IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138
INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG
An International Open Access, Peer-reviewed, Refereed Journal

Post Reforms Growth in Indian Manufacturing- An Exploration

Suraj Das[1]

[1] Lecturer in Humanities, Coochbehar Polytechnic, Coochbehar & PhD Research Scholar, Department of Economics, Jadavpur University, Kolkata, India.

Abstract: Pro-market reforms were initiated in India since the early 1990's, as a result, there has been adjustments in firm size and the structure of the manufacturing sector in India. The paper is an attempt to study and highlight some stylised facts about the organised Indian Manufacturing sector in the post reforms era. Using the Annual Survey of Industries (ASI) summary results and the ASI unit level records between 1991-92 and 2019-20, the study focuses on the productivity and the size distribution of Indian Manufacturing sector in terms of the skill profile, highlighting significant developments and thoughts in the form of some generalised observations.

Keywords- Indian Manufacturing, Productivity, Skilled labour, Unskilled Labour, Micro Data, Size distribution of firms.

JEL Classification- J24, L6, L11

1. Introduction

The comprehensive economic reforms in 1991 which included liberalisation, privatisation and deregulation has shifted the Indian growth trajectory dramatically. Reforms were aimed to promote firm productivity and international competition. Post reforms, with the scrapping of traditional reservation policy, the liberalization of import controls and the dismantling of the licensing system, there has been substantial growth of Indian manufacturing firms. These reforms were directed to free the sector from entry restrictions and scale restrictions and in turn to help in expansion, diversification and modifications so as to improve the efficiency, productivity and competitiveness of firms. The structural change is not expected to affect growth but occur as a result of the growth process (Aggarwal& Kumar, 2012).

It has been argued by Dasgupta & Singh (2005) that the Indian Economy has skipped away from the Kaldorian Growth prediction and that India should take advantages of its strengths in IT and use it extensively in all areas to upgrade its manufacturing sector, significantly deviating away from the manufacturing as "the engine of growth" hypothesis. The shifting of economic activity and the labour force towards higher productive activity as a feature of structural change can be well traced by studying the trends of productivity and employment. It is argued that the growth of the service sector has been productivity led which hints us to comment that the heart of the employment problem in India lies at the low productivity of the manufacturing sector and the two aspects of dualism- the bi-polar distribution of employment within the formal manufacturing sector and, the productivity gap between the smallest and the largest manufacturing units. The structural changes in the Indian economy since liberalization in 1991 have provoked a critical reassessment of firm growth dynamics and highlighted the persistent issue of the "missing middle" – a phenomenon referring to the scarcity of medium-sized enterprises amidst the rising number of micro and large firms.

In light of structural change in Indian Manufacturing, the paper is an attempt to study the structure and patterns of wage productivity across major industrial groups in the past three decades from 1991-92 to 2019-20. The section that follows discusses the existing literature on growth and structural change in the context of the Indian organised manufacturing sector. The next section describes data and methods undertaken to analyse the statistics in exploring the stylised facts. The last two sections discuss the analytical results and conclusion with suggestions and recommendations respectively.

2.Review of Literature

2.1 Manufacturing as Engine of Growth

The development experience in India has been said to have skipped the manufacturing phase in the sense that the structural transformation has taken place in the economy with increasingly more and more reliance on the service sector[2]. Considerable debate exists behind the validation of the "manufacturing as an engine of growth" hypothesis. The importance of the service sector can also be highlighted from the deliberations of Ghani& O'Connell (2014) who rules for the reallocation of labour towards modern dynamic and IT –enabled services (and not manufacturing) to stimulate productivity and economic growth. Counter-arguments led by Szirmai (2012) presents theoretical and empirical evidence for a set of 67 developing economies during 1950-2005 suggesting that

manufacturing has served as engine of growth for the developing economies from the 1950s onwards. Further, Szirmai & Verspagen (2015) find a moderate positive impact of manufacturing growth in line with the engine of growth hypothesis; the authors reveal that through interaction between education and income gaps there is a positive effect of manufacturing on growth in developing countries with an educated work force. Post reforms, the Indian Economy has witnessed removal of restrictions in the business and industrial landscape and that has even raised questions on the transition process of the Indian Economy, especially in light of Indian Manufacturing. Manufacturing as an engine of growth hypothesis loses focus in deliberations of Dasgupta & Singh (2005) whereas as per Datta (2019) the apparent stagnancy of manufacturing conceals the story of labour-saving technical progress under heightened competition causing slippage of value added away from the sector. Erumban et al. (2019) using the KLEMS database points out that the structural transformation in India during post reforms incorporated a TFP growth with increase in allocation of capital across the sectors of the economy. In terms of employability, there has been growth of job opportunities in the construction sector but manufacturing and service sector experienced a stagnated growth. In light of labour employment, productivity and structural change, the issue of missing middle stands important as the absence of mid-sized firms in the Indian manufacturing landscape is an appalling factor inhibiting growth of firms.

