes.

Education levels to determine skills is a fairly blunt instrument, more so given that the notion of "skill" is socially constructed, but that's another argument and linked to the new National Skills Qualification Framework (NSQF). As far as the question of which skills are important, the argument about the issue of skill shortages and the importance of expansion of the higher education system should go hand in hand. Higher education may bring higher returns on investments only if the person is employed. Also, the analysis of employability of those with vocational type training may bring a different insight into the story of lower returns on investments into vocational training, if the employability is high. Several studies have used education as a base. Based on the evidence in Asia

and the Pacific countries, Tilak (2003) observed significant effects of higher education on development. In terms of NSS data, Mehrotra et al. (2013) use educational (general, technical and vocational) attainments to understand the skill levels of the existing workforce. They estimate the skilling requirements, sector-wise, under different scenarios to arrive at a realistic and desirable target and find that the challenge of skill development—both in quantitative and qualitative terms—is enormous and requires a careful policy stance. Mitra et al. (2002) noted that in most of the two-digit industry groups of the manufacturing sector, education, health and other indicators of social infrastructure impacted on the total factor productivity growth much more than the physical or the financial infrastructure. Hence, the quality of human capital is a strong determinant of performance. In the present study on Indian manufacturing, after bringing out certain aspects of sluggish growth in demand for labour, it is important to assess the employability of the existing labour force. There is a view that highlights the supply side factor, pointing to poor human capital formation, reducing the performance indicator, which in turn motivates employers to adopt capital-intensive technology. On the other hand, given the complementary relationship between capital and skill, capital-intensive technology does not necessarily assure optimal utilization of the available technology due to skill shortage. Mitra (2009) noted that imported technology, which is capital-intensive in nature, tends to reduce technical efficiency in the manufacturing sector in developing countries, which could also be due to the unavailability of skilled labour.

Based on the NSS data we have estimated the index of skill mismatch following the methodology of Estevão and Tsounta (2011): Skill Mismatch Index = sigma (j = 1…n) $(S_{jt} - M_{jt})^2$, where, *j* is skill level, *n* is the number of skill categories, Sij is proportion of population with skill level *j* at time *t* and Mij is proportion of employees with skill level *j* at time *t*.

We have also estimated a similar index taking the difference in the proportional distribution of working persons and the unemployed across various skill levels. A third set is estimated by taking into account the proportional distribution across various skill levels of workers in each of the activities and also all workers between the following two time points: 2004–05 and 2009–10.

6.1 Results on skill mismatch index

The index representing the difference between the skill level of the population and the workers is estimated at 73.11 (based on table 18), which is quite high. In other words, the difference between the skill levels of the potential labour supply and those already working is sizeable. Of course we need to understand that those who are employed are not necessarily absorbed in demand-induced activities. There are several activities, which are repository of surplus labour, not requiring much skill to be pursued. Hence, those who are working are not necessarily better off compared to the non-workers in terms of skill levels. Even then the mismatch is significant.

Table 18. Percentage distribution across educational levels, 2009–10

Category	Not literate	Up to primary	Middle	Secondary	Higher secondary	Diploma/ certificate course	Graduate	Postgraduate	All
Workers	31.7	24.8	16.9	11.5	6.1	1.2	5.8	1.9	100
Unemployed	5.3	12.5	17.3	15.4	16.2	6.2	20.4	6.7	100
Population	33.2	32	13.8	9.3	5.7	0.8	3.9	1.1	100

Source: Based on NSS Data from employment-unemployment survey, 2009-10.

The inter-temporal skill mismatch index as estimated from the distribution of workers in each of the activities across various skill levels is again highly significant (Table 19). The skill gap in the manufacturing sector is seen to be on the high side indicating that with time jobs in this activity are becoming more skill-based compared to those in other activities such as construction and transport.

Table 19. Skill mismatch index across activities, 2004–05 to 2009–10

Activities	Manu-facturing	Electricity	Construction	Trade	Transport	Financing	Services	Total workers
Index	48.86	73.88	21.41	53.21	21.41	46.12	46.82	88.38

Note: All workers include agriculture and mining.

Source: Based on NSS Data from employment-unemployment surveys, 2004-05 and 2009-10.

Even a cursory look at the percentage of population with an education shows that only around one-fifth of the population/workforce had studied either up to higher secondary or more in the age brackets of 30–44 and 45–59 in 2004–05. More than half of the children in the age group of 7 to 14 had not studied at least up to the primary level. All this shows poor employability of the available labour supply (tables 20a and 20b). However, with time, there has been a rise in the percentage of the population/workforce who acquired the specified level of education, as is seen from the 2009–10 survey data.

Table 20a. Education level: Total population

Year	Up to 6	7–14 (% primary and above)	15–29 (% secondary and above)	30–44 (% higher secondary and above)	45–59 (% higher secondary and above)	>59 (% higher secondary and above)	Total (% above the threshold limit)
2004–05	Omitted	42.06	38.54	19.68	15.45	6.67	28.9
2009–10	Omitted	47.88	50.63	25.16	18.48	10.61	35.4

Source: Based on NSS Data from employment-unemployment surveys, 2004-05 and 2009-10.

Table 20b. Education level: Workforce

Year	Up to 6	7–14 (% primary and above)	15–29 (% secondary and above)	30–44 (% higher secondary and above)	45–59 (% higher secondary and above)	>59 (% higher secondary and above)	Total (% above the threshold limit)
2004–05	Negligible sample	38.24	31.04	21.78	18.32	6.92	23.25
2009–10	Negligible sample	48.34	41.68	28.24	22.50	10.14	29.59

Source: Based on NSS Data from employment-unemployment surveys, 2004-05 and 2009-10.

Tables 21a and 21b list the percentage of population and workforce with no education, education up to the primary level, education above the primary level, and those with technical education. All the three categories may add up to more than 100 per cent as some individuals may have acquired both general and technical education. These tables also identify only one third of the population and a little below half of the workforce who can be considered to be relatively better in terms of skill

endowment, in the year 2004–05. The corresponding figures, however, went up to a little above two-fifths of the population and a little above half of the workforce in 2009–10 (tables 21a and 21b).

Table 21a. General and technical education: Total population

	Type	Up to 6	7–14	15–29	30–44	45–59	>59	Total
2004–05	Illiterate	79.87	9.43	16.66	32.34	42.14	60.62	34.21
	Up to primary	20.12	79.44	22.60	24.91	24.38	22.13	33.37
	Above primary and also those with technical education	0.01	11.21	63.61	45.98	35.97	18.40	34.24
2009–10	Illiterate	75.11	4.79	10.54	24.17	34.96	53.63	27.43
	Up to primary	24.89	81.09	17.22	21.33	22.94	21.24	31.15
	Above primary and also those with technical education	0.00	14.12	74.99	57.10	43.96	26.20	43.04

Note: All the three categories may add up to more than 100 per cent as some individuals may have acquired both general and technical education.

Source: Based on NSS Data from employment-unemployment surveys, 2004-05 and 2009-10.

Table 21b. General and technical education: Workforce

		Up to 6	7-14	15-29	30-44	45-59	>59	Total
2004-05	Illiterate	Negligible sample	40.13	21.04	31.23	39.43	55.32	31.52
	Up to Primary		49.84	27.65	24.66	24.29	25.64	25.99
	Above Primary and Also those with Technical Education		10.09	54.59	47.99	39.44	20.38	45.78
2009-10	Illiterate	Negligible sample	29.08	13.66	21.67	30.87	47.43	23.50
	Up to Primary		56.83	23.34	21.14	22.84	25.31	22.77
	Above Primary and Also Those with Technical Education		13.36	66.38	60.61	48.87	28.53	56.75

Note and Source: See Table 21a.

