

Export Performance:

A Study of Labour and Capital Intensive Manufacturing Industries in India

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Abstract: This paper makes an attempt to explore the export performance and its determinants of labour and capital intensive industries of Indian manufacturing sector for the period of 2004 to 2019. The paper found that the labour-intensive industries are more export-oriented than capital intensive industries. Foreign share, research and development and real effective exchange rate have a positive relationship with the export performance of most of the industries classified under both labour and capital-intensive industry groups. On the other hand, the inverted U shape relation has been found between firm size and export performance. From the policy point of view, the paper suggests that developing export policies for certain industries could help to protect or uphold the export performance of manufacturing sector.

Key words: export performance; manufacturing industries; capital-intensive; labour-intensive; foreign share, research and development; size

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1. Introduction

Even with the remarkable trade liberalization and many favored trade agreements, export performance of manufacturing sector in India is dormant. India's experience of the slowdown of export and increasing dependence on imports in the manufacturing sector is a matter of complication. Yet, this sector plays a crucial role in India's merchandise exports. Engineering goods, gems and jewelry, leather products, chemicals, and textiles are the major export items of this sector. But despite this growing performance, India's share of manufacturing sector exports is lower compared to other emerging countries.

In spite of the improvement of GDP growth rate during the post reforms, the share of manufacturing in GDP has not increased. The reason could be due to non-manufacturing sectors have grown at a faster pace than the manufacturing sector. While the manufacturing sector's GDP growth registered at 5.8 percent each in the 1980s and 1990s and 7.9 percent in the 2000s, on the other hand, the non-manufacturing sector recorded 6.5, 7.1 and 8.5 percent growth rate respectively during the same period. Transforming the manufacturing sector as the engine of long-run growth is one of the major focus points of Govt. of India (Economic Survey, GoI, 2014-15). For this, the Government of India announced the National Manufacturing Policy in 2011 to enhance the share of GDP in manufacturing sector in to 25 percent, creating 100 million jobs and to increase global competitiveness by 2022. Though this sector is continuously facing some structural problems, yet it is a difficult task to achieve the aspiring target.

As challenges related to sustaining India's manufacturing export growth are continuously rising, the main focus of this study is to examine the export performance and also to identify key

factors that determine the export performance of the manufacturing sector.

While most of the studies analysing export performance of manufacturing sector focused on the role of firm size and technology, in this backdrop, the present study first examines the inter industry export performance of both capital and labour intensive industries of manufacturing sector in India. Second, it also identifies the key factors that determine export performance of both capital and labour intensive industries of manufacturing sector in India. The aggregate industry level analysis can't give the clear picture of which industries are more export oriented within the broad manufacturing, for this, the above objectives are examined at both aggregated and disaggregated level.

The remaining part of this paper is organized as follows: the literature review is presented in section 2, methodology and data are discussed in section 3. Section 4 presents the empirical results and the conclusion is discussed in the final section.

2. Review of Literature

This section emphasizes on reviewing the empirical works based on two broad themes, viz., the examination of export performance of the manufacturing sector and the determinants of export performance in India and other countries. There are a number of studies related to examining export performance using different approaches in terms of model specification, assumptions, firm selection and time horizon etc.

The first strand of literature presents international studies related to examining the export performance and the determinants of manufacturing sector. For example, Siddhartha and Kumar (1990) found R&D intensity is a relevant variable of inter-firm trade of US MNEs. Aitken (1997) found that the production of MNEs and export activities positively influence the export

performance of Mexican firms. Allard et.al (2005) found that real exchange rate appreciation negatively affect the export of goods and services in EURO area countries. Zhang (2007) showed FDI inflow and infrastructure have a positive and significant impact on high tech exports of China. Tebaldi (2011) examined the determinants of high technology exports and indicated that human capital, FDI inflows and trade openness are the major factors to impact the high technology export of fifteen European Union countries. Sertic et.al. (2015) examined the determinants of manufacturing industries of twenty-seven European member states from the period 2000-2011. The result obtained from the analysis suggested that industrial production and domestic demand are positively related to manufacturing exports. Brache and Felzensztein (2019) in their study addressed the effects of firm's engagement with trade associations on export performance. Firm-level primary data by a survey of Chile from 2015-2016 are used. By using the General Linear Model (GLM), the results revealed that stronger engagement of trade associations located at the company's export market has a positive effect on export performance.