2.2 The Wage Productivity debate

The wage productivity debate finds essence from the theoretical views of the classical economist in the sense that the real wage of workers equals to the labour productivity. The presence of skilled unskilled wage gap has often attributed to skill biased technological change, international trade and demand-supply factors (Katz & Murphy, 1992; Berman et al., 1998; Machin, 2002). Research in the context of the Indian Economy exhibits that trade openness exaggerated the skilled-unskilled wage gap (Marjit & Acharyya, 2003; Marjit & Beladi, 2004, Sahoo & ten Raa, 2012).

In the context of the Indian Economy, Goldar et al. (2005) found presence of a positive association between labour productivity and wage rate. Seminal work by Bhattacharya et al. (2011) investigates the long run association between labour productivity and real wage rate for the organised manufacturing sector in India at NIC two-digit level of aggregation. The authors show that flexible labour market has significant influence on productivity, employment and real wages. Productive efficiency of firms is quite low in India. Small size firms with 5-9 employees though account for more than 50 per cent of total employment, but have low productive efficiency (Mazumder & Sarkar, 2009). On the other extreme, firms with 500 or more workers, have high productive efficiency and intensive use of capital. The wage and employment patterns at the two extremes partially explain the transition of the Indian economy from agricultural sector to service sector with very few labour-intensive firms in the middle range of the sector. The absence of labour-intensive middle size firms is known as the "Missing Middle" in India's manufacturing literature (Wei & Balasubramanyam, 2015).

The discussion of the existing literature encourages us to investigate the structure and patterns of productivity across major manufacturing industrial groups in the past three decades from 1991-92 to 2019-20 for the organised sector in India. Further explorations based on the skilled unskilled wage gap and patterns of productivity across the skill profile have been conducted so as to highlight the stylised facts in likes of the post globalisation scenario in Indian Manufacturing.

3. Objectives Data and Methods

The prime objective of the study is to highlight the stylised facts unfolding behind the wage-productivity debate in the context of the organised Indian Manufacturing sector in India. In order to fulfil the objectives, the study begins with a brief overview of decomposition of GVA in terms of productivity of workers across skill profile, post which the study attempts to explore the size distribution of firms in the post liberalisation era.

In order to fulfil these objectives, the study uses the Annual Survey of Industries (ASI) summary results and the unit level ASI records for the period ranging from 1991-92 to 2019-20. Information with respect to 12 major industrial groups were collected and collated at NIC 2-digit level of aggregation. The data set has been made comparable using the concordance tables for NIC 1987, NIC 1998, NIC 2004 and NIC 2008. The 12 major industrial groups are Manufacture of food products and beverages; Manufacture of textiles and wearing apparel; Manufacture of Leather Products; Manufacture of wood and wood products; Manufacture of paper, paper products, print and recorded media; Manufacture of coke and refined petroleum products; Manufacture of chemical, chemical products, pharmaceuticals, medicinal chemical, botanical products, rubber and plastic products; Manufacture of glass and glass products; Manufacture of basic metals, fabricated metal products, except machinery and equipment; Manufacture of computer, electronic, optical products and electrical equipment; Manufacture of non-electrical machinery; and Manufacture of motor vehicles, trailers, semi-trailers and other transport equipment.

The nominal variables are converted in real terms using sector specific WPI as the price deflator, with base year 2012. The average productivity of workers has been tabulated as a ratio of the real output to number of workers or unskilled workers. Likewise, the average productivity of total persons engaged was calculated as the ratio of real output to total persons engaged. It is important to note that total persons engaged is the sum of workers and managerial staff. The managerial staff/workers can be considered as skilled workers as the managerial staff poses specific skillset, formal education, thorough trainings and apprenticeships. In similar manner, the average productivity of the skilled workers has been calculated as the ratio of real output to the number of skilled workers measured by the difference between total persons engaged and total workers. In the next step, the nominal wages paid to unskilled workers have been converted in real terms using the industry-specific WPI deflator. On the other hand, the nominal wages paid to skilled workers have been obtained as the difference between total emoluments and wages to workers. This figure has been deflated with the appropriate WPI to arrive at the real wage of skilled workers. The figure thus obtained is divided by the difference between total persons engaged and number of workers to derive the average real wage rate of skilled workers. Further, the decadal averages are used in the analysis to fulfil the objectives of highlighting the stylised facts. Wages and labour productivity have been found to be synonymous (correlation with wages and productivity have been provided in the appendix in Table A1) so the study focuses on the productivity of labour, specifically productivity of unskilled labour and productivity of skilled labour, and the inferences drawn with respect to the productivity automatically applies for wages as well.

4. Analysis and results

The present analysis has been organised keeping in mind the theoretical understanding which explains that labour productivity and real wage should move simultaneously in absence of market distortion. The study covers a comprehensive span of three decades from 1991-92 to 2019-20, explorations have been done at the aggregate level as well as the disaggregate level. During this period, the decadal growth has been tabulated from 1991-92 to 2000-01, from 2000-01 to 2010-11, and from 2010-11 to 2019-20. To begin with at the aggregate level, the changes in real GVA have been studied post which attempt has been made to decompose this decadal growth of GVA with changes in labour productivity, specifically productivity of unskilled workers and that of skilled workers. The disaggregate level analysis have been carried out for 2000-01, 2005-06, 2010-11, 2015-16 and 2019-20. At the disaggregate or unit level, the productivity patterns of unskilled and skilled workers have been studied in concordance employment to explore the size distribution of firms. The aggregate level findings are provided first, post which the disaggregate level findings are placed.

