

Wage Productivity Gap in Indian Manufacturing Industries in terms of Wage Elasticity of Labour Productivity

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Abstracts

In this paper we make an attempt of assessing the wage productivity gap in Indian manufacturing at a disaggregated level in terms of classifying different 3-digit industry groups in some categories based upon wage elasticity of labour productivity.

We have classified industry groups (3-digit NIC) for high, medium, and low category. We have suggested that we find some differences in the nature of the trend in labour share as far high, medium, and low-growth industries are concerned. The following figures suggest that the category of industries with Low AAGRI (based on elasticity) has comparatively higher labour share than the category of industries with Medium AAGRI (based on elasticity) till 1999-2000 and after 2000 the situations have been completely reversed. We can opine that industrial growth rates did not essentially increase labour share in manufacturing industries. The groups have been formulated based on wage elasticity of labour productivity.

It is important to note that the mentioned classified range here is for measuring High, Medium and Low category. There is absence of industry with High AAGRI based on wage elasticity of labour productivity. Therefore, we have only two categories of industry groups. Category 1 represents medium industry groups based on wage elasticity of labour productivity and category 2 represents low industry group based on wage elasticity of labour productivity. We have found that the following figures exhibit the overall downward trend in labour share in all these categories for the whole period under consideration.

Keywords: Labour elasticity, Wage Productivity Gap, Labour Share, Labour Productivity, Manufacturing Wage

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I. Introduction and Review of Literatures

An effort is being made in the current research to examine the disparity between wages and productivity in the Indian manufacturing sector on a nationwide scale at disaggregate level, utilizing the ASI database covering the years from 1973-74 to 2019-2020. The wage productivity gap is measured at the 3-digit level classification of industry groups as is available in the ASI database.

In this chapter, we have assessed the impact of wage elasticity of labour productivity and have calculated (Annual Average Growth Rates for each industry group) AAGRI² that influence the labour share and its growth in Indian manufacturing industries.

The main inspiration of this study is from Karanassou and Sala (2014) where long-run elasticity of real wages with respect to productivity has been analysed for seven developed countries. The noteworthy contribution has been made by Sen and Dasgupta (2009) where they have addressed the issues of the slow growth of employment and the low employment elasticity of output also sometimes dwells on relative prices.

Carter (2007) has pointed out the relationship between real wages and productivity and mentioned that changes in real wages are greater than those of productivity and vice versa for productivity across industries of advanced economies.

Besides this several studies carry out the inspiration for this present work. Few among these are (Verdoorn 1998; Upender 1996; Nikulin 2015; Dasgupta; Lee-peng and Yep 2001; Karanassou and Sala 2010;

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² See Sen and Dasgupta (2009)

Sen and Dasgupta 2006; Strauss and Wohar 2004; Kumar, Webber and Perry 2012; Sen and Dasgupta 2008; Policardo and Carrera 2019).

II. Methodology of the Study

As indicated at the onset, the data has been collected from the Annual Survey of Industries (3-digit NIC classification for all India level). The data source is secondary, and it is panel data. After taking into consideration the important data variables for the study, all the data values have been converted into real terms by using consumer price index for industrial workers (CPI-IW) and wholesale price index for manufacturing products (WPI-MP). The wages of the workers have been converted into real values by using CPI-IW and value of outputs has been converted into real values by using WPI-MP. The CPI-IW data has been obtained from Labour Bureau with its base year 2016 and the WPI-MP has been obtained from the Office of Economic Advisor with the base year of 2011-2012.

The detailed methodology of the study is provided step by step as follows:

STEP 1: We have arranged the panel data of real value of output for each manufacturing industry group by deflating the nominal value of output by WPI-MP.

STEP 2: Then we have calculated the wage elasticity of labour productivity by the following standard ordinary regression performed separately for each industry group for the period under consideration as a whole:

$$(\log w)_{it} = \alpha + \beta (\log LP)_{it} + u_{it}$$

where the notations have their usual meaning and the estimated value of the β coefficient measures the elasticity.

Elasticity here measures the proportionate change in real wage due to a proportionate change in labour productivity.

