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Value Addition, Jobs and Skills: A Study of India's Exports

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Table of Contents

List of Tables

List of Figures

Abstract

Exports serve as an engine of economic growth and can potentially help countries come out of poverty and unemployment. However, as the production process is increasingly getting fragmented globally, greater exports no longer imply higher domestic production, as imports of intermediate products used as inputs in exports also increase. Global Value Chains (GVCs) have now become a defining feature of trade in goods and services globally. Economic Survey 2019-20 also highlighted the importance of GVCs in India's exports, by devoting an entire chapter, suggesting ways to integrate Indian firms into GVCs. With the advent of GVCs, the official trade data does not go very far in explaining the job creating aspect of exports. Further, technological changes are creating new occupations and jobs as the demand for workers with requisite skills is rising. At the same time, some existing jobs may be altered, reduced or eliminated. Therefore, besides assessing the extent of employment supported by India's exports, it is also important to understand the skill composition of such jobs. In this regard, the present study looks at the trends in domestic and foreign value-added share, and employment and skill-composition of jobs supported by India's exports between 2003-04 and 2013-14 using an Input-Output (I-O) table framework. The analysis highlights several interesting patterns. First, import content in exports has steadily increased from 15.9% in 2003-04 to 27.2% in 2013-14. Secondly, export related jobs grew at a much faster rate than overall employment during the period. Thirdly, a chunk of these jobs has gone to persons with below secondary education. While the rate of growth for these low skilled jobs has declined, we observe a sharp rise in the rate of growth of high skilled jobs supported by exports. Lastly, there is also a huge inter-sector disparity in the skill composition of jobs supported by exports, with agricultural exports supporting majorly unskilled and low-skilled jobs, whereas exports of services supporting mostly high skilled ones.

Key Words: *Exports; Global Value Chain; Input-Output; Value Added; Jobs; Skills*

JEL Classification: *F10; F14; F16; L60; J24*

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Value Addition, Jobs and Skills: A Study of India's Exports

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1. Introduction

Exports serve as an engine of economic growth and can potentially help countries come out of poverty and unemployment. Besides contributing to growth, they create jobs for the rising labor force. Following the economic reforms of 1990s, it was expected that greater liberalization would improve India's manufacturing performance and would create jobs for the fast-rising labor force. However, after almost three decades, manufacturing productivity still remains very low and the ability of the sector to generate employment continues to remain a question mark (Das, 2016). Apart from issues related to growth and employment, poor manufacturing performance continues to be plagued by a number of other factors including the issue of lack of adequate skills (Manufacturing Plan - Strategies for Accelerating Growth of Manufacturing in India in the 12th Five Year Plan and Beyond, Planning Commission, Government of India).

Being a young nation, with around 62 per cent of its population in the working age group (15-59 years) and more than 50 per cent of the total population below 25 years of age[3], India has a great potential to climb up the growth ladder. As it stands today at the threshold of becoming one of the world's fastest growing economies, a large and young labour pool, in fact, serves as a double-edged sword. While the demographic dividend that the nation possesses is definitely an opportunity, it also reflects the inability of the government to create productive jobs for the upcoming generation of young workers

There is no denying the fact that India's export performance in the wake of the economic reforms of 1990s till 2012 has indeed been phenomenal, putting India at par with the first world economies in terms of its share in total world exports. This undoubtedly has provided better opportunities and has given a fresh spur for continued growth. Figure 1 presents the post-reform trends in India's merchandise and services exports. As shown in the figure, India's merchandise recorded an exceptionally high rate of export growth of over 20% per annum between 2001 and 2012. Oil exports during this period grew much faster than non-oil exports. Services exports have grown relatively faster than merchandise exports at the rate of 24% per year between 2001 and 2012. Its share in India's total exports has increased rapidly from about 19% in 1993-94 to 27% in 2000-01 and to 37% in 2006-07.

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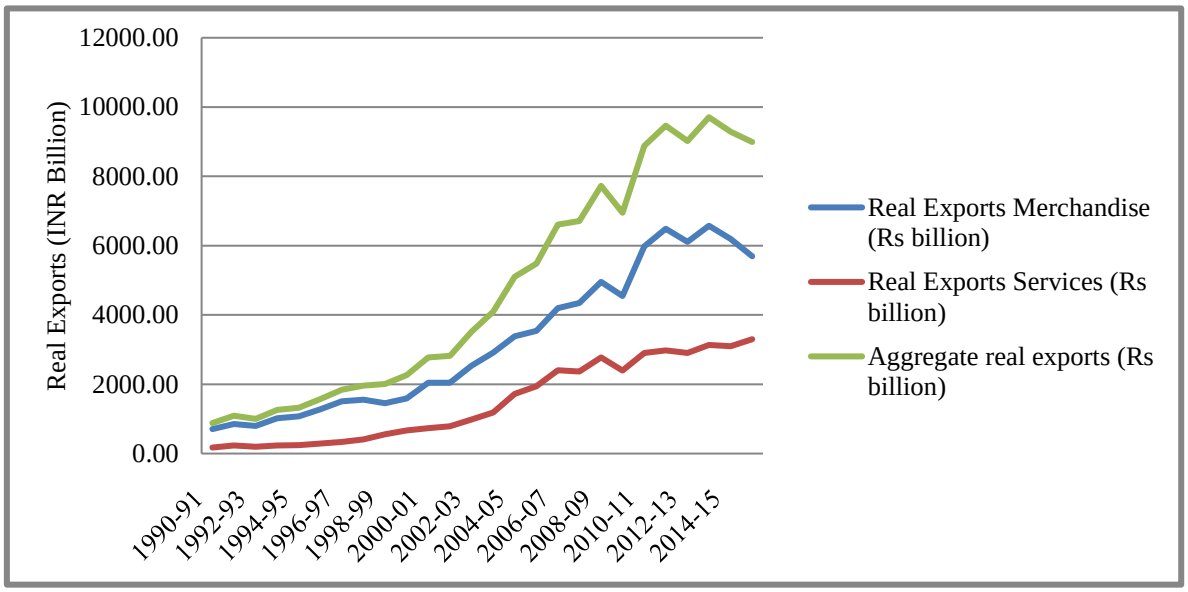
[3] Source: Report by Agriculture Skill Council of India (http://asci-india.com/pdf/Report-on-LMIS.pdf)

Figure 1: Trends in India's Merchandise and Services Exports (1990-91 to 2015-16)



Note: Unit Value Index is used as price index to arrive at real values of exports

Source: RBI handbook of statistics on Indian Economy

However, the official trade data, reported as gross flow does not go very far in explaining the job creating aspect of exports. The relationship between exports and employment becomes more complex in the context of Global Production Sharing (GPS) (Dhir and Veeramani, 2019). The production process in today's era is often globally fragmented, which implies that the intermediate inputs have to cross international border multiple times, leading to multiple counting by the official trade data, usually reported as gross flows (rather than as net value added) at each border crossing (ibid). Therefore, in order to gauge the potential contribution of exports to domestic job creation, what is required is to assess the domestic value-added (DVA) content in exports. Estimating DVA content not only captures the job creating potential, but also helps in understanding the extent of country's involvement in Global Production Sharing (GPS). A higher share of DVA in gross exports reflects a lower participation in GPS and vice versa.

In this study, we use the Input Output (I-O) analysis to provide estimates of domestic and foreign value-added share in India's exports, employment and skill-composition of jobs supported by India's exports across 121 sectors for the year 2013-14. Further, we also estimate these for the years 2003-04 and 2007-08 across relatively broader product categories. The study makes use of the official I-O tables for the years 2003-04 and 2007-08 provided by the CSO, MoSPI; and for the year 2013-14, provided by Singh and Saluja (2016). The rest of the paper is organized as follows: the next section provides a brief review of literature. Section 3 discusses the data used and the methodology followed. This is followed by section 4 that provides the aggregate and sectoral estimates of DVA and FVA share, employment and skill composition of jobs supported by India's exports.

2. Review of Literature

The standard trade theory (Heckscher Ohlin model) predicts that as a country opens up to international trade, each country would specialize in producing the commodity, whose production intensively requires the abundant factor of production. Therefore, the gains to trade should flow to abundant factors of production. This suggests that in developing countries, unskilled labour would benefit most from globalization (Topalova, 2007). However, this ignores the possibility of differences in technology across countries. The new trade theory, which takes into account inter-country technological differences, suggests that there could be multiple equilibria reached by an economy as a result of trade openness. Similarly, technological catch-up models show that trade openness could introduce new technologies in developing countries that could raise total factor productivity and thereby could potentially affect employment adversely (Vivarelli, 2002).

Clearly, there seems to be a lack of consensus on the theoretical premise regarding the impact of openness to trade on employment. While one strand of literature maintains that openness to trade could increase employment by raising output growth, the other strand argues that trade openness could impede employment by improving total factor productivity. This lack of clarity on the impact of trade openness on employment in developing countries makes the issue largely empirical.

While there is a vast literature available analyzing the effect of exports on employment, there are broadly two strands of studies: one, which measures this using the regression analysis framework and the other one, which uses the Input-Output (I-O) approach.

The pioneering study in this regard has been by Leontief (1946), who estimated the export dependent employment for the United States for the year 1939 using an I-O table. He found that exports generated employment for about 1.1 million persons, which accounted for about 3.6% of the total employment in US that year. Since then, a number of studies in different countries have been carried out to provide such estimates for different years. Beginning from the early 1960s, the United States Bureau of Labor Statistics (BLS) undertook studies for several years, estimating the number of workers supported by exports. One of the reports, which was published in 1967, showed that the goods and services exports in the US supported about 2.8 million jobs in 1960 and 2.9 million jobs in 1965 (Roxon, 1967).

Later, Aho and Orr (1981), using a massive 367-sector I-O table, estimated the total employment supported by US manufacturing exports during the period 1964 to 1975. They find a steady increase in export supported employment in manufacturing sector from 1.2 million in 1964 to 2.4 million in 1975. Correspondingly, estimates for the European Union, made by Sousa et al (2012) suggest that export dependent employment rose from 22 million in 2000 to 25 million in 2007. Kiyota (2012), using the I-O tables for the period 1975-2006, estimated the number of direct and indirect jobs supported by Japan's exports of goods and services. The estimates indicate that the number of jobs supported by exports grew from 3.6 million in 1975 to 6.4 million in 2006. In the case of China, Feenstra and Hong (2007) find

that the export supported employment which grew modestly between 1997 and 2002, grew much faster during 2000 and 2005 at the rate of 7.5 million jobs per year.