4.1 Overview of Real GVA and productivity of unskilled and skilled workers in the post liberalisation era

For all the 12 industrial groups in consideration, between 1991-92 and 2019-20, there has been a continued decade on decade rise in real GVA. The decadal breakup of real GVA across industries reveal that manufacture of chemical, chemical products, pharmaceuticals, medicinal chemical, botanical products, rubber and plastic products has been the top most performer in terms of real gross value addition across the entire time period from 1991-92 to 2019-20. This was closely followed up by manufacture of basic metals, fabricated metal products, except machinery and equipment, which retained the second spot. Manufacture of coke and refined petroleum products have also exhibited significant real gross value addition over this period, this was followed up by the manufacture of motor vehicles, trailers, semi-trailers and other transport equipment and further by manufacture of food products and beverages.

The comparison of real GVA with that of productivity of skilled as well as unskilled labour clearly reveals important patterns in the sense that the real GVA can be decomposed to movements of productivity of labour. In order to have a better understanding, a rank correlation analysis has been performed in order to find the nature of association between real GVA, unskilled labour productivity and skilled labour productivity. The actual value of real GVA, along with values of unskilled labour productivity and values of skilled labour productivity have been ranked for the 12 industries in consideration and used further to tabulate the rank correlation; the results of this exercise have been presented in the table below-

Table 1- Rank Correlation between Real GVA, productivity of unskilled labour and productivity of skilled labour

1991-92 to 2000-01		Real GVA
	Real GVA	1
	Unskilled Labour Productivity	*0.727**
	Skilled Labour Productivity	0.342
2000-01 to 2010-11		Real GVA
	Real GVA	1
	Unskilled Labour Productivity	*0.797**
	Skilled Labour Productivity	0.566*
2010-11 to 2019-20		Real GVA
	Real GVA	1
	Unskilled Labour Productivity	*0.720**
	Skilled Labour Productivity	0.384

Source: Author's tabulation; * denotes significance at 5% level.

The table clearly points out that there is a significant positive association between Real GVA and productivity of unskilled labour, this association is strong, positive and significant for the entire time span across three decades from 1991-92 to 2019-20. The association between real GVA and that of skilled labour is significant only in the second decade, that is between 2000-01 and 2010-11. It can be inferred from the table above that movements of real GVA could be traced down more significantly to movement of productivity of unskilled labour rather than movement of productivity of skilled labour. So, what explains the increase in GVA? In order to answer that question, the growth rates of real GVA, growth rates of unskilled labour productivity and growth rates of skilled labour productivity has been calculated for the period 1991-92 to 2019-20; and an attempt has been made to study the decomposition of growth of GVA in terms of growth of unskilled labour productivity and growth of skilled labour productivity.

4.2 Growth of Real GVA

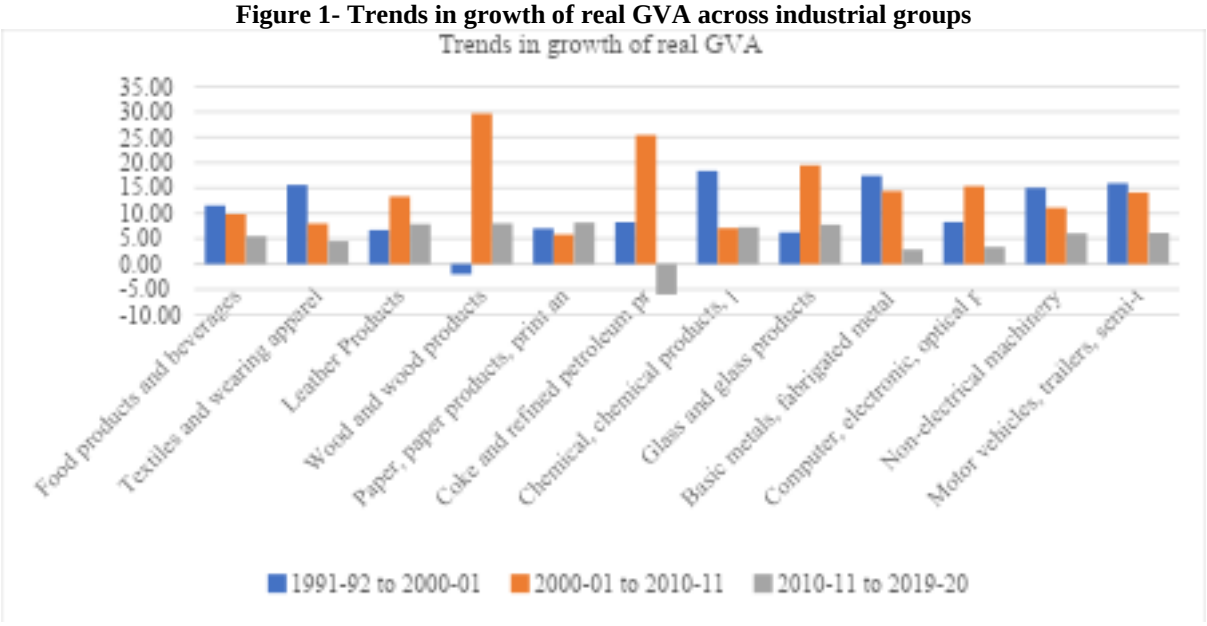
Between 1991-92 and 2000-01, manufacturing of chemicals, chemical products, pharmaceuticals, medicinal chemical, botanical products, rubber and plastic products has been the highest around the 18.4% mark, this was closely followed by manufacture of basic metals, fabricated metal products, except machinery and equipment where the average growth rate was around 17.43%, manufacture of motor vehicles, trailers, semi-trailers and other transport equipment; manufacture of non-electrical machinery; manufacture of textiles and wearing apparel grew significantly above 15% during this time span between 1991-92 and 2000-01. it is significant to note that during time span the manufacture of wood and wood products registered negative growth.