STEP 3: Here, we have categorized high, medium and low group of industries on the basis of the value of wage elasticity of labour productivity.

where, (i) high growth industries group is with wage elasticity of labour productivity greater than 15%,

(ii) medium growth industries group with wage elasticity of labour productivity lying between 10% and 15%,

(iii) low growth industries group with wage elasticity of labour productivity less than 10%.

STEP 4: Finally, for each category (high or medium or low), we have calculated the labour share and drawn the labour share trend and labour share growth trend respectively.

$$LS = \frac{RWW}{RNVA}$$

where LS stands for labour share and RWW and RNVA stand for real wages to workers and real net value added respectively.

$$LSG = \frac{LS_t - LS_{(t-1)}}{LS_{(t-1)}}$$

where LSG stands for labour share growth and t denotes each time period under consideration and (t-1) denotes each time period preceding the t-th time period under consideration.

III. Empirical Findings

From table 1 we can observe the classified ranges of industry groups based on wage elasticity of labour productivity that have been set to undertake the following analysis.

Table 2 represents the obtained values of labour share (ls) and labour share growth (lsg) in high wage elasticity on labour, medium wage elasticity on labour, and wage elasticity on labour industry groups at 3-digit NIC (1973-74 to 2019-20).

It is important to note that the mentioned classified range for measuring High, Medium and Low category there is absence of industry with High wage elasticity of labour productivity. Therefore, we have only two categories of industries in this group 1 medium industry group based on wage elasticity of labour productivity to low industry group based on which elasticity on labour productivity.

Table 1: Classified Ranges of Industry Groups Based on Wage elasticity of labour productivity

High WAGE ELASTICITY OF LABOUR PRODUCTIVITY it- Industrial Growth Rates	MEDIUM WAGE ELASTICITY OF LABOUR PRODUCTIVITY it- Industrial Growth Rates	LOW WAGE ELASTICITY OF LABOUR PRODUCTIVITY it- Industrial Growth Rates
INDUSTRY GROUP	INDUSTRY GROUP	INDUSTRY GROUP
WAGE ELASTICITY OF LABOUR PRODUCTIVITY _{it} ≥ 15%	10% ≤ WAGE ELASTICITY OF LABOUR PRODUCTIVITY _{it} < 15%	WAGE ELASTICITY OF LABOUR PRODUCTIVITY _{it} < 10%

Table 2: Labour Share (LS) and Labour Share Growth (LSG) in High Wage Elasticity on Labour, Medium Wage Elasticity on Labour and Wage Elasticity on Labour Industry Groups at 3-Digit NIC (1973-74 to 2019-20)