If we consider those who acquired vocational training formally or informally or through self-learning – the information for whom is given only for the age cohort 15–29 – their percentage share in the total population in the corresponding age bracket turns out to be only 11 and 7 for 2004–05 and 2009–10 respectively. However, if we consider the set of workers in this age bracket, the respective figures go up to 15.6 and 10 per cent for both years.

6.2 Wage function

Another important way of showing the importance of skills in the job market is to calculate the returns to skill and the differences in the returns across various levels of skills. One of the convenient ways of conceptualizing the returns is to estimate an earning function with dummies representing different educational levels. The weekly wage function estimated on the basis of the NSS unit-level data from the 66th round shows that education dummies (both general and technical) tend to enhance earnings (table 22). Those who have general education tend to have higher earnings in comparison to the illiterates. In fact, most of the education dummies are significant except Gedu2, which represents literates without formal schooling. Similarly, technical education dummies are also significant. But

those who have acquired vocational training are not better off in comparison to those who do not have it. Male earnings are higher than female earnings. Scheduled castes receive a lower wage compared to the general-cum-Other Backward Classes (OBCs). Large households are also worse off in terms of earnings, suggesting lower productivity levels and poor quality of labour. Though age, taken to be a proxy for job market experience, is not significant, age-square is and it has a positive coefficient. All this tends to suggest that skill formation does contribute to higher levels of earnings. Though ideally it would have been desirable to estimate an earning function with both demand and supply side variables, due to unavailability of data on the demand side such an equation could not be pursued. The sector-specific dummies are mostly negative, suggesting lower earnings compared to mining and quarrying. However, the occ7, representing other services, including financing, among others, has a positive coefficient indicating higher earnings in this sector. In relation to the manufacturing sector we may infer that those who are able to acquire skills are able to secure employment with higher levels of earnings as there is a demand for the skilled variety of labour due to a rise in the skill intensity of technology.

Table 22. Dependent variable: Regression equation for weekly wage (in rupees per person)

Variables	Coeff.	t ratio
Age	-1.98	-0.58
Agesq	0.39	8.98*
hhhold_size	-10.28	-4.57*
Gedu2	18.63	0.24
Gedu3	201.06	13.44*
Gedu4	831.28	46.45*
Gedu5	2028.29	95.56*
Tedu2	2756.52	47.92*
Tedu3	690.78	20.12*
Tedu4	903.45	19.08*
vtrn1	-766.49	-24.02*
vtrn2	-124.35	-3.89*
vtrn3	-77.98	-3.59*
mst1	-8.88	-0.29
mst2	193.45	7.68*
gender1	371.49	27.14*
reldum1	-184.97	-10.26*
reldum2	-155.69	-6.42*
Socdum1	26.93	1.56
Socdum2	-101.55	-7.4*
occ1	-700.31	-16.03*
occ3	-412.47	-9.3*
occ4	-586.32	-13.42*
occ5	-750.70	-16.42*
occ6	-323.05	-7.09*
occ7	101.45	2.34*
Secdum1	-258.73	-22.27*

Note: Number of obs = 75,518, F(27, 75490) = 1914.54, Adj R-square = 0.4062

age: Age of the earner; Agesq: age square; hhhold_size: household size; Gedu2: literate without formal schooling; Gedu3: primary and middle level; Gedu4: secondary and higher secondary; Gedu5: graduation and postgraduation; Tedu2: technical degree in agriculture/engineering/technology/medicine, etc.; Tedu3: diploma or certificate (below graduate level) in: agriculture, engineering/technology, medicine, crafts, other subjects; Tedu4: diploma or certificate (graduate and above level) in: agriculture, engineering/technology, medicine, crafts, other subjects; vtrn1: receiving formal vocational training; vtrn2: received vocational training: formal; vtrn3: received non-formal: hereditary, self-learning, learning on the job, others; mst1: never married; mst2: currently married; gender1: male; reldum1: Hindu; reldum2: Islam; Socdum1: schedule tribe; Socdum2: schedule caste; occ1: agriculture, hunting, forestry, fishing; occ3: manufacturing, electricity, gas and water

supply; occ4: construction; occ5: wholesale and retail trade, hotel and restaurant; occ6: transport, storage and communication; occ7: other services including financing, etc.; secdum1: rural dummy.

Source: Based on NSS unit-level data (66th Round, 2009–10) from employment-unemployment survey.

7. Conclusion

The performance of the organized manufacturing sector in India, based on gross value added growth rate, showed marked improvement in the 1990s compared to the earlier period. In terms of growth rates, both workers and total persons employed increased from a mere 1 per cent per annum during the deregulated regime (1984–85 to 1990–91) to around 3 per cent per annum over the 1990s, though this growth rate was marginally above the growth rate that was experienced during the regulated regime (1973–74 through 1984–85). The increase in employment growth rate in organized manufacturing in the 1990s, particularly between 1990–91 and 1995–96, could also be explained by the huge expansion that took place in the early reform period.

Subsequently, the gross value added growth rate continued to be a little above 9 per cent per annum from 1998–99 to 2007–08. However, the employment growth rate during this phase decelerated marginally in comparison to the 1990s (prior to 1998–99) experience, and more so in the case of employees (other than workers). Labour productivity, defined as the value added per person employed, grew at almost 7 per cent per annum. Wages per worker remained almost stagnant while the remuneration per person shot up significantly, implying a substantial growth in the salaries per employee (excluding workers).The growth rate in fixed capital decelerated to almost half, resulting in a sluggish growth in capital–labour ratio. Since Indian entrepreneurs had already accumulated a huge stock of capital – evident from sustained growth in fixed capital over the preceding period – the decline in the growth rate during 1997–98 to 2007–08 does not come as a surprise.

Industries, which dominated in terms of employment share, did not necessarily result in fast employment growth. Over this phase, several industries, however, witnessed rapid value added growth. Industries, which did not perform well in terms of value added, did not perform well in terms of employment either. There is a strong positive correlation between the average value added growth and total employment growth measured across all the three-digit manufacturing groups, implying growth is essential for employment generation. However, and not necessarily, rapid value added growth has resulted in faster employment growth. Total employment increased only at around 2.6 per cent per annum at the aggregate level, from 1998–99 to 2007–08.

Decomposing total employment in terms of workers and employees (other than workers) several industries are seen to have experienced a negative growth rate in the latter category, though value added growth in these industries was more than 5 per cent per annum. Four clusters are discernible: (a) low employment and low value added growth; (b) low employment but high value added growth; (c) moderate employment and high value added growth; and (d) high employment and high value added growth. Decomposition of value added in terms of employment and productivity shows that only a few groups experienced rapid productivity growth of at least 5 per cent per annum and employment growth of at least 4 per cent per annum, simultaneously. Capital-intensive technology leading to rapid labour-productivity growth naturally reduces the extent of employment generation.

For the aggregate organized manufacturing sector the elasticity of total employment with respect to value added is 0.43 and the elasticity of workers with respect to value added is 0.35. Industries, which

recorded an employment elasticity of up to 0.4, are many, though only a handful of them had an employment elasticity of more than 0.55. These industries may be targeted for providing a boost to employment growth but given their share it is unlikely that they will succeed in raising the overall employment growth of the manufacturing sector in a significant manner as specified in the National Manufacturing Policy.