Between 2000-01 and 2010-11, phenomenal growth performance has been registered by manufacture of wood and wood products and manufacture of coke and refined petroleum, the former grew at a decadal average of 29.38% while the latter registered a decadal average of 25.44%. Manufacture of glass and glass products; manufacture of computer, electronic, optical products and electrical equipment; and manufacture of basic metals, fabricated metal products, except machinery and equipment registered decadal average growths of 19.49%, 15.36% and 14.39% respectively.

The period 2010-11 to 2019-20, saw the highest growth rate in the manufacture of paper, paper products, print and recorded media where the growth rate was to the tune of 8.17%. This was followed by the manufacture of wood and wood products; manufacture of leather and leather products; manufacture of glass and glass products and manufacture of chemical, chemical products,

pharmaceuticals, medicinal chemical, botanical products, rubber and plastic products; these industries registered growth rates of 8%, 7.88%, 7.76% and 7.27% respectively.

Figure 1- Trends in growth of real GVA across industrial groups



Source: Author's tabulation

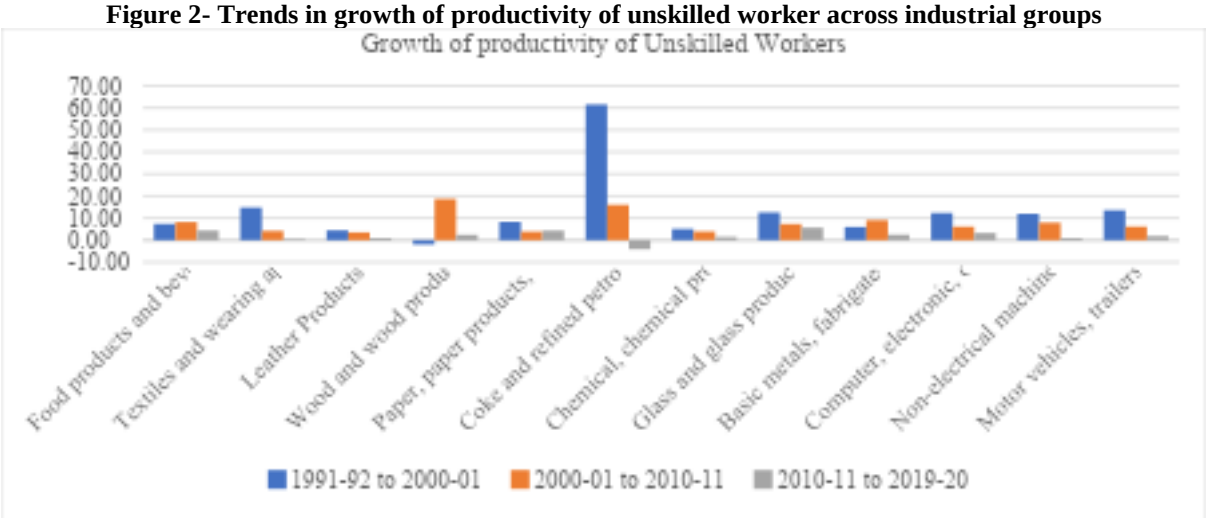
4.3 Growth of Productivity of unskilled workers

The growth of productivity of unskilled workers poses significant insights as well. From 1991-92 to 2000-01, the productivity of unskilled labour was highest for the manufacture of coke and refined petroleum products around the 61.52% mark. This was followed by the manufacture of textiles and wearing apparel; manufacture of motor vehicles, trailers, semi-trailers and other transport equipment; manufacture of glass and glass products; and manufacture of computer, electronic, optical products and electrical equipment, where the labour productivity of unskilled labour grew at 14.81%, 13.59%, 12.57% and 12.34% respectively. During this decade, the manufacture of wood and wood products recorded a decline in labour productivity for unskilled labour.