The second strand of literature presents studies in India. In despite the vast literature of export performance of the manufacturing sector in developed and other developing countries; the existing empirical literature of the export performance of the manufacturing sector in India is limited. Riedel et. al. (1984) studied the determinants of Indian export performance in 1970 and found that domestic market conditions strongly influence the export behaviour. Pant (1993) in his study export performance of manufacturing sector in India, revealed that industry and firm-specific factors are vital to export. Kumar and Siddharthan (1994) in their study analyzed export variation of thirteen manufacturing industries in India from 1987-88 to 1989-90 and found that technology factor is important for explaining export behaviour of low and medium-tech

industries. Agarwal (2002) examined determinants of export performance of Indian manufacturing sector in late 1990s and suggested that firm technology, firm size and import of raw materials are crucial determinants of export performance. Lall and Mohammad (2007) found that foreign shares of the large firms in India have positive impact on export performance. Rijesh (2018), examined the impact of capital goods on export performance of organised manufacturing sector in India for fifteen two-digit manufacturing sector firms from 1997 to 2016, found that capital goods are positively related to export performance.

As far as I know, yet there is no work on the export performance and key determinants of both labour and capital intensive industries of Indian manufacturing, this study attempts to look into the same.

3. Data and methodology

3.1. Data

For examining export performance, this paper uses yearly data of the two digit industries of manufacturing sector from 2004 to 2019. First, the data on number of employees and capital stock are used for calculating labour and capital intensive industries respectively. As capital stock data is not available in Prowess data base, capital stock is calculated by perpetual inventory method. To find this, capital deflator is extracted from Hand Book of Statistics on Indian Economy published by RBI. Firm specific variables i.e; export to sales, gross fixed assets, no of employees research and development, foreign share are collected from Prowess data base, Centre for Monitoring Indian Economy (CMIE). Real Effective Exchange Rate (REER) data are extracted from Hand Book of Statistics on Indian Economy published by Reserve Bank of India (RBI). Industry specific WPI deflators are used to obtain the real gross value added at constant

2011-12 prices. To measure capital input, 2011-12 constant prices of capital stock are taken. National level price deflator of machinery and equipment is used to deflate capital stock (as industry level price deflator of the same is not available).

3.2. Methodology

In the first step, export performance of capital and labour intensive manufacturing sector in India is examined. In this, the export performance based on two digit industry group is estimated. For calculating capital and labour intensive industries, number of employees is taken as a proxy of labour and capital stock is used as the capital. The perpetual inventory method which is used to estimate capital stock in this study is given below.

$$K_t = K_{t-1} - \delta K_{t-1} + GFA_t = (1 - \delta)K_{t-1} + GFA_t \quad \text{“(1)”}$$

Where, K_t is the capital stock of current year, GFA_t is the current year gross fixed capital formation, δ is the depreciation rate (constant over time) and K_{t-1} is denoted as the initial capital stock. According to Unel(2003), 5 percent depreciation rate of capital is used. The nominal gross fixed capital formation is deflated by investment deflator series of machine and equipment. To estimate capital stock, investment time series (GFA), initial capital stock, and depreciation rate of the capital stock are required. From these above indicators, generally, initial capital stock is not available. Following Hall and Jones (1999), initial capital stock is calculated by below formula.

$$K_0 = \frac{GFA_0}{\delta + g_{GFA}} \quad \text{“(2)”}$$

Where, K_0 is the initial capital stock, GFA_0 represents initial gross fixed capital formation, g_{GFA} denotes growth rate of gross fixed capital formation and δ is the rate of depreciation. Capital stock in real term is derived by using above two equations. Then l/k ratio is calculated and averages of the ratio are measured. The industries more than the mean value is considered as labour intensive and less than the mean value are considered as capital intensive industries. Yearly averages are calculated and the firms having consistent data set from 2004 to 2019 for all the variables are included and others are dropped from the sample. Thus the sample size is restricted to 2149.