The impact of remuneration per employee (or wages per worker) on total employment (or workers) is not statistically significant. The correlation between the average growth in workers' productivity and wages is again negligible. Since wages do not constitute a large component of the total cost, a more careful analysis has to be pursued to identify what restricts industrial expansion and employment creation rather than simply blaming the strict labour laws. Wage share can be interpreted as the wage rate-labour productivity ratio, implying that if the numerator is greater than the denominator it reflects gross inefficiency. However, not a single case is seen where the ratio is greater than unity. Thus, the popular views on unionization and inefficiency are apparently exaggerated.

Even within the ASI sector, the proportion of contractual workers to total workers (directly employed plus those appointed through the contractors) has increased steadily over time. Secondly, in many industries the proportion has been extremely high. The third observable pattern relates to the ratio of female to male workers in the category of directly recruited workers, which is significant in a group of industries. Since female wages are usually believed to be lower than that of the males, feminization of the workforce may be treated as an indicator of labour market flexibility that the employers have chosen as a means to reduce labour cost. On the whole, mechanisms to initiate flexibility are already in motion even without labour market deregulation being carried out formally.

In the context of unorganized manufacturing, the growth rate in value added has been much faster than the growth rate in number of workers and number of enterprises during 1989–90 to 2005–06. In the more recent period, i.e. 2005–06 to 2010–11, employment growth has been mostly negative in own account enterprises. However, in the establishments it was a little below 2 per cent per annum, though the aggregate employment figure for all establishments and own account enterprises turns out to be negative.

Wages or emoluments per worker in the unorganized manufacturing sector grew at a rapid pace. Even across various groups of industries the elasticity of wages with respect to productivity turns out to be unity or more than unity, implying wage growth has been more than the productivity growth. However, we need to recognize the fact that the base year wage in the unorganized sector has been much lower than that in the organized sector and, therefore, a higher growth rate corresponding to the unorganized manufacturing sector does not come as a surprise. Notwithstanding these explanations it should be noted that globalization has resulted in a higher degree of mobility across activities and regions, and in an attempt to prevent high labour turnover cost it is natural for employers to offer higher wages. Hence, part of the rapid growth in wages in the unorganized sector is in response to the changing economic environment. Also, subcontracting from large units is believed to have raised the supply of work consignments in the unorganized sector, which possibly contributed to rapid wage growth. Subcontracting from the large units requires quality control which can be assured partly by improving the tenure of the workers, i.e. by reducing the labour turnover rate and introducing regularity in the informal or unorganized sector, which is possible only by raising the wages.

Regarding inter-industry linkages we may conclude that some of the labour-intensive industries do not have strong inter-industry linkages whereas some others, like textiles, do, implying that industrial deceleration in the heavy goods sector can reduce the input demanded from labour- as well as capital-intensive sub-sectors. Thus, growth and employment in the labour-intensive sub-sectors may suffer,

which in turn may affect adversely the overall employment growth in the manufacturing sector. This may also have spill-over (negative) effects on the rest of the economy, the pace of employment generation and the effectiveness of the industrial sector in reducing poverty.

The index representing the difference between the skill level of the population and the workers is estimated at 73.11. In other words, the difference between the skill levels of the potential labour supply and those already working is sizeable. The inter-temporal skill mismatch index as estimated from the distribution of workers in each of the activities across various skill levels is again substantial. Relatively speaking, the skill gap in the manufacturing sector is seen on the high side compared to some of the tertiary activities, indicating that over time jobs in the manufacturing are becoming more skill-biased. In the earnings function, the dummies representing different educational levels are significant, suggesting positive returns to education. Thus, those who are able to acquire a skill are able to secure employment with higher levels of earnings as there is a demand for the skilled variety of labour due to rise in the skill intensity of technology. Absorption of unskilled labour is, therefore, a major challenge.

The important policy implications are as follows. Industries, which have experienced rapid growth in both value added and employment, need to be given priority. Those with high employment elasticity with respect to growth can be encouraged to enhance manufacturing employment. The industries, which are highly labour-intensive and have recorded sizeable employment growth, naturally deserve greater attention.[29] Even the industries, which are labour-intensive but are not able to grow at a rapid pace, require closer scrutiny.

Even in the capital-intensive sector, possibilities have to be explored if some of the phases in the production process can be carried out using labour-intensive methods. Since labour-productivity growth and not employment has been the major contributing factor to value added growth, emphasis has to be laid on reducing the capital accumulation process if manufacturing has to be the engine of employment generation.

Labour market deregulation may not bring in rapid employment growth because the responsiveness of employment with respect to wages is not statistically significant across a number of industry groups. The process of contractualization is already on the rise in several industries even without much deregulation measures being carried out in black and white. In spite of that, if employment could not pick up sizably, other constructive routes to employment generation need to be pursued instead of blaming the labour market laws univocally.

Improvement in employability is an important consideration from the point of view of policy. For this, skill formation is an essential prerequisite, which can be attained by accessing quality education and participating in institutions, which impart training in skill formation. Such technical institutions, particularly which provide diplomas, are however few in number and thus government initiative is indeed crucial. From the point of view of the quality of vocational education again greater efforts are called for. Besides, on-the-job training is another important way of eliminating skill mismatches.

Over the next decade India has to create gainful employment opportunities for a large section of its population, with varying degrees of skills and qualifications. It is the manufacturing sector, which is expected to be the driver of this employment creation initiative. Apart from the employment imperative, the development of the manufacturing sector is critical from the point of view of ensuring

[29] 181, 182, 192, 191, 369, 281, 372, 371, 172, 361, 273, 289, 312, 173, 319, 343.

sustainable economic growth in India. Thus, with the objective of developing the Indian manufacturing sector to reflect its true potential, the Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, has embarked on creating a policy environment that would be suitable for the manufacturing sector to grow rapidly. Keeping in view the importance of the employment–industrialization policies, as mentioned above, and also the fact that India has not been able to generate employment opportunities in the organized/formal manufacturing sector on a large scale, the national manufacturing policy comes as a silver lining.

Against the backdrop of global recession and large job losses, if corrective steps are not taken, India's situation could be worse. From this perspective, the recently cleared National Manufacturing Policy promises to create 100 million more jobs and contribute 25 per cent to the country's GDP in a decade. In the face of dampening demand and the rising cost of capital, experts in policy circles believe that it can change the fate of manufacturing in India and turnaround the overall economy. The policy addresses in great detail the environment and regulatory issues, labour laws and taxation, but it is the proposed creation of the National Manufacturing Investment Zones (NMIZs) or clustering of manufacturing units that is treated as a unique way of integrating industrial infrastructure and achieve economies of scale. NMIZs will be developed as integrated industrial townships with world-class infrastructure and land use on the basis of zoning, clean and energy efficient technology with a size of at least 5,000 hectares. The NMIZs will be on non-agricultural land, with adequate water supply, and the ownership will be with the state government. The policy aims at introducing flexibility in the labour market by offering greater freedom to the employers while hiring and firing. It also enables the sunset industrial units to follow a simplified exit mechanism. At the same time, it insists on workers' rights, which run the risk of being compromised in the name of flexibility.

An important feature of the manufacturing policy is its financial and development incentives to the small and medium enterprises. On the whole, the policy promises to increase the share of the manufacturing sector to the country's GDP to 25 per cent from the existing 16 per cent. However, the National Manufacturing Policy's objective of raising industrial employment to an unprecedented level may not be realized as organized manufacturing employment comprises only a fraction of the total manufacturing employment.