The decade 2000-01 to 2010-11 saw a phenomenal increase in the labour productivity of unskilled labour for the manufacture of wood and wood products to the tune of 18.7%. This was followed up by the manufacture of coke and refined petroleum; manufacture of basic metals, fabricated metal products, except machinery and equipment; manufacture of food products and beverages; and manufacture of non-electrical machinery where the decadal growth rates of productivity of unskilled labour were 16%, 9.1%, 8.2% and 7.9% respectively.

During the decade 2010-11 to 2019-20, the growth rates of productivity of unskilled labour was highest in the manufacture of glass and glass products, where the productivity of unskilled labour grew at 5.7%. This was closely followed by the manufacture of food and food products; and manufacture of paper and paper products where the growth of productivity of unskilled labour was 4.3% for both the industries. This was followed by manufacture of computer, electronic, optical products and electrical equipment; and manufacture of basic metals, fabricated metal products, except machinery and equipment where the growth of productivity of unskilled labour was 3.2% and 2.5% respectively.

Figure 2- Trends in growth of productivity of unskilled worker across industrial groups



Source: Author's tabulation

4.4 Growth of Productivity of skilled workers

From 1991-92 to 2000-01, the growth of skilled worker has been the highest for the manufacture of coke and refined petroleum, the decadal average of the productivity of skilled labour was phenomenal at 55.75%. This was closely followed up by the manufacture of non-electrical machinery; manufacture of computer, electronic, optical products and electrical equipment; manufacture of glass and glass products; and manufacture of textiles and wearing apparel where the productivity of skilled labour grew at 18.98%, 15.44%, 15.06% and 14.76% respectively.

During the second decade from 2000-01 to 2010-11, once again the productivity of skilled labour was highest in the manufacture of coke and refined petroleum. This was closely followed by manufacture of wood and wood products; manufacture of non-electrical machinery; manufacture of basic metals, fabricated metal products, except machinery and equipment and manufacture of food and food products where the productivity of skilled labour grew at 15.18%, 12.93%, 10.63% and 9.38% respectively.

The time period from 2010-11 to 2019-20 saw the highest growth in the productivity of skilled workers for the manufacture of computer, electronic, optical products and electrical equipment, where the productivity of skilled labour grew at 12.20%. This was closely followed by the manufacture of glass and glass products; manufacture of chemical, chemical products, pharmaceuticals, medicinal chemical, botanical products, rubber and plastic products; manufacture of paper and paper products and manufacture of basic metals, fabricated metal products, except machinery and equipment where the productivity of skilled labour grew at 4.70%, 4.59%, 4.23% and 3.3% respectively.

Figure 3- Trends in growth of productivity of skilled worker across industrial groups



Source: Author's tabulation

In attempt to decompose the growth of real GVA to that of growth of productivity of skilled and unskilled labour, the growth rates of the 12 industries have been ranked and rank correlations between growth of Real GVA, growth of productivity of unskilled labour and growth of productivity of skilled labour have been calculated; the table below presents the results.

Table 2- Rank Correlation between growth of Real GVA, growth of productivity of unskilled labour and growth of productivity of skilled labour

1991-92 to 2000-01		Growth of Real GVA
	Growth of Real GVA	1
	Growth of Unskilled Labour Productivity	0.139
	Growth of Skilled Labour Productivity	0.118
2000-01 to 2010-11		Growth of Real GVA
	Growth of Real GVA	1
	Growth of Unskilled Labour Productivity	*0.678**
	Growth of Skilled Labour Productivity	0.510
2010-11 to 2019-20		Growth of Real GVA
	Growth of Real GVA	1
	Growth of Unskilled Labour Productivity	0.342
	Growth of Skilled Labour Productivity	0.146

Source: Author's tabulation; * denotes significance at 5% level.

