Inter-industry Wage Differentials in Indian Manufacturing: Convergence or Persistence?

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Inter-industry Wage Differentials in Indian Manufacturing: Convergence or Persistence? [1]

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Abstract

From a labour perspective, wage rates are reflective of the market demand for different skills and the institutional structures. Also, wage rate is a better measure of the well-being of workers solely dependent on wage income. This paper notes persistent regularity in industry-level wage rates confirming the absence of a convergence behaviour. The stability of industry-level wage rates brings industrial reforms under scanner for their implications on worker welfare. Wage convergence could be inhibited by the inter-industry movement of workers. One way to counter the proliferation of low-wage employment can be improved inter-industry worker movement through better adaptability of workers.

Keywords: Convergence, wage rates, factory sector, non-factory sector, work-based credits, worker welfare.

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Inter-industry Wage Differentials in Indian Manufacturing: Convergence or Persistence?

Achieving a fair and balanced distribution of income is crucial to realising the Sustainable Development Goals of the United Nations Development Programme that aim to attain economic and social equality for all. The significance of spatial convergence of income is well-recognised in a number of international studies.[1] A prominent finding is that income inequalities have risen in industrial countries encouraging research to decipher the underlying causes for income accumulation at the top (Piketty 2014). This phenomenon is observed in India as well. Studies, such as those by Acemoglu (2002), ascribe technological progress as driving the trending inequalities, the mechanism being referred to as skilled biased technological change (SBTC). Subsequently, the stronger demand for specific workers induces a separation in labour markets, based on worker skills. The resulting worker inequalities also induce inter-industry differences in worker attributes and their incomes.

Based on technological progress, industries can be differentiated into high-tech and low-tech; as well as labour-intensive and capital-intensive industries, characterised by differential wages. For instance, capital-intensive industries are more vulnerable to unionisation that has a threat of greater downtime of the machines, and tend to give-in for the wage demand (Viren 2005). In other cases, the capital–skill complementarities, as suggested by Griliches (1969), tend to drive the wage inequalities (Krusell et al 1997; Kruger 1993). While many studies confirm that skilled workers have benefited from SBTC, the inter-industry inequalities remain less explored due to complexities that arise from the difficulties in capturing the differentials in skills, labour productivity and individual characteristics of the industries. Perhaps another reason for lesser concern on inter-industry income (or wage) differences is the faith in factor-price equalisation under competitive market conditions, which ensures that workers are compensated their marginal product. However, past studies on the United States (US) and Organisation for Economic Co-operation and Development (OECD) countries found that wage differentials have been rather stable, leading to the broad conclusion that inter-industry wage differences cannot be easily attributed to worker characteristics, unionisation, demographic and geographical attributes (Dickens and Katz 1987).

Studies on inter-industry wage difference

Dickens and Katz (1987) reveal that industry-effects account for 7%–30% of the variation in non-union wages and 10%–29% of the variation in union wage rates. The proposed explanations include decline in wages in import-competing industries and increase in exporting industries, as asserted by Amiti and Davis (2012) in their firm-level analysis. Kruger and Summer (1988) attribute the inter-industry wage difference to firm characteristics that affect the average pay, conditional upon worker fixed effects and within occupations. Other explanations for the incidence of low pay include employment in the private sector, absence of a recognised union, smaller work places, and primarily service sector activities (Metcalf 1999).

A change in wage rates is expected due to improving standards of living, skill requirement, average hours of work, structural change in production and profit margins. It can be argued that income inequalities are more representative than wage inequalities due to the inclusion of non-wage income components—such as government transfers—in the former. However, from a labour perspective, the latter are more reflective of the market demand for labour by different skills and also of the institutional structures such as the minimum wage regulation, as suggested by Gottschalk and Danzinger (2003). Also, the changes in wage distribution may not necessarily reflect through a parallel change in earnings if the workers respond to wage rates through altering their hours of work.[2]

The efficiency wage theories recognise the adverse effects of low wages, suggesting that a worker's productivity primarily depends on wage rates. However, despite the strong linkage between worker productivity and wage rates, the gains are not necessarily equally distributed across worker categories. Also, a duality in labour market can result if the wage-productivity relationship is more significant in select industries (Doeringer and Piore 1971). Accordingly, job rationing of the high-paying jobs in specific sectors arising from the efficiency wage payments vis-a-vis jobs in the low-paying sectors, results in inter-industry wage differences. The efficiency wage payments offset the high monitoring costs in specific industries, as predicted under the shirking model of labour market. Further, industry wage premiums are likely to exist due to transitory differences in the shift of labour across industries, and will be attained if labour mobility is incomplete in the short-run as drawn in the extensive review done by Katz (1986). The turnover model of labour market explains higher wage rates to maintain lower rates of attrition. The adverse selection model ascribes higher wage rates to improve worker efficiency. Another explanation of inter-industry wage differentials is based on the union threat model conforming to higher wage rates in industries that have a stronger threat from unionisation (Dickens 1986). The inter-industry wage differentials can also be viewed differently across occupation categories, for example, factory workers are more likely to have union affiliations than managerial personnel.

Following the seminal work of Barro and Sala-i-Martin (1992), most studies deploy measures such as per capita income in the analysis of inequality. However, it is reasonable to believe that income inequalities are linked to labour compensation as the latter amounts to significant proportion of aggregate income. It is crucial to note here the usual behaviour in India's labour income share vis-à-vis peer economies. During the post-crisis period, share of labour income in India's Gross Domestic Product (GDP) has declined from 56.8% during 2010 to 49% during 2017, bringing it to lowest among the BRICS economies, US, UK and the world level (ILO 2021). However, it is pertinent to note that the wage share in labour income (that is, emoluments) has been largely stable (in the non-factory sector) or increased (in the factory sector).[3] For instance, wage share in the factor sector has increased from 68% during 2000 to 74% during 2015.[4] Similarly, the wage share in total emoluments of the non-factory sector has hovered around 97%–94%.[5] This underscores the increasing importance of wage earnings for a worker in India.