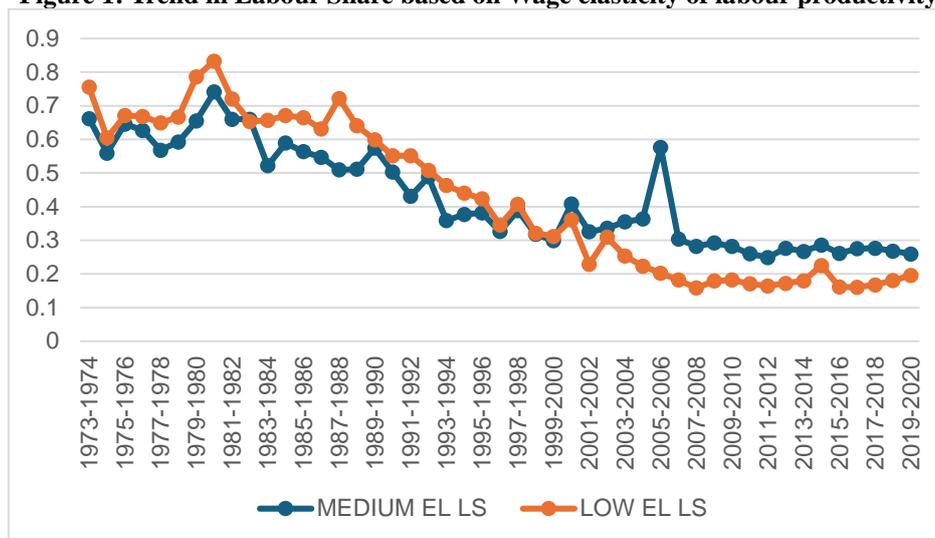
YEAR	MEDIUM LS	MEDIUM LSG	MEDIUM LS per Worker	MEDIUM LSG per Worker	LOW LS	LOW LSG	LOW LS per Worker	LOW LSG per Worker
1973-1974	0.662		0.662		0.756		0.081	
1974-1975	0.559	-0.155	0.559	-0.155	0.604	-0.200	0.054	-0.339
1975-1976	0.646	0.155	0.646	0.155	0.671	0.110	0.059	0.095
1976-1977	0.627	-0.029	0.627	-0.029	0.669	-0.003	0.057	-0.026
1977-1978	0.568	-0.094	0.568	-0.094	0.649	-0.029	0.054	-0.051
1978-1979	0.592	0.043	0.592	0.043	0.667	0.027	0.056	0.025
1979-1980	0.655	0.105	0.655	0.105	0.786	0.178	0.055	-0.019
1980-1981	0.741	0.132	0.741	0.132	0.833	0.060	0.049	-0.111
1981-1982	0.660	-0.109	0.660	-0.109	0.720	-0.135	0.040	-0.178
1982-1983	0.660	0.000	0.660	0.000	0.653	-0.093	0.035	-0.123
1983-1984	0.522	-0.209	0.522	-0.209	0.657	0.005	0.033	-0.052
1984-1985	0.590	0.129	0.590	0.129	0.671	0.021	0.032	-0.046
1985-1986	0.564	-0.044	0.564	-0.044	0.665	-0.009	0.030	-0.065
1986-1987	0.547	-0.030	0.547	-0.030	0.631	-0.051	0.027	-0.085
1987-1988	0.509	-0.069	0.509	-0.069	0.722	0.144	0.029	0.066
1988-1989	0.511	0.004	0.511	0.004	0.640	-0.112	0.023	-0.189
1989-1990	0.574	0.123	0.574	0.123	0.599	-0.065	0.020	-0.159
1990-1991	0.503	-0.124	0.503	-0.124	0.551	-0.079	0.017	-0.151
1991-1992	0.431	-0.142	0.431	-0.142	0.552	0.001	0.015	-0.101
1992-1993	0.489	0.133	0.489	0.133	0.508	-0.080	0.012	-0.170
1993-1994	0.359	-0.266	0.359	-0.266	0.463	-0.088	0.011	-0.154
1994-1995	0.377	0.051	0.377	0.051	0.441	-0.048	0.009	-0.139
1995-1996	0.381	0.011	0.381	0.011	0.423	-0.041	0.008	-0.116
1996-1997	0.326	-0.144	0.326	-0.144	0.345	-0.183	0.006	-0.200
1997-1998	0.389	0.191	0.389	0.191	0.407	0.178	0.007	0.145
1998-1999	0.318	-0.183	0.318	-0.183	0.321	-0.211	0.006	-0.244
1999-2000	0.299	-0.058	0.299	-0.058	0.311	-0.030	0.005	-0.055
2000-2001	0.408	0.364	0.408	0.364	0.361	0.158	0.006	0.121
2001-2002	0.326	-0.202	0.326	-0.202	0.229	-0.365	0.004	-0.377
2002-2003	0.336	0.032	0.336	0.032	0.309	0.351	0.005	0.316
2003-2004	0.355	0.057	0.355	0.057	0.253	-0.180	0.004	-0.224
2004-2005	0.363	0.023	0.363	0.023	0.224	-0.118	0.003	-0.170
2005-2006	0.576	0.586	0.576	0.586	0.202	-0.094	0.003	-0.121
2006-2007	0.304	-0.473	0.304	-0.473	0.182	-0.100	0.002	-0.138
2007-2008	0.282	-0.070	0.282	-0.070	0.159	-0.130	0.002	-0.176
2008-2009	0.292	0.035	0.292	0.035	0.179	0.129	0.002	0.078
2009-2010	0.282	-0.036	0.282	-0.036	0.182	0.016	0.002	-0.043
2010-2011	0.260	-0.076	0.260	-0.076	0.171	-0.061	0.002	-0.082
2011-2012	0.249	-0.043	0.249	-0.043	0.165	-0.036	0.002	-0.088
2012-2013	0.277	0.111	0.277	0.111	0.172	0.045	0.002	-0.026
2013-2014	0.267	-0.035	0.267	-0.035	0.180	0.043	0.002	0.012
2014-2015	0.286	0.071	0.286	0.071	0.225	0.254	0.002	0.224
2015-2016	0.261	-0.086	0.261	-0.086	0.161	-0.285	0.001	-0.272
2016-2017	0.275	0.052	0.275	0.052	0.161	-0.003	0.001	-0.016
2017-2018	0.277	0.006	0.277	0.006	0.167	0.042	0.001	0.014
2018-2019	0.268	-0.032	0.268	-0.032	0.181	0.080	0.002	0.042
2019-2020	0.259	-0.031	0.259	-0.031	0.195	0.080	0.002	0.077