It may be therefore useful to consider the employment potential of the unorganized manufacturing sector as well and tap the potential to create quality employment in this sector. Small and medium enterprises (SMEs) need to undergo an innovative revolution in terms of scale of operations, technology, financing, and ways to upgrade the skills of the workers. Since labour-intensive sectors like food processing, apparels and textiles, leather and footwear contribute to over 60 per cent of employment in SMEs (Kant, 2013), greater focus on the labour-intensive sectors will enable productive absorption of surplus unskilled labour. Though our study did not deal with the regional profile of the labour market and aspects relating to inter-spatial industrial growth disparity, the policy initiatives need to give top priority to labour-intensive goods based industrial growth in regions characterized by greater magnitudes of unskilled labour and insignificant industrialization.

Issues relating to infrastructure shortage, constraints on energy supply, sluggish export growth and poor performance of the labour-intensive exportable goods sector are pertinent. The lack of innovations required for developing appropriate technology is a major hurdle. The bureaucratic and administrative rigidities in areas where they tend to hamper growth and employment or fail to attract foreign investment are undoubtedly important though an empirical investigation of these issues remained outside the ambit of the present study.

Appendix

TableA.1. ASI code, name of the industry groups, WPI used to deflate the value added, distribution of value added and employment

ASI code	Industry name	WPI used (1993–94 base) to deflate value added	Average share in total value added (%)	Average share in total employment (%)
151	Production, processing and preservation of meat, fish, fruit vegetables, oils and fats	b. Canning, preserving & processing of fish	1.13	1.92
152	Manufacture of dairy product [production of raw milk is classified in class 0121]	a. Dairy products	0.77	0.98
153	Manufacture of grain mill products, starches and starch products, and prepared animal feeds	c. Grain mill products	1.20	3.75
154	Manufacture of other food products	k. Other food products n.e.c	3.18	8.16
155	Manufacture of beverages	a. Wine industries	1.03	1.04
160	Manufacture of tobacco products [tobacco related products are also included while preliminary processing of tobacco leaves is classified in class 0111]	d. Manufacture of bidi, cigarettes,tobacco & zarda	0.01	5.48
171	Spinning, weaving and finishing of textiles	(C) Textiles	7.58	12.46
172	Manufacture of other textiles	e. Other misc. textiles	0.63	1.47
173	Manufacture of knitted and crocheted fabrics and articles	(C) Textiles	0.80	1.33
181	Manufacture of wearing apparel, except fur apparel [this class includes manufacture of wearing apparel made of material not made in the same unit. Both regular and contract activities are included]	b. Man-made textiles	2.97	4.68
182	Dressing and dyeing of fur; manufacture of articles of fur	b1. Man-made fibre	0.01	0.02
191	Tanning and dressing of leather, manufacture of luggage handbags, saddlery & Harness	Hessain & sacking bags	0.21	0.62
192	Manufacture of footwear	(F) Leather & leather products	0.46	1.16
201	Saw milling and planing of wood	Timber planks	0.02	0.12

ASI code	Industry name	WPI Used (1993–94 base) to deflate value added	Average share in total value added (%)	Average share in total employment (%)
202	Manufacture of products of wood, cork, straw and plaiting materials	b. Manufacture of board	0.21	0.50
210	Manufacture of paper and paper product paperboard	a. Paper & pulp	1.71	2.13
221	Publishing [This group includes publishing whether or not connected with printing. Publishing involves financial, technical, artistic, legal and marketing activities, among others but not predominantly]	c. Printing & publishing of newspapers, periodicals, etc.	0.64	0.63
222	Printing and service activities related to printing	c. Printing & publishing of newspapers, periodicals, etc.	0.34	0.78
223	223 Reproduction of recorded media [This class includes reproduction of records, audio, video and computer tapes from master copies, reproduction of floppy, hard or compact disks, reproduction of non-customised software and film duplicating]	Roll films	0.07	0.03
231	Manufacture of coke oven products	III MANUFACTURED PRODUCTS	0.37	0.33
232	Manufacture of refined petroleum products	III MANUFACTURED PRODUCTS	8.63	0.58
241	Manufacture of basic chemicals	a. Basic heavy inorganic chemical	8.82	2.57
242	Manufacture of other chemical products	c1. Fertilisers	8.56	6.45
243	Manufacture of man-made fibers [This class includes manufacture of artificial or synthetic filament and non-filament fibres]	Man-made Fibre	0.47	0.31
251	Manufacture of rubber products	(G) Rubber & plastic products	1.63	1.37
252	Manufacture of plastic products	b. Plastic products	2.05	2.04
261	Manufacture of glass and glass products	b. Glass earthenware Chinaware & their Products	0.51	0.61
269	Manufacture of non-metallic mineral products n.e.c.	(I) Non-metallic mineral products	4.61	5.49
271	Manufacture of basic iron & steel	a1. Iron & steel	8.69	4.87
272	Manufacture of basic precious and non-ferrous metals	a2. Foundries for casting forging & structurals	2.28	0.95

ASI code	Industry name	WPI used (1993–94 base) to deflate value added	Average share in total value added (%)	Average share in total mployment (%)
273	Casting of metals [This group includes casting finished or semi-finished products producing a variety of goods, all characteristic of other activity classes]	a2. Foundries for casting forging & structurals	0.64	1.36
281	Manufacture of structural metal products, tanks, reservoirs and steam generators	c. Metal products	1.29	1.39
289	Manufacture of other fabricated metal products; metal working service activities	c. Metal products	1.87	2.42
291	Manufacture of general purpose machinery	a. Non-electrical machinery & parts	3.11	2.79
292	Manufacture of special purpose machinery	b. Electrical machinery	4.17	2.41
293	Manufacture of domestic appliances, n.e.c.	b4. Electrical apparatus & appliances	0.77	0.41
300	Manufacture of office, accounting and computing machinery	Computer & computer based system	2.0	2.0
311	Manufacture of electric motors, generators and transformers	Electrical generators	1.85	0.95
312	312 Manufacture of electricity distribution and control apparatus [electrical apparatus for switching or protecting electrical circuits (e.g. switches, fuses, voltage limiters, surge suppressors, junction boxes etc.) for a voltage exceeding 1000 volts; similar apparatus (including relays, sockets etc.) for a voltage not exceeding 1000 volts; boards, panels, consoles, cabinets and other bases equipped with two or more of the above apparatus for electricity control or distribution of electricity including power capacitors.]	Power capacitors	1.39	0.69
313	Manufacture of insulated wire and cable [insulated (including enamelled or anodized) wire, cable (including coaxial cable) and other insulated conductors; insulated strip as is used in large capacity machines or control equipment; and optical fibre cables]	b2. Wires & cables	1.28	0.46

ASI code	Industry name	WPI used (1993–94 base) to deflate value added	Average share in total value added (%)	Average share in total employment (%)
314	Manufacture of accumulators, primary cells and primary batteries	b3. Dry & wet batteries	2.06	0.24
315	Manufacture of electric lamps and lighting equipment	Gls lamps	0.74	0.29
319	Manufacture of other electrical equipment n.e.c.	Other electrical equipment & systems	0.29	0.32
321	Manufacture of electronic valves and tubes and other electronic components	Valve all types	0.74	0.000008
322	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	Telephone instruments	1.36	0.35
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods	TV sets colour	2.0	0.37
331	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, navigating and other purposes except optical instruments	Medical X-Ray films	1.21	0.57
332	Manufacture of optical instruments and photographic equipment	Roll films	0.19	0.07
333	Manufacture of watches and clocks	(K) Machinery & machine tools	0.19	0.18
341	Manufacture of motor vehicles	Motorcycles	3.32	0.96
342	Manufacture of bodies (coach work) for motor vehicles; manufacture of trailers and semi-trailers	Body manufactured for buses	0.09	0.25
343	Manufacture of parts and accessories for motor vehicles and their engines [brakes, gear boxes, axles, road wheels, suspension shock absorbers, radiators, silencers, exhaust pipes, steering wheels, steering columns and steering boxes and other parts and accessories n.e.c.]	Other automobile spare parts	2.70	2.46