Export performance of an industry determined by various factors. Most of the studies have given emphasis on technology and firm size. Some of the literature found that affiliation with multinational companies, foreign share, advertisement and promotion etc. are the important determinants of export. Besides that, Government policies such as export import promotions and reductions, exchange rate regulations, tax concessions etc. have diverse impact on export promotion. First, this study examines the export performance of both capital and labour intensive industries, the inter-industry variation of export performance is also evaluated. The result suggests the best performing industries in terms of export within the broad umbrella of the manufacturing sector. As all sample firms do not have export data and some of the information on dependent variables is not available in the data set, therefore, the panel Tobit model is used.

In the second step, the factors which determine the export performance of manufacturing industries of both capital and labour intensive industries are also examined by employing panel Tobit model. In this model export is treated as the dependent variable, R & D expenditure, foreign share, size, and Real Effective Exchange Rate are used as independent or explanatory variables with the following equation.

$$\begin{aligned}
 \text{Export}_{it} &= \beta_0 + \beta_1 R\&D_{it} + \beta_2 \text{FOREIGN}_{it} + \beta_3 \text{REER}_{it} + \beta_4 \text{SIZE}_{it} + \varepsilon_{it} \text{ if } RHS > 0 \\
 &= 0 \text{ otherwise}
 \end{aligned}
 \tag{3}$$

Where, Export represents the percentage of export to sales ratio, Foreign is percentage of firms' foreign share, R&D represents the expenditure of research and development, REER is the real effective exchange rate and SIZE represents the size of the firms.

The factors considered to determine the export performance of manufacturing sector in this study with their possible relations with export are discussed below.

As India is a labour abundant country with scarce of capital, higher labour intensity is likely have a positive impact on export performance of labour-intensive industries and negative impact on capital intensive industries. Theoretically, R&D is positively related with export performance of firms. It supports new technology which improves international competitiveness. We expect a positive relation between foreign shares and export. Foreign shares lead to improved technology and accessible external finance and transaction which enhances more export. Firm Size is considered as a key factor in firm export. The firm size has both positive and negative relation with export considering economies and diseconomies of scale. The small firm's export beyond a capacity could have negative impact on the firm and on the other hand a large oligopolistic firm has access to capture the domestic market need not export. Hence, both positive and negative relation between firm size and export can be expected. We expect a positive relation between real effective exchange rate and export. When real exchange rate depreciates, it leads to decline in competitiveness which further induces increase in export.

5. Econometric Analysis and Result

For examining export performance of capital and labour intensive industries, the paper is derived the labour and capital intensive industries using the ratio of labour to capital (L/K).

Table. 1 Labour and Capital intensity of Indian Manufacturing Industries

NIC Code	Industries	2004-05 to 2009-10	2010-11 to 2014-15	2015-16 to 2018-19
Labour intensive				
10	Food products	1.26	1.58	1.24
11	Beverages	0.91	1.03	0.65
12	Tobacco products	0.86	0.70	0.57
13	Textiles	0.88	0.54	0.55
14	Wearing apparel	6.94	2.90	2.12
15	Leather and related products	0.95	1.36	1.35
16	Wood and products of wood and cork, except furniture; manufacture of articles	2.27	1.68	1.16
25	Fabricated metal products, except machinery and equipment	0.84	0.72	0.50
32	Other manufacturing	1.33	2.02	1.05
Capital intensive				
17	Paper and paper products	0.37	0.38	0.32
19	Coke and refined petroleum products	0.07	0.13	0.21
20	Chemicals and chemical products	0.42	0.44	0.41
21	Pharmaceuticals, medicinal chemical and botanical products	0.74	0.72	0.59
22	Rubber and plastics products	0.42	0.62	0.52
23	Other non-metallic mineral products	0.32	0.31	0.28
24	Basic metals	0.49	0.38	0.29