Source: ASI Database of Government of India. Authors' own calculation.

From the above table we have drawn the following figure in the below portion.

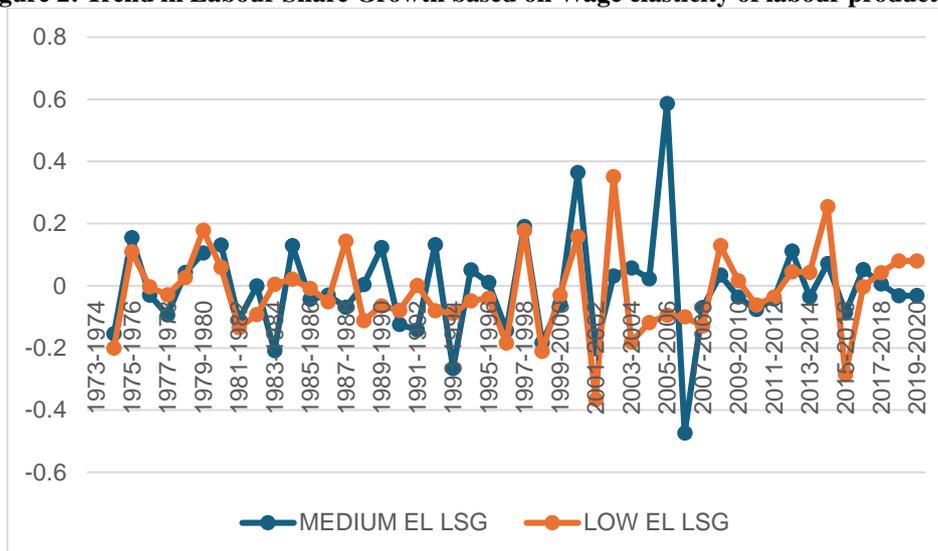
Figure 1 and 2 represents the LS and LSG scenario for high, medium and low category of industry groups and Figure 3 and 4 represents LS and LSG rate or per worker scenario for high, med and low category of industry groups respectively.