Turning to the studies on India, Banerji (1975) and Taylor (1976) provided one of the earliest estimates on export dependent employment. Banerjee provided these estimates for three years: 1964, 1970 and 1980 using the I-O table for 1964-65, assuming that the structural relations in the economy, as captured by the I-O table for 1964/65, remained constant until 1980. The estimates suggested that about 2.2 million jobs were created by manufactured exports in 1964 and 2.4 million in 1970, but increased sharply to 5.8 million in 1980. Taylor's estimate for jobs supported by exports during 1964-65 was about 2.2 million man-years, accounting for 2.7% of total employment. Nambiar (1979) showed that employment tied to India's exports rose from 4.9 million in 1963-64 to 5.4 million in 1973-74, accounting for about 2 per cent of total domestic employment in 1973-74. Additionally, he estimated that the sectors that contributed the largest to export supported employment during 1973-74 were Agriculture and Food Grains (1.1 million); Jute Textiles (0.61 million) and Tea and Coffee (0.52 million).

Chishti (1981), using Input-Output Table (IOT) for the year 1968-69 estimated that the exports of India's goods and services supported an employment of about 5.4 million person years in 1970-71, which increased to 7.2 million person years in 1975-76, representing around 4.3 per cent of total employment in 1975-76.

Among recent studies, a paper by EXIM Bank (2016) provides estimates for employment supported by India's merchandise and services exports during the period 1999-00 to 2012-13 using I-O framework. The analysis has been carried out at both, aggregate level as well as at broad sectoral group level. Goldar et al (2017), using the official I-O table, provide estimates of domestic as well as foreign value added share in India's gross exports for the years 1998-99, 2003-04 and 2007-08. They make use of more disaggregated IOT as compared to World Input-Output Database (WIOD) and Trade in Value Added (TiVA) database. Veeramani and Dhir (2019) provide a time series estimate for India's economy spread across 112 sectors of DVA content and number of jobs supported by India's merchandise and services exports for the period 1999-00 to 2012-13. They find that while the DVA content increased from USD 46 billion in 1999-00 to USD 295 billion in 2012-13, the number of jobs supported by India's exports increased from 34 million in 1999-00 to 62.6 million in 2012-13.

A few other studies (See Goldar, 2002; Sen, 2008; Sankaran et al, 2010; Raj and Sen, 2012; Raj and Sasidharan, 2015, Vashisht, 2016) have used growth accounting and regression based analysis to estimate the effect of exports on employment in India's manufacturing sector.

The literature brings out certain general trends with respect to export supported employment. In general, while the absolute number of jobs supported by exports as well as the share of exported jobs to total jobs are on a rise, the number of jobs per million dollar worth of exports in most countries have declined, though the degrees vary across countries. Also, the skill composition of jobs tied to exports shift over time as wage rates go up and comparative advantage shifts towards relatively more skill intensive activities. In case of India, for

example, Vashisht (2016) examines the change in skill-composition of manufactured exports between 1990 and 2014 and find that India's exports, which were increasingly dominated by low skilled labour intensive industries in 1990-91, became dominated by high skilled labour intensive industries by 2013-14. This indicates towards a shift in the skill composition of jobs supported by exports. What remains to be seen is whether this translates into a corresponding shift in the skill composition of employment tied to exports.

Therefore, while there is some literature providing estimates on the number of jobs supported by India's merchandise and services exports for various years using the I-O framework, there seems to be no study so far, to the best of our knowledge, providing estimates on the type of jobs (in terms of level of education) supported by exports by various sectors in India's economy. The present study, therefore, attempts to fill this gap by providing estimates on the number of jobs across education level supported by India's exports from 121 sectors (covering the whole economy) for the year 2013-14.

The rest of the paper is organized as follows. The section that follows gives a brief account of the sources of data and methodology used in the analysis. Section 4 provides the broad findings and estimates at both, the aggregate level as well as at the sectoral level. The paper ends with some concluding remarks and discussion, provided in section 5.

3. Data and Methodology

Our analysis is based on the Input-Output table for India for the years 2003-04 and 2007-08 provided by the CSO, MoSPI; and for the year 2013-14, provided by Singh and Saluja (2016). I-O model is a quantitative technique that represents the linkages and interdependencies between outputs of different sectors of a national/regional economy. In a typical I-O table, the economy is presented such that each industry listed across the top represents the consuming sector ('j') and down the table, each row represents the producing sectors ('i'). Thus, the output from the row sector (i) is distributed as an intermediate input to all the sectors mentioned in the respective headings of columns (j) plus the final demand and import.

The Supply Demand balance equation of the I-O table (having only two sectors) can be expressed as:

$$x_{11} + x_{12} + F_1 = X_1 \quad (1)$$

$$\underbrace{x_{21} + x_{22}}_{\text{Intermediate}} + \underbrace{F_2}_{\text{Final}} = \underbrace{X_2}_{\text{Total}} \quad (2)$$

The above structure of equations can easily be extended to an IO table for n sectors. Let A denote the input-output coefficients matrix (n×n), X the output vector (n×1) and F the final demand vector (n×1), then the supply-demand balance equation may be written as: AX+F=X.

Our analysis starts with estimating input share to each industry (i) in total intermediate input use for each commodity (j). Once we have a matrix containing shares in total intermediate input use for each commodity (j), we estimate the respective shares of total intermediate input use (IIUSE) and total final use (TFUSE) in total use (TUSE) for each commodity (j).

The total final use of each commodity can be further subdivided into the following components: (a) PFCE: Private Final Consumption Expenditure; (b) GFCE: Govt. Final Consumption Expenditure; (c) GFCF: Gross Fixed Capital Formation; (d) Valuables; (e) CIS: Change in Stock (f) EX-IM: Net Export

$$TFUSE = PFCF + GFCE + GFCF + VALUABLES + CIS + (EX - IM) \qquad (3)$$

Assuming that the imports of commodities (j) to be used as intermediate inputs to produce commodities (i) are taking place in proportion to the share in which they are used as intermediate inputs, we use the shares as weights to total imports of commodities (j) in order to arrive at intermediate input use in imports for the commodities (j). Subsequently, the respective estimated value of total intermediate input use in imports for each commodity (j) is then divided among each industry (i) in proportion to the shares in which they are used as intermediate inputs in each industry (i). This gives us the **Import Flow Matrix ($\mathbf{A^M}$)**. A^M coefficient matrix is then calculated by dividing each entry of the A^M matrix by total output.

We estimate the A^D matrix by subtracting each cell of A^M matrix from the respective cells in the original I-O table and then arrive at the A^D coefficient matrix by dividing each entry of the A^D matrix by total output.

Thus, A^D is an nxn flow matrix of input coefficients of domestic products, whereas A^M is an nxn flow matrix of input coefficients of imported products. Following Hummel et al (2001), therefore, our input-output table can be re-specified in matrix form as follows:

$$A^D X + F^D = \mathrm{X} \qquad (4)$$

$$A^M X + F^M = \mathrm{M} \qquad (5)$$

$$\mathrm{u}A^D + uA^M + A_V = \mathrm{u}$$

F^D is a 1xn vector of final demands for domestically produced products, whereas F^M is a nx1 vector of final demands for imported products. X is a nx1 vector of gross output; M is a nx1 vector of imports; A_v is an 1xn vector of each sector j's ratio of value added to gross output. u is a 1xn unity vector.

We define a vector of share of domestic content, DVS = $\{dvs_j\}$, a 1xn vector, as the additional domestic value added generated by one additional unit of final demand for domestic products.

$$DVS = \widehat{A_V}(\mathrm{I} - \mathrm{A^D})^{-1} \qquad (6)$$

Where $\widehat{A_V}$ is a diagonal matrix with a_j^v as its diagonal elements and $(\mathrm{I} - \mathrm{A^D})^{-1}$ is the well-known Leontief inverse: a matrix of coefficients for total domestic intermediate product requirement.

Subsequently, we define a vector of share of foreign content by FVS= u – DVS.

Next, in order to estimate the employment coefficient matrix, we use NIC 5-digit industry-wise employment figures from the NSS 68th round of Employment and Unemployment survey for the year 2011-12. We estimate these figures across general education level of workers. The NIC product categories are then mapped with the Supply and Use table 2011-12 product classification of 140 commodities. The SUT classification is then mapped to IOT 2011-12 product classifications and the employment figures are divided by the output values for respective industries to arrive at the employment coefficient matrix for the year 2011-12. Now, in order to make the estimates consistent with the 2013-14 estimates, we deflate by using sector deflators and thereby obtain the employment coefficient matrix for the year 2013-14.

Finally, in order to estimate the value of employment supported by exports by industry across skill level, we multiply the nxn diagonal matrix of exports from n sectors: $\hat{X}$ with the product of the 1xn vector containing employment coefficients and the nxn inverse of $(\mathrm{I} - \mathrm{A^D})$ matrix across all skill levels. I is an identity matrix

$$e = l(I - A^D)^{-1}\hat{X}$$

Where e gives the value of employment supported by exports, by industry.

4. Findings and Estimates

4.1 Trends in DVA and FVA content in India's Exports

4.1.1 Aggregate level estimates

Table 1 provides estimates of India's exports and total Domestic and Foreign Value Added (DVA and FVA) content for the years 2003-04, 2007-08 and 2013-14. These values are obtained at the aggregate level, by summing the estimates for 121 sectors for the respective years. Our estimates are by and large in agreement with the past studies (See table A-2).

As we can clearly observe, India's gross exports in 2013-14 stood at USD 426.32 billion, in which the contribution of DVA was USD 310.32 billion (72.79%). As Table 1 clearly shows, there has been a sharp rise in gross exports and a corresponding decline in the DVA share in the last decade. In 2003-04, the ratio of DVA to gross exports was estimated to be 0.84, which declined to 0.78 in 2007-08 and then continued to decline to reach 0.73 in 2013-14. Consequently, between 2003-04 and 2013-14, the FVA share has steadily increased by 11.34 percentage points from 15.87% to 27.21%. This clearly implies that with rising exports, India has been increasingly getting integrated into the global value chains.