2004	18.76	3.35	23.80	1500.43	20.70	0.66	26.43	246.45
2005	20.48	2.39	27.27	1163.16	27.14	7.34	26.40	722.13
2006	13.97	3.81	21.75	1399.93	20.06	1.41	20.63	336.86
2007	16.23	5.23	27.24	323.51	30.28	1.15	27.14	96.00
2008	16.33	3.38	21.73	900.60	15.22	0.48	18.16	35.75
2009	18.90	1.20	26.64	222.59	11.91	1.16	23.70	227.88
2010	18.51	3.36	24.17	429.56	19.45	1.06	21.28	61.62
2011	17.04	0.57	30.30	257.14	21.12	0.46	14.57	96.31
2012	19.40	1.83	25.19	601.27	16.67	5.65	13.29	190.43
2013	17.14	3.75	23.63	480.26	22.79	0.83	25.24	109.24
2014	17.28	2.75	23.56	372.44	35.43	0.38	23.33	41.78
2015	15.01	0.71	20.88	303.73	24.36	0.59	24.15	79.58
2016	15.53	1.11	21.57	303.10	27.68	3.51	27.19	104.66
2017	17.14	1.45	21.63	260.91	24.30	1.09	26.30	68.30
2018	18.97	0.92	20.37	370.42	30.85	1.74	30.94	94.41
2019	18.29	1.95	20.32	482.46	25.60	1.00	21.98	54.95
Total	17.34	2.20	23.18	539.90	24.11	1.71	23.68	136.52
N	1630	1630	1630	1630	519	519	519	519

Note: Exp_sale is export to sale in %, R&D is research and development expenditure in Rs. million , Foreign is the foreign share in Rs million, Size is the asset of firm in Rs. Million and N is the total observation.

Table. 2 shows the mean of the key variables (statistics of other supportive variables are given in Appendix) used to estimate the determinants of export performance of both capital and labour-intensive industries from 2004 to 2019. In case of capital intensive industries, the highest and lowest mean of the export to sale are 20.48 percent and 13.97 percent in the years 2005 and 2006 respectively. Overall, the average of export to sale for all capital intensive industries is 17.34 percent. For R&D, the year 2007 has the highest mean value of 5.23 percent and the year 2011

has the lowest mean 0.57 percent. In case of the foreign share, the year 2011 and 2019 gives the highest and lowest mean value i.e., 30.30 percent and 20.32 percent respectively. Similarly, in labour intensive industries, the mean export to sale has 35.43 percent and 11.91 percent, which are the highest and lowest among all for the years 2014 and 2009 respectively. The mean export to sale for all labour intensive industries is 24.11 percent, which is less than the mean values of other years. In the year 2012 and 2014, R&D records the highest and lowest mean percentages respectively across the years. Similarly, in case of foreign share, 30.94 percent and 13.29 percent are the high and low mean value across the year in the labour intensive industries.

While comparing capital intensive with labour intensive industries, the paper finds that average export to sale ratio of labour intensive industries is higher than capital intensive industries. From this, it is evident that labour intensive industries usually do more export than capital dominating industries. When R&D is considered, most of the cases, the mean values are higher in capital intensive industries than labour intensive industries. As expected, in an aggregate capital intensive industry has also higher R & D mean value than labour intensive industries. The reason could be as new technology and research expenses incurred for the better production, the R&D value is higher in case of capital intensive industries. Similarly, in most of the individual years, the mean foreign shares are higher in case of labour intensive than capital intensive industries. But in an aggregate, the mean foreign shares are more or less same in both groups of industries.

The estimated panel Tobit model for total industries and both capital and labour intensive industries are presented below.

Table.3 Estimated Panel Tobit Model of Export Performance of Total Industry

Variables	Exp_sale
Constant	19.71*** (0.363)
L_inten	5.301*** (0.710)
Wald chi2(p-value)	0.006
N	6827

Note: L_inten is the labour intensity, Wald stat is the p value of wald chi square statistics, Standard errors in parentheses. ***, **, * denotes 1%, 5% and 10% level of significance respectively

Table.3 shows the result of the export performance of the total industry. It is evident that the estimated coefficient of labour-intensity is positive and significant at one per cent level. The result suggests that labour-intensive firms have more export performance than capital intensive firms.