ASI code	Industry name	WPI used (1993–94 base) to deflate value added	Average share in total value added (%)	Average share in total employment (%)
351	Building and repair of ships & boats	a1. Heavy Machinery & Parts	0.17	0.28
352	Manufacture of railway and tramway locomotives and rolling stock	III MANUFACTURED PRODUCTS	0.21	0.30
353	Manufacture of aircraft and spacecraft	III MANUFACTURED PRODUCTS	0.10	0.05
359	Manufacture of transport equipment n.e.c.	b. Motor Vehicles, motorcycles, scooters, bicycles & parts	2.22	1.70
361	Manufacture of furniture	Steel furniture	0.24	0.33
369	Manufacturing n.e.c.	III MANUFACTURED PRODUCTS	1.13	1.46
371	Recycling of metal waste and scrap [from rejected aluminium, utensil, containers and other used metallic items etc. Collection of metal waste and scrap for recycling is included in 51498.]	(J) Basic metals alloys & metal products	0.003	0.007
372	Recycling of non-metal waste and scrap [from old new papers, rejected glass articles and used non-metallic items etc. Collection of non-metal waste and scrap for recycling is included in 51498.]	(J) Basic metals alloys & metal products	0.003	0.01
OTHER		MANUFACTURED PRODUCTS	1.92	1.72
TOTAL		MANUFACTURED PRODUCTS		
Fixed Asset		Machinery & machine tools		
Wages and Salaries		Consumer price index for industrial workers		

Source: Annual Survey of Industries, EPW Research Foundation.

Table A.2. Employment growth in industries with a value added growth rate of more than 5 per cent per annum (ascending order): ASI sector (1998-99 through 2007-08)

Industry code	Workers	Emplo-yees other than workers	Total persons	Value added
222	2.82	3.19	2.91	5.46
191	4.36	3.70	4.23	5.58
321	3.51	1.99	3.06	5.72
153	1.37	2.87	1.71	5.96
293	-1.32	-6.27	-2.60	6.49
221	0.46	3.29	1.92	6.65
252	6.01	1.24	4.58	6.73
192	6.76	2.55	6.14	6.75
223	1.64	-1.42	0.56	7.03
210	2.95	0.56	2.47	7.15
261	-0.45	-1.01	-0.55	7.77
155	5.29	2.46	4.55	7.83
242	2.75	2.77	2.76	8.10
351	2.90	-3.25	1.57	8.11
361	4.98	3.11	4.48	8.20
181	9.43	9.60	9.46	8.51
369	8.66	9.23	8.77	8.89
202	3.77	3.95	3.80	9.13
342	4.20	-2.27	2.99	9.18
322	-0.80	-6.63	-2.90	9.44
Total	2.98	1.29	2.58	9.45
272	0.99	-0.26	0.63	9.76
323	-4.05	-6.14	-4.70	9.84
271	2.91	2.22	2.74	10.05
291	0.73	-6.81	-2.61	10.07
172	9.12	19.46	13.48	10.11
269	5.85	3.81	5.44	10.40
289	7.63	4.08	6.78	10.62
292	3.36	0.01	2.26	10.80
315	3.08	0.72	2.57	11.50
182	4.42	8.40	4.91	11.55
343	8.70	5.36	7.88	11.63
319	8.66	3.25	7.04	12.32
371	8.81	8.88	9.31	12.72
332	4.92	5.00	5.01	13.68
314	-0.02	1.91	0.53	13.73
359	0.31	-2.15	-0.24	14.07
331	4.80	0.18	2.92	14.47
173	17.16	13.72	9.46	15.30
281	7.00	3.65	6.13	16.51

311	2.78	0.16	1.93	17.07
312	7.04	2.18	5.50	18.22

Industry code	workers	Emplo-yees other than workers	Total persons	Value added
231	3.45	1.06	2.95	18.43
Others	7.25	8.74	7.78	18.57
341	3.04	-1.65	1.69	18.97
300	8.10	3.97	6.06	22.88
232	6.60	0.10	4.71	25.46
372	43.15	44.12	44.26	59.44

Source: Annual Survey of Industry Data (compiled by the Economic and Political Weekly Research Foundation)..

Table A.3. Industries with negative growth in total employment: ASI sector (1998-99 through 2007-08)

Industry code	Workers	Employees other than workers	Total persons	Value added
333	-6.08	-12.30	-7.55	-0.57
323	-4.05	-6.14	-4.70	9.84
243	-4.04	-6.35	-4.53	-14.00
322	-0.80	-6.63	-2.90	9.44
352	-2.21	-4.85	-2.86	4.92
291	0.73	-6.81	-2.61	10.07
293	-1.32	-6.27	-2.60	6.49
241	-1.68	-3.35	-2.24	-0.12
313	-0.09	-4.04	-1.21	-0.98
171	-0.80	-2.02	-0.98	4.62
160	-0.88	-0.91	-0.88	2.49
261	-0.45	-1.01	-0.55	7.77
359	0.31	-2.15	-0.24	14.07
201	-1.15	3.57	-0.04	4.59

Source: See table A2

Table A.4. Sluggishly growing industries in terms of total employment (0 to 2% per annum): ASI sector (1998-99 through 2007-08)

Industry code	Workers	Employees other than workers	Total persons	Value added
154	0.47	-1.22	0.13	2.66
314	-0.02	1.91	0.53	13.73
223	1.64	-1.42	0.56	7.03
272	0.99	-0.26	0.63	9.76
251	1.29	-0.53	0.87	2.29
351	2.90	-3.25	1.57	8.11
341	3.04	-1.65	1.69	18.97

153	1.37	2.87	1.71	5.96
152	3.34	-1.14	1.81	0.94
221	0.46	3.29	1.92	6.65
311	2.78	0.16	1.93	17.07

Source: See table A2

Table A.5. Industries with total employment growth of 2 to 4 per cent per annum: ASI sector (1998-99 through 2007-08)

Industry code	Workers	Employees other than workers	Total persons	Value added
Total	2.98	1.29	2.58	9.45
292	3.36	0.01	2.26	10.80
353	4.30	-0.36	2.37	3.59
151	3.12	0.40	2.44	0.32
210	2.95	0.56	2.47	7.15
315	3.08	0.72	2.57	11.50
271	2.91	2.22	2.74	10.05
242	2.75	2.77	2.76	8.10
222	2.82	3.19	2.91	5.46
331	4.80	0.18	2.92	14.47
231	3.45	1.06	2.95	18.43
342	4.20	-2.27	2.99	9.18
321	3.51	1.99	3.06	5.72
202	3.77	3.95	3.80	9.13
273	4.91	1.18	4.08	4.57

Source: See table A2

Table A.6. Rapidly growing industries in terms of total employment (in ascending order): ASI sector (1998-99 through 2007-08)