Table 1: DVA and FVA content in India's gross exports: 2003-04 to 2013-14

	2003-04	2007-08	2013-14
Gross Exports (USD Billion)	89.45	237.98	426.32
DVA share (%)	84.13	78.55	72.79
FVA share (%)	15.87	21.45	27.21

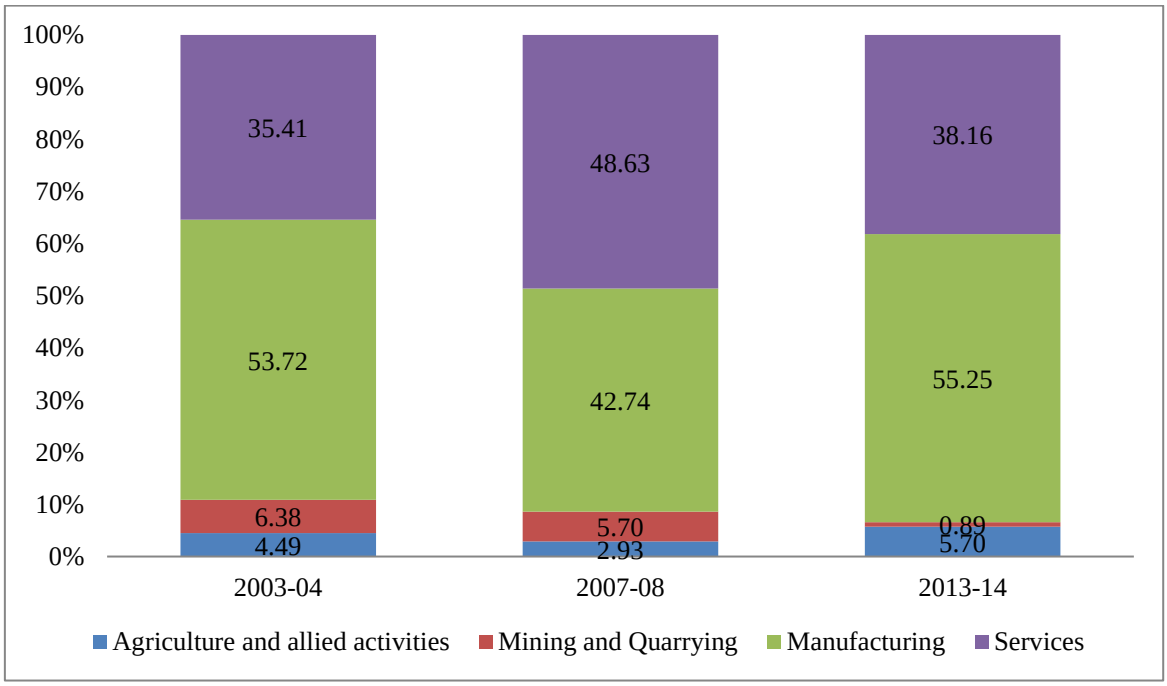
Source: Authors' estimation based on the official I-O tables

It is noteworthy to point out that while the composition of exports has been changing since 2003-04, with share of foreign content rising and of domestic content falling, dollar value of both, has risen. In 2003-04, aggregate domestic value added in exports was USD 75.25 Billion which increased to USD 310.32 Billion in 2013-14, whereas the foreign value added in exports during the same period, increased from USD 14.2 Billion to USD 116 Billion.

4.1.2 Sector Level Estimates

We now move to the sectoral analysis of DVA and FVA content. But before we put forth the sectoral picture, a brief account on the composition of India's exports is essential. Figure 2 shows the change in the composition of exports across four broad sector groups: (i) Agriculture and allied activities (named as Agriculture); (ii) Mining and Quarrying; (iii) Manufacturing and (iv) Services based on the data on gross exports from the official IOT between 2003-04 and 2013-14.

Figure 2: Sectoral composition of India's exports (% share): 2003-04, 2007-08 and 2013-14



Source: Authors' estimation based on the official I-O tables

As Figure 2 shows, the share of exports by Agriculture in total exports declined from about 4.49% to 2.93% between 2003-04 and 2007-08 and increased to 5.70% in 2013-14. The share in manufacturing also declined from 53.72% in 2003-04 to 42.74% in 2007-08 and then rose to 55.25% in 2013-14. On the other hand, share of services in total exports rose from 35.41% in 2003-04 to 48.63% in 2007-08, before declining to 38.16% in 2013-14. Share of mining in total exports declined during all the three sub-periods from 6.38% in 2003-04 to 5.70% in 2007-08 and further to 0.89% in 2013-14.

Turning to the sectoral analysis of DVA content, we estimate the sectoral composition of total DVA in India's exports in Table 2. As one may clearly observe, Manufacturing sector contributes the highest to total DVA in India's exports during 2013-14, followed by Services. While Services sector witnessed a sharp increase in its share in total DVA between 2003-04 and 2007-08, becoming the highest contributor to total DVA in 2007-08, its share again declined thereafter to reach 44.88% in 2013-14. The share of Mining and Quarrying continued to decline throughout the period.

Table 2: Sectoral composition of DVA in India's exports: 2003-04 to 2013-14

DVS (%)	**2003-04**	**2007-08**	**2013-14**
Agriculture and allied activities	5.06%	3.46%	7.23%
Mining and Quarrying	7.38%	6.85%	1.05%
Manufacturing	48.53%	36.00%	46.85%
Services	39.04%	53.69%	44.88%

Source: Authors' estimation based on the official I-O tables

Within manufacturing DVA, we find that the highest contribution is by *Textiles, Textile Products, Leather and Footwear* whereas lowest is by *Wood and Products of Wood* throughout the period as shown in Table A-2 in Appendix. While the share of *Textiles, Textile Products, Leather and Footwear* in total manufacturing DVA has consistently declined, the shares of *Coke, Refined Petroleum Products and Nuclear Fuel* as well as of *Transport Equipment* in total manufacturing DVA have significantly risen.

In order to gauge the extent of fragmentation across sectors and change over time, we look at the trends in domestic and foreign value-added share in India's exports at a disaggregate level in Table 3. It is observed that the extent of fragmentation varies greatly across sectors. *Coke, Refined Petroleum Products and Nuclear Fuel* had very high foreign value-added share in exports. The foreign value-added share is well above the average FVS across product categories. Other products with relatively high import share include *Basic Metals and Fabricated Metal Products, Chemicals and Chemical Products, Machinery, Electrical and Optical Equipment* and *Transport Equipment*. In contrast, sectors like *Wood and Products of Wood* and *Food Products, Beverages and Tobacco* have relatively low import content in exports.

While the gross exports increased significantly between 2003-04 and 2013-14, domestic value-added share in gross exports shows a downward trend across all sectors. Largest

increase in imported content in exports was recorded in the case of *Chemicals and Chemical Products* (increase of 13.55 percentage points), whereas lowest by "*Wood and Products of Wood*" (increase of 1.02 percentage points). This is expected since a chunk of intermediate inputs that go into the production of chemical and chemical products are not available domestically. On the other hand, the Indian wood and furniture sector is predominantly steered by unorganized small units. That could be a reason why the sector has so far shyed away from integrating into the Global Value Chains. However, large corporate houses have recently started taking interest in production of modern furniture, the effect of which may be visible in the coming years.

Table 3: DVS and FVS in India's manufacturing exports by commodity: 2003-04 to 2013-14

	DVS (%)			FVS (%)		
KLEMS product categories	**2003-04**	**2007-08**	**2013-14**	**2003-04**	**2007-08**	**2013-14**
Food Products, Beverages & Tobacco	91.46	90.04	87.21	8.54	9.96	12.79
Textiles, Textile Products, Leather and Footwear	86.97	83.49	80.60	13.03	16.51	19.40
Wood and Products of Wood	91.11	89.88	90.09	8.89	10.12	9.91
Pulp, Paper, Paper Products, Printing and Publishing	83.40	80.56	72.29	16.60	19.44	27.71
Coke, Refined Petroleum Products and Nuclear Fuel	48.08	34.32	40.71	51.92	65.68	59.29
Chemicals and Chemical Products	79.68	68.79	66.13	20.32	31.21	33.87
Rubber and Plastic Products	80.29	75.11	72.02	19.71	24.89	27.98
Other Non-Metallic Mineral Products	78.33	74.50	69.35	21.67	25.50	30.65
Basic Metals and Fabricated Metal Products	78.65	69.82	65.42	21.35	30.18	34.58
Machinery, n.e.c.	79.57	68.62	67.09	20.43	31.38	32.91
Electrical and Optical Equipment	76.92	67.08	68.71	23.08	32.92	31.29
Transport Equipment	82.77	50.38	69.24	17.23	49.62	30.76
Manufacturing, n.e.c.; recycling	54.54	68.27	50.81	45.46	31.73	49.19
Total Manufacturing	76.00	66.15	61.72	24.00	33.85	38.28

Source: Authors' estimation based on the official I-O tables

We delve further into these sectors and estimate DVA and FVA share in exports across agricultural, mining, manufacturing and services sector at commodities level (covering the whole of India's economy) for the year 2013-14 as shown respectively in Tables 4(a), 4(b), 4(c) and 4(d). We find that among agricultural exports, highest proportion of domestic value-added content was recorded by *Vegetables* (97.9%), followed by *Fruits* (97.8%) and *Coffee* (96.46%), whereas, it is found to be the lowest for *Poultry and Eggs* (88.85%). In the case of Mining *and Quarrying*, highest DVA share was recorded by *Other Non-Metallic Minerals* (93.22%), followed by *Bauxite* (84.62%). In the case of manufacturing, the DVA share is

found to be the highest for *Tea and Coffee processing* (95.02%), followed by *Tobacco products* (92.92%), and *Sugar* (92.54%), and the lowest for *Petroleum products* (40.46%). Among services, the highest domestic value-added content was recorded for *Banking* (93.07%), followed by *Education and Research* (92.89%), and *Insurance* (90.18%). The lowest share in Services was observed for *Air Transport* (60.38%).

Table 4 (a): DVA and FVA content in Agricultural exports: 2013-14

S.No.	Commodity	Exports (INR Lakh)	DVS	FVS
1	*Wheat*	1751.25	89.27%	10.73%
2	*Jowar, Bajra and Maize*	999.90	90.21%	9.79%
3	*Groundnut*	497.25	91.81%	8.19%
4	*Other oilseeds*	1312.60	90.11%	9.89%
5	*Cotton*	3156.27	93.98%	6.02%
6	*Coffee*	337.74	96.46%	3.54%
7	*Fruits*	504.08	97.83%	2.17%
8	*Vegetables*	668.45	97.92%	2.08%
9	*Other crops*	6828.01	92.01%	7.99%
10	*Milk and milk products*	620.85	91.92%	8.08%
11	*Animal services (agricultural) and other livestock production*	3768.97	90.22%	9.78%
12	*Poultry & Eggs*	76.92	88.85%	11.15%
13	*Fishing*	3787.83	94.01%	5.99%

Source: Authors' estimation based on the official I-O tables

Table 4 (b): DVA and FVA content in Mining and Quarrying exports: 2013-14

S.No.	Commodity	Exports (INR Lakh)	DVS	FVS
1	*CoaI tar products*	155.16	82.59%	17.41%
2	*Iron ore*	1235.92	83.26%	16.74%
3	*Manganese ore*	26.93	70.83%	29.17%
4	*Bauxite*	243.46	84.62%	15.38%
5	*Copper ore*	1.88	75.50%	24.50%
6	*Other metallic minerals*	941.79	83.77%	16.23%
7	*Limestone*	58.33	71.35%	28.65%
8	*Mica*	36.46	66.54%	33.46%
9	*Other non-metallic minerals*	1083.11	93.22%	6.78%