However, unlike a vast body of literature on income convergence among countries, the inter-industry studies on wage differentials have received relatively less attention; while employment characteristics such as contractualisation and informalisation have been addressed more frequently in recent works. The neglect is primarily due to the data constraints that arise from the requirement of a large set of information related to personal characteristics of the employees (or workers), job attributes and industry virtues. Further, the information is required in a consistent manner over a period of time, and across the distinguished but co-existing set-ups of operation under the organised and unorganised sectors in the economy. In addition to this is also the need for deflators for (inter-temporal comparison of) real wages, which are often available over fragmented time periods and indexed over varying base years.

Expanding the scope of coverage

Existing studies on India have maintained a limited focus, possibly due to the reasons stated before. For instance, in the Indian content, the state-level analysis by Jayanthakumaran (2010) recognises inadequate income convergence due to trailing behaviour of the poor states. An earlier study by Kumar and Mishra (2008) notes wage differentials across industries. They find a strong and negative relationship with trade liberalisation as a result of productivity-induced firm-level changes that are transmitted through higher wages. These are in contrast to the findings of Dutta (2007) with a positive tariff-wage relationship to be decreasing the wage inequalities. Both studies make use of the data from the National Sample Survey Organisation (NSSO), and are thus confined to unorganised manufacturing. A more recent study by Mitra and Singh (2016) points to the evidence of persistent wage differences across organised manufacturing, limited to the pre-financial crisis period. Therefore, there is scope and more importantly a need to expand the coverage to evaluate inter-industry wage differences, simultaneously for factory and non-factory sectors, over a longer and more recent time frame, and across the occupation categories.

Most convergence studies are spatial in nature, focussing on the geographical spread of income inequalities. The present work branches-out from the existing literature on spatial convergence in two key ways. First, the traditional use of income is replaced with worker wage rate, that is, real wage per worker.[6] Wage rate is considered a better measure of the wellbeing of a large share of population that may depend on wages as the only source of income**.** Also, wage earnings constitute a substantial share of emoluments and total income. Furthermore, the fact that convergence in factor prices (wage rates) has a pro-convergence support for the broader income convergence, supports the analysis based on wage rates. This is naturally appealing as the broad aggregates, such as the GDP, are a collection endowments weighted by factor prices (O'Roukre et al 1996). The second key departure is the shift in focus from spatial convergence to convergence in inter-industry wage rates.

With the above background, this paper estimates industry-level wage rates, examines the trends in industrial wage rates and the (possible) convergence in wage rates for workers in factory and non-factory sectors. Additionally, industry-level wages are also worked for differential occupational categories—for example, supervisors, contract workers, hired workers, working owners, etc—to study the convergence behaviour of industry-level wages. In view of the rarely available quantitative estimates on industry-level wages, simultaneously for the organised and unorganised sectors, the paper might be a useful exercise for future analysis.

The key findings are summarised here. First, we find that real wage rates have increased in both sectors for most worker categories. Second, a persistent regularity in industrial-wage rates is an evidence of the absence of convergence. Third, the wage premium to education is observed to have increased substantially over time. The continued persistence of industry-level wage rates brings the industrial reforms under the scanner for their implications on worker welfare. Income transfers and a progressive tax structure are the attempts to balance and correct for the existing inequalities. However, there is no room for complacency, as reflected from an absent convergence in inter-industry wage rates. In fact, the findings on India's manufacturing sector are aligned with the findings in the earlier studies on economies including the US, UK and Italy (Kruger and Summer 1987; Haskel and Martin 1990; Lucifora 1993). The findings are also in concurrence with the earlier results for India by Mitra and Singh (2016), leading us to think that inter-industry worker movements have been less prevalent.

Methodology

The term "convergence" refers to "coming closer," and is synonymous to the catch-up effect. Various measures of convergence attempt to assess the spread in a distribution. Commonly used measures include standards deviations, coefficient of variation (normalised standard deviation), Gini coefficient, Atkinson index, and Theil index. However, the analysis of convergence is complex, cannot be concluded using a single measure and should take into account the complementarity of information. This makes it necessary to study dynamics of the distribution, which are often concealed under the simplistic summary measures. Therefore, a clear view of the distributional characteristics is a key consideration.

In dealing with convergence, this paper makes use of the three measures: σ (sigma) convergence, β (beta) convergence, and γ (gamma) convergence. The σ-convergence statistic measures if the dispersion in the variable under analysis diminishes over time in a cross-section (Barro and Sala-i-Martin 1991). The β-convergence statistic provides an understanding of (the possible) intra-distribution mobility (for example, through the upward movement of the low values; or through the downward movement of high values). Particularly, σ-convergence is the coefficient of variation. The β-convergence expresses the annualised growth rate of the variable as a logarithm of initial levels. The β-convergence is estimated from the slope coefficient of the following equation:

$$\frac{1}{t}\ln\left(\frac{y_{it}}{y_{i0}}\right) = \propto + \beta \ln y_{i0} + \epsilon_i \dots\dots\dots\dots\dots\dots\dots.(1)$$

where y_{it} refers to real monthly wage rate in industry, denoted by index *i* at the time *t*.

A negative sign of the statistically significant slope coefficient indicates convergence. The existence of β-convergence is a necessary condition for σ-convergence to exist. The absence of σ-convergence cannot be used to infer the absence of β-convergence. In fact, the two measures may not prevail simultaneously in a distribution, as the former refers to contraction in the cross-unit dispersion, while the latter refers to mobility within the distribution. Exploring the possibility of an unchanging σ-convergence alongside the changing ranks of the groups, Boyle and McCarthy (1997) propose the use of γ-convergence for the analysis of asymptotic behavior of variation problems. The γ-convergence is the index of rank concordance. The γ-convergence is useful to ascertain the existence of β -convergence, under the situations where σ-convergence is not observed. The computational formula for γ-convergence is given as follows.

$$\gamma = \frac{variance\ (Rank\_y_{it} + Rank\_y_{it-1})}{variance\ (2 * Rank\_y_{it-1})} \dots\dots\dots\dots\dots\dots\dots.(2)$$

where, $Rank\_y_{it}$ refers to the rank of the industry *i* during the time *t*.