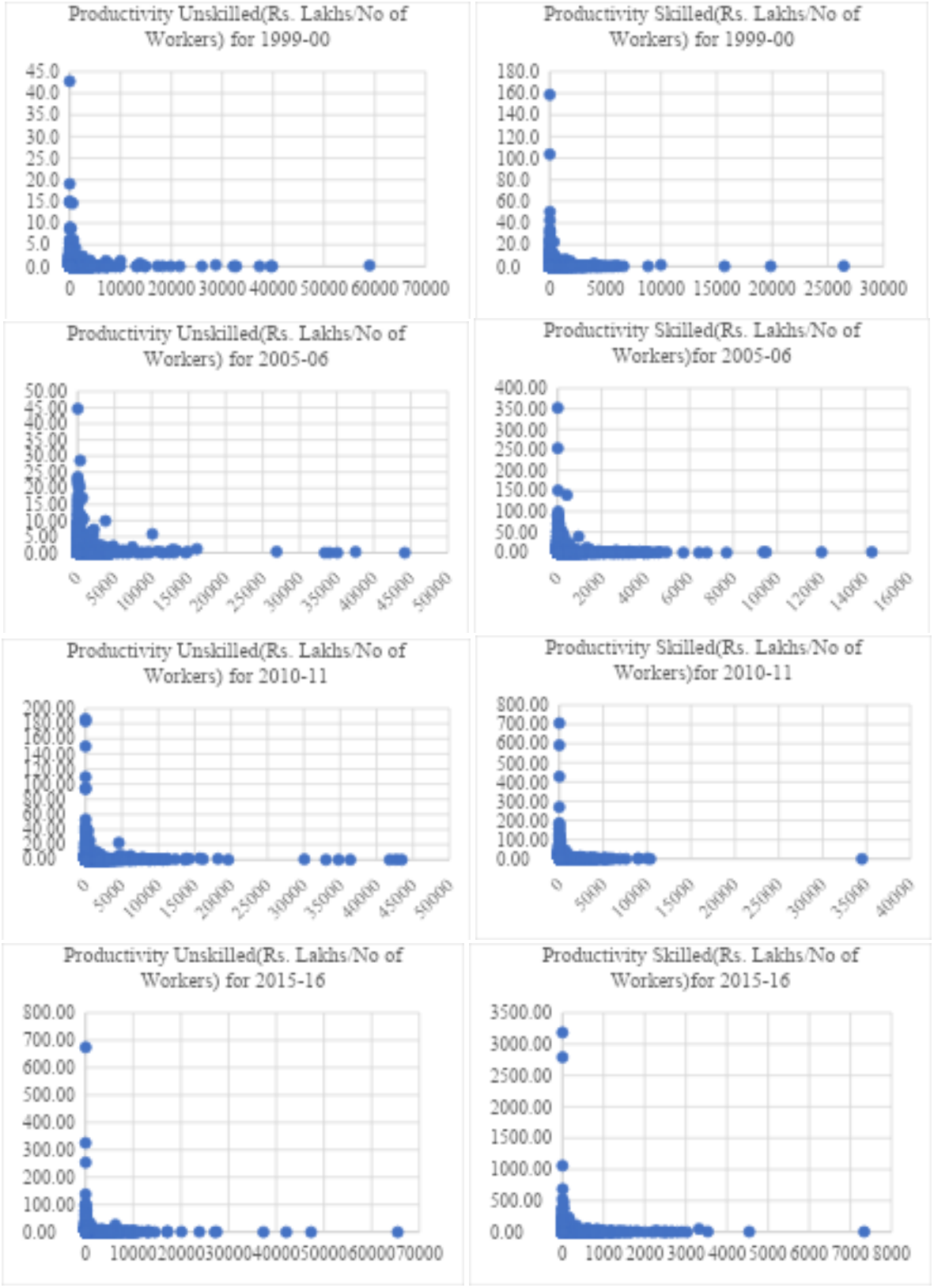
Table 2 clearly states that only in the second decade that is between 2000-01 and 2010-11, there has been presence of a strong positive association between growth of real GVA and growth of unskilled labour productivity; except for this, there has been no presence of significant association between growth of real GVA and growth of unskilled labour productivity for the other two decades. All throughout the period from 1991-92 to 2019-20, there has not been any significant association between growth of real GVA and growth of skilled labour productivity.

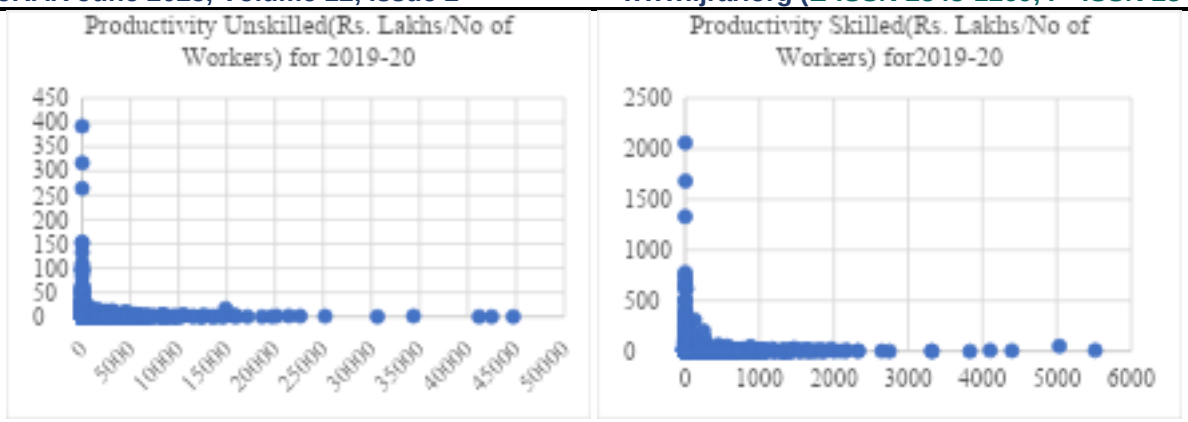
In order to further shed light on the size distribution of firms across productive efficiency, a disaggregate level analysis has been carried out for the years 2000-01, 2005-06, 2010-11, 2015-16 and 2019-20.