In the dataset, there are a number of firms within the two-digit industry. However, on an average, some of the two-digit industries are labour intensive, but the L/K ratios of some of the firms are less than the average of the total that means some firms within the labour-intensive industries are capital intensive in nature. Similarly, some of the firms are labour intensive within the capital intensive industries. Therefore, it is relevant to investigate the labour-intensity on export performance as a whole labour and capital intensive industries.

Table. 4 Estimated Panel Tobit Model of Export Performance of Labour and Capital intensive Industries

Industry group	Constant	L_ inten	Wald Chi2 (p-value)	N
Labour intensive				
Food products	26.06*** (1.889)	6.134* (3.569)	0.085	357
Beverages	23.98*** (0.992)	23.05*** (2.728)	0.031	98
Tobacco products	11.47*** (1.136)	6.099* (3.298)	0.064	59
Textiles	34.36*** (1.295)	5.011** (2.209)	0.023	751
Wearing apparel	65.91*** (1.72)	5.496*** (1.914)	0.004	132
Leather and related products	70.16*** (7.883)	32.62*** (9.348)	0.0004	45
Wood and products of wood and cork,	7.950** (3.868)	0.0174 (4.839)	0.997	36
Fabricated metal products, except	18.16*** (1.797)	1.278 (3.313)	0.7	204
Other manufacturing	39.15*** (8.185)	22.66** (9.471)	0.016	83
Capital intensive				
Paper and paper products	6.343*** (0.500)	-4.255** (-2.036)	0.036	168
Coke and refined petroleum products	12.10*** (1.922)	5.324*** (1.024)	0.032	99
Chemicals and chemical products	18.19*** (0.685)	-4.066** (-1.845)	0.027	1,112
pharmaceuticals, medicinal chemical	36.41*** (1.563)	-6.279*** (-2.342)	0.007	577
Rubber and plastics products	15.15*** (1.165)	16.98*** (2.817)	1.66E-09	450
Other non-metallic mineral products	12.09*** (1.099)	6.891* (3.884)	0.076	376
Basic metals	16.79*** (0.905)	9.395*** (2.19)	1.79E-05	604
Computer, electronic and optical	37.43*** (3.303)	-13.06** (-5.136)	0.011	187

Electrical equipment	12.22*** (1.312)	-0.748 (-2.326)	0.748	377
Machinery and equipment	11.77*** (0.696)	-2.600** (-1.298)	0.045	648
Motor vehicles, trailers and semi-	11.76*** (1.02)	-3.809* (-1.952)	0.051	388
Other transport equipment	9.483*** (1.724)	-6.883* (-3.541)	0.051	76

Note: L_inten is the labour intensity, Wald stat is the p value of wald chi square statistics, Standard errors in parentheses. ***, **, * denotes 1%, 5% and 10% level of significance respectively

Table 4 shows the tobit model of the two-digit industries of labour and capital intensive industries. In this table, this paper analyzed the impact of labour-intensity on the export performance of labour and capital intensive industries. The results found that the coefficients of labour-intensity is significant and positively affect export to sales ratio in most of the labour-intensive industries except Wood and products of wood and cork industries and Fabricated metal products. The results also found that in most of the capital intensive industry, the coefficients of the labour-intensity is significant and negatively affect export performance. In the capital intensive industries such as Rubber and plastics products, other non-metallic mineral products and basic metals industries, the labour-intensity is positive and significantly affect export performance. Overall, the results suggest that labour-intensive firms play a crucial role in exporting products. This result is evident because there are 95% of SMEs in India and they contribute 40% of exports and most of small and medium-size firms are labour intensive in nature (Ministry of MSME, India).

Moreover, this study examines the factors which determine the export performance of both capital and labour-intensive manufacturing industries using Tobit model. The results of total industries are presented in Table.5. The explanatory variables such as labour-intensity, foreign shares, research & development poses positive relation with the dependent variable export to sales ratio. The firm size has an inverse relationship with the export to sales ratio. It is also found

that real effective exchange rate is significant and positively related to export performance of total (sample of) industries.