Figure 1: Trend in Labour Share based on Wage elasticity of labour productivity



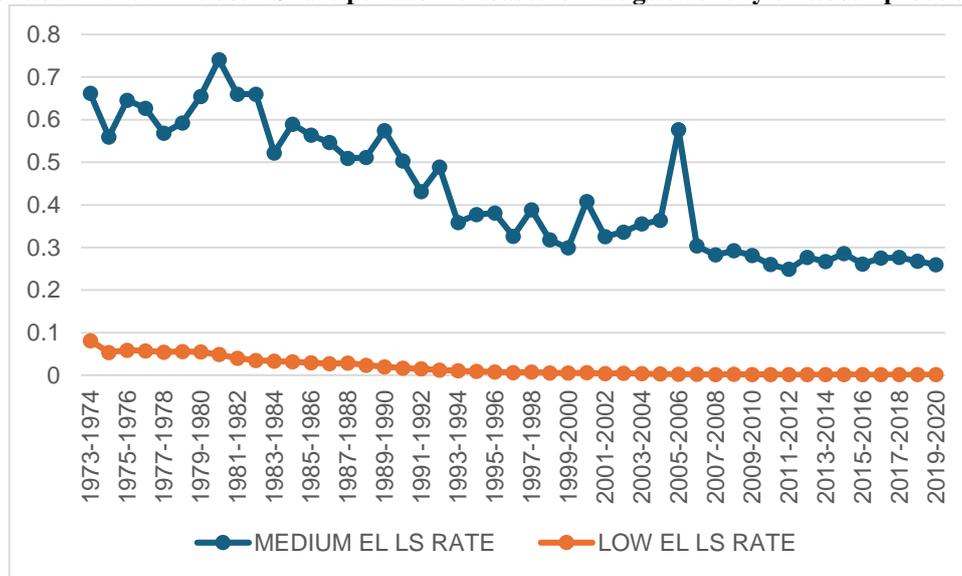
Source: ASI Database of Government of India. Authors' own calculations.

Figure 2: Trend in Labour Share Growth based on Wage elasticity of labour productivity



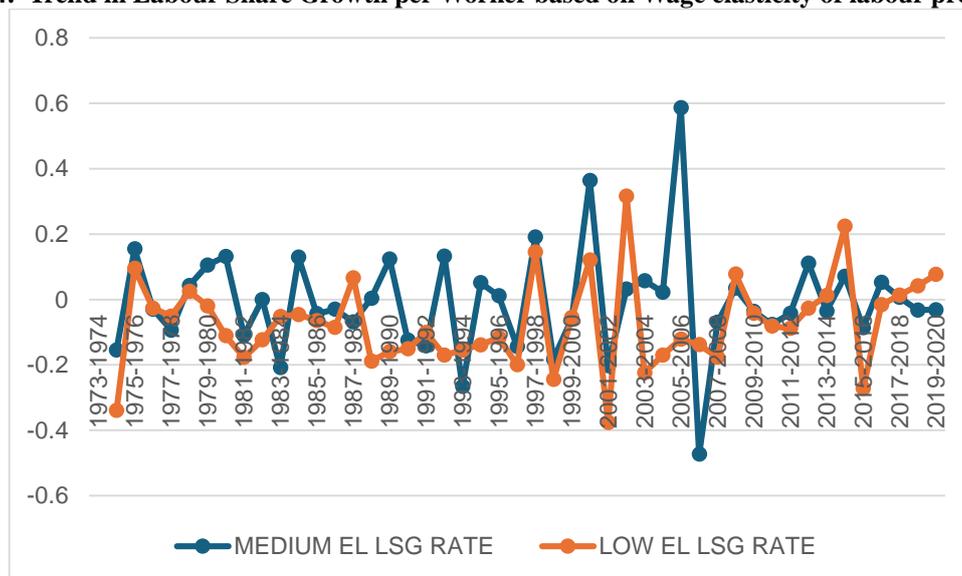
Source: ASI Database of Government of India. Authors' own calculations.

Figure 3: Trend in Labour Share per Worker based on Wage elasticity of labour productivity



Source: ASI Database of Government of India. Authors' own calculations.

Figure 4: Trend in Labour Share Growth per Worker based on Wage elasticity of labour productivity



Source: ASI Database of Government of India. Authors' own calculations.

The major findings of this study are delineated as follows:

Figure 1 suggests that the category of industries with low-wage elasticity has slightly higher LS compared to industries with medium elasticity.

After 2000-2001 the scenario is becoming opposite. Then the middle industries have higher LS compared to lower level of industries.

Both type of industries exhibits downward sloping trend.

Now, coming to the LS per worker, here in Figure 3 we can see that though the category of the industry has a downward sloping trend for LS per worker, the LS for the medium category of the industry possesses more downward slope than the low elasticity category of industries.

There is very low level of LS in the low elasticity category of industries.

Significant difference is observed in per worker LS for the medium and low level of industries groups based on wage elasticity of labour productivity.