Source: Authors' estimation based on the official I-O tables

Table 4 (c): DVA and FVA content in Manufacturing exports: 2013-14

S. No.	Commodity	Exports (INR Lakh)	DVS	FVS
1	*Sugar*	1000.74	92.54%	7.46%
2	*Hydrogenated oil(vanaspati) and other edible oils*	45.38	82.25%	17.75%
3	*Tea and coffee processing*	613.99	95.02%	4.98%
4	*Miscellaneous food products*	9810.02	86.08%	13.92%
5	*Beverages*	290.73	88.72%	11.28%
6	*Tobacco products*	129.03	92.92%	7.08%
7	*Khadi, cotton textiles(handlooms)*	7992.97	84.00%	16.00%
8	*Woolen textiles*	143.73	83.53%	16.47%
9	*Silk textiles*	14.50	77.58%	22.42%
10	*Art silk, synthetic fiber textiles*	4506.25	78.80%	21.20%
11	*Jute, hemp, mesta textiles*	3224.70	77.88%	22.12%
12	*Carpet weaving*	1015.06	74.57%	25.43%
13	*Readymade garments and miscellaneous textile products*	10413.41	77.59%	22.41%
14	*Furniture and fixtures-wooden*	608.11	87.36%	12.64%
15	*Wood and wood products*	165.37	90.09%	9.91%
16	*Paper, paper prods. & newsprint*	1236.72	71.55%	28.45%
17	*Printing and publishing*	315.84	75.16%	24.84%
18	*Leather footwear*	1710.09	83.23%	16.77%
19	*Leather and leather products*	2808.54	88.54%	11.46%
20	*Rubber products*	2278.81	77.63%	22.37%
21	*Plastic products*	4923.88	69.42%	30.58%
22	*Petroleum products*	51477.28	40.46%	59.54%
23	*Coal and lignite*	700.25	58.96%	41.04%
24	*Inorganic heavy chemicals*	677.97	66.35%	33.65%
25	*Organic heavy chemicals*	5105.98	55.73%	44.27%
26	*Fertilizers*	146.87	73.73%	26.27%
27	*Paints, varnishes and lacquers*	1973.75	73.72%	26.28%
28	*Drugs and medicines*	12545.34	70.87%	29.13%
29	*Soaps, cosmetics & glycerin*	1413.48	65.59%	34.41%
30	*Other chemicals*	4135.79	60.85%	39.15%
31	*Structural clay products and other non metallic mineral products*	1002.94	84.96%	15.04%
32	*Cement*	203.74	84.67%	15.33%
33	*Iron, steel and ferro alloys*	8048.45	67.02%	32.98%
34	*Iron and steel foundries*	5336.43	67.05%	32.95%
35	*Non-ferrous basic metals*	2957.06	60.83%	39.17%
36	*Hand tools, hardware*	590.58	68.99%	31.01%
37	*Miscellaneous metal products*	5129.66	64.67%	35.33%
38	*Tractors and agri. implements*	1669.17	69.41%	30.59%
39	*Industrial machinery(F & T)*	1208.16	65.41%	34.59%
40	*Industrial machinery(others)*	976.78	71.14%	28.86%
41	*Machine tools*	306.89	68.17%	31.83%
42	*Other non-electrical machinery*	7555.46	66.79%	33.21%
43	*Electrical industrial Machinery*	878.02	69.16%	30.84%
44	*Electrical wires & cables*	688.13	54.06%	45.94%
45	*Batteries*	139.85	67.04%	32.96%
46	*Electrical appliances*	164.17	72.88%	27.12%
47	*Communication equipments*	2999.05	65.96%	34.04%

S. No.	Commodity	Exports (INR Lakh)	DVS	FVS
48	*Other electrical Machinery*	1589.37	66.16%	33.84%
49	*Electronic equipments(incl.TV)*	3826.53	74.35%	25.65%
50	*Ships and boats*	4209.98	69.81%	30.19%
51	*Rail equipments*	143.21	69.71%	30.29%
52	*Motor vehicles*	8681.25	72.17%	27.83%
53	*Motor cycles and scooters*	1279.68	68.17%	31.83%
54	*Bicycles, cycle-rickshaw*	280.33	69.91%	30.09%
55	*Watches and clocks*	37.29	82.27%	17.73%
56	*Medical, precision & optical instruments*	1335.73	66.38%	33.62%
57	*Gems & jewelry*	35850.20	48.92%	51.08%
58	*Aircraft & spacecraft*	4520.35	63.36%	36.64%
59	*Miscellaneous manufacturing*	2514.76	68.80%	31.20%

Source: Authors' estimation based on the official I-O tables

Table 4 (d): DVA and FVA content in Services exports: 2013-14

S. No.	Commodity	Exports (INR Lakh)	DVS	FVS
1	*Construction*	1334.30	83.14%	16.86%
2	*Water transport*	1204.66	75.58%	24.42%
3	*Air transport*	7462.51	60.38%	39.62%
4	*Supporting and aux. tpt activities*	4827.13	86.31%	13.69%
5	*Communication*	2430.37	78.09%	21.91%
6	*Trade*	19717.28	90.03%	9.97%
7	*Banking*	6954.92	93.07%	6.93%
8	*Insurance*	1905.29	90.18%	9.82%
9	*Education and research*	580.19	92.89%	7.11%
10	*Business services*	26035.30	86.70%	13.30%
11	*Computer & related activities*	69574.16	86.76%	13.24%
12	*Other services*	20650.44	83.55%	16.45%

Source: Authors' estimation based on the official I-O tables

4.2 Trends in Employment supported by India's Exports

4.2.1 Aggregate-level estimates

Next, we turn to the job creating potential of India's exports. Despite continued decline in DVA share, number of jobs supported by India's exports has continued to rise between 2003-04 and 2013-14. Total number of jobs supported by India's exports increased from 40.2 Million in 2003-04 to 78.2 Million in 2013-14 at a CAGR of 6.9% per annum. However, the total number of jobs per million dollar of exports has reduced from around 450 in 2003-04 to as low as 183 in 2013-14. The fact is not surprising given the sharp decline in domestic value-added share in India's exports, among various other factors. Nevertheless, export related jobs grew at a much faster rate than overall employment during the period.

The question that follows is: what kind of jobs are these? Table 5(a) shows general education category wise total number of jobs supported by exports for the period 2003-04 to 2013-14.

While a chunk of the jobs has gone to persons with below secondary education, the rate of growth for low skilled jobs has been low. On the other hand, we observe a sharp rise in the rate of growth of high skilled jobs supported by exports. As table 7 clearly indicates, the number of jobs created by exports for illiterates during the period grew at merely 4.3% per annum, whereas, for persons with diploma and above, the growth rate was as high as 11.4% per annum.

Table 5 (a): Education category-wise number of jobs supported by India's exports (2003-04 to 2013-14) (in Millions)

Education Level	2003-04	2007-08	2013-14	Growth Rate (2003-04 to 2013-14) (%)
No Formal Schooling	14.49	13.54	20.98	3.77
Below Secondary Education	16.89	18.88	32.64	6.81
Secondary and Higher Secondary Education	5.76	7.48	15.60	10.47
Diploma and Above	3.06	4.78	9.00	11.41
Total	40.21	44.68	78.23	6.88

Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Table 5(b) shows general education category wise total number of jobs supported per US $1 million of exports. As mentioned above, total number of jobs created per million dollar worth of exports in 2013-14 was estimated to be around 183, falling from 450 in 2003-04. This number is still significantly higher than those reported for other countries, such as US and China (See Veeramani and Dhir, 2019). In terms of skills, we see a higher fall in employment coefficients for low skilled jobs as compared to that for high skilled ones. As Table 5(b) clearly shows, between 2003-04 and 2013-14, jobs created per US$ 1 million of exports for people with no formal schooling fell at a CAGR of 11.27%, whereas for people with diploma and above it fell by less than 5% per annum.

Table 5 (b): Education category-wise number of jobs per US $1million of India's exports (2003-04 to 2013-14)

Education Level	2003-04	2007-08	2013-14	Growth Rate (2003-04 to 2013-14) (%)
No Formal Schooling	162	57	49	-11.27
Below Secondary Education	189	79	77	-8.63
Secondary and Higher Secondary Education	64	31	37	-5.50
Diploma and Above	34	20	21	-4.70
Total	450	188	183	-8.57

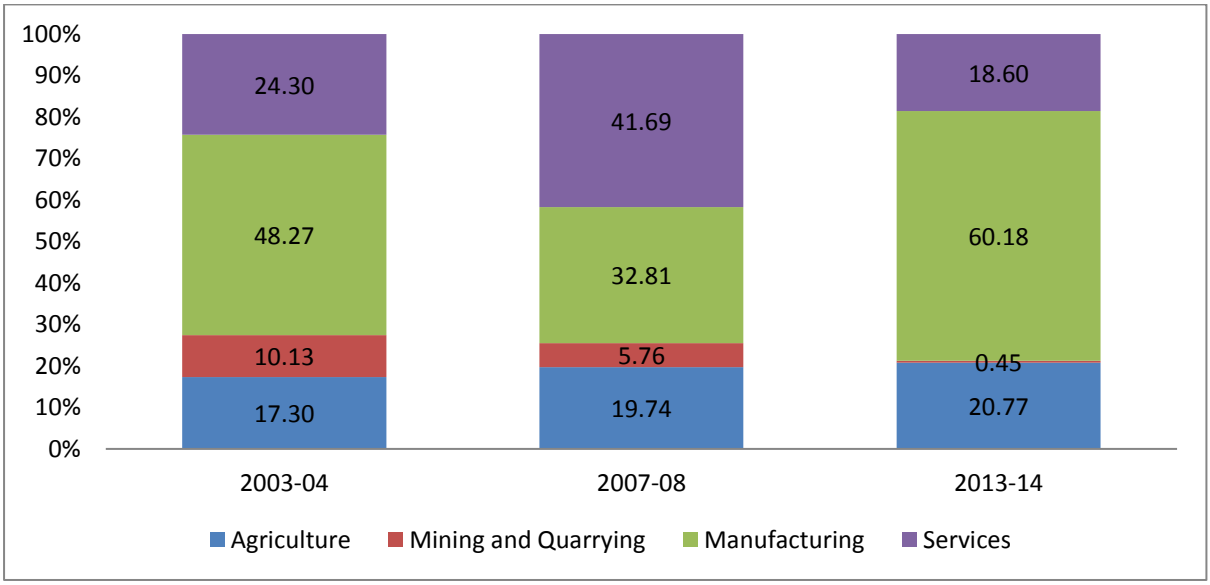
Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

4.2.2 Sector Level Estimates

Next we move to the sectoral composition of jobs created by India's exports. Figure 3 presents the share of each of the three sectors in total number of jobs created by India's exports for the period 2003-04 to 2013-14. As one may clearly observe, share of agriculture

sector increased marginally from 17.30% in 2003-04 to 20.77% in 2013-14; share of manufacturing sector increased from 48.27% in 2003-04 to 60.18% in 2013-14, whereas services sector declined from 24.30% in 2003-04 to 18.60% in 2013-14.