Industry code	Workers	Employees other than workers	Total persons	Value added
191	4.36	3.70	4.23	5.58
361	4.98	3.11	4.48	8.20
155	5.29	2.46	4.55	7.83
252	6.01	1.24	4.58	6.73
232	6.60	0.10	4.71	25.46
182	4.42	8.40	4.91	11.55
332	4.92	5.00	5.01	13.68
269	5.85	3.81	5.44	10.40
312	7.04	2.18	5.50	18.22
300	8.10	3.97	6.06	22.88
281	7.00	3.65	6.13	16.51
192	6.76	2.55	6.14	6.75
289	7.63	4.08	6.78	10.62
319	8.66	3.25	7.04	12.32
Others	7.25	8.74	7.78	18.57
343	8.70	5.36	7.88	11.63

369	8.66	9.23	8.77	8.89
371	8.81	8.88	9.31	12.72
181	9.43	9.60	9.46	8.51
173	17.16	13.72	9.46	15.30
172	9.12	19.46	13.48	10.11
372	43.15	44.12	44.26	59.44

Source: See table A2

Table A.7. Employment elasticity with respect to value added and remuneration: ASI sector (1998-99 through 2007-08)

Industry	Dep Var: Ln (person engaged)					Ln (workers)				
		Ln (gross value added)		Ln (emoluments per all categories of employees including workers)			Ln (gross value added)		Ln (wage per worker)	
	Adj. R^2	Coefficient	T	Coefficient	t	Adj. R^2	Coefficient	t	Coefficient	t
151	0.25	0.30	1.98*	0.26	0.82	0.03	0.25	1.45	0.20	0.22
152	0.49	-0.13	-1.03	0.60	3.25*	-0.18	0.33	0.69	-2.30	-0.78
153	0.90	0.29	2.71*	-0.02	-0.09	0.85	0.27	4.46*	-0.09	-0.38
154	0.09	0.10	1.26	0.01	0.06	0.40	0.13	2.57*	0.32	1.37
155	0.81	0.08	1.16	0.77	4.27*	0.63	0.24	2.49*	1.58	2.55*
160	0.26	0.28	1.18	-0.36	-2.17*	-0.22	-0.10	-0.54	-0.11	-0.16
171	0.38	0.39	2.59*	-0.79	-2.54*	-0.06	0.23	1.19	0.58	0.71
172	0.92	1.29	9.24*	-0.84	-5.02*	0.88	0.77	3.84*	0.17	0.22
173	0.95	1.12	9.71*	-0.92	-12.02	0.90	1.08	8.99*	-1.56	-1.86
181	0.94	0.40	2.48*	1.02	3.68	0.89	0.62	3.62*	1.08	2.16*
182	0.69	0.68	4.65*	-0.29	-0.76	0.70	0.70	4.74*	-0.59	-1.22
191	0.39	0.30	0.89	0.32	0.56	0.45	0.97	2.48*	-2.61	-1.50
192	0.89	0.66	4.51*	0.46	1.17	0.87	0.76	4.80*	1.00	1.01
201	0.05	0.08	1.50	-0.01	-0.11	0.00	0.10	1.04	-0.41	-1.39
202	0.62	0.10	0.57	0.52	1.41	0.48	0.31	2.13*	0.11	0.18
210	0.69	0.49	4.64*	-0.52	-2.44*	0.96	0.19	4.21*	-1.19	-9.68*
221	0.51	0.29	2.71*	-0.02	-0.14	0.55	0.20	2.90*	-0.63	-2.23*
222	0.78	0.33	3.60*	0.24	1.24	0.77	0.43	5.60*	0.10	0.20
223	0.61	0.64	3.35*	-0.69	-1.41	0.71	1.14	4.06*	1.38	1.51
231	0.56	0.17	3.46*	-0.05	-0.18	0.67	0.15	2.67*	-0.31	-1.07
232	0.64	0.25	3.88*	-0.36	-1.55	0.79	0.25	5.63*	-0.56	-2.37*
241	0.69	0.42	2.44*	-0.36	-4.16*	0.28	0.36	1.59	-0.73	-1.68
242	0.89	0.30	2.80*	0.07	0.45	0.85	0.35	5.43*	-0.16	-0.11
243	0.54	0.10	0.63	-0.56	-1.60	0.67	0.20	2.55*	-1.30	-2.80*
251	0.26	0.39	1.97*	0.02	0.12	0.39	0.46	2.71*	-0.24	-0.80
252	0.73	0.50	1.26	0.27	0.42	0.88	0.85	6.33*	-0.31	-0.28
261	-0.20	-0.16	-0.43	0.16	0.27	-0.20	-0.02	-0.16	-0.17	-0.45
269	0.77	0.74	4.94*	-1.18	-2.50*	0.89	0.36	5.44*	-2.05	-5.00*
271	0.54	0.47	3.06*	-0.41	-1.34	0.76	0.26	3.26*	-0.90	-3.14*
272	0.49	0.35	3.11*	-0.30	-1.99*	0.59	0.28	3.80*	-0.35	-1.97*
273	0.90	0.66	7.07*	0.30	1.48	0.84	0.84	5.89*	0.22	0.32
281	0.85	0.47	5.70*	-0.22	-0.60	0.88	0.46	7.17*	-0.56	-1.18

289	0.97	0.60	8.17*	0.11	0.55	0.97	0.70	15.78*	0.14	0.26
291	0.63	0.35	2.33*	-0.95	-4.16*	0.31	0.06	0.53	-3.90	-2.18*
292	0.25	-0.04	-0.34	0.61	1.72	0.06	0.16	1.27	0.13	0.04
293	0.37	0.13	1.09	-1.26	-2.66*	-0.16	0.12	0.48	-0.06	-0.10
300	0.70	0.31	2.54*	-0.33	-0.72	0.99	0.27	2.32*	0.93	4.97*
311	0.27	0.28	1.89	-0.35	-0.72	0.42	0.16	1.11	-0.55	-0.71
312	0.78	0.35	4.65*	-0.16	-0.44	0.82	0.38	2.76*	-0.23	-0.25
313	-0.26	-0.01	-0.18	0.12	0.35	-0.25	-0.01	-0.28	0.25	0.34
314	-0.27	0.00	-0.12	0.03	0.18	-0.04	-0.01	-0.34	-0.50	-1.25
315	-0.02	-0.05	-0.72	0.94	1.34	0.25	-0.02	-0.38	-1.18	-2.23*
319	0.72	-0.01	-0.06	1.14	2.53*	0.56	0.38	3.04*	0.88	0.80
321	0.05	0.02	0.07	0.30	0.89	-0.03	0.52	1.23	-0.82	-0.72
322	0.30	0.22	1.69	-1.07	-2.32*	0.63	-0.03	-0.24	-2.05	-3.67*
323	0.73	0.30	2.30*	-0.61	-4.79*	0.52	0.17	1.18	-1.60	-3.35*
331	0.65	0.86	3.80*	-1.26	-2.93*	0.70	0.33	4.05*	0.13	0.28
332	0.57	0.23	2.02*	0.10	0.31	0.57	0.27	2.85*	-0.15	-0.30
333	0.39	0.26	1.63	-0.99	-1.97	0.16	0.33	1.90	0.17	0.32
341	0.32	0.43	2.23*	-0.89	-1.70	0.84	0.20	5.59*	-1.60	-4.90*
342	0.72	0.56	3.33*	-0.33	-0.57	0.78	0.55	5.46*	-0.35	-0.80
343	0.81	0.39	1.42	0.69	0.98	0.84	0.57	4.45*	-2.39	-1.78
351	0.06	0.25	1.58	-0.38	-0.83	0.49	0.33	2.93*	-1.50	-2.33*
352	0.01	0.30	1.00	-0.80	-1.45	-0.17	0.29	0.81	0.88	0.73
353	0.44	0.24	2.47*	-0.02	-0.05	0.07	0.17	1.62	-0.07	-0.17
359	0.52	0.71	3.06*	-1.48	-3.40	0.89	0.49	6.39*	-2.68	-8.47*
361	0.68	0.17	1.15	0.53	2.04	0.55	0.36	2.64*	-0.74	-1.36
369	0.96	0.36	3.98*	1.05	5.89	0.95	0.53	6.18*	1.25	4.45*
371	0.96	0.61	2.60*	-0.41	-1.04	0.98	0.91	6.40*	-0.97	-3.94*
372	0.94	0.75	3.68*	-0.65	-1.73	0.95	0.75	5.38*	-0.69	-2.62*
Others	1.00	0.12	1.45	0.87	4.64	1.00	0.33	5.39*	0.35	2.41*
Total	0.80	0.43	2.79*	-0.21	-0.77	0.89	0.35	8.83*	-0.54	-0.85

Note: * represents significance at 5 per cent level.

Source: Based on ASI data (1998–99 through 2007–08).

Table A.8. Decomposition of value added in terms of productivity and employment: ASI sector (1998-99 through 2007-08)

Industry code	Value added per person engaged	Persons engaged
151	-2.12	2.44
152	-0.87	1.81
153	4.25	1.71
154	2.53	0.13
155	3.28	4.55
160	3.37	-0.88

171	5.60	-0.98
172	-3.37	13.48
173	5.84	9.46
181	-0.95	9.46
182	6.64	4.91
191	1.36	4.23
192	0.61	6.14
201	4.63	-0.04
202	5.33	3.80
210	4.67	2.47
221	4.73	1.92
222	2.55	2.91
223	6.47	0.56
231	15.49	2.95
232	20.75	4.71
241	2.12	-2.24
242	5.34	2.76
243	-9.47	-4.53
251	1.42	0.87
252	2.16	4.58
261	8.33	-0.55
269	4.95	5.44
271	7.31	2.74
272	9.13	0.63
273	0.49	4.08
281	10.38	6.13
289	3.84	6.78
291	12.68	-2.61
292	8.53	2.26
293	9.09	-2.60
300	16.82	6.06
311	15.14	1.93
312	12.72	5.50
313	0.24	-1.21
314	13.20	0.53
315	8.92	2.57
319	5.28	7.04
321	2.65	3.06
322	12.34	-2.90
323	14.54	-4.70
331	11.55	2.92
332	8.67	5.01
333	6.98	-7.55
341	17.29	1.69
342	6.19	2.99
343	3.75	7.88
351	6.54	1.57
352	7.78	-2.86
353	1.22	2.37

359	14.30	-0.24
361	3.73	4.48
369	0.12	8.77
371	3.41	9.31
372	15.18	44.26
Others	10.80	7.78
Total	6.87	2.58

Source: See table A2

Table A.9. Wages and salaries: ASI sector (1998-99 through 2007-08)

Industry code	Wage share	Salary share	Emolument share	Wage rate/ salary per employee	Worker/ empl-oyee
151	11.51	10.38	21.88	0.37	3.18
152	15.31	20.17	35.48	0.40	1.98
153	14.92	9.91	24.83	0.45	3.37
154	18.42	16.30	34.72	0.30	3.94
155	10.06	11.25	21.32	0.31	3.01
160	16.68	6.23	22.90	0.17	18.14
171	16.92	8.95	25.87	0.34	5.92
172	15.02	11.93	26.95	0.51	3.86
173	13.11	8.44	21.55	0.20	4.01
181	11.51	7.99	19.50	0.26	5.97
182	15.34	10.67	26.00	0.30	5.80
191	20.44	16.09	36.53	0.31	4.29
192	18.53	12.28	30.81	0.29	5.54
201	24.76	13.63	38.40	0.63	3.05
202	14.79	11.75	26.54	0.38	3.37
210	13.38	11.12	24.50	0.34	3.69
221	11.31	28.47	39.78	0.44	0.94
222	20.42	19.14	39.56	0.37	3.02
223	3.58	8.05	11.63	0.30	1.63
231	18.13	10.44	28.56	0.44	3.83
232	2.72	3.01	5.73	0.36	2.58
241	5.02	7.57	12.59	0.36	1.97
242	6.34	11.91	18.25	0.26	2.10
243	19.66	17.99	37.65	0.35	3.78
251	10.47	9.39	19.85	0.36	3.29
252	7.17	8.98	16.15	0.30	2.83
261	12.93	10.78	23.71	0.30	4.15
269	9.24	7.98	17.22	0.28	4.26
271	10.75	10.13	20.89	0.37	3.01
272	7.71	7.03	14.74	0.40	2.84
273	21.01	18.18	39.19	0.36	3.43

281	12.69	14.22	26.91	0.33	2.78
289	11.86	11.47	23.33	0.33	3.27
291	11.72	16.73	28.45	0.49	1.73
292	8.46	12.42	20.88	0.34	2.06
293	6.29	6.66	12.95	0.34	2.82
300	1.49	3.84	5.33	0.26	1.53
311	9.50	12.28	21.78	0.38	2.03
312	6.65	9.94	16.59	0.32	2.11
313	7.02	8.53	15.54	0.34	2.59
314	7.37	7.88	15.25	0.37	2.49
315	8.94	8.22	17.16	0.32	3.48
319	11.22	14.35	25.57	0.31	2.70
321	9.82	16.92	26.74	0.29	2.16
322	3.94	7.32	11.25	0.32	1.75
323	1.92	4.21	6.13	0.23	2.11
331	5.17	9.83	15.00	0.33	1.71
332	3.77	5.50	9.27	0.30	2.33
333	14.95	15.28	30.23	0.31	3.42
341	8.95	9.91	18.86	0.36	2.51
342	29.04	17.27	46.31	0.39	4.59
343	11.95	12.93	24.88	0.32	3.05
351	27.25	18.85	46.10	0.42	3.60
352	18.03	16.10	34.13	0.39	2.98
353	21.61	28.42	50.02	0.50	1.49
359	10.77	10.53	21.30	0.30	3.42
361	17.31	16.74	34.06	0.44	2.59
369	13.71	9.99	23.70	0.37	3.84
371	30.71	16.09	55.53	0.44	4.90
372	24.01	14.34	38.35	0.44	4.20
Others	7.12	9.05	16.17	0.41	1.90
Total	10.03	10.51	20.54	0.29	3.38

Source: See table A2

Table A.10. Inputs drawn from various sub-sectors for the production of one unit of output (column total is 1)

	Food	Bev	Tex	Other Tex	Wood	Paper	Leather	Rubber	Petro-leum	Ferti-lizers	Chemi-cals	Cem-ent	Non-Met	Metals	Metal Prod	Non-Elec	Elect Mach	Trans	Other Mfg
	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32
Food	0.015	0.000	0.000	0.000	0.000	0.003	0.892	0.000	0.026	0.000	0.000	0.000	0.001	0.595	0.456	0.002	0.000	0.003	0.005
Bev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.193	0.000	0.000	0.008	0.000
Tex	0.011	0.002	0.000	0.000	0.000	0.006	0.005	0.001	0.109	0.000	0.000	0.000	0.016	0.005	0.008	0.492	0.567	0.023	0.004
Other Tex	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.209	0.000	0.000	0.000	0.001	0.008	0.012	0.023	0.082	0.010	0.005
Wood	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.016	0.043	0.004	0.007	0.009	0.035	0.007	0.007	0.010	0.091	0.040
Paper	0.002	0.001	0.000	0.002	0.001	0.001	0.003	0.038	0.000	0.009	0.001	0.005	0.007	0.071	0.053	0.021	0.014	0.081	0.641
Leather	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.015	0.003	0.000
Rubber	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.096	0.000	0.013	0.001	0.084	0.025	0.037	0.082	0.034	0.031	0.114	0.029
Petroleum	0.189	0.192	0.068	0.161	0.241	0.145	0.005	0.396	0.361	0.060	0.179	0.307	0.139	0.075	0.028	0.067	0.029	0.036	0.041
Fertilizers	0.651	0.696	0.349	0.804	0.738	0.711	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.002	0.000
Chemicals	0.081	0.092	0.576	0.012	0.008	0.111	0.051	0.002	0.023	0.420	0.159	0.237	0.344	0.099	0.134	0.298	0.142	0.238	0.185
Cement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Non-Met	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.099	0.000	0.034	0.000	0.002	0.000	0.001	0.005	0.003
Metals	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.016	0.000	0.002	0.002	0.244	0.001	0.000	0.001	0.003	0.153	0.010
Metal Prod	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.020	0.016	0.070	0.184	0.289	0.042	0.004	0.003	0.001	0.005	0.072	0.006
Non-Elec	0.044	0.012	0.005	0.014	0.009	0.019	0.020	0.046	0.000	0.297	0.361	0.041	0.103	0.047	0.022	0.044	0.077	0.049	0.007
Elect Mach	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.025	0.000	0.000	0.000	0.013	0.004	0.003	0.000	0.001	0.004	0.073	0.012
Trans	0.004	0.003	0.001	0.004	0.002	0.003	0.000	0.193	0.224	0.056	0.005	0.008	0.007	0.001	0.000	0.000	0.001	0.017	0.000
Other Mfg	0.001	0.000	0.000	0.001	0.000	0.001	0.005	0.131	0.000	0.031	0.004	0.007	0.018	0.004	0.000	0.007	0.021	0.022	0.013

Source: Pradhan et al. (2013).

Table A. 11. Distribution of one unit of output from a given sub-sector as input across various sub-sectors (row total is 1)

	Food	Bev	Tex	Other Tex	Wood	Paper	Leather	Rubber	Petro-leum	Ferti-lizers	Chemi-cals	Cem-ent	Non-Met	Metals	Metal Prod	Non-Elec	Elect Mach	Trans	Other Mfg
	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32
Food	0.610	0.296	0.002	0.000	0.000	0.003	0.000	0.002	0.000	0.001	0.078	0.000	0.001	0.001	0.003	0.001	0.001	0.000	0.002
Bev	0.026	0.849	0.001	0.000	0.007	0.000	0.000	0.005	0.000	0.001	0.098	0.000	0.002	0.004	0.005	0.000	0.001	0.000	0.001
Tex	0.005	0.005	0.395	0.513	0.003	0.002	0.003	0.010	0.000	0.000	0.024	0.001	0.004	0.002	0.002	0.003	0.017	0.005	0.006
Other Tex	0.044	0.044	0.110	0.447	0.007	0.014	0.011	0.063	0.003	0.004	0.089	0.008	0.010	0.008	0.009	0.035	0.072	0.009	0.013
Wood	0.134	0.017	0.024	0.034	0.040	0.077	0.004	0.025	0.008	0.012	0.206	0.024	0.031	0.024	0.027	0.091	0.144	0.033	0.044
Paper	0.105	0.050	0.026	0.019	0.014	0.488	0.002	0.025	0.005	0.000	0.088	0.012	0.019	0.012	0.012	0.020	0.074	0.010	0.019
Leather	0.000	0.000	0.007	0.085	0.002	0.000	0.640	0.085	0.000	0.000	0.033	0.000	0.001	0.005	0.003	0.007	0.044	0.069	0.020
Rubber	0.036	0.051	0.028	0.028	0.013	0.015	0.004	0.222	0.006	0.004	0.131	0.028	0.018	0.020	0.023	0.045	0.200	0.079	0.049
Petroleum	0.053	0.012	0.039	0.019	0.003	0.015	0.003	0.029	0.163	0.103	0.166	0.020	0.081	0.152	0.029	0.026	0.058	0.020	0.010
Fertilizers	0.106	0.001	0.000	0.000	0.002	0.000	0.000	0.013	0.000	0.672	0.205	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Chemicals	0.020	0.017	0.048	0.026	0.005	0.019	0.004	0.129	0.023	0.035	0.522	0.000	0.010	0.022	0.009	0.012	0.069	0.017	0.014
Cement	0.001	0.000	0.000	0.002	0.001	0.000	0.003	0.007	0.035	0.000	0.066	0.014	0.724	0.032	0.024	0.013	0.029	0.040	0.012
Non-Met	0.001	0.004	0.001	0.002	0.002	0.005	0.001	0.006	0.002	0.000	0.029	0.119	0.418	0.053	0.021	0.035	0.258	0.018	0.023
Metals	0.000	0.000	0.000	0.000	0.003	0.001	0.000	0.009	0.000	0.000	0.009	0.000	0.003	0.330	0.116	0.161	0.281	0.064	0.022
Metal Prod	0.003	0.001	0.001	0.004	0.006	0.002	0.001	0.015	0.000	0.000	0.008	0.000	0.007	0.184	0.081	0.163	0.359	0.129	0.035
Non-Elec	0.035	0.010	0.027	0.053	0.004	0.003	0.003	0.015	0.006	0.001	0.039	0.001	0.006	0.037	0.042	0.294	0.244	0.144	0.034
Elect Mach	0.001	0.000	0.000	0.001	0.003	0.002	0.000	0.005	0.000	0.000	0.007	0.000	0.000	0.015	0.016	0.070	0.792	0.054	0.033
Trans	0.004	0.000	0.000	0.001	0.005	0.000	0.001	0.019	0.000	0.000	0.001	0.000	0.000	0.066	0.010	0.039	0.016	0.833	0.006
Other Mfg	0.003	0.000	0.005	0.017	0.002	0.005	0.003	0.008	0.002	0.000	0.039	0.001	0.008	0.013	0.017	0.038	0.092	0.040	0.708

Source: Pradhan et al. (2013).

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Can Industry be the Key to Pro-poor Growth?
An Exploratory Analysis for India

The results of this study show that in the Indian manufacturing sector, employment has grown relatively slowly in recent years. Wages per worker remained almost stagnant, while the remuneration per person shot up significantly, implying strong growth in the salaries per employee (excluding workers). Industries, which dominated in terms of employment share, did not necessarily experience faster employment growth. Nonetheless, there is a strong positive correlation between the average value added growth and total employment growth measured across all the three-digit manufacturing groups, implying growth is essential for employment generation. Regarding inter-industry linkages we may conclude that industrial deceleration in the heavy goods sector can reduce the input demanded from both labour- and capital-intensive sub-sectors. The inter-temporal skill mismatch index, as estimated from the distribution of workers in each of the activities across various skill levels, is again substantial, indicating that over time jobs in manufacturing are becoming more skill-biased. Two key policy areas are highlighted: (a) priority to be given to industries that can contribute to employment growth; and (b) skill formation for improving the employability of workers.

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