Data and Reference Period

Industrial wage rates, being the subject of the present analysis, the use of the Annual Survey of Industries (ASI) with data reported by factories in the manufacturing sector was deemed appropriate. This essentially represents the organised manufacturing and is referred to as the "factory sector". The inclusion of unorganised manufacturing is important due to its massive employment base and the stark structural differences, including those related to productivity, capital, technology and outward-orientedness. This type of manufacturing set-up is also referred as the "non-factory sector", primarily due to smaller size of the units. In view of the factory-level data reporting in ASI, the corresponding information for the units (enterprises) in the non-factory sector are available from the enterprise surveys of the NSSO. The latest five enterprise surveys correspond to 1994, 2000, 2005, 2010 and 2015. Due to difficulty in extraction and the limited data availability through broad measures of total employment, ASI data for 1994 could not be used, bringing the reference period to include 2000, 2005, 2020 and 2015. Nevertheless, the period is sufficiently lengthy to reflect upon the impact of the structural and distributional reforms that were initiated in the early 1990s and early 2000s, respectively.

Computing industry-level wage rates poses a challenge in selecting a component which is both consistent and comparable over a multitude of dimensions across: (i) factory and non-factory sectors, (ii) worker categories, and (iii) over time. The data issues are particularly severe in the non-factory sector. In view of all the considerations for the wage-endowments, only the paid workers have been considered for analysis.

Wages, rather than total compensation to employees, are used for the following reasons. First, wages constitute a substantially high component of total compensation. Second, the inter-industry disparities in employee compensation are likely to be larger than for wages as shown by Gittleman and Pierce (2012). Third, reporting differences prevent the inclusion of non-wage compensation. Four, the wage rates are likely to vary with the nature of industry and profit margins.[7]

Wage rates are computed as wages per employee in a given industry and are divided by 12 to provide the monthly wage rate. Henceforth, wage rate refers to real monthly wage rate measured in ₹ per month. The wage rates are deflated by consumer price index (CPI) to get the real wage rates reported in the paper. The price indices have been brought to a common base year of 1993–94, which coincides with the (formal initiation of) industrial reforms, and helps understand the trends in wage rates in the post-liberalisation period.

The unit of analysis is three-digit industry under the National Industrial Classification (NIC) 2008. Data for prior years have been mapped to NIC 2008 at the four-digit level, before aggregating to a three-digit level. The convergence analysis is based on 73 manufacturing industries at the three-digit level of NIC 2008. To study the trends in wage rates for broad industry groups, 14 aggregated industries are considered. The wage rates for the broad industry are employment-weighted.

Wage Structure in Indian Manufacturing

Some general remarks about the features of the data set used are in order. First, the sizes of firms across the two sectors are not necessarily comparable, and therefore supplement each other. The average firm size (output per worker) of a manufacturing firm is approximately ₹18 lakh per worker in the factory sector, compared with an insignificantly low firm size of less than ₹0.40 lakh per worker in non-factory sector.[8] Second, the data available is silent on the affiliation to a union, making it implausible to discern if the wage differentials are due to personal characteristics, union status, industry features, or other factors.

The distribution of units—enterprise and factory in the non-factory and factory sectors, respectively—is highly skewed with manufacturing under the non-factory sector accounting for a substantial (99%) share throughout the period. This is in contrast to the corresponding share in total output that has been disproportionally low, varying within a range of 7%–15%, depending on the year. Similarly, the non-factory sector accounts for only 2%–3% of total emoluments and 5%–7% of the net fixed assets. However, it is a significant source of employment with 69%–79% of total employees. Given the predominance of non-factory sector employment, a convergence in wages (if found to exist) will be a promising situation for their economic welfare.

Wage-drawing workers from within the factory sector include worker categories as follows: regular male workers (MW), regular female workers (FW), contract workers (CW) and supervisory workers (SW). The SW correspond to members of the management and supervisors who are generally more educated and skilled– referred to as white collar workers. The composite employment in the factory sector is the sum of the four categories of workers (MFCS). Workers in the non-factory sector are grouped into hired workers (HW) and working owners (WO).[9]

Aggregate Wage Differentials

The wage rates for the factory sector have been 11 times the wage rate in the non-factory sector during 2000 (Table 1). The wage rate gap narrowed to 9 times by the year 2015 due to a slower growth in factory sector wages. The relative acceleration in non-factory wages, however, is not sufficient to generate a sense of satisfaction as this has been at a very low level of wage rates, for a large proportion of workers. Across the worker categories, wage rates are highest for SW, as expected. Next are wage rates of MW, which are distant from SW wages. This is followed by wage rates of CW, FW; and further by the HW and WO, in that order.

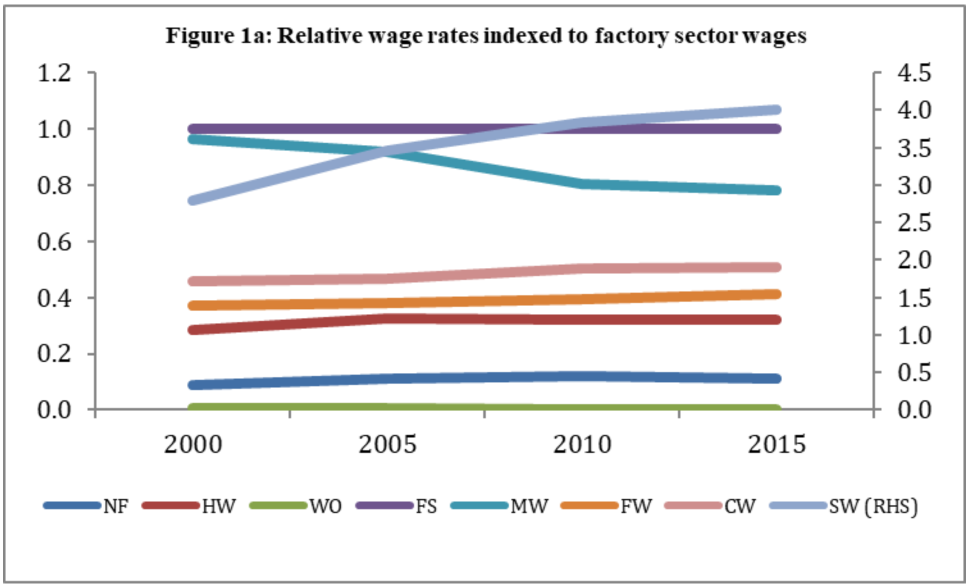
Table 1: Real Monthly Wage Rates (₹)