Table. 5 Estimated Tobit Model with key determinants of export performance of total industries

Variables	Exp_sale
Constant	2.744*** (0.930)
L_inten	0.002*** (0.019)
Foreign	0.004** (0.002)
R&D	0.089*** (0.024)
Size	-8.51e-05*** (-3.12e-05)
REER	0.025*** (0.008)
Wald Chi2 (p-value)	0.010
N	2094

Note:(i)Exp_sale is export to sale in %, R&D is research and development expenditure in Rs million, Foreign is the foreign share in Rs million, Size is the asset of firm in Rs. Million, L_inten is the labour intensity, Wald stat is the wald chi square statistics and N is the total observation.(ii)Standard errors in parentheses (iii) ***, **, * denotes 1%, 5% and 10% level of significance respectively.

After examining the key factors of export performance for the total industry, further this study examines the determinants of export performance of both capital and labour-intensive industries. Specific industries such as leather and related products and wood and products of wood and cork, except furniture; manufacture of articles, and pharmaceuticals, medicinal chemical and botanical products are dropped from labour and capital intensive industries because of inadequate observations. Hence, seven industries from labour-intensive and eleven industries

from capital intensive are taken to be consideration. The estimated Tobit model of two-digit industries of labour and capital intensive industries are presented in Table. 6.

Table.6 Estimated Tobit Model with key determinants of export performance of labour and capital intensive industries.

Industry group	Constant	L_ inten	Foreign	R&D	Size	REER	Wald Chi2	N
Labour intensive								
Food products	21.77** (10.41)	2.253*** (0.400)	0.059*** (0.022)	-0.911* (0.468)	0.008** (0.003)	-0.035 (0.094)	0.003	111
Beverages	21.54 (80.49)	30.43** (12.33)	0.112 (0.291)	-10.17 (6.889)	-0.012 (0.011)	0.085 (0.723)	0.007	24
Tobacco products	19.221* (15.17)	20.13** (8.24)	0.231*** (0.062)	-0.367 (0.285)	-0.004 (0.006)	0.043 (0.138)	0.003	32
Textiles	69.17* (40.77)	6.198*** (1.255)	0.024 (0.091)	-0.668 (5.893)	-0.011*** (0.001)	0.330*** (0.068)	0.663	131
Wearing apparel	101.9** (48.55)	9.288** (4.532)	0.364* (0.194)	-1.368 (16.06)	-0.398** (0.164)	0.441** (0.154)	0.004	25
Fabricated metal products, except machinery and equipment	-11.99 (49.83)	2.160* (1.275)	1.022*** (0.109)	0.102*** (0.029)	0.018*** (0.002)	0.239* (0.138)	0.012	27
Other manufacturing	76.13 (119.3)	12.29 (16.27)	0.743*** (0.216)	-9.130 (9.346)	0.003*** (0.001)	-0.461 (1.132)	0.0002	18
Capital intensive								
Paper and paper	22.16* (119.3)	-1.916 (16.27)	0.058** (0.216)	10.20*** (9.346)	-0.015*** (0.001)	-0.158 (1.132)	0.0003	68