The LSG and LSG per worker is seen in Figure 2 and 4 respectively. From their two figures, it can be interpreted that LSG and LSG rate in all the categories of industry groups depicts fluctuations from ear to ear.

The obtained fluctuations of LSG and LSG rate from Figure 2 and Figure 4 are wilder for industry groups. Significant difference. with high elasticity of wedge on lever productivity.

IV. Summary

In this assessment, we are interested in seeing whether higher elasticity reduces the anti-labour wage productivity gap or not. Going by the logic it is expected that the higher the elasticity, the lower the anti-labour wage productivity gap. The result is quite similar as expected. We found that labour share in the medium elasticity group is below the labour shares in the other two categories till 1999-2000 after which it rose above them. However, the overall downward trend is the widening anti-labour wage productivity in all these categories of industry groups. To solve the wage productivity gap in this context policy attention is required. Our one suggestion here might be the revision of labour laws and minimum wage revision so that the responsiveness between the wage and labour productivity might be stabilized.

References

- [1]. Carter, S. (2007). Real wage productivity elasticity across advanced economies, 1963-1996. *Journal of Post Keynesian Economics*, 29(4), 573-600.
- [2]. Dasgupta, B. Labour Under Stress: An Assessment Based on Primary Information Sunanda Sen. *Economic and political weekly*, 43(3), Jan. 19-25.
- [3]. Karanassou, M., & Sala, H. (2010). The Wage-Productivity Gap Revisited: Is the Labour Share Neutral to Employment?.
- [4]. Karanassou, M., & Sala, H. (2014). The role of the wage-productivity gap in economic activity. *International Review of Applied Economics*, 28(4), 436-459.
- [5]. Kumar, S., Webber, D. J., & Perry, G. (2012). Real wages, inflation and labour productivity in Australia. *Applied economics*, 44(23), 2945-2954.
- [6]. Lee-Peng, H., & Yap, S. F. (2001). The link between wages and labour productivity: An analysis of the Malaysian manufacturing industry. *Malaysian Journal of Economic Studies*, 38(1/2), 51.
- [7]. Nikulin, D. (2015). Relationship between wages, labour productivity and unemployment rate in new EU member countries. *Journal of International Studies*, 8, 31-40.
- [8]. Policardo, L., Punzo, L. F., & Carrera, E. J. S. (2019). On the wage-productivity causal relationship. *Empirical Economics*, 57, 329-343.
- [9]. See the webpage <https://eaindustry.nic.in/>
- [10]. See the webpage <https://labourbureau.gov.in/>
- [11]. See the webpage <https://microdata.gov.in/nada43/index.php/catalog/ASI>
- [12]. See the webpage <https://www.indiastat.com/data/industries/annual-survey-of-industries#>. The author has accessed this website for 3-digit panel data from Annual Survey of Industries.
- [13]. See the webpage <https://www.mospi.gov.in/annual-survey-industries>
- [14]. See the webpage <https://www.mospi.gov.in/asi-summary-results>
- [15]. See the webpage <https://www.mospi.gov.in/classification/national-industrial-classification>
- [16]. Sen, S., & Dasgupta, B. (2006). Labour in India's manufacturing sector. *Indian Journal of Labour Economics*, 49(1), 79-101.
- [17]. Sen, S., & Dasgupta, B. (2008). Labour under stress: findings from a survey. *Economic and political weekly*, 65-72.
- [18]. Sen, S., & Dasgupta, B. (2009). Unfreedom and waged work: Labour in India's manufacturing industry. SAGE Publications India: Delhi.
- [19]. Strauss, J., & Wohar, M. E. (2004). The linkage between prices, wages, and labor productivity: A panel study of manufacturing industries. *Southern economic journal*, 70(4), 920-941.
- [20]. Upender, M. (1996). Elasticity of labour productivity in Indian manufacturing. *Economic and Political Weekly*, M7-M10.
- [21]. Verdoorn, P. J. (1998). Factors that determine the growth of labour productivity. *National Income and Economic Progress*. London: Macmillan, 199-207.