Figure 3: Jobs created by India's exports (2003-04 to 2013-14): Sectoral Composition



Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Looking at jobs created per USD 1 million of exports between 2003-04 and 2013-14, we see a decline across all the sectors (See table 6), but the rate of decline is found to be the fastest in case of mining and quarrying. This significant decline is majorly owing to the decline in employment in *iron ore*, contributing the highest to exports within *Mining and Quarrying* category.

Table 6: Jobs created per million dollar of exports (2003-04 to 2013-14): Sectoral Estimates

Sectors	2003-04	2007-08	2013-14	Growth Rate (2003-04 to 2007-08) (%)	Growth Rate (2007-08 to 2013-14) (%)	Growth Rate (2003-04 to 2013-14) (%)
Agriculture	1734	1267	668	-7.54	-10.11	-9.09
Mining and Quarrying	713	190	94	-28.19	-11.10	-18.38
Manufacturing	404	144	200	-22.71	5.60	-6.79
Services	308	161	89	-15.01	-9.33	-11.65

Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

We further delve into each of these sectors in Tables 7(a), 7(b), 7(c) and 7(d), to look at the total number of jobs supported by exports of commodities within each of these four sectors (covering the whole of India's economy) for the year 2013-14.

Table 7 (a): Employment supported by India's exports (2013-14): Agricultural sector

S.No.	Commodity	Employment	Exports ($million)	Employment per USD 1 million of Exports
1	*Wheat*	5065357	1751	2892
2	*Jowar, Bajra and Maize*	3235640	1000	3236
3	*Groundnut*	317339	497	638
4	*Other oilseeds*	270316	1313	206
5	*Cotton*	3433761	3156	1088
6	*Coffee*	139855	338	414
7	*Fruits*	71805	504	142
8	*Vegetables*	173513	668	260
9	*Other crops*	1765821	6828	259
10	*Milk and milk products*	101110	621	163
11	*Animal services (agricultural) and other livestock production*	1327616	3769	352
12	*Poultry & Eggs*	29208	77	380
13	*Fishing*	313580	3788	83

Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

It is estimated that in agriculture sector, while *Wheat* reported the highest number of jobs tied to exports, of more than 5 million, followed by *Jowar, Bajra and Maize* together, accounting for around 3.23 million, the lowest no. of jobs were supported by export of *Poultry and Eggs*, which was estimated to be less than 30 thousand. On the other hand, highest number of jobs tied to Mining and Quarrying exports was in the *Other non-metallic mineral* category, of close to 0.2 million, whereas the lowest was by *Copper Ore*, which accounted to just 270.

Table 7 (b): Employment supported by India's exports (2013-14): Mining and Quarrying sector

S.No.	Commodity	Employment	Exports ($ million)	Employment per USD 1 million of Exports
1	*CoaI tar products*	13474	155	87
4	*Iron ore*	66601	1236	54
5	*Manganese ore*	3605	27	134
6	*Bauxite*	10881	243	45
7	*Copper ore*	270	2	144
8	*Other metallic minerals*	45936	942	49
9	*Lime stone*	11919	58	204
10	*Mica*	4000	36	110
11	*Other non metallic minerals*	197305	1083	182

Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Among manufacturing industries, highest number of jobs created by exports was in the *Miscellaneous Food Products* segment of more than 13 million, followed by *Readymade garments and miscellaneous textile products* of around 7.8 million. On the other hand, lowest

number of jobs created by manufacturing sector exports was in the *Silk Textiles* segment of just over four thousand.

Table 7 (c): Employment supported by India's exports (2013-14): Manufacturing sector

S.No.	Commodity	Employment	Exports ($ million)	Employment per USD 1 million of Exports
1	*Sugar*	667413	1001	667
2	*Hydrogenated oil(vanaspati) and other edible oils*	13479	45	297
3	*Tea and coffee processing*	59857	614	97
4	*Miscellaneous food products*	13148198	9810	1340
5	*Beverages*	96596	291	332
6	*Tobacco products*	111287	129	863
7	*Khadi, cotton textiles(handlooms)*	3221822	7993	403
8	*Woolen textiles*	24784	144	172
9	*Silk textiles*	4021	15	277
10	*Art silk, synthetic fiber textiles*	962558	4506	214
11	*Jute, hemp, mesta textiles*	1275372	3225	396
12	*Carpet weaving*	528288	1015	520
13	*Readymade garments and miscellaneous textile products*	7803626	10413	749
14	*Furniture and fixtures-wooden*	238931	608	393
15	*Wood and wood products*	92848	165	561
16	*Paper, paper prods. & newsprint*	136220	1237	110
17	*Printing and publishing*	68073	316	216
18	*Leather footwear*	758736	1710	444
19	*Leather and leather products*	734584	2809	262
20	*Rubber products*	225124	2279	99
21	*Plastic products*	522812	4924	106
22	*Petroleum products*	1221088	51477	24
23	*Coal and lignite*	28306	700	40
24	*Inorganic heavy chemicals*	46733	678	69
25	*Organic heavy chemicals*	275402	5106	54
26	*Fertilizers*	14248	147	97
27	*Paints, varnishes and lacquers*	123107	1974	62
28	*Drugs and medicines*	1249662	12545	100
29	*Soaps, cosmetics & glycerin*	198701	1413	141
30	*Other chemicals*	484807	4136	117
31	*Structural clay products and other non metallic mineral products*	121025	1003	121
32	*Cement*	16635	204	82
33	*Iron, steel and ferro alloys*	925912	8048	115
34	*Iron and steel foundries*	343175	5336	64
35	*Non-ferrous basic metals*	142832	2957	48
36	*Hand tools, hardware*	98475	591	167
37	*Miscellaneous metal products*	661410	5130	129
38	*Tractors and agri. implements*	153266	1669	92
39	*Industrial machinery(F & T)*	126856	1208	105
40	*Industrial machinery(others)*	76983	977	79
41	*Machine tools*	24855	307	81
42	*Other non-electrical machinery*	552245	7555	73

S.No.	Commodity	Employment	Exports ($ million)	Employment per USD 1 million of Exports
43	*Electrical industrial Machinery*	49546	878	56
44	*Electrical wires & cables*	41213	688	60
45	*Batteries*	12678	140	91
46	*Electrical appliances*	10465	164	64
47	*Communication equipment*	168224	2999	56
48	*Other electrical Machinery*	83926	1589	53
49	*Electronic equipment(incl.TV)*	181651	3827	47
50	*Ships and boats*	605342	4210	144
51	*Rail equipment*	18444	143	129
52	*Motor vehicles*	514069	8681	59
53	*Motor cycles and scooters*	98005	1280	77
54	*Bicycles, cycle-rickshaw*	27124	280	97
55	*Watches and clocks*	51266	37	1375
56	*Medical, Precision & Optical Instruments*	95472	1336	71
57	*Gems & jewelry*	6968005	35850	194
58	*Aircraft & Spacecraft*	353309	4520	78
59	*Miscellaneous manufacturing*	220924	2515	88

Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Within Services, highest number of jobs was created by export of *computer and related activities* of around 4.74 million, followed by *Trade*, to the tune of 4.33 million. The least number of jobs was supported by export of *Water transport* of just 0.1 million.

Table 7 (d): Employment supported by India's exports (2013-14): Services sector

S.No.	Commodity	Employment	Exports ($ million)	Employment per USD 1 million of Exports
1	*Construction*	251541	1334	189
2	*Water transport*	113807	1205	94
3	*Air transport*	491000	7463	66
4	*Supporting and aux. tpt activities*	546932	4827	113
5	*Communication*	178416	2430	73
6	*Trade*	4328124	19717	220
7	*Banking*	403588	6955	58
8	*Insurance*	151134	1905	79
9	*Education and research*	144716	580	249
10	*Business services*	715806	26035	27
11	*Computer & related activities*	4739207	69574	68
12	*Other services*	2482513	20650	120

Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

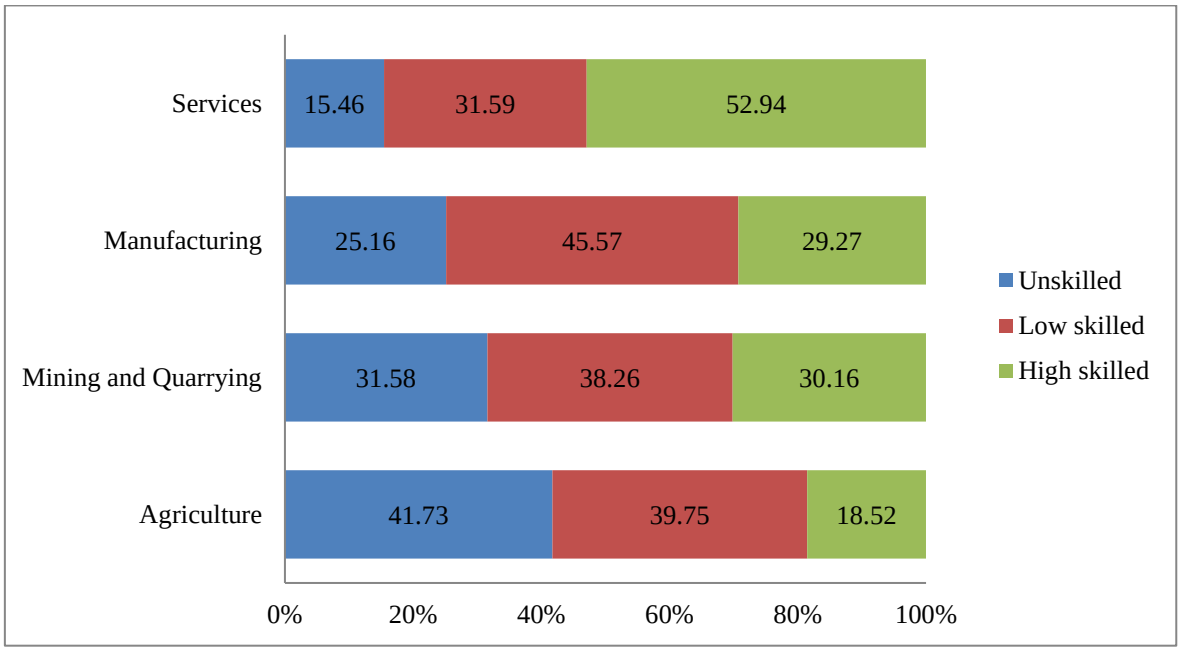
4.3 Skill Composition of Jobs supported by India's Exports: Sectoral estimates

We next turn to the sector-wise skill composition of jobs created by exports. Figure 4 shows the skill composition of employment tied to exports by the four broad sectors during 2013-14.

For the purpose of simplicity, we merge the education categories into 3 broad categories[4]: (a) Unskilled; (b) Low-skilled and (c) High skilled.