products	(11.51)	(2.748)	(0.023)	(2.692	(0.004)	(0.106)		
Coke and refined petroleum products	54.24 (43.44)	-5.25** (-2.24)	0.147 (0.106)	0.254*** (0.095)	0.003*** (0.001)	0.425** (0.193)	0.009	48
Chemicals and chemical products	15.33 15.63	0.295 (3.315)	0.066** (0.031)	-1.030 (0.960)	0.005* (0.003)	0.117** (0.042)	0.237	423
Rubber and plastics products	-13.37 (25.52)	22.54*** (5.052)	-0.059 (0.051)	1.736** (0.674)	0.001 (0.001)	0.273** (0.129)	9.09e-06	124
Other non-metallic mineral products	-4.166 (32.07)	-9.557 (8.657)	0.190** (0.074)	-4.300 (3.801)	-0.002 (0.006)	0.168* (0.090)	0.024	135
Basic metals	35.48 (27.42)	16.31*** (4.765)	0.513*** (0.089)	-0.486 (0.483)	0.144*** (0.014)	-0.195 (0.249)	0.054	110
Computer, electronic and optical products	22.55 (74.91)	-7.92*** (1.305)	0.696*** (0.144)	0.179* (0.109)	0.007* (0.004)	0.008** (0.003)	6.68e-05	42
Electrical equipment	31.32 (23.70)	3.031 (3.073)	0.202*** (0.055)	0.310*** (0.105)	0.003*** (0.001)	0.250 (0.217)	0.007	140
Machinery and equipment	33.77** (13.56)	-0.86*** (0.013)	0.033 (0.026)	-0.107 (0.311)	-0.002 (0.001)	0.197 (0.122)	0.296	241
Motor vehicles, trailers and semi-trailers	-1.956 (21.63)	-0.39*** (0.056)	0.096 (0.061)	-0.022 (0.036)	-0.002** (0.001)	0.105 (0.193)	0.516	157
Other transport equipment	16.07** (8.114)	-1.803 (1.249)	-0.022 (0.051)	-0.077 (0.055)	-0.043 (0.027)	-0.108 (0.0726)	0.347	29

Note: (i) Exp_sale is export to sale in %, R&D is research and development expenditure in Rs million, Foreign is the foreign share in Rs million, Size is the asset of firm in Rs. Million, L_inten is the labour intensity, Wald stat is the p value of wald chi square statistics and N is the total observation. (ii) Standard errors in parentheses (iii) ***, **, * denotes 1%, 5% and 10% level of significance respectively.

As expected, the coefficients of labour-intensity are significant and positive mostly in labour-intensive industries and whereas, it is negative and significant in most of the capital intensive industries. Like previous results, the coefficient of labour-intensity has positive and significant in some of the capital intensive industries such as Rubber and plastics products and basic metals industries.

Foreign share of firms is mostly significant in both labour and capital intensive industries. Under labour-intensive industries, it poses a significant and positive sign for food products, tobacco products, fabricated metal products, except machinery and equipment, and other manufacturing at the one per cent level of significance and ten per cent significance level for wearing apparel. Likewise in capital intensive industries, it is positive and significantly determines the export performance of paper and paper products, chemicals and chemical products and other non-metallic mineral products at five per cent level. And for basic metals, computer, electronic and optical products and electrical equipment, it is positive and significant at one per cent level. The foreign share is significant for most of the industries suggested improved technology and accessible external finance and transaction which enhances better export performance.

Out of seven industries from labour-intensive industry group, R&D is negatively significant for food products at ten per cent and positively significant (at one percent level) for fabricated metal products, except machinery and equipment. Except those two industries, it is insignificant for all other industries. The insignificant coefficient of R&D in most of the labour-intensive industries is might be the reason that R&D expenses are likely to have fewer roles in labour-intensive industries.

When taking the consideration of the capital intensive industries, the estimated coefficients of R&D expenditure is found to be positive and statistically significant for four industries namely, paper and paper products, coke and refined petroleum products, electrical equipment, Rubber and plastics products and for computer, electronic and optical products. This could be interpreted as a result of new investment in technology and increase in international competitiveness.

The estimated coefficient of firm size in labour-intensive industry group is statistically significant and positive for food products (at the five per cent level), fabricated metal products except for machinery and equipment and other manufacturing (at the one per cent level). Additionally, it has a negative sign in case of textiles and wearing apparel at the five and one per cent significance level respectively. Furthermore, in a capital intensive industry group, firm size is positive and statistically significant for six industries (namely, coke and refined petroleum products, basic metals, electrical equipment, chemicals and chemical products, and computer, electronic and optical products). Firm size is negative and significant for two industries of capital intensive industry group such as paper and paper products and motor vehicles, trailers and semi-trailers. The results suggest that inverted U shaped relationship exists between firm size and export performance of Indian manufacturing industries like very large firms dominate in the domestic market and less liable to export than others.