	Factory sector					Non-factory sector		
Year	All workers	MW	FW	CW	SW	All workers	HW	WO
2000	2,845	2,746	1,052	2,845	7,960	251	816	16
2005	2,967	27,30	1,128	2,967	10,280	324	968	21
2010	3,456	2,778	1,359	3,456	13,223	418	1,111	6
2015	3,865	3,023	1,588	3,865	15,504	426	1,235	10

Note: Wage rates are real monthly wage per worker measured in ₹ per worker.
MW: regular male workers; FW: regular female workers; CW: contract workers; SW: supervisory workers; HW: hired workers; WO: working owners.
Source: Author computations.

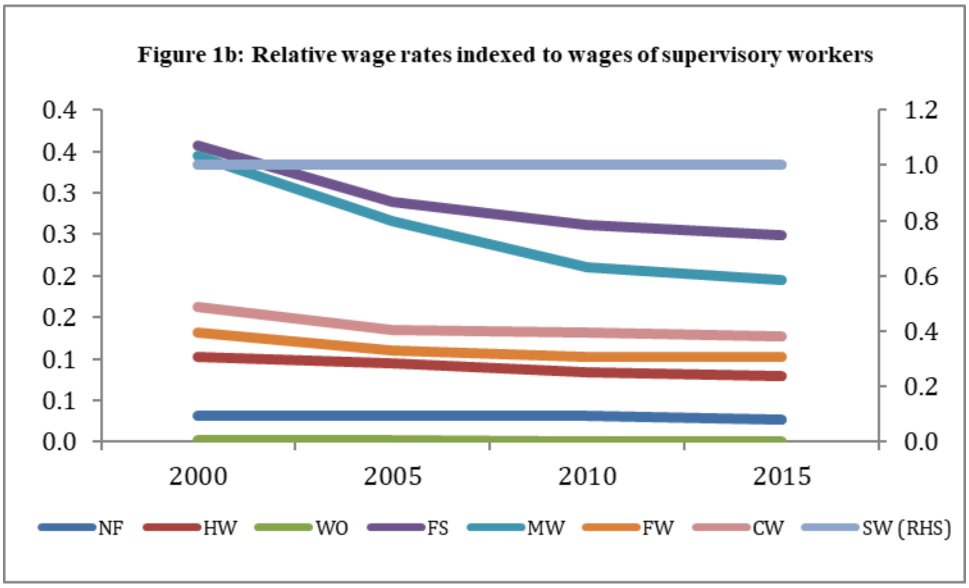
If workers are paid their marginal product, the magnitude of wages and their ordinal placements provide a fair proxy to the level of skills across worker categories. By this argument, supervisors are the most skilled worker category, and working owners are among the least skilled. In the context of WO, it needs to be borne in mind that the wage rates referred to here are based on their reported labour income; a part of their income (as an owner) could be reported under capital gains or profit, and it is highly unlikely for the WO to have a distinct estimate of the returns to their labour. Therefore, a low monthly wage of WO is instinctive. The possibility of substantially higher skills of WO are ruled out, as supported by the argument that larger firms have requirements for better skills, which translates into the use of machines and technology; effectively sorting the skilled workers into larger firms. The WO essentially refer to the own account manufacturing enterprises (OAME) which constitute 85% of the enterprises, but produce only 31% of the output. The size of an OAME is less than one-tenth (7.7%) of the size of an establishment. The absence of any ordinal changes in the wage rate by worker categories shows that worker skills have remained stable over time. Wage rate of FW continues to be lower than that of MW hinting at either the continued prevalence of gender-differentiated wages or that the skill-sets of females are lower than male. This makes a case for a gender focus in skill-advancement programmes.

Associated with Table 1 are two figures that assist our understanding of relative wage differentials. Two variants of indices are worked to highlight the differentials between: (i) factory and non-factory sector; (ii) worker categories; and (iii) the nature of employment (regular or contract arrangements). In the first index, wage rates of are indexed to the composite wage rates in the factory-sector (Figure 1a). Relative wages of MW have declined over time confirming a greater contraction of regular labour as a means to the circumvent rigidities in labour laws. Since wage rates are weighted with number of employees, a switch to contractual labour will result in lower number of regular males, also pulling down their wage rates.



Note: NF: non-factory sector, HW: hired worker, WO: working owner, FS: factory sector, MW: regular male worker, FW: regular female worker, CW: contract worker, SW: supervisory worker

Source: Author computations.



Note: NF: non-factory sector, HW: hired worker, WO: working owner, FS: factory sector, MW: regular male worker, FW: regular female worker, CW: contract worker, SW: supervisory worker

Source: Author computations.

For the second index, the worker wages are indexed to SW. These are used as an indication of wage premium on skills (Figure 1b). For every single worker category, the index value has declined over time. This means that the wage differential vis-à-vis the most skilled workers (SW) has widened further, that is, the wage premium to education has increased. Wage rates for SW increased by 25%, the highest growth for any worker category. This gives a sense that worker wages would not have experienced convergence, drawing further attention to the inter-industry wage differentials.

Inter-industry Wage Differentials

The wage rates for broad industry groups are reported in Table 2. The associated Figures 2a and 2b show that the relative position of industries has not changed over time. The linear shape of the scatter plot shows that both, high-wage and low-wage industries occupy the same position. Wage rates are lowest in the food processing, wood products and textile industries for both, factory and non-factory sectors. Within the factory sector, wage rates are highest for the petroleum industry; a different set of industries is identified for their high wage rates in the non-factory sector. These include machinery n.e.c (not elsewhere classified), transport equipment and electrical equipment.

Further, a direct comparison of industry wage rates through their rank correlations reveals an unchanging structure of wage rates over time. The rank correlation is between 0.87 to 0.96 for most worker categories, 0.70 for WO and 0.60 for CW. The absence of notable fluctuations, in the figures is an indication that inter-industry wage gaps have failed to narrow over time.

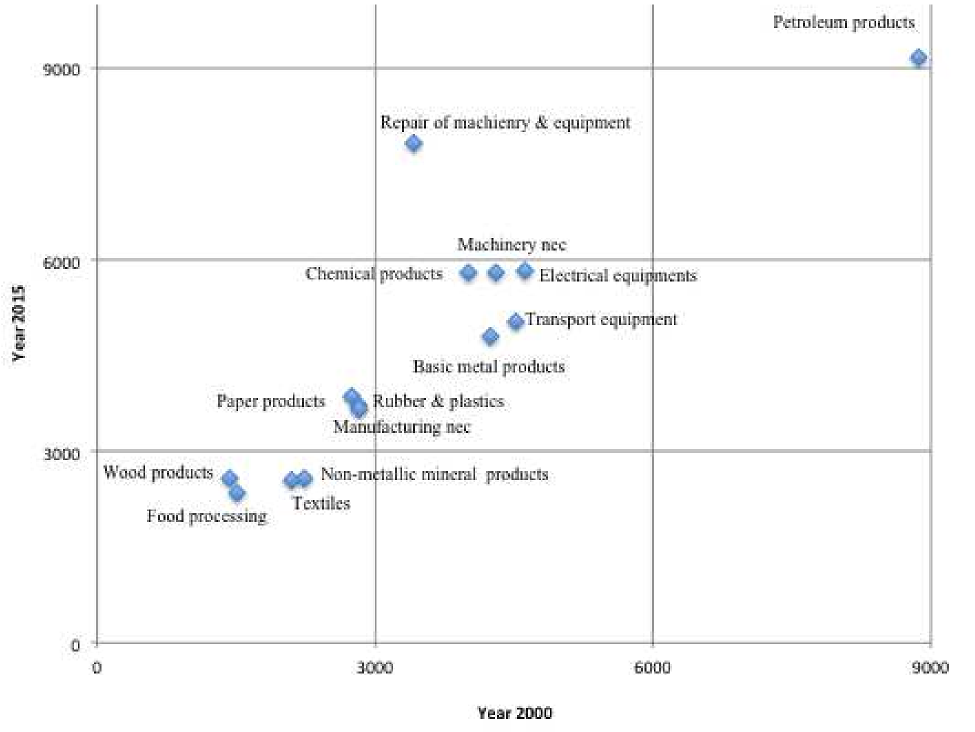
Table 2: Industry-wise Real Monthly Wage Rates (₹), 2015

	Factory sector					Non-factory sector		
Industry	All workers	MW	FW	CW	SW	All workers	HW	WO
Food processing	2348	2285	1051	1325	10972	1070	4830	62
Textiles	2562	2150	1700	1931	10230	1533	5913	27
Wood products	2584	1768	1163	2013	8067	1500	5946	42
Paper industry	3856	2836	1540	2171	12796	3705	6565	58
Petro products	9185	11110	8248	2691	27915	4260	4894	1906
Chemical products	5811	3891	1799	2319	19745	2150	4880	30
Rubber & plastics	3714	2790	1747	2166	12847	5000	7408	322
Non-metallic mineral products	2576	2367	1162	1409	11214	3403	4832	65
Basic metal products	4791	4079	2940	2311	15153	3890	6892	119
Machinery nec	5812	3405	2395	2410	19527	6826	8274	161
Electrical equipment	5842	3661	2497	2341	21343	5116	7193	232
Transport equipment	5036	4007	2858	2204	18931	6191	8866	222
Manufacturing nec	3672	2867	1772	2371	13250	2312	5902	44
Repair of machinery & equipment	7830	5685	8615	3402	22138	1641	5801	19

Note: NF: non-factory sector, HW: hired worker, WO: working owner, FS: factory sector, MW: regular male worker, FW: regular female worker, CW: contract worker, SW: supervisory worker

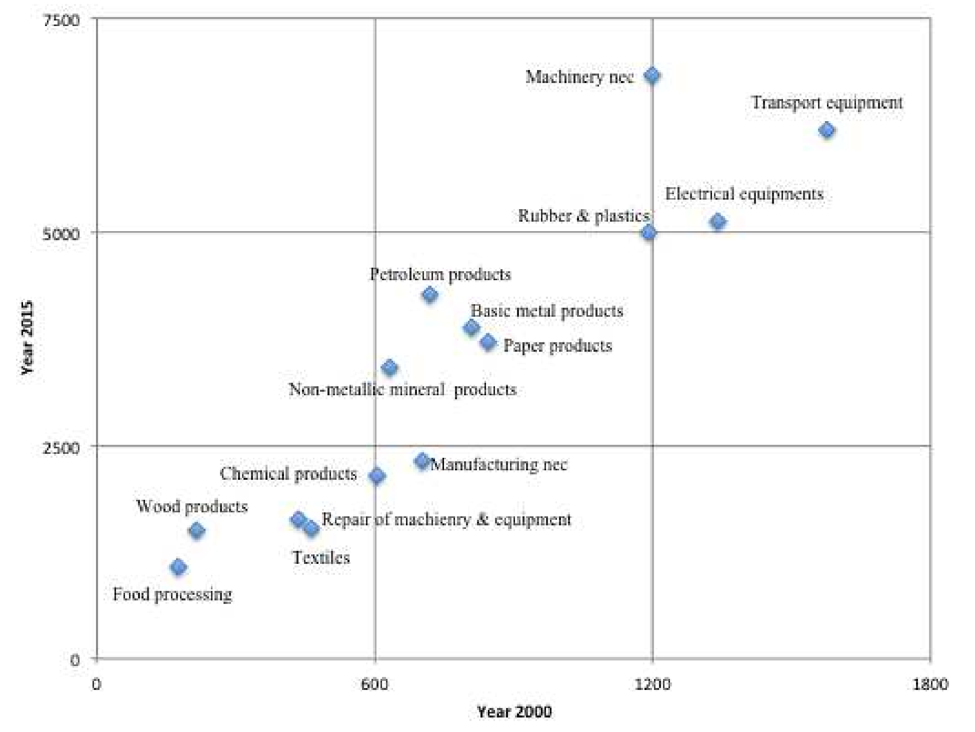
Source: Author computations.

Figure 2a Industry-wise wage rates in non-factory sector, 2000 and 2015



Note: Wage rate is measured in ₹ per month.
Source: Author computations.

Figure 2b Industry-wise wage rates in non-factory sector, 2000 and 2015

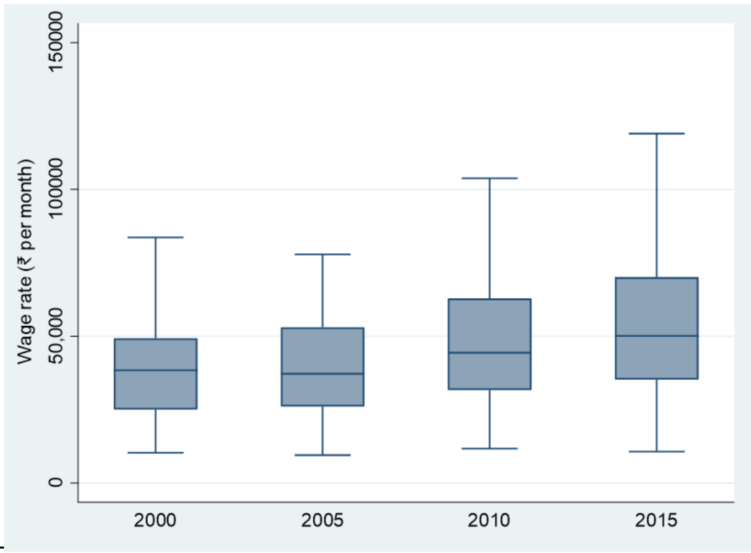


Note: Wage rate is measured in ₹ per month.
Source: Author computations.

Convergence in Inter-industry Wage Rates

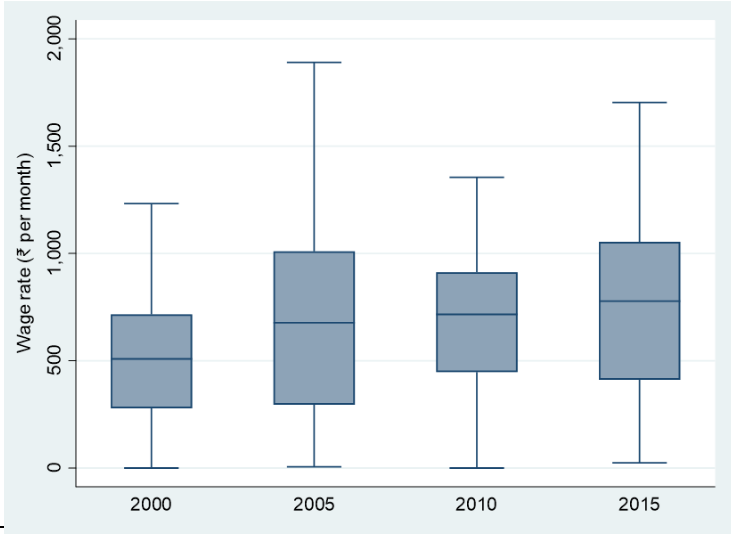
Industry-level wage rates for factor and non-factory manufacturing are found to be more dispersed in recent times (Figures 3a and 3b). Wage distribution does not seem to become compact over time. With every passing year, the gap between the whiskers has widened; a minor exception is noted for 2005. This means that the overall variations in the wage rate distribution of the factory sector have not reduced in their spread. In fact, the dispersion of the wage rates has widened. The overall variation as well as the variation in the middle-half (second and third quartiles) has broadened, as noted from the taller height of the box in 2015, than in 2000. Also, the wage rates are more dispersed in the top quartile, meaning that highest wages (in the fourth quartile) are less concentrated. This implies that the wage rate distribution is skewed towards the bottom where the wages are low. Alternately, low-wage industries are more in number. Similarly, distribution in the non-factory sector has also failed to become compact, and has large variations, both overall and in the middle-half, with insignificant upward movement of the lower whiskers. Like the factory sector, the industry-level wage rates in the non-factory sector are skewed at the bottom where the wage rates are low.

Figure 3a: Wage Rate Dispersion across Three-digit Industries, Factory Sector



Source: Author computations.

Figure 3b: Wage Rate Dispersion across Three-digit Industries, Non-factory Sector

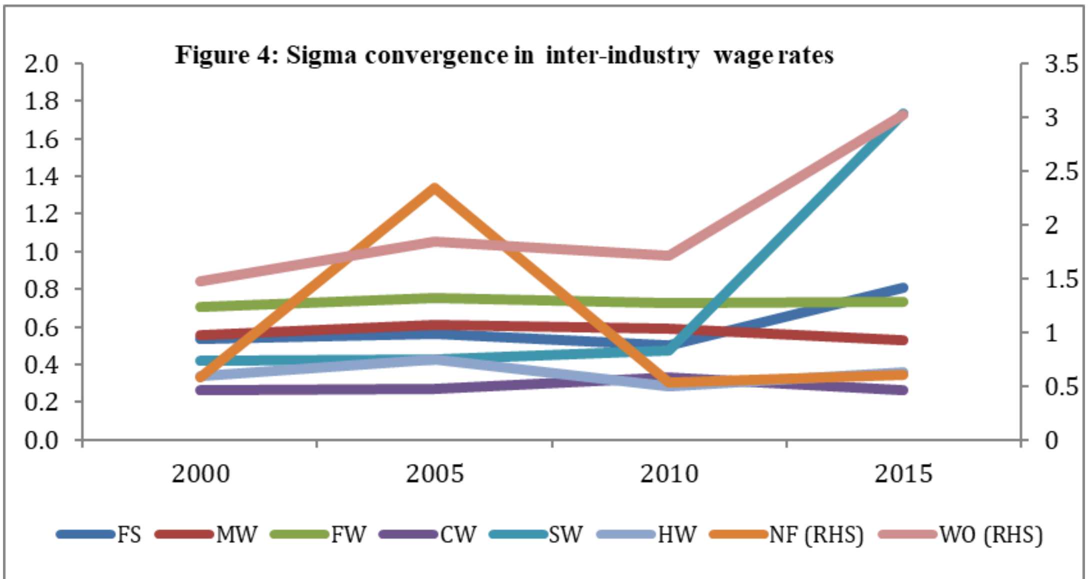


Source: Author computations.

Tracing Convergence in Inter-Industry Wage Rates

To validate the earlier observation of non-convergence in worker wages, three explicit measures of convergence using more granular data for three-digit industries are further computed.

The assessment of σ-convergence in real monthly wage rates shows no clear and consistent trend of convergence in wage rates. A convergence is expected if the wage rates in low-wage industries increase faster than the growth in wage rates of high-wage industries, leading the dispersion to decline. However, Figure 4 shows that dispersion in wage rates has not declined with time for any worker category.



Note: NF: non-factory sector, HW: hired worker, WO: working owner, FS: factory sector, MW: regular male worker, FW: regular female worker, CW: contract worker, SW: supervisory worker

Source: Author computations.

The β-convergence allows to test if there have been any changes due to mobility of industry wage rates, while the overall distribution remains unchanged over time. In other words, we test if wage rates in low-wage industries have swapped positions with wage rates in a high-wage industry. The possibility of mobility within the distribution (without altering the distribution itself) cannot be ruled out prima facie due to the impact of international trade. [10] In fact, McCausland et al (2020) argue that macroeconomic demand within an industry is a significant determinant of industry-level earnings. They opine that low-paid workers are not evenly spread across industries. Certain industries fail to pay higher wages than others. Since trade enables industries to operate on the principles of comparative advantage, it is possible that export-oriented industries may experience an increase in average wage rates due to increased worker requirement to meet external demand. Also, the demand for workers with higher productivity will push the wage rate to the right. In the Indian context, export-oriented industries—such as manufacture of petroleum products, chemicals products, machinery, transport equipment, and textiles—fall into this category of industries where access to world markets could (possibly) have impacted wage rates. On the other hand, wage rates in import dependent industries are expected to fall due to increased competition from other countries. The toys and readymade apparel industry qualify under this category that has been adversely affected by cheaper imports. Another possibility of mobility within the distribution arises from the increasing use of contractual labour against the regular workers; the wage rates of former being generally lower. Thus, it makes sense to test if there have been transitions within the distribution of industry-level wage rates.

Table 3 reports the coefficients from the results of fixed effect panel data regressions of Equation (1).[11] β-convergence is established if the slope coefficient appears with a characteristic negative sign, indicating a downward slope. The exercise returns a positive and statistically significant slope coefficient for all worker categories. This indicates that inter-industry differences in wage rates do not tend to mitigate and wage rates in the low-wage industries have not moved up vis-a-vis the high wage industries. These results validate the earlier observation on the lacking of convergence in inter-industry wage rates.

Table 3: β-convergence in Real Monthly Wage Rates, Three-digit Industry Level, 2000 to 2015

	Factory sector					Non-factory sector		
	All workers	MW	FW	CW	SW	All workers	HW	WO
β coefficient	0.351***	0.0328	0.107***	0.221***	0.135***	0.019	0.0810***	0.00137
	(0.071)	(0.023)	(0.027)	(0.036)	0.000	(0.024)	(0.021)	(0.018)
Observations	213	213	210	210	213	207	204	143
R-squared	0.162	0.014	0.102	0.263	0.256	0.004	0.097	0.000
Number of industries	71	71	71	71	71	71	70	61

Notes: NF: non-factory sector, HW: hired worker, WO: working owner, FS: factory sector, MW: regular male worker, FW: regular female worker, CW: contract worker, SW: supervisory worker

Robust standard errors in parentheses

***: $p<0.01$, **:$p<0.05$, *: $p<0.1$

The reported value of β coefficient is the slope in the Fixed Effect (FE) panel regression for each worker category.

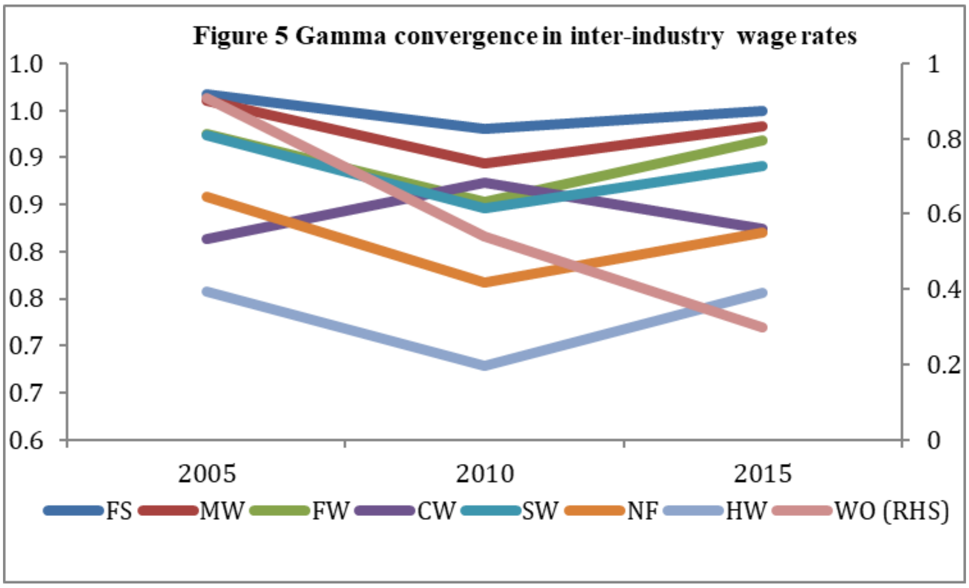
The FE model is determined based on the Hausman test for all workers in the factory sector.

Figures in parenthesis show standard errors

Results show the absence of β-convergence as noted from the non-negative slope coefficient or its statistical insignificance.

Source: Author computations.

From the computation of γ-convergence, no consistent pattern exists over time. For most worker categories (excluding CW and WO), the γ-convergence declined from 2005 to 2010, but increased thereafter, defying a consistent pattern (Figure 5). An opposite pattern is observed for CW, with an increase in the measure during the first sub-period, followed by a decrease in the second sub-period. The WO stands out with a consistent decline in the γ-convergence measure indicating a change in the industry ranks with time. Prominent among the broad industries that have gained in their inter-industry ranks of the WO wage rates are food processing and rubber and plastics; while the machinery nec and paper industry have lost on their earlier ranks observed during 2005, and have lower rank positions during the more recent 2015v period.



Note: NF: non-factory sector, HW: hired worker, WO: working owner, FS: factory sector, MW: regular male worker, FW: regular female worker, CW: contract worker, SW: supervisory worker
Source: Author computations.

Conclusions

The paper has a focus on the inter-industry convergence in wage rates across manufacturing industries in India. Using data for factory and non-factory sectors for the post-liberalisation period, real wage rates are been worked for broad industries, three-digit industry-level, and for different worker categories. Workers in the factory sector are sub-categorised into regular male, regular female, contract and supervisory workers. Similarly, composite workers in the non-factory sector are sub-categorised into hired workers and working owners.

Results show that inter-industry wage rates do not appear to be converging. In fact, the lack of convergence is a consistent finding based on the three measures: σ-convergence, β-convergence and γ-convergence. There is no tendency for wage rates in the low-wage industries to come closer to wage rates in the high-wage industries. Persistence of the wage rates is observed for both, factory and non-factory sectors, as also for each type of worker studied.

At the first instance, the observed persistence of wage rates across worker categories is surprising, particularly, in view of the significant differences between the factory and non-factory sectors. This, however, highlights the pervasive regularities in the inter-industry wage rates in Indian manufacturing. The inter-industry dispersion of the wage rates has not reduced over time. Also, convergence in terms of initial wage levels or growth in wage rates could not be observed. The stability in relative industry wages leads to the inference that wages rates in low-wage manufacturing have not grown faster than wage rates in high-wage industries. These findings are broadly in agreement with the earlier studies reporting the stability in inter-industry wage rates—that is, a lack of convergence—in the US, UK, Italy and India.

In view of the rarely available quantitative estimates on industry-level wages, simultaneously for the factory (organised) and non-factory (unorganised) sectors, this paper might be a useful research exercise. The conclusion on continued persistence of industry-level wage rates brings industry policy and the worker–industry relationship under scrutiny for its failure to lift wage rates for all workers who have similar skills but are employed in different industries. Although income transfers and a progressive tax structure are attempts to balance and correct the inequalities—although not specifically on account of difference in wage rates—there is no sense of contentment as reflected from an absent convergence in wage rates of workers. It is important that public policy should focus on improving the skills as the wage premium to skills is also observed to have increased substantially.

Although, the diagnostics of the persistence in wage rate is not the focus, few plausible explanations are forwarded for an empirical exercise in future. The inability of wage rates in low-wage industries to grow faster than their high-wage counterparts shows that either productivity differences have not bridged in the long run or that gains from improved productivity have not been passed-on to workers in all industries. This is certainly not an encouraging outcome after three decades of economic policy changes and has adverse implications on worker welfare. Differences in wage rates arise due to productivity differences, which are in turn liked to capital intensity. However, existing literature prevents us from making sweeping statements on strong productivity–wage relations across industries, particularly with regard to intermediates and non-consumer durables. Therefore, it is important to look for other answers.

The observed persistence in inter-industry wage rates provides compelling evidence for policy action to address inter-industry wage disparities for workers with similar skills. While not discrediting the employment effect of the government announcements, it is equally important to review the prevailing income-levels of workers, more specifically the wage rates. One way to counter the proliferation of low-wage employment can be improved inter-industry worker movement through better adaptability of workers. While shifting from one industry to another, a worker in transition is less informed about the potential wage rate in the new industry. This limits the ability to bargain for a wage rate based on past work experience. Under such circumstances, the worker is likely to be paid less than peer workers who are already employed in the new industry. Also, workers, particularly migrants, generally have less information on the job profile and a low bargaining capacity. Thus, convergence in wage rates could be inhibited by inter-industry movement of workers due to information asymmetry. Another, plausible reason is the casual nature of employment which has often brought the employer under the scanner (due to lower non-wage benefits for workers). However, it could also be the case that the seasonal nature of employment prevents workers from taking advantage of their work experience when they return for work in the next season. In other words, the seasonal nature of work, a more likely concern in the non-factory sector, which also engages a significantly high proportion of workers, prevents the wage increments and there is no upward movement of the wage rate. Thus, it would be helpful to set up a work-based credit system to acknowledge the past work, subject to fulfilling criteria. A seasonal worker would then be able to benefit from his previous work experience, through the credits based on accumulated experience despite discontinuous over time.

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[1] Income convergence is established if low-income economies grow at a faster rate than developed economies.

[2] For instance, a condition where workers respond to wage cuts through contributing additional hours, would lead to increasing wage inequality without a similar increase in income inequity. However, a low-wage worker's response to a wage-cut through contributing lesser working hours will lead to higher increase in income inequality than wage inequality. Therefore, wage inequality has an explicit importance.

[3] Definitions of the factory and non-factory sector are detailed in the section on data and reference period.

[4] Refers to wage salaries as proportion of emoluments for a composite worker category based on computations from the Annual Survey of Industries (ASI).

[5] Based on computations from the National Sample Survey Organisation (NSSO) surveys.

[6] The words worker, employee and person are used interchangeably.

[7] For instance, industry with high profit rates will undergo production expansion from the entrepreneurs. The resulting increased worker demand would improve the workers' bargaining power. On the other hand, the demand for higher wages are often turned down in industries with falling profit rates.

[8] Figures are based on nominal output for 2015.

[9] Gender-wise wages are not available for non-factory sector.

[10] Here, we abstract from the effect of trade on different types of workers, such as skilled or low skilled.

[11] Hausman test under the presence of hetroscedasticity with robust standard errors confirms fixed effect to be true model for the factory sector.