Not surprisingly, while a chunk of employment created by exports in the Agriculture sector has been for unskilled and low-skilled workers, employment of high skilled workers has been meager. Around 41.73% of jobs in the agriculture sector were taken up by unskilled workers, whereas merely 18.52% of the total employment tied to agricultural exports was taken up by high skilled ones. On the other hand, in case of services exports, bulk of employment was created for high skilled workers. As the figure shows, close to 53% of the total jobs created by services exports were for high skilled, whereas just over 15% for unskilled workers. While a clear inter-sector disparity in skill composition of employment tied to exports is evident, we next explore the composition of skills across commodities or sub-segments within each of these sectors.

Figure 4: Skill composition of jobs tied to exports by broad sectors: 2013-14

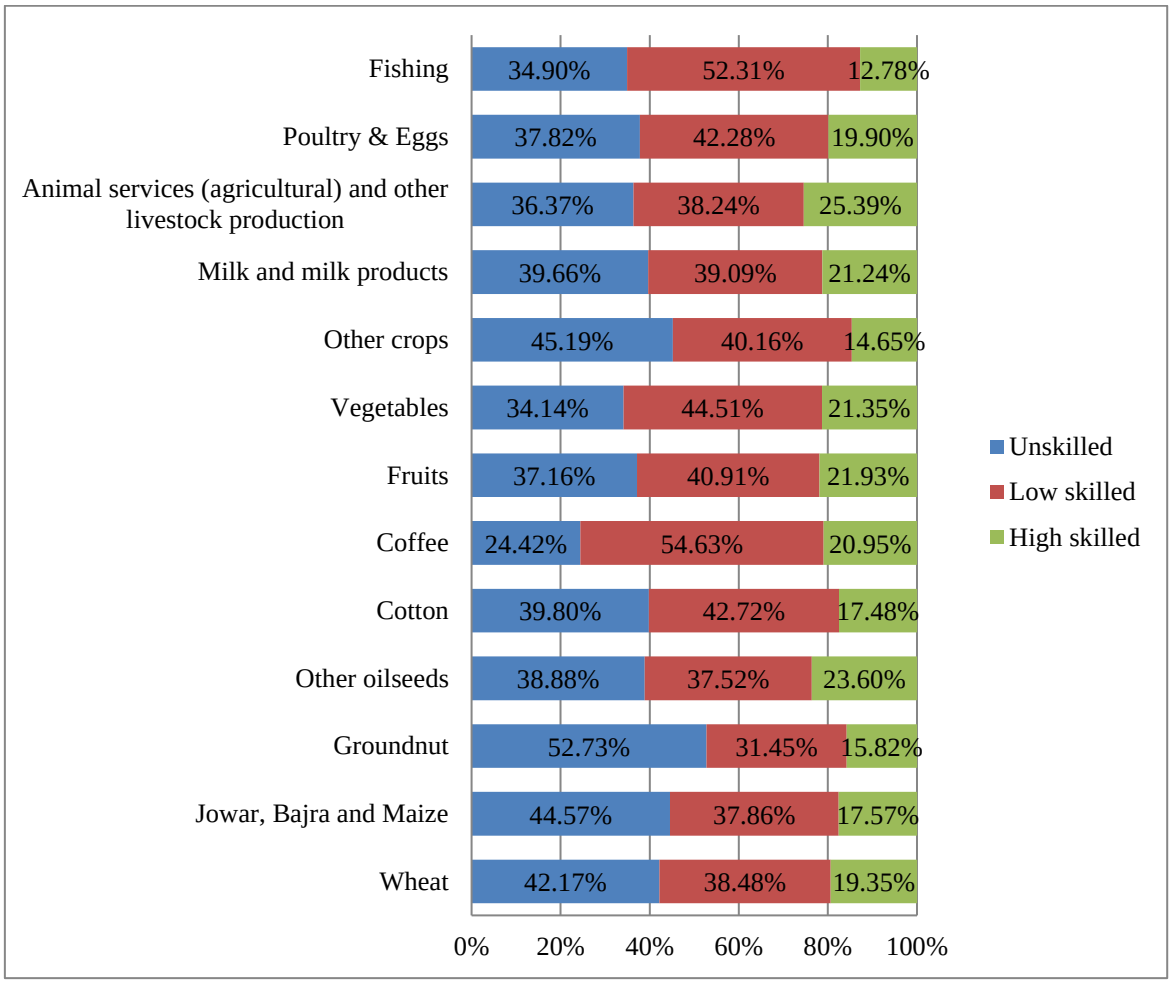


Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Figure 5(a), 5(b), 5(c) and 5(d) present the skill composition of jobs created by exports of various commodities within agriculture and allied activities, mining and quarrying, manufacturing sector and services sector respectively during 2013-14. As one may clearly observe, while exports of agriculture, forestry and fishing is largely dominated by unskilled and low skilled workers, exports of mining products create greater employment opportunities for high skilled workers.

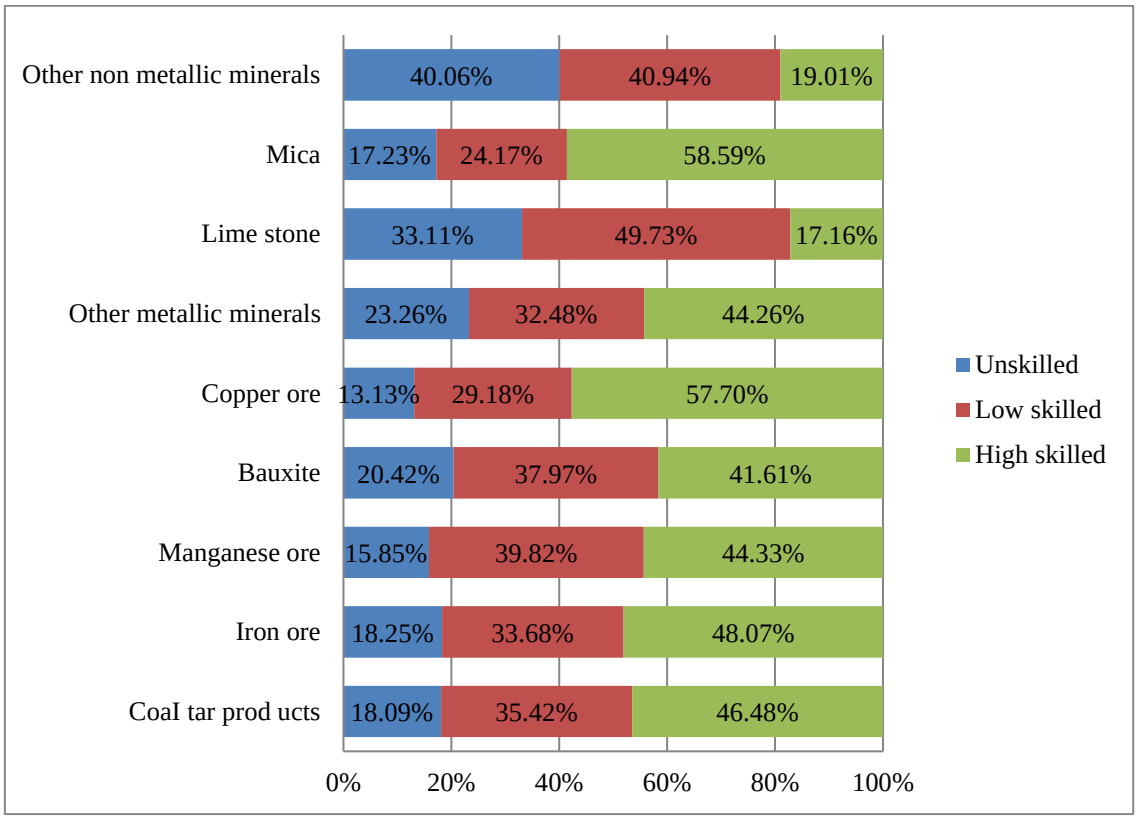
[4] (a) Unskilled = Illiterates + Literates without schooling; (b) Low skilled = Below secondary formal education; (c) High skilled = Above secondary education

Figure 5 (a): Skill composition of jobs tied to India's exports (2013-14): Agriculture and allied commodities



Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Figure 5 (b): Skill composition of jobs tied to India's exports (2013-14): Mining and Quarrying commodities