The macro specific factor real exchange rate (i.e. REER) is significant with positive sign in most cases classified under both labour and capital intensive industry groups. The positive and significant impact of REER on export performance of most industries suggests that the real effective exchange rate is positively related to export behavior.

6. Concluding Remarks

This study investigates the export performance of both labour and capital intensive Indian manufacturing industries for the period of 2004 to 2019. The export behaviour of both labour and capital intensive industry groups is examined. From the results, it is clear that labour-intensive industries are more export-oriented than capital intensive industries. The possible explanation of this could be that in labour abundant and developing country like India, the firm's operation favourably affects its export performance in case of labour-intensive industries. The result also found that labour-capital ratio has been declined over the periods and labour intensive firms are substituting their labour and adopting the new technology in their production process. The divergent performance of export in labour and capital intensive industries is of policy interest.

Furthermore, the above results provide insights into the determinants of export performance of both labour and capital intensive industry groups. The labour-intensity variable poses a significant and positive effect on export performance of the labour-intensive industries. Also, in some of the capital intensive industries such as Rubber and plastics products and basic metals industries, the labour-intensity has a positive and significant impact on their export performance. An increase in foreign share has significant impact on the export performance of manufacturing industry. It could be explained that India's liberalisation policy inspires foreign share which leads to export performance. Research and development is statistically significant and positively related to export performance. The result suggests that it supports new technology which improves international competitiveness and consequently exports performance. Besides, firm size has both positive and negative impact on the export of industries suggests that firm size and export performance because of economies and diseconomies of scale. On the other hand, the

coefficient of the real effective exchange rate variable is positive and statistically significant in most of the industries.

The diversified findings of this study could serve on the basis of industrial policy development of the Indian manufacturing sector. Export policies for certain industries could assist policymakers to focus on protecting or promoting certain manufacturing industries.

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Appendix

Capital intensive industries

year	asset	sale	emp	cap stock	obs
2004	571.70	541.74	3025.53	2773.05	80
2005	634.91	634.44	2725.13	4995.41	72
2006	680.20	782.40	3279.44	3159.21	82
2007	244.13	311.98	2690.74	1136.33	80
2008	657.99	882.83	5116.16	2447.79	99
2009	784.96	476.69	2963.64	2854.90	75
2010	442.88	439.06	4022.59	1729.55	94
2011	819.25	1127.90	3500.84	3360.50	77
2012	755.38	781.56	4399.18	3219.31	84
2013	651.23	707.81	6318.10	2269.06	89
2014	996.17	1249.20	7202.85	3532.84	98
2015	605.07	542.39	3306.74	2200.36	133
2016	897.41	937.78	5895.85	3644.53	132
2017	847.07	780.04	5485.04	2969.70	159
2018	863.98	842.42	5976.86	3366.37	140
2019	1402.03	1190.30	6390.14	5082.70	136
Total	772.48	785.18	4743.93	3089.75	
obs	1629	1629	1630	1630	

Labour Intensive industries

year	asset	sale	emp	Cap stock	obs
2004	100.92	99.05	7481.39	325.47	18
2005	306.31	201.35	7173.38	592.10	21
2006	296.61	221.81	6991.39	623.18	23
2007	108.61	110.12	4982.39	267.61	23
2008	117.37	105.44	4433.50	207.16	22
2009	246.94	229.95	4904.04	374.85	23
2010	215.56	167.99	4218.90	315.82	30
2011	470.22	377.92	6029.00	514.78	28
2012	235.75	213.38	4900.18	432.77	28
2013	226.85	211.22	5782.61	411.77	31
2014	91.51	110.50	4141.76	275.90	25
2015	257.74	211.92	5506.60	525.61	50
2016	298.24	282.48	5563.09	612.08	47
2017	203.50	187.85	5817.02	499.28	44
2018	235.94	203.37	6438.55	476.14	51
2019	245.54	202.14	5865.16	600.49	55
Total	236.57	203.83	5645.70	466.19	
obs	519	519	519	519	

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