4.5 Unit level analysis

The unit level data has been sourced from http://microdata.gov.in/ which provides the unit level Annual Survey of Industries (ASI) Data for every year. Unit level or disaggregate or enterprise level data has been extracted for three blocks, namely block A, block C and block E. Block A presented the information related to the identification of firms, specifically the 'DSL No' of the surveyed firms. This 'DSL No' have been used to identify and extract data on 'Closing Gross Value' which has been obtained from Block C. Further using this 'DSL No', the data for employment has been extracted from Block E where the data for unskilled workers has been obtained as the sum of male, female workers and contract workers; and the figures for managerial and supervisory staffs have been proxied as figures for skilled workers. It is important to note that as ASI changes the identifiers or 'DSL No' every year, the construction of a panel has not been possible, instead the study focuses on the five different time points starting 2000-01. The numbers for Gross Value have been converted in real terms using the WPI for manufacturing products for the respective years and five different cross sections corresponding to the five time points have been created along with the respective values of unskilled and skilled labour. Average productivity of unskilled and skilled labour has been calculated and a scatter with the corresponding levels of unskilled and skilled labour have been generated so as to have an understanding of the size distribution of firms.

Figure 4- Size-productivity plots for unskilled and skilled workers for 1999-00, 2000-01, 2005-06, 2010-11, 2015-16, 2019-20.





Source: Author's tabulation

All the plots clearly point to the fact that the distributions are unimodal in nature. The is no presence of bimodality, the distributions are unimodal with a clear L shaped pattern observed for the size productivity plots, the results hold robust for the unskilled as well as skilled workers. To certain extent, the figures also point at the ever-widening gap between the productivity levels of unskilled and skilled workers, this finding can be further conjectured with the classical approach of wages and productivity to infer that the widening productivity gap might be concorded with the widening wage gap between unskilled and skilled workers.

5. Conclusion

The post 90's Indian Manufacturing sector exhibit some interesting stylised facts. To begin with, there has been an increase in the GVA for all the 12 Industrial Groups in the post globalisation era from 1991-92 to 2019-20. The decadal breakup of the growth rate suggests that between 2000-01 and 2010-10, the growth in real GVA was highest at 14.47% for these 12 industrial groups; the recent past decade from 2010-11 to 2019-20 saw the slowest growth of real GVA at 5.12%. The decade wise breakup of the growth of productivity of unskilled labour reveals that between 1991-92 and 2000-10 the productivity growth of unskilled labour has been the highest to the tune of 13%, this rate has however slowed down to 7.93% between 2000-01 and 2010-11, and then further to 2.02% between 2010-11 and 2019-20. The productivity growth of skilled labour reveals a similar scenario in the sense that, the decade 1991-92 to 2000-01 witnessed the highest growth of productivity of skilled labour at 13.88%, the rate slowed down to 9.64% between 2000-01 and 2010-11 and in the subsequent period it slowed down to 3.07% between 2010-11 to 2019-20. This perspective does not essentially offer the explanation of decomposition of real GVA growth to changes in labour productivity in the sense that, compared to the first decade since globalisation (1991-92 to 2010-11), real GVA grew at the highest pace between 2000-01 and 2010-11, but the same period witnessed fall in labour productivity for both the unskilled as well as skilled labour.

Insights from Table 1 pointed towards the presence of co-movement between real GVA and productivity of unskilled labour productivity for the three decades (from 1991-92 to 2019-20). It has also been established that there has been a strong positive association between real GVA and skilled labour productivity only for the second decade (from 2000-01 to 2010-11). Insights from Table 2 pointed that there has been presence of a significant positive association between growth of real GVA and growth of unskilled labour productivity only in the second decade (from 2000-01 to 2010-11). There has not been any presence of significant association between growth of real GVA and growth of skilled labour productivity for the time period in consideration across the three decades since globalisation (from 1991-92 to 2019-20).

The unit level analysis points reveals that the size-productivity plots for the firms are unimodal in nature, this rules out the presence of bimodality or the absence of missing middle in the size distribution of firms. the findings are in tandem with that of Hsieh & Olken (2014) and Ghosh & Abraham (2019), where the authors do not find presence of bimodality in the size distribution of firms in Indian Manufacturing. The study finds disparity in the productivity levels and wages between unskilled and skilled workers; the findings are in concordance with researches by Banga (2005) and Ramaswamy (2012) where the authors find significant improvement in labour productivity post reforms along with differential impact of technological progress on wages of skilled and unskilled labour.

To summarise, the weak association of GVA with that of skilled labour employment is noteworthy. More than three decades after the reforms, the existence of disparities in the levels of employment and increasing inequality between productivity and wages raise questions about the underlying factors behind such observation. In light of the context, the issue of missing middle also needs further exploration. The Indian economy initiated pro-business reforms during 1980s followed by the pro market reforms since 1990s, the attitudinal shift of the Government resulted in increased productivity and growth (Rodrik & Subramanium, 2004), alongside the process of structural transformation, there are adjustments in firm size due to market forces (Moscarini et al. 2008; Fort et al.,2013), in this regard, there is an inherent need to intensively explore the unit level databases in order to extensively study the size distribution of firms in light of the labour regulatory scenario.

Appendix

Table A1- Correlation with wages of unskilled workers and productivity of unskilled workers

1991-92 to 2000-01		Productivity of unskilled workers
	Wages of unskilled Workers	0.835*
2000-01 to 2010-11		Productivity of unskilled workers
	Wages of unskilled Workers	0.972*
2010-11 to 2019-20		Productivity of unskilled workers
	Wages of unskilled Workers	0.883*

Source: Author's tabulation; * denotes significance at 5% level.

Table A2- Correlation with wages of skilled workers and productivity of skilled workers

1991-92 to 2000-01		Productivity of skilled workers
	Wages of skilled Workers	0.746*
2000-01 to 2010-11		Productivity of skilled workers
	Wages of skilled Workers	0.957*
2010-11 to 2019-20		Productivity of skilled workers
	Wages of skilled Workers	0.789*

Source: Author's tabulation; * denotes significance at 5% level.

References

[1] Aggarwal, A., & Kumar, N. (2015). Structural change, industrialization, and poverty reduction. *Structural change and industrial development in the BRICS*, 199

[2] Banga, R. (2005). *Liberalisation and wage inequality in India* (No. 156). Working paper.

[3] Berman, E., Bound, J., &Machin, S. (1998). Implications of skill-biased technological change: international evidence. *The quarterly journal of economics*, *113*(4), 1245-1279.

[4] Dasgupta, S., & Singh, A. (2005). Will services be the new engine of Indian economic growth?. *Development and Change*, *36*(6), 1035-1057.

[5] Datta, M. (2019). Manufacturing Sector in the Indian Economy: Output-Value Added Symbiosis. *Journal of Asian Economics.*

[6] Erumban, A. A., Das, D. K., Aggarwal, S., & Das, P. C. (2019). Structural change and economic growth in India. Structural Change and Economic Dynamics, 51, 186-202.

[7] Fort, T. C., Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2013). How firms respond to business cycles: The role of firm age and firm size. IMF Economic Review, 61(3), 520-559.

[8] Ghani, E., & O'Connell, S. D. (2014). *Can service be a growth escalator in low-income countries?* (Policy Research Working Paper No. 6971). Washington, DC: World Bank Group

[9] Ghosh. S. and Abraham. V (2019) The Case of the 'Missing Middle' in the Indian Manufacturing Sector: A firm level analysis. CDS Working paper.

[10] Hsieh, C. T., &Olken, B. A. (2014). The missing" missing middle". *Journal of Economic Perspectives*, *28*(3), 89-108.

[11] Katz, L. F., & Murphy, K. M. (1992). Changes in relative wages, 1963–1987: supply and demand factors. *The quarterly journal of economics*, *107*(1), 35-78.

[12] Machin, S. (2002, January). Labour Market Inequality and Changes in the Relative Demand for Skills. In *Paper for the Royal Statistical Society Conference on Explanations of Rising Economic Inequality*.

[13] Marjit, S., &Acharyya, R. (2003). *International trade, wage inequality and the developing economy: A general equilibrium approach; with 15 tables*. Springer Science & Business Media.

[14] Marjit, S., Beladi, H., &Chakrabarti, A. (2004). Trade and wage inequality in developing countries. *Economic Inquiry*, *42*(2), 295-303.

[15] Mazumdar, D., & Sarkar, S. (2009). The employment problem in India and the phenomenon of the missing middle. *Indian Journal of Labour Economics*, *52*(1), 43-55.

[16] Moscarini, Guiseppe and Fabien Postel-Vinay, 2008,, "The Timing of Labor Market Expansions: New Facts and a New Hypothesis," in D. Acemoglu, K Rogoff, and M. Woodford., eds, NBER Macroeconomics Annual, 23, 1-51.

[17] Ramaswamy, K. V. (2012). Wage inequality in Indian manufacturing: Is it trade, technology or labour regulations?. IGIDR Working paper.

[18] Rodrik, D., & Subramanian, A. (2004). *From" Hindu growth" to productivity surge: the mystery of the Indian growth transition*(No. w10376). National Bureau of Economic Research.

[19] Sahoo, A., & ten Raa, T. (2012). Wage–productivity differentials and Indian economic efficiency. *Economic Modelling*, *29*(2), 341-348.

[20] Szirmai, A. (2012). Industrialisation as an engine of growth in developing countries, 1950–2005. *Structural change and economic dynamics*, *23*(4), 406-420.

[21] Szirmai, A., &Verspagen, B. (2015). Manufacturing and economic growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics*, *34*, 46-59.

[22] Wei, Y., & Balasubramanyam, V. N. (2015). *A comparative analysis of China and India's manufacturing sectors* (pp. 1-28). Lancaster University Management School.