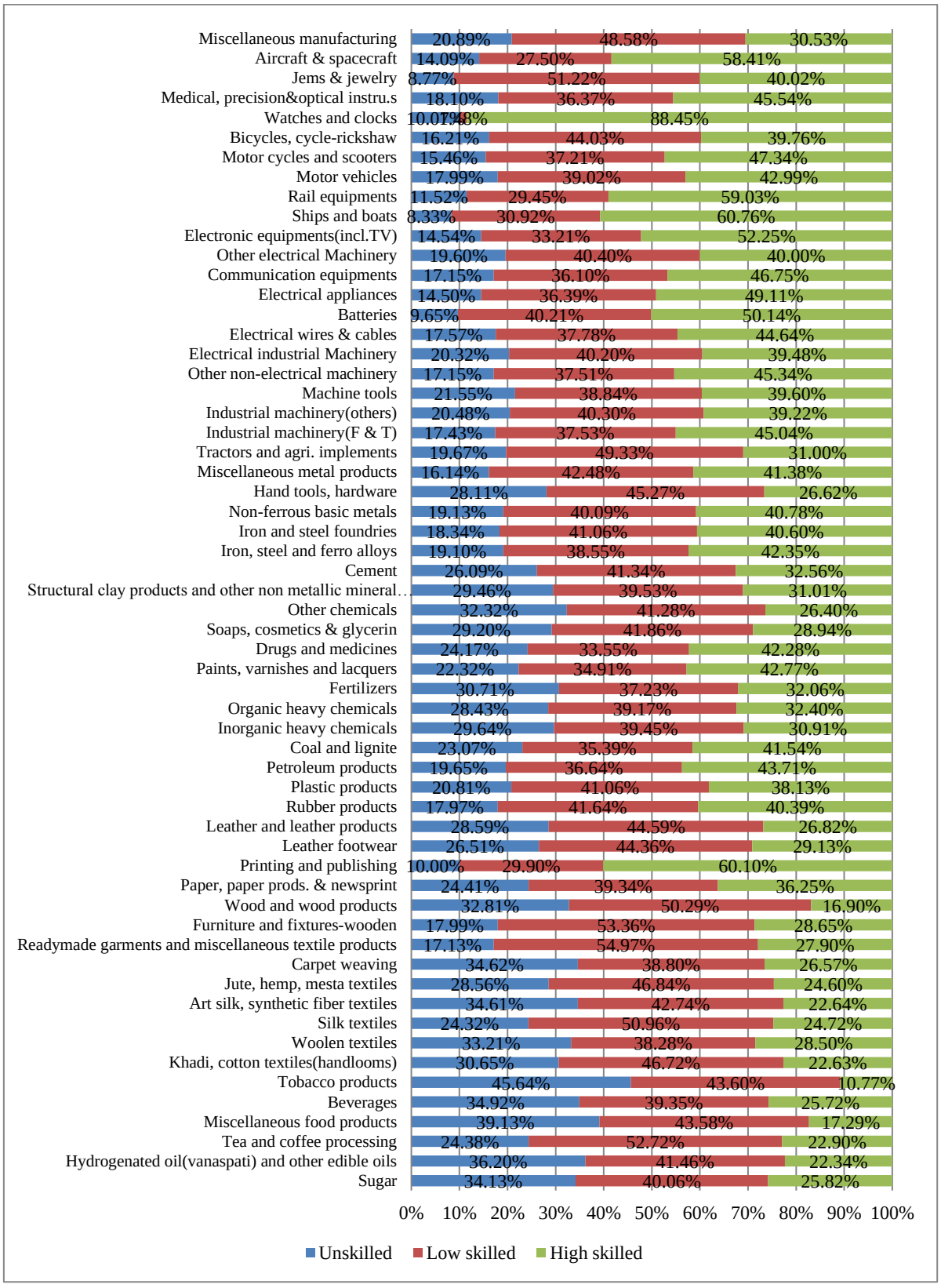


Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Within manufacturing, as Figure 5(c) shows, exports of manufactured food products and beverages, tobacco products, manufacture of textiles and garments as well as manufacture of chemical products employ majorly unskilled workers. On the other hand, exports of watches and clocks, printing and publishing, manufactured electrical equipment and transport equipment require majorly high skilled workers. Interestingly, a bulk of jobs created by India's exports of network products (namely, *Electrical industrial machinery, Batteries, Electrical appliances, Communication equipments, Other electrical machinery, Electronic equipments (incl. TV), Motor vehicles, Motor cycles and scooters and Bicycles and cycle-rickshaw)* has been for high skilled workers, which is in sharp contrast to the corresponding share in case of overall manufacturing exports.

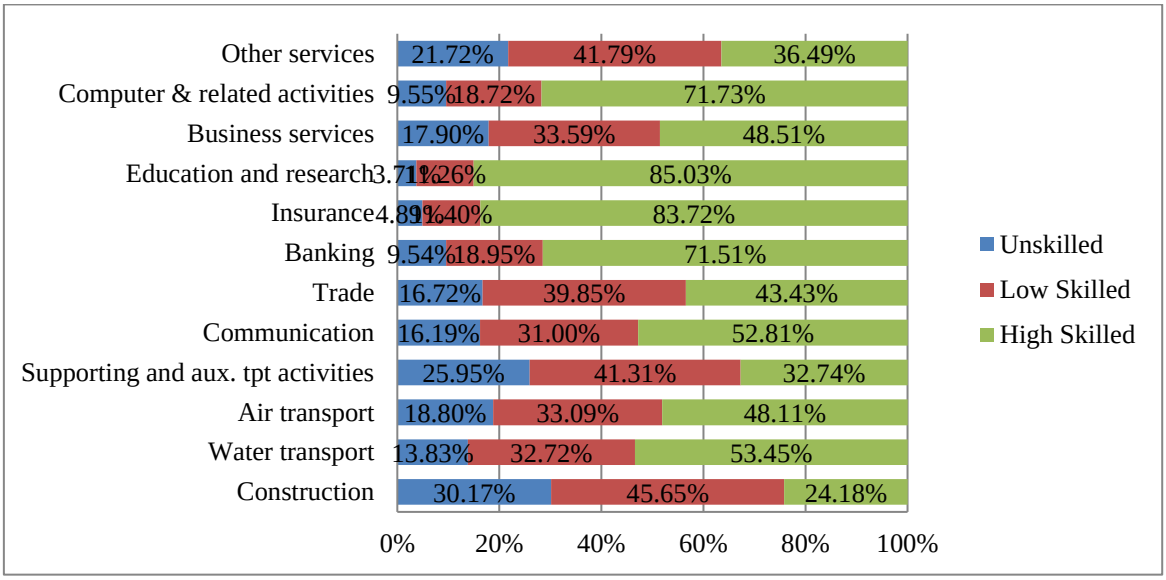
Within services exports, as figure 5(d) points out, there is a clear abundance of high skilled employment across most sub-sectors. The fact can be clearly observed in case of Education and Research, Insurance, Banking and Computer Related Activities, where the proportion of high skilled workers is more than 70%.

Figure 5 (c): Skill composition of jobs tied to India's export (2013-14): Manufacturing commodities



Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Figure 5 (d): Skill composition of jobs tied to India's exports (2013-14): Services sector



Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

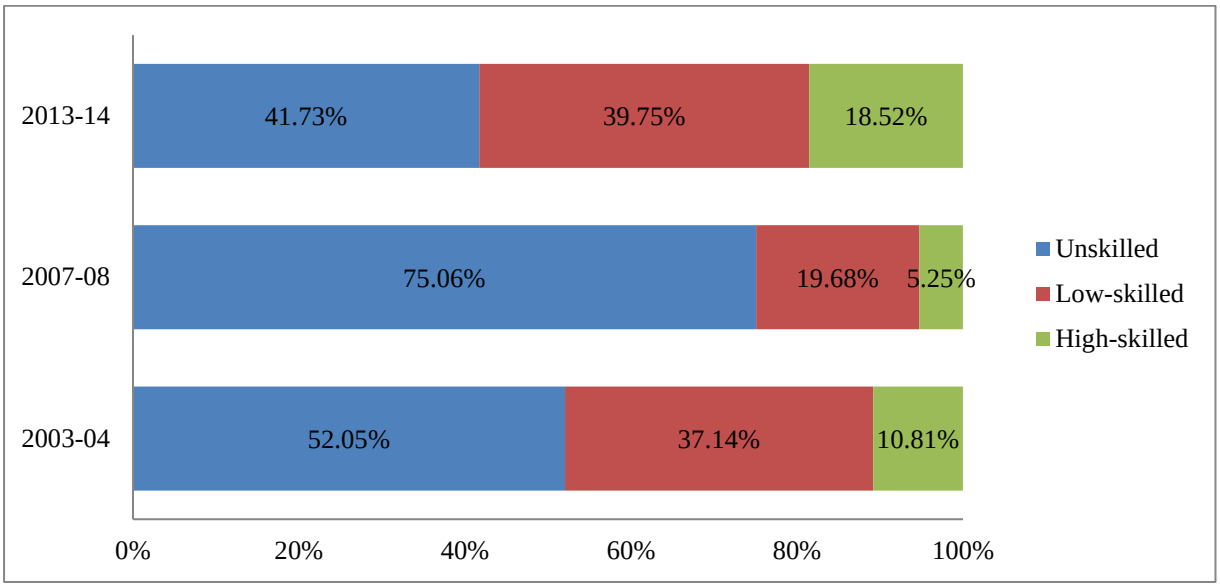
While we see a clear disparity in skill composition of jobs created by India's exports across sectors in 2013-14, we analyze if there has been a shift across years. Figure 6(a),6(b), 6(c) and 6(d) respectively present trends in skill composition of India's agricultural, mining, manufacturing and services exports by subsectors between 2003-04 and 2013-14. As can be observed from the figures, we see a rise in the share of high-skilled workers and a fall in the share of unskilled workers across most sub-sectors.

Between 2003-04 and 2007-08, out of the total jobs tied to exports of Agriculture and allied products, the share for unskilled workers rose sharply from 52.05% in 2003-04 to 75.06% in 2007-08. Correspondingly, the share of jobs for both low skilled as well as high-skilled workers dropped during the period. However, by 2013-14, there was a reversal of the trend such that the share of jobs for unskilled workers declined, whereas it increased for low skilled and high skilled workers.

In case of jobs supported by *Mining and Quarrying* exports, while the share of unskilled workers consistently declined from 57.55% in 2003-04 to 31.58% in 2013-14, the share of high skilled workers rose sharply from 8.46% in 2003-04 to 30.16% in 2013-14.

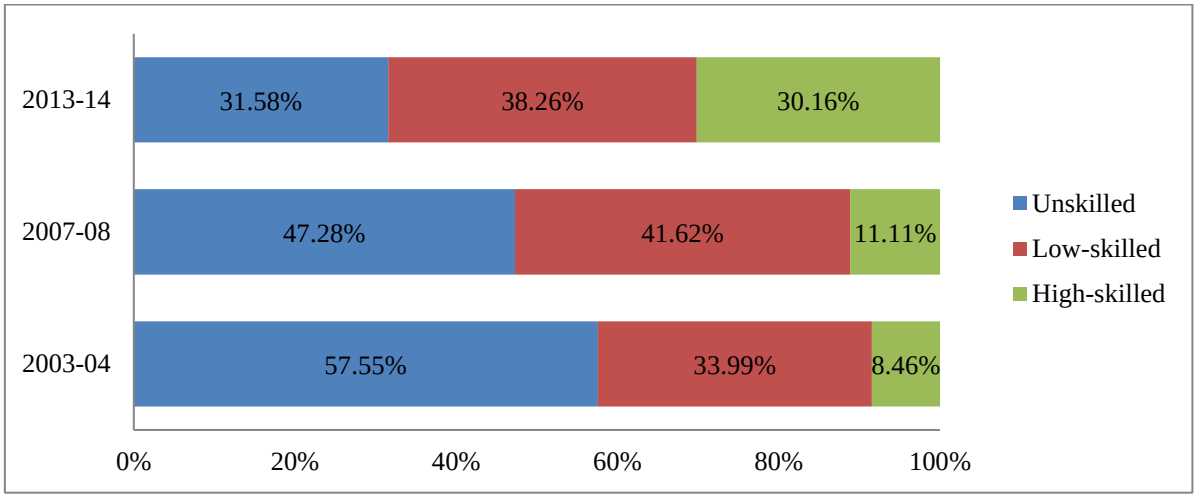
In case of manufacturing exports, while there has been a rise in the share of high skilled workers accompanied by a decline in the share of unskilled workers, the trend is most prominent in case of *Other Non-Metallic Mineral products,* where the share of unskilled workers declined from 50.21% in 2003-04 to 20.39% in 2013-14 and correspondingly, the share of high skilled workers rose from 14.04% to 40.91%.

Figure 6 (a): Skill composition of jobs tied to India's exports (2003-04 to 2013-14): Agriculture and allied activities



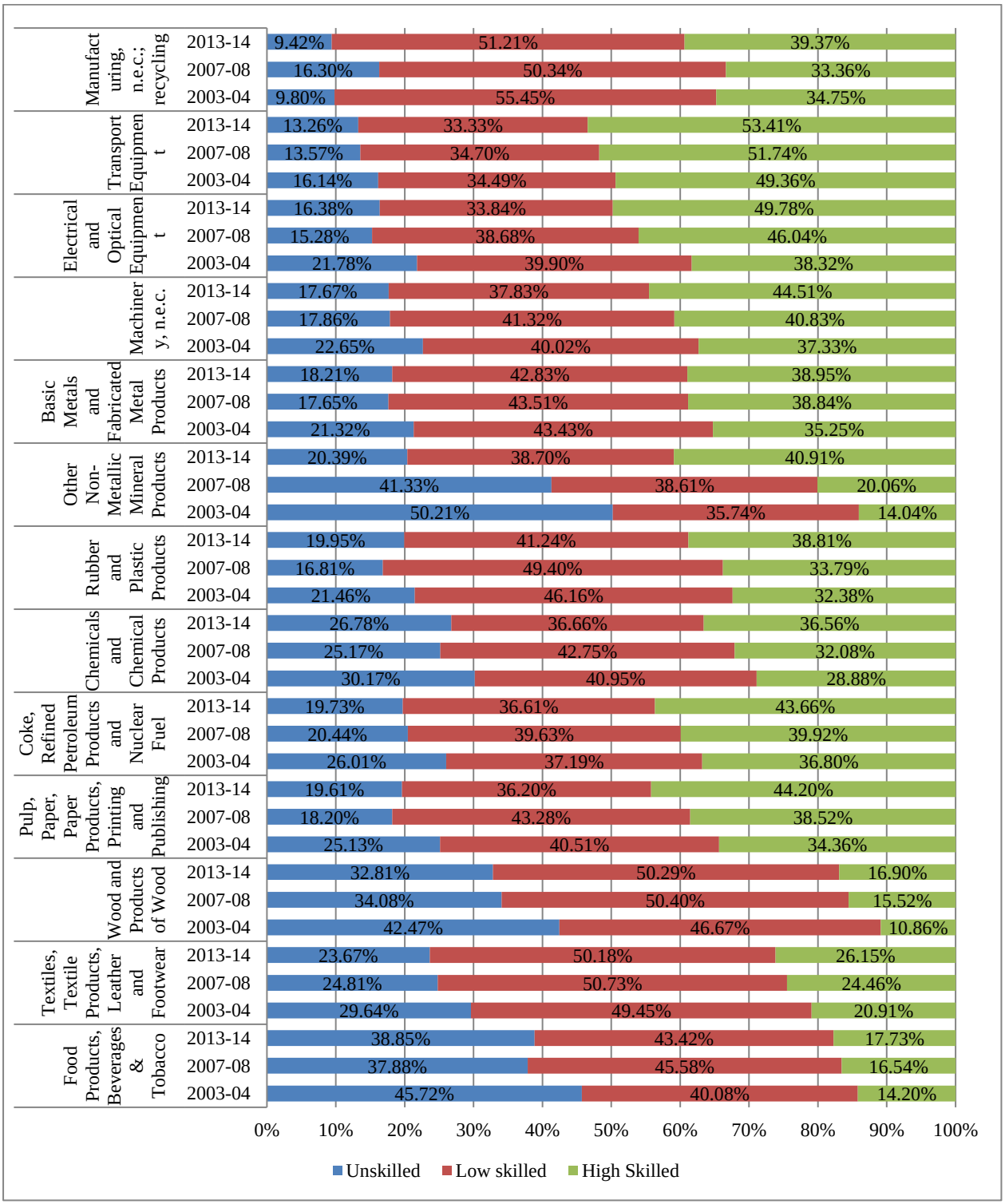
Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Figure 6 (b): Skill composition of jobs tied to India's exports (2003-04 to 2013-14): Mining and Quarrying



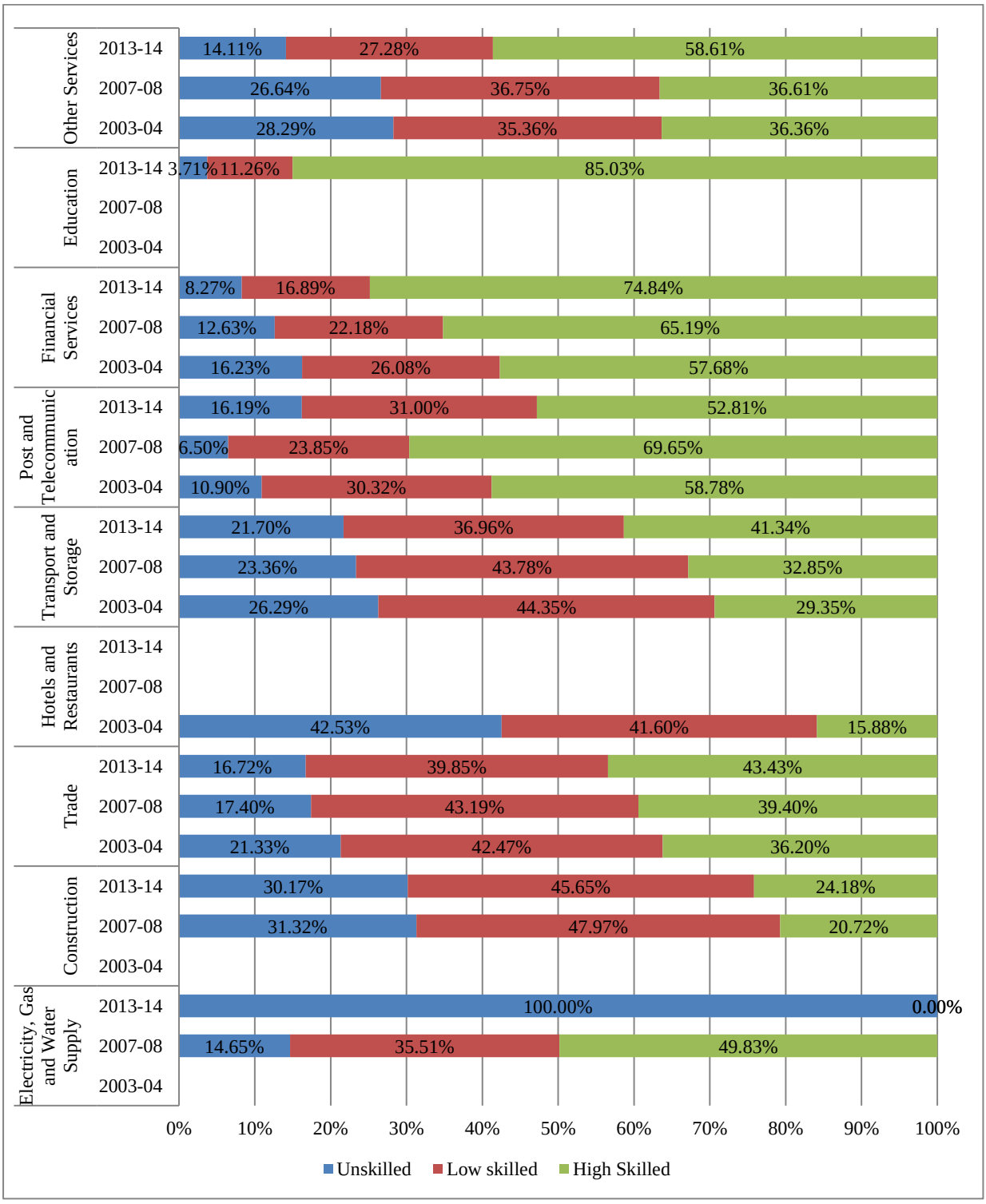
Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Figure 6 (c): Skill composition of jobs tied to India's exports (2003-04 to 2013-14): Manufacturing sector



Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

Figure 6 (d): Skill composition of jobs tied to India's exports (2003-04 to 2013-14): Services sector



Source: Authors' estimation based on the official I-O tables and NSS EU survey estimates

5. Conclusion

As the production process is increasingly getting fragmented globally, greater exports no longer imply higher domestic production activity and associated job creation, as import of intermediate products used as inputs in exports also increase. Nor does the official trade data go very far in explaining the job creating aspect of exports. The relationship between exports and employment becomes more complex in the context of Global Value Chains (GVCs) (Dhir and Veeramani, 2019). GVCs have been a significant development in cross-border trade since the 1990s as these offer an efficient path of transition from exporting largely commodities to basic manufacturing products. Economic Survey 2019-20 has also highlighted the importance of GVCs in India's exports, by devoting an entire chapter, suggesting ways to integrate Indian firms into GVCs. Fragmentation of the production process implies that the intermediate inputs have to cross international border multiple times, leading to multiple counting by the official trade data, usually reported as gross flows (rather than as net value added) at each border crossing (ibid). Therefore, in order to gauge the potential contribution of exports to domestic job creation, we estimate the domestic value-added content in exports and the resulting employment coefficients.

Also, with time, a new global economic paradigm is emerging, driven by the rapid growth in digital technologies. Technological changes are creating new occupations and jobs as the demand for workers with requisite skills rises. At the same time, some existing jobs may be altered, reduced or eliminated. Therefore, besides assessing the extent of employment supported by India's exports, it is also important to understand the skill composition of such jobs.

The present study therefore provides estimates of domestic and foreign value-added share, employment and skill-composition of jobs supported by India's exports across 121 sectors for the year 2013-14 using Input-Output (I-O) analysis. Further, we make similar estimates for the years 2003-04 and 2007-08 across relatively broader product categories.

The estimates show that the domestic value-added content in India's exports increased from USD 75.25 Billion in 2003-04 to USD 310.32 Billion in 2013-14, with a CAGR of 17.04% per annum. On the other hand, the foreign value added increased from USD 14.2 Billion in 2003-04 to USD 116 Billion in 2013-14 with a CAGR of 26.28% per annum. Domestic Value-Added content in exports has declined from 84.1% in 2003-04 to 72.8% in 2013-14, and foreign value added share in India's exports has increased from 15.9% in 2003-04 to 27.2% in 2013-14. This shows that Indian industries are increasingly getting involved into Global Production Sharing (GPS).

It is observed that the manufacturing sector contributes the highest to the DVA content in exports, followed by services. Within manufacturing, largest increase in imported content in exports between 2003-04 and 2013-14 was recorded in the case of *Chemicals and Chemical Products*, whereas lowest by "*Wood and Products of Wood*".

Further, we find that export related jobs grew at a much faster rate than overall employment during the period. It is estimated that total number of jobs supported by India's exports increased from 40.2 Million in 2003-04 to 78.2 Million in 2013-14 at a CAGR of 6.9% per annum. While a chunk of these jobs has gone to persons with below secondary education, the rate of growth for these low skilled jobs has declined. On the other hand, we observe a sharp rise in the rate of growth of high skilled jobs supported by exports.

While a majority of the jobs generated by exports in agriculture and allied activities has gone to unskilled and low-skilled workers, employment of high skilled workers has been meager. Around 41.73% of jobs in the agriculture sector were taken up by unskilled workers, whereas merely 18.52% of the total employment tied to agricultural exports was taken up by high skilled ones. On the other hand, in case of services exports, bulk of employment was created for high skilled workers. Close to 53% of the total jobs created by services exports were for high skilled, whereas just over 15% for unskilled workers. