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*Institute for Development Policy and
Management (IDPM)*

**Development Economics and Public Policy
Working Paper Series
WP No. 35/ 2014**

Published by: Development Economics and Public Policy Cluster, Institute of Development
Policy and Management, School of Environment, Education and Development, University of
Manchester, Manchester M13 9PL, UK; email: idpm@manchester.ac.uk.

Where Have All The Workers Gone? The Puzzle of Declining Labour Intensity in Organized Indian Manufacturing

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Abstract:

A puzzling feature of India's post-reform economic development has been the sustained decline in labour-intensity in the organized manufacturing sector, especially in the labour-intensive industries. In this paper, we argue that this has occurred due to an increase in the real wage to rental price of capital ratio. This in turn has been mostly due to a fall in the relative price of capital goods, driven by trade reforms in capital goods, and falling import tariffs on capital goods over time. Therefore, while the fall in the relative price of capital may have led to an increase in the rate of private fixed investment in machines, and consequently, economic growth, one inadvertent consequence of the trade reforms was the disincentive to firms to hire labour, and to quicken the adoption of machines in their workplaces.

Key-words: labour-intensity, jobs, organised manufacturing, trade reforms, capital goods.

I. Introduction:

India's disappointing performance in creating jobs in the manufacturing sector is one of the compelling and least understood aspects of India's post-reform economic development (Kocchar et al. 2006, Joshi 2010). In the period 1990-91 to 1999-0, growth in value added in manufacturing was 6.70 per cent per annum, while employment growth was 1.81 per cent per annum. This works out to an employment elasticity of output of 0.27. However, in the period 2000-01 to 2009-10, while value added growth increased to 8.49 per cent per annum, employment growth slowed to 0.41, leading to a fall in employment elasticity of output to an abysmal 0.05 in this period.

The slow growth of employment in the Indian manufacturing sector in the post-reform period, in spite of a strong growth in manufacturing output in the same period poses a puzzle for three important reasons. Firstly, a key prediction of mainstream trade theory (of the neoclassical variety) is

that as labour-abundant economy opens up to international trade, it will export labour-intensive commodities and import commodities with relatively higher capital requirements, observing a change in the composition of its output towards more labour-intensive activities. This will shift the national demand for labour curve to the right, and under an assumption of a fairly elastic supply of labour, will lead to an increase in overall employment. Given the large numbers of surplus labour in low productivity agriculture in India, the expectation was with the economic reforms of 1991, and the removal (at least in part) of existing distortions in factor and capital markets such as the industrial licensing system and interest rate controls, India's structure of production would shift more towards labour-intensive sectors, and there would be an increase in labour-intensity across the board in Indian manufacturing. Yet as Hasan et al. (2013) show, India uses more capital-intensive techniques of production than countries at similar levels of development, and this has remained the case after two decades of economic reforms.

Secondly, as labour-surplus countries move away from the import substituting phases of their economic development to an export-oriented development strategy, they witness in their initial years a strong growth in the labour intensive segment of the manufacturing sector. All the major Asian economies, starting with Japan, then Korea, Singapore, and Taiwan, and now more recently, China and Vietnam, have followed this development trajectory. In all these countries, as their economies integrated more closely with world markets, economic growth and structural transformation from an agriculture based to a manufacturing based economy went hand in hand, one driving the other. Surplus labour was pulled, sometimes in massive amounts, from less productive agriculture to the more productive manufacturing sector, and economic growth was driven in its early stages by a rapid expansion of labour-intensive manufacturing, mostly producing for export markets (Krueger 1997). This has not happened in India, where the share of the labour-intensive textile, clothing and footwear industries actually contracted from the mid 1970s to the late 1990s in organized manufacturing production and employment, in spite of India's apparent comparative advantage in labour intensive industries (Wood and Calandrino 2000, Sen 2008). At the same time, the lack of growth in the formal segments of labour-intensive industries was not accompanied by an increase in the share of the informal/unorganised sector in output and employment in the same industries (Raj and Sen 2012). The lack of growth in export-oriented labour-intensive manufacturing along with the emergence of a highly skill-intensive export-oriented segment of the services implied that the pattern of structural change in India was atypical, and certainly not in line with the experience of

industrialisation in other Asian countries who successfully industrialised, moving away from labour-intensive industries over time towards more technology-intensive industries.

Finally, it is not the case that India has not experienced labour-intensive industrialisation in the past. As Roy (2010) notes, Indian industrialisation in the pre-independence period was significantly labour-intensive, in that factories were characterised by a relatively high employment-elasticity and that the ordinarily more labour-intensive crafts made a positive contribution to income growth in manufacturing. Employment in the factory sector grew substantially in the colonial period, driven by capital accumulation, and by strong growth in employment-intensive sectors such as textiles. While the move to autarky and an emphasis on heavy industries in the planning period may explain why labour-intensive manufacturing did not exhibit the same level of dynamism in the four decades after independence, the lack of re-emergence of labour-intensive manufacturing in the post-reform period is difficult to understand.

In this paper, we focus on one piece of the puzzle – the surprising decline of labour-intensity in Indian organised manufacturing.¹ Overall labour intensity has fallen from an average of 1.45 in the 1980s to 0.33 in the 2000s. This implies that while there were roughly 1.5 workers per unit of capital in the 1980s, there was one worker per three units of capital in the 2000s. What is remarkable about this phenomenon is that the decline has also happened in the labour-intensive sectors, where labour intensity fell from an average of 3.34 in the 1980s to 0.78 in the 2000s. While falling labour intensity may not be surprising in the capital intensive sectors as firms in these sectors engage in ‘defensive innovation’ and invest in computerisation and machines to ward off foreign competition, the decline in labour intensity in the labour-intensive sectors is not what one should expect, given that labour is the source of comparative advantage in these sectors.

We first document the phenomenon of falling labour intensity across NIC three digit manufacturing sectors in India, from 1980-81 to 2009-10, focusing on the labour-intensive sectors, and provide a set of ‘stylized facts’ about growth and employment in the labour-intensive sectors. We then discuss standard explanations for the fall in labour intensity in organised Indian manufacturing, and provide our own explanation for this phenomenon.

¹ One of the first studies to show a decline in of labour intensity across organized manufacturing in India was a study commissioned by National Manufacturing Competitive Council of India to study the employment potential of labour intensive manufacturing for the period 1980-2004 (ICRIER , 2008).

Intuitively, overall labour-intensity in Indian manufacturing is dependent on how labour-intensive is each industry in the manufacturing sector along with the weight of the labour-intensive industries in overall manufacturing. Clearly, the best scenario for increasing overall labour-intensity is an increase in labour-intensity in each industry and an increase in the share of the labour-intensive industries in aggregate manufacturing. In our analysis of labour-intensity of Indian manufacturing, we keep sight of both these variables. Before we move on to the analysis, we first propose a method of identifying the labour-intensive industries.

II. Identifying Labour Intensive Manufacturing Industries

Our purpose in the paper is to analyse the patterns and determinants of labour-intensity in Indian manufacturing. To do this, we need to know which industries can be classified as labour-intensive and which cannot be. We propose and implement a simple method of classifying industries by labour-intensity. Using our classification, we examine broad trends and patterns in labour-intensity (that is, the ratio of workers to fixed capital stock) in the sectors we identify from 1980-81 to 2009-2010. For identifying labour intensive (LI) industries, we computed the labour-intensity² for the entire three-digit (NIC 1998) organized manufacturing industries for every year, and for each industry an average labour-intensity ratio was calculated for the period 1980-81 to 2009-10. The average labour-intensity (L/K) ratio for all industries taken together was found to be 0.84. All the industries with average labour-intensity ratio greater than 0.84 were considered as labour intensive industries and all those industries with a ratio less than 0.84 were labelled capital intensive. According to this definition, we found 13 industries that were labour intensive industries. Box 1 below provides the description of the labour intensive industries.

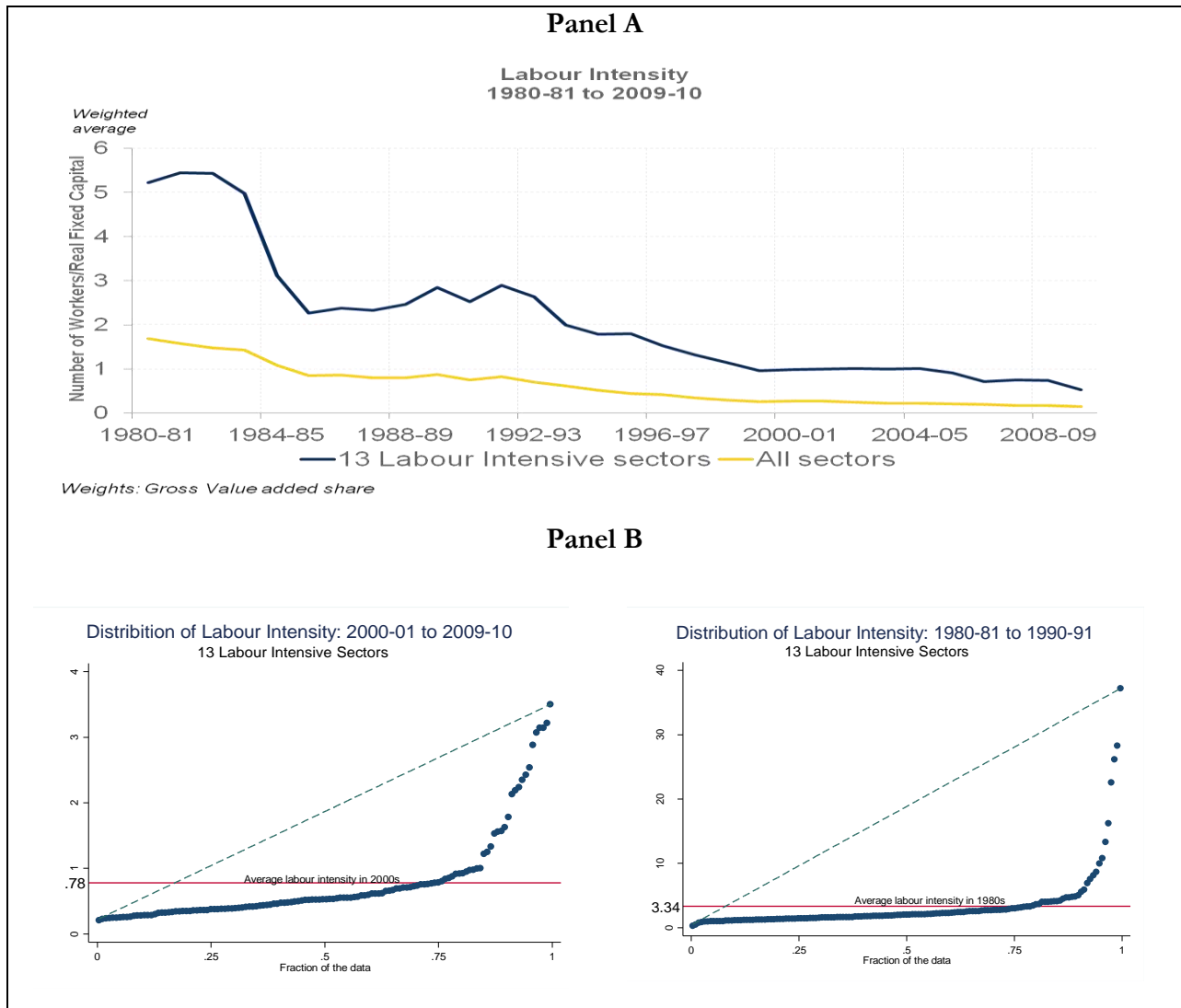
² Labor intensity is defined as a ratio of number of workers to real fixed capital.

Box 1: Identified labour intensive manufacturing industries

| NIC-1998 | Industry Description |
|----------|--|
| 153 | Grain mills products, starches and starch products and prepared animal feeds |
| 154 | Other food products |
| 160 | Tobacco products |
| 173 | Knitted and crocheted fabrics and articles |
| 181 | Wearing apparel, except for fur apparel |
| 182 | Dressing and dyeing of fur, manufacture of articles of fur |
| 191 | Tanning and dressing of leather, manufacture of luggage hand bags, saddler & harness |
| 192 | Manufacture of footwear |
| 201 | Saw milling and planning of wood |
| 202 | Products of wood, cork, straw and plaiting materials |
| 352 | Railway and tramway locomotives and rollick stock |
| 361 | Manufacture of furniture |
| 369 | Manufacturing n.e.c |

Source: Authors' calculations

Figure 1: Level and Distribution of Overall Labour Intensive Industries 1980-81 to 2009-10

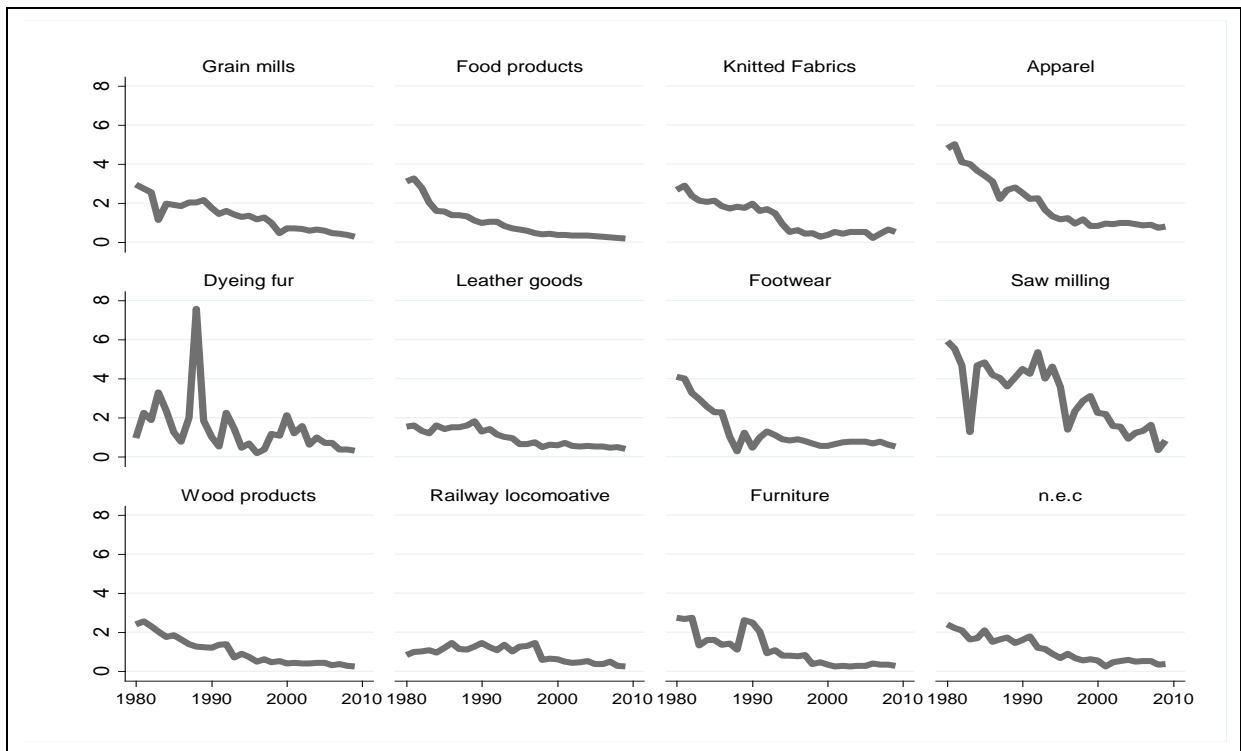


Source: Authors' calculations

Our estimates indicate that over the last 30 years there has been a decline in levels of labour intensity across organized manufacturing. Labour Intensity across 52 NIC 3 digits sectors have fallen from average 1.45 in 1980s to 0.33 in 2000s. The pace of decline has been much steeper for the labour intensive sectors (for 13 Labour intensive sectors, it has fallen from average 3.34 in 1980s to 0.78 in 2000s) in comparison to all organized manufacturing as evident from panel b. Further, the pace of fall in labour intensity was highest during the period of 1980 (fell by 27 per cent), moderate during 1990s (fell by 19 per cent) and slowed by 2000s (4.8 per cent).

The overall decline in levels of labour intensity is spread across all the industry groups- ranging from food products, wearing apparel, to transport equipment's as is evident from Figure 2 below. The pace of decline in the 1990s and 2000s at the aggregate level holds true even at the broad product groups.

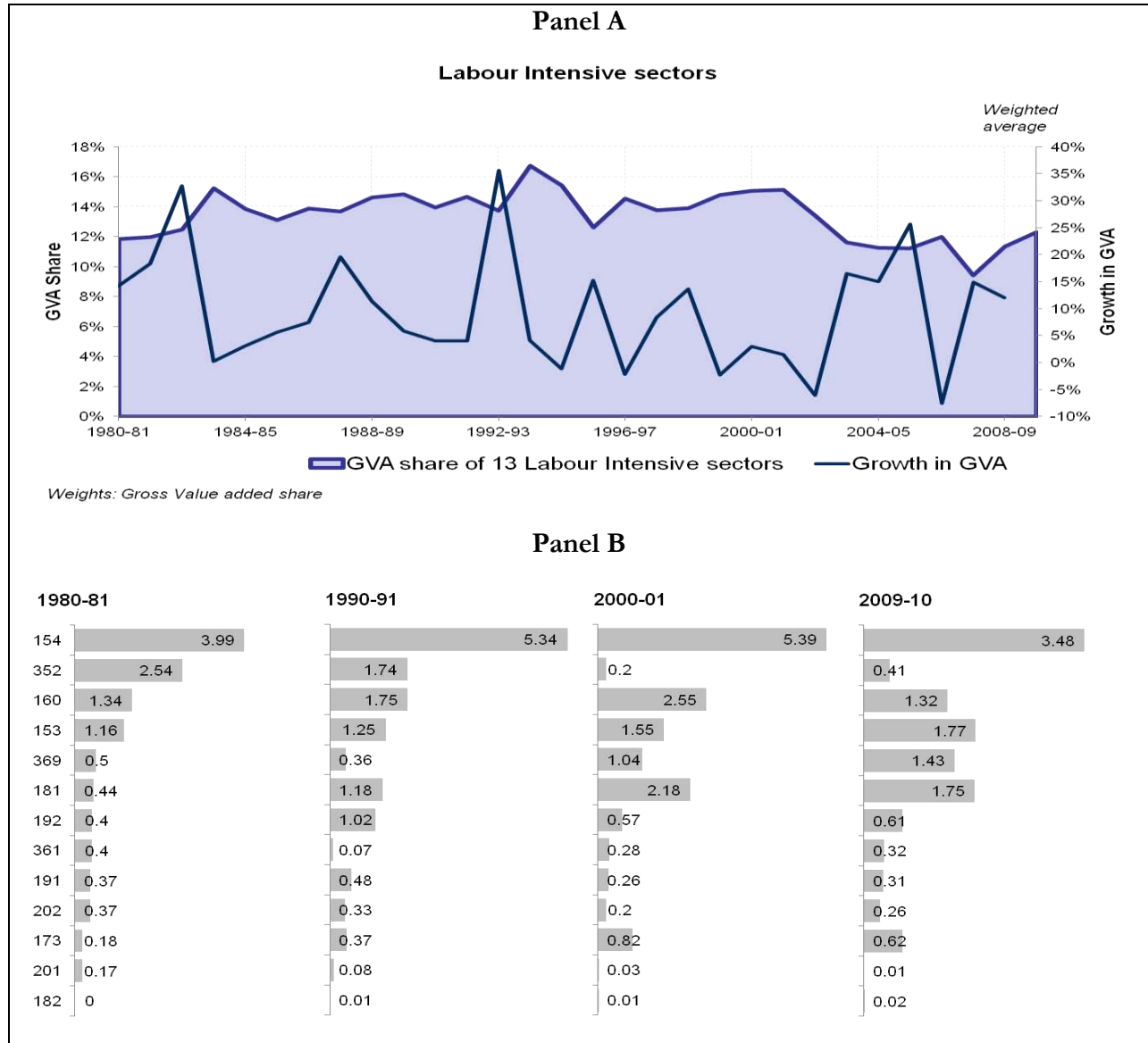
Figure 2: Levels of labour Intensity across Manufacturing Industries: 1980-81 to 2009-10



Source: Authors' calculations

Overall employment elasticity of manufacturing can increase, even with declining labour-intensity, if the share of labour-intensive sectors in total manufacturing increases. However, this has not been the case in India. Panel A of Figure 3 shows the Gross Value Added (GVA) share of 13 labour intensive sectors as against the overall growth in GVA for the organized manufacturing. We find that the share of the labour intensive industries in the overall manufacturing value added remained constant (12 per cent of organized manufacturing) for almost two decades beginning 1980 with sharp fall at the beginning of the decade of 2000s.

Figure 3: Overall and Individual labour intensive Manufacturing Industries: Value Added Shares



Source: Authors' calculations

From Panel B of the figure above, we find that in 1980-81, we observe that food products (154), railway locomotives (352) and tobacco manufacturing (160) contributed more than 60 per cent of the value added share of the labour intensive groups. The 1990s saw apparel (181) and leather footwear (192) increase its share substantially. The beginning of the 2000s (2000-01) saw the share of labour intensive sectors improve to around 15 per cent, mainly through doubling the share of

apparel industries. In recent times, the aggregate share of labour intensive sectors in Gross Value Added (GVA) has come down to around 12 per cent mainly through the falling share of food and apparel industries.

III. Patterns in Labour Intensity in Indian Manufacturing: Growth, Employment and Productivity.

In this section, we discuss the observable patterns in the identified labour intensive sectors for the period 1980-2010. As discussed in section II, the share of labour intensive industries in the total value added of the organized manufacturing sector has remained more or less unchanged for a large part of the time period. However, to understand the dynamics of the labour-intensive sectors, we need to look at the individual industries. We look at some yardsticks of performances – namely, growth in value added, employment growth, labour productivity and wages.

Growth in Value Added

As regards the growth of Value Added (VA) across different industries of the labour intensive sector, we find evidence of sharp inter-industry variations. In addition, we find that the apparel sectors (173, 181, 182 and 369) drove the growth in the labour-intensive sectors by recording more than 10 per cent growth in value added per annum for the 30 year period.

Table 1: Growth in Real Value Added: Labour Intensive Manufacturing Industries

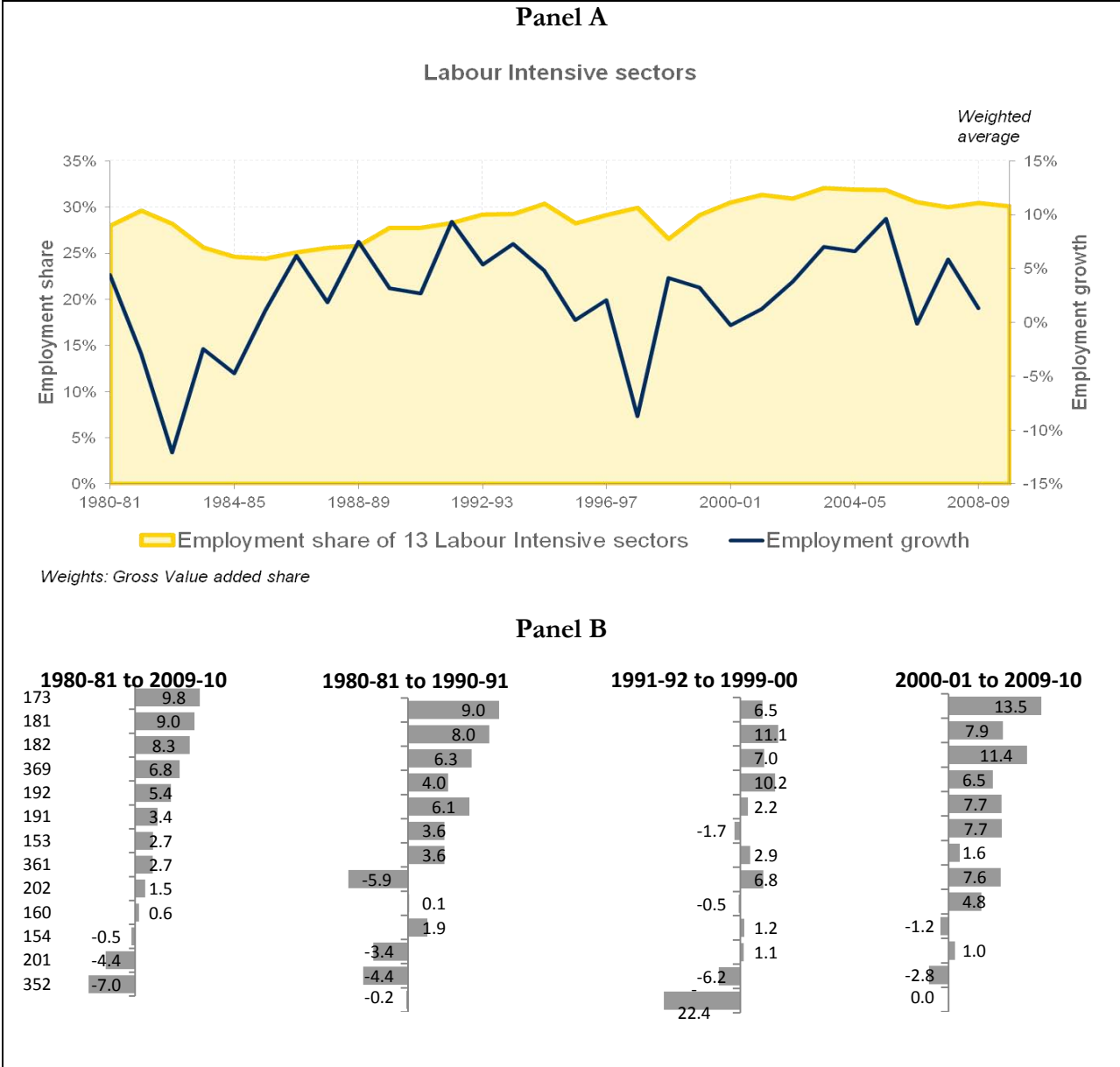
| NIC-98 | 1980-81 to 1990-91 | 1991-92 to 1999-2000 | 2000-01 to 2009-10 | 19980-81 to 2009-10 |
|--------|--------------------|----------------------|--------------------|---------------------|
| 153 | 7.64 | 8.7 | 7.84 | 8.04 |
| 154 | 11.69 | 5.04 | 3.68 | 6.87 |
| 160 | 7.87 | 7.96 | 0.59 | 5.39 |
| 173 | 15.83 | 15.46 | 9.34 | 13.48 |
| 181 | 18.39 | 15.83 | 7.76 | 13.93 |
| 182 | 14.86 | 2.34 | 23.57 | 13.98 |
| 191 | 9.31 | 2.05 | 10.39 | 7.43 |
| 192 | 16.01 | 2.36 | 9.12 | 9.4 |
| 201 | 1.12 | -15.51 | 3.13 | -3.35 |
| 202 | 7.44 | -7.2 | 10.11 | 3.82 |
| 352 | 3.45 | -13.74 | 14.15 | 1.8 |
| 361 | -9.25 | 14.38 | 8.76 | 4.29 |
| 369 | 5.71 | 24.94 | 6.97 | 12.11 |

Source: Authors' calculations

Employment Generation

Second, turning our attention to employment generation by the labour intensive sectors we find that the employment share of LI industries increased from 26% in 1980s to 29% in 1990s and further increased to 31% in 2000s. Further, the 1990s show a substantial jump in employment growth of LI industries from -0.1% on an average during 1980s to 3.0% in 1990s and again 3.3% in 2000s. In terms of employment growth at the level of individual industries, we observe that the industry groups- food products has the largest employment share (25%) followed by apparel (21%) and tobacco (14 %) in the year 2009-10. Further, we find that the apparel, leather, gems and jewellery has contributed the highest to employment generation during the 30 year period from 1980-2010 (Panel B of Figure 4). The rest of the labour intensive industries exhibits evidence of poor employment generation during the same 30 year period.

Figure 4: Overall and Individual labour Intensive industries: Employment Share and Growth

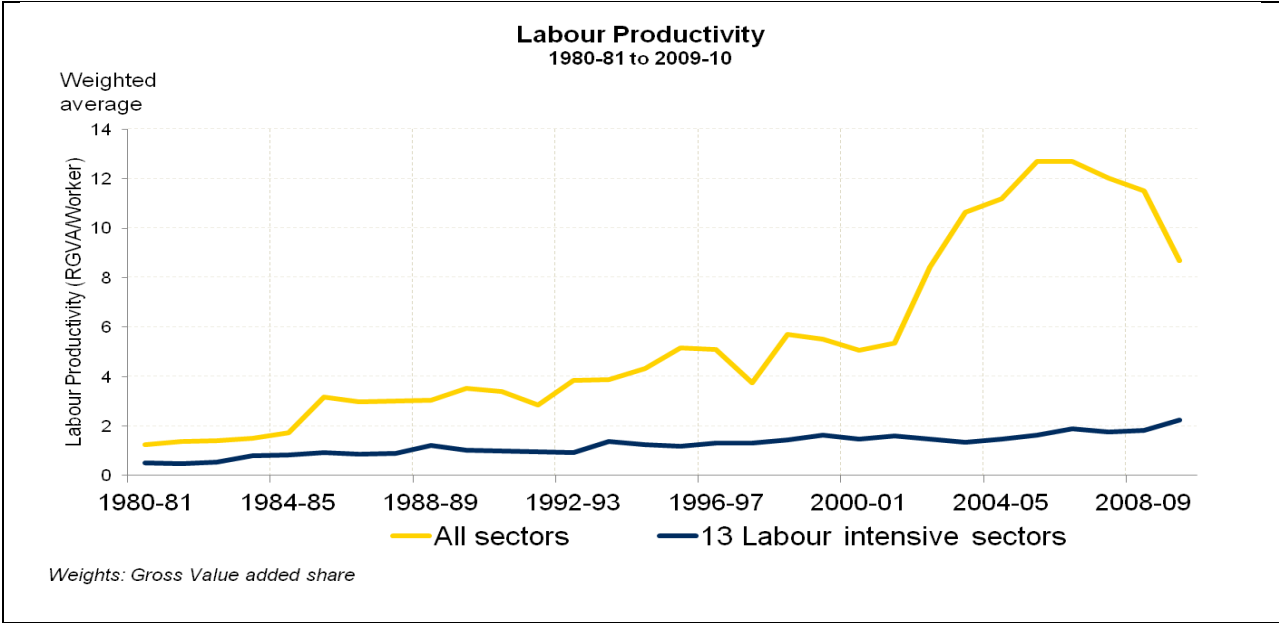


The employment elasticity of the LI industries witnessed a decline in 2000s after showing signs of improvements in the 1990s, keeping in line with the decline in real value added growth for the same period.

Labour Productivity Performance

We now look at the productivity performance of the labour-intensive sectors. Productivity is defined as gross value added per worker. We observe that the labour productivity growth was very low in the labour-intensive sectors relative to the aggregate organised manufacturing. In addition, we find continuous divergence in labour productivity between labour intensive sectors and organized manufacturing as a whole. It is worth noting that after 2000-01 organized manufacturing experienced a substantial jump in labour productivity but there is not much contribution from the labour intensive industries. The majority of industries recorded growth in labour productivity of around 4 per cent and above with the highest growth recorded by the transport equipment sector (8 per cent per annum) for the 30 year period (Table 2). We also see significant variation in labour productivity growth both across industries and over time.

Figure 5: Growth in labour productivity: All Manufacturing versus Overall Labour Intensive Manufacturing Industries



Source: Authors' calculations

Table 2: Growth in labour productivity: Labour Intensive Manufacturing Industries

| NIC-98 | 1980-81 to 2009-10 | 1980-81 to 1990-91 | 1991-92 to 1999-00 | 2000-01 to 2009-10 |
|--------|--------------------|--------------------|--------------------|--------------------|
| 153 | 5.34 | 4.03 | 5.81 | 6.21 |
| 154 | 7.4 | 15.13 | 3.99 | 2.73 |
| 160 | 4.78 | 5.97 | 6.79 | 1.78 |
| 173 | 3.68 | 6.83 | 8.94 | -4.19 |
| 181 | 4.98 | 10.35 | 4.76 | -0.19 |
| 182 | 5.7 | 8.58 | -4.65 | 12.15 |
| 191 | 4.05 | 5.71 | 3.75 | 2.65 |
| 192 | 3.96 | 9.94 | 0.13 | 1.41 |
| 201 | 1.09 | 5.56 | -9.27 | 5.96 |
| 202 | 2.28 | 7.34 | -6.7 | 5.31 |
| 352 | 8.81 | 3.62 | 8.61 | 14.17 |
| 361 | 1.62 | -3.32 | 7.63 | 1.16 |
| 369 | 5.36 | 1.76 | 14.76 | 0.5 |

Source: Authors' calculations

Wage Share and Workers per Factory

Has the decline in labour intensity led to a corresponding decline in the wage share of income, and an increase in the share of income going to capital? We find that this has been the case in organized manufacturing in India, and the decline in labour intensity across industry groups for successive time periods has been reflected in the share of labour income in value added declining from around 53 per cent in 1980-81 to about 31 per cent in 2009-10. We find that this declining trend also holds across all industry groups and for all time periods. We also do not see any discernible trends in real wage growth over time.

Figure 6: Growth rate of real wages and wage share in GVA.



Source: Authors' calculations

We also do not find any evidence of an increase in the number of workers per factory, suggesting that factories have not become more employment intensive over time. This is surprising, given the removal of licenses and de reservation, and may be linked to labour laws and infrastructural and skill constraints.

Table 3: Number of Workers per Factory: Labour Intensive Manufacturing Industries

| NIC-98 | 1980-81 to 1990-91 | 1991-92 to 1999-00 | 2000-01 to 2009-10 | 1980-81 to 2009-10 |
|--------|--------------------|--------------------|--------------------|--------------------|
| 153 | 19 | 20 | 19 | 19 |
| 154 | 100 | 98 | 93 | 97 |
| 160 | 46 | 89 | 147 | 93 |
| 173 | 20 | 27 | 65 | 37 |
| 181 | 43 | 64 | 116 | 74 |
| 182 | 19 | 34 | 65 | 39 |
| 191 | 43 | 35 | 41 | 40 |
| 192 | 61 | 60 | 80 | 67 |
| 201 | 9 | 7 | 6 | 8 |
| 202 | 31 | 25 | 19 | 25 |
| 352 | 638 | 459 | 69 | 394 |
| 361 | 27 | 23 | 30 | 26 |
| 369 | 26 | 44 | 68 | 46 |

Source: Authors' calculations

IV. Explaining the Puzzle of Declining Labour Intensity in Indian Manufacturing

Why have we seen the sustained decrease in labour intensity across all industries over time in organized Indian manufacturing? There are two standard explanations for the weak performance of labour-intensive sectors in India. The first explanation highlights the stringent nature of labour laws in India. Several papers have shown that stringent employment protection legislation – among the most protective of formal workers in the world – has reduced the incentive of firms, especially those in the purview of employment protection legislation, to hire workers on permanent contracts and pushed them towards more capital intensive modes of production, than warranted by existing costs of labour relative to capital. For example, Gupta, Hasan and Kumar (2008) find that Indian states with relatively inflexible labour legislation have experienced slower growth in labour-intensive industries and slower employment growth overall. Saha, Sen and Maiti (2013) find that states with labour legislation that favour permanent workers have shown a higher growth of contract workers relative to regular workers. A second explanation highlights a range of supply side factors, such as

infrastructural bottlenecks, poor skills and low literacy rates among unskilled workers in India as possible reasons why firms are substituting capital for labour (Panagariya 2008, Sen 2008).

The first explanation may be able to explain the *level* of labour intensity, and why Indian firms tend to use less labour per unit of capital than firms in other countries at similar level of economic development (Hasan et al 2013). However, to explain decreasing labour-intensity over time, one would need to labour restrictions to become tighter over time. This has not happened with an absence of pro-worker labour legislations for much of the 1990s and 2000s in most Indian states. On the contrary, Indian firms are increasingly getting around employment protection legislation by using contract workers in place of permanent workers (Saha, Sen and Maiti 2013). The second explanation may be able to explain why labour intensive manufacturing sectors in India have not been able to compete effectively against similar sectors in other countries (such as garments in Bangladesh). But the lack of adequate infrastructure and skills in the workforce cannot be an explanation for the *sustained* decline in labour intensity that we have observed across all sectors in Indian manufacturing.

We propose a third explanation – an increase in the ratio of real wages (W) to the rental price of capital (R). We first define the rental price of capital for a particular industry, *i*, for a given year, *t*, as:

$$R_{it} = [PK_t [r_t - \pi_t]]/P_{it},$$

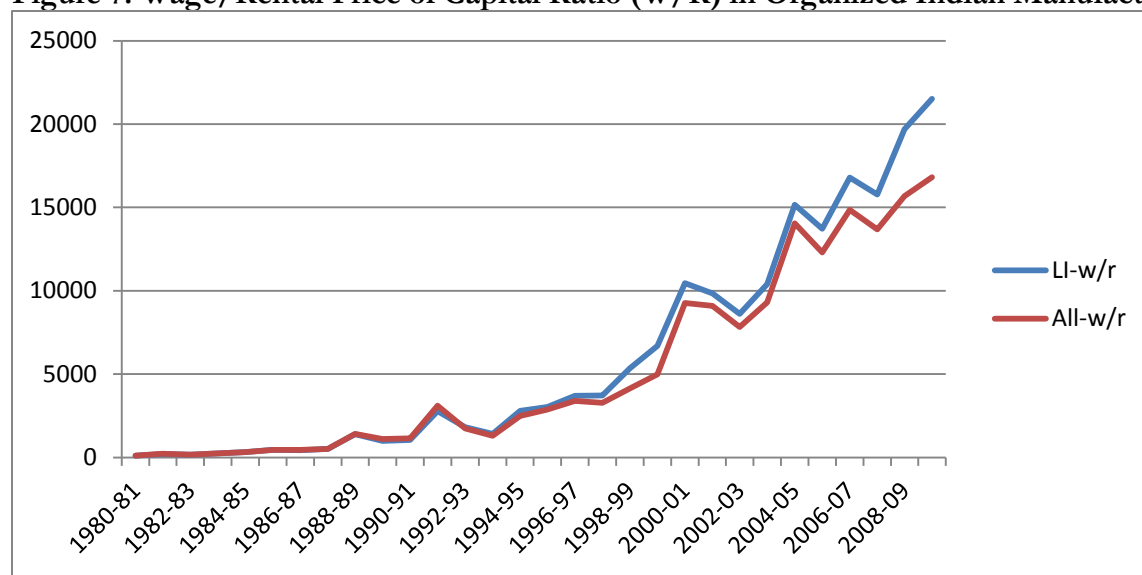
where PK_t is the price of capital goods in year *t*, P the output price level of the industry *i* in year *t*, r_t the nominal bank lending rate in year *t*, and π_t the inflation rate of capital goods in year *t*. We use the Wholesale Price Index of Capital Goods for PK , and the Wholesale Price Index for the industry as P . We use the Advance Rate of the State Bank of India as the nominal interest rate. We plot the ratio of real wages to the rental price of capital, W/R , for all industries and only labour intensive industries in Figure 7, and Real Wages and the Rental Price of Capital separately in Figures 8 and 9. We see a sustained increase in the wage/rental price of capital ratio, driven by an increase in the real wages and a fall in the rental price of capital. The fall in the latter is in turn to due to the fall in the relative price of capital goods, rather than a fall in the nominal interest rate. While both the increase in real wages and the fall in the rental price of capital has led to an increase in the wage to rental price of capital ratio, we have already seen in the previous section that the growth in wages was not strong enough to compensate for the fall in employment, leading to a fall in wage income share over

time. Moreover, unit labour costs does not show an increase in the 2000s, and in fact, has fallen slightly in the 2000s as compared to the 1990s, implying that real wages has not kept pace with labour productivity over the 1990s and 2000s (Figure 10).

What explains this sharp decline in the relative price of capital goods, especially in the 1990s? This was mostly due to the significant liberalization of the trade regime with respect to capital and intermediate goods since 1991. Import licensing was virtually abolished with respect to the imports of most machinery and equipment and manufactured intermediate goods (Das 2003). There was also a significant cut in tariff rates, with the peak tariff rate reduced from 300 per cent to 150 per cent and the peak duty on capital goods cut to 80 per cent. Import-weighted custom duty rates fell from an average of 97 per cent in 1990-91 to 29 per cent in 1995-96. As we can see from Figures 11 and 12, there was a sustained decline in nominal protection rates for a range of capital goods, and this decline was not simply due to the one off trade liberalisation that occurred in the early 1990s but was sustained all the way to the 2000s.

Thus, as protection for capital goods was removed slowly over time, their domestic prices fell relative to the overall price level. This led to a fall in the price of machines relative to the price of labour, and increasingly made firms in the organised sector substitute labour for machines. In sum, the key determinant of the declining labour intensity of labour intensive industries in India, and across the organised manufacturing sector were trade reforms which targeted capital goods in particular, and brought their prices down over time. While this may have led to an increase in the rate of private fixed investment in machines, and consequently, economic growth (see Sen 2007), one inadvertent consequence of the trade reforms was the changes in the incentive structures of firms to hire labour, and to quicken the adoption of machines in their workplaces.

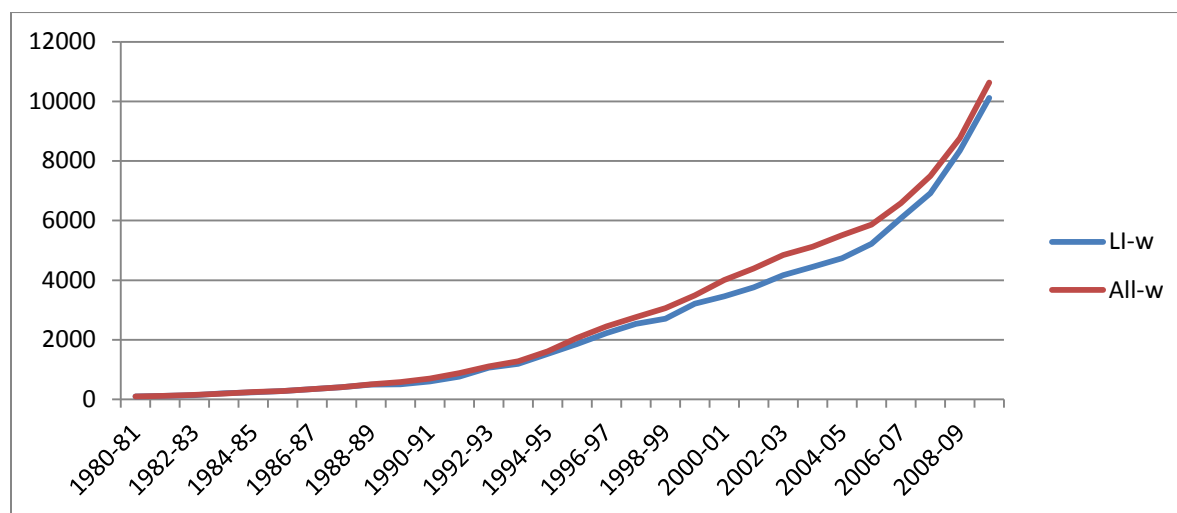
Figure 7. Wage/Rental Price of Capital Ratio (W/R) in Organized Indian Manufacturing



Source: Our Calculations.

Note: 'All' refers to all sectors within organised Indian manufacturing; 'LI' refers to labour-intensive sectors in organised Indian manufacturing.

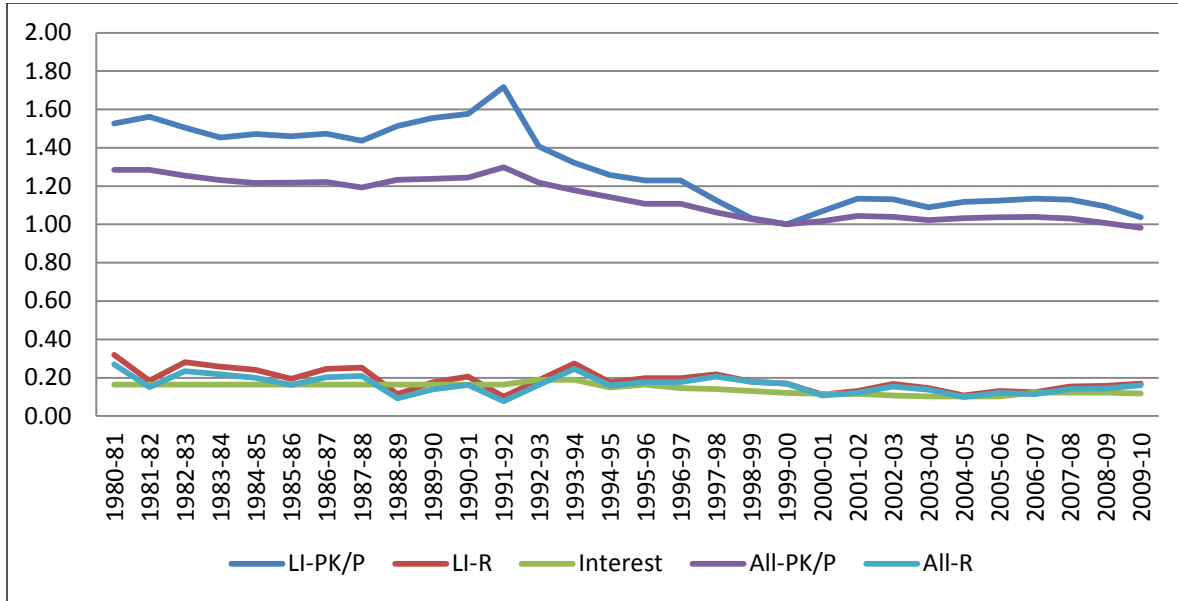
Figure 8. Real Wages in Organized Indian Manufacturing



Source: Our Calculations.

Note: ‘All’ refers to all sectors within organised Indian manufacturing; ‘LI’ refers to labour-intensive sectors in organised Indian manufacturing.

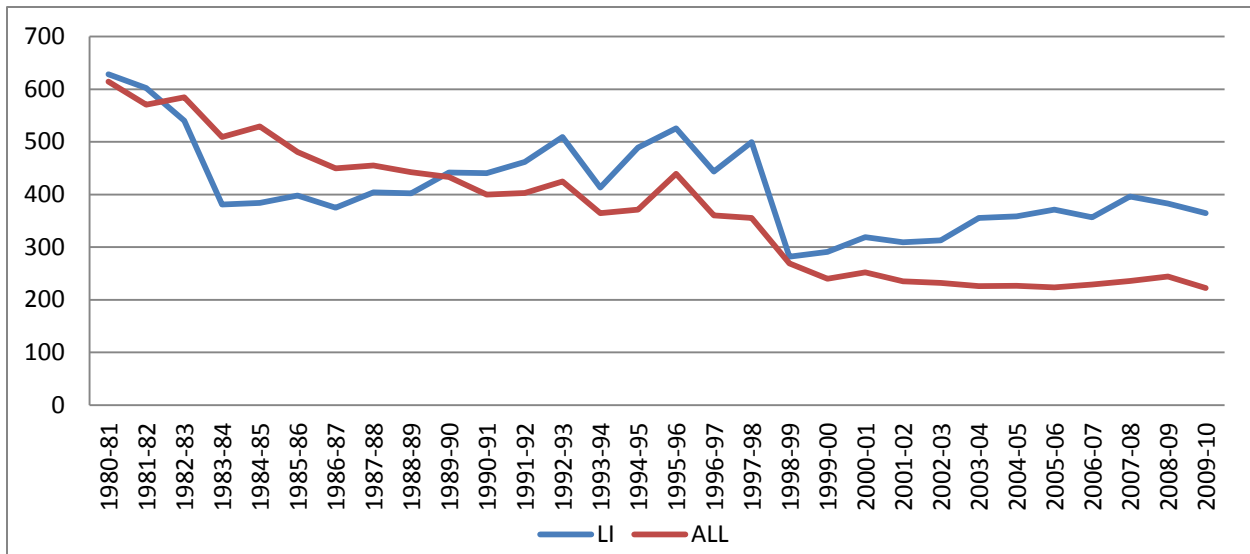
Figure 9. Rental Price of Capital (R) and its Components – the Real Interest Rate (Interest) and the Relative Price of Capital (PK/P) in Organized Indian Manufacturing



Source: Our Calculations.

Note: ‘All’ refers to all sectors within organised Indian manufacturing; ‘LI’ refers to labour-intensive sectors in organised Indian manufacturing.

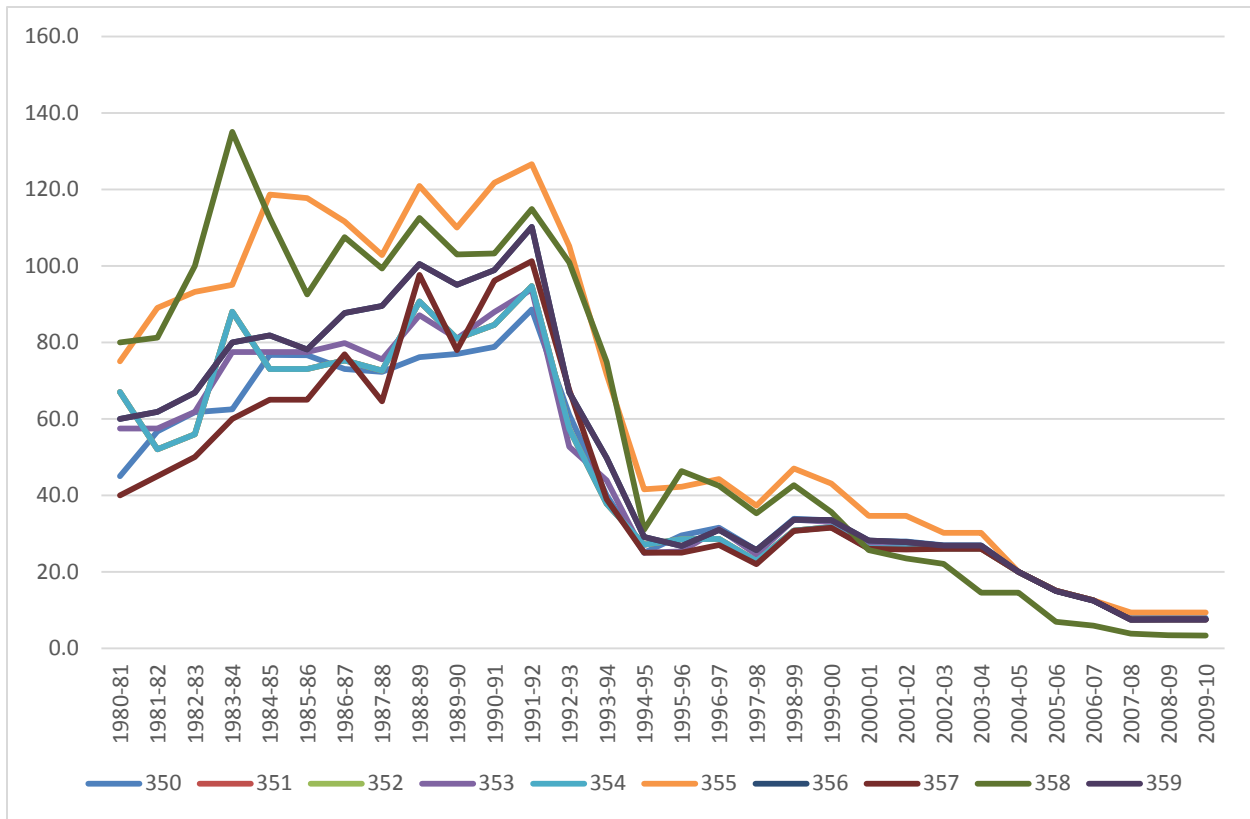
Figure 10. Unit Labour Costs in Organized Indian Manufacturing



Source: Our Calculations.

Note: ‘All’ refers to all sectors within organised Indian manufacturing; ‘LI’ refers to labour-intensive sectors in organised Indian manufacturing.

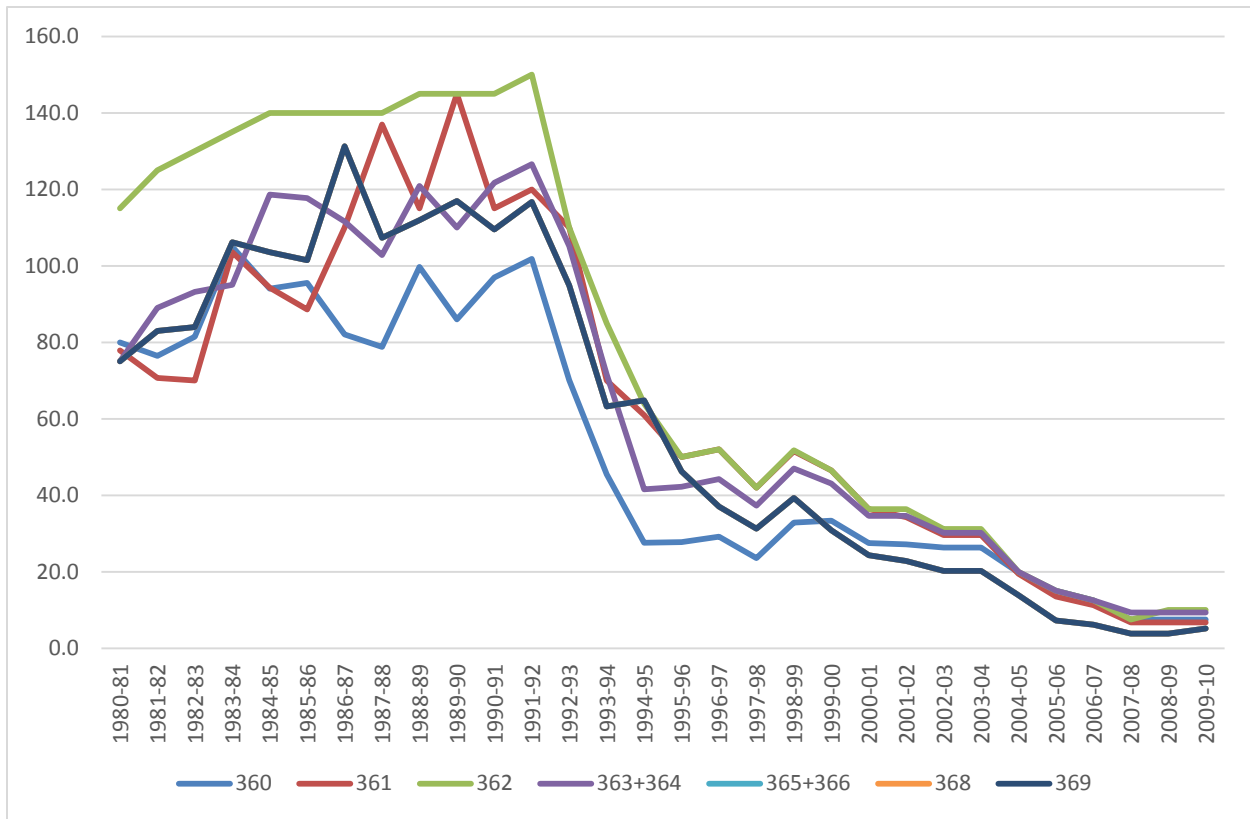
Figure 11. Nominal Rate of Protection of Selected Capital Goods, NIC 35 Category



Note: Industry Classification: 350: Agricultural machinery and equipment 351: Construction and mining industries, prime movers, boilers, steam generating plants 352: Nuclear reactors 353: Industrial machinery for food and textile industry 354: Industrial machinery other than food and textile 355: Manufacturing of refrigerators, AC's 356: General purpose machinery 357: Machine tool parts and accessories 358: Office, computing and accounting machinery and parts 359: Special purpose machinery and equipment/ component/ accessories.

Source: Our calculations

Figure 12. Nominal Rate of Protection of Selected Capital Goods, NIC 36 Category



Note: Industry Classification: 360: Electrical industrial machinery; 361: Insulated wires and cables; 362: Primary cells and primary batteries; 363+364: Electric lamps, fans and Domestic Appliances; 365+366: Radio and TV apparatus; 368: Electronic valves and tubes; 369: Xray Machines and Electrical equipments nec

Source: Our calculations

V. Conclusions

India has witnessed the fastest rates of economic growth since the 1991 economic reforms in its post-independence period. However, this process of economic growth has not been job creating. The employment elasticity of output in manufacturing has fallen from 0.47 in 1990-1999 to 0.05 in 2000-2009. Particularly disappointing has been the low rates of job creation in the organised manufacturing sector, which has meant that a vast number of the working poor has been relegated for their job prospects in the low wage informal sector and in agriculture. The inability of the organised manufacturing sector to create jobs in sufficient numbers has been one of the disappointing features of the post-reform period. Given the large numbers of surplus labour in the low-productivity agriculture sector in India, the expectation was that the 1991 economic reforms and the removal (at least in part) of existing distortions in factor and capital markets (such as the industrial licensing system and interest rate controls), would lead to a shift in the structure of production towards labour-intensive sectors and an increase in labour-intensity across the board in Indian manufacturing. That this has not happened is a puzzling feature of India's post-reform economic performance.

In this paper, we focus on one piece of the puzzle – the surprising decline of labour-intensity in Indian organised manufacturing. Overall labour intensity has fallen from an average of 1.45 in the 1980s to 0.33 in the 2000s. What is remarkable about this phenomenon is that the decline has also happened in the labour-intensive industries, where labour intensity fell from an average of 3.34 in the 1980s to 0.78 in the 2000s.

Examining the performance of individual labour-intensive industries, we find that the employment share of labour-intensive industries has not increased over time, while the wage share of these industries in total gross value added has fallen. Further, labour productivity growth has been low in the labour-intensive sectors relative to the aggregate organised manufacturing, leading to a continuous divergence in labour productivity between labour intensive sectors and organized manufacturing as a whole over the 1990s and 2000s. Overall, by most indicators of performance, the labour-intensive industries have performed worse than non-labour intensive industries in the post-reform period.

In this paper, we try and understand why labour-intensity in the labour-intensive sectors of organized manufacturing has fallen steadily over time. While the standard explanations of the weak performance of the labour-intensive industries in India focus on labour laws, infrastructure and lack

of skills in the work-force, here we propose an alternate explanation – a sustained rise in the real wage to rental price of capital ratio. We attribute this rise to a sharp decline in the relative price of capital goods, due to the trade reforms in the post-1991 period. With declining protection for capital goods over time, the price of machines fell steadily relative to the price of labour, and increasingly made firms in the organised sector substitute labour for machines. While the fall in the relative price of capital may have led to an increase in the rate of private fixed investment in machines, and consequently, economic growth, one inadvertent consequence of the trade reforms was the changes in the incentive structures of firms to hire labour, and to quicken the adoption of machines in their workplaces.

Acknowledgements: This paper is an outcome of an ESRC-ICSSR research grant. Pilu Chandra Das provided able research assistance, for which we are grateful. We thank participants in a seminar in ICRIER for their comments. The usual disclaimer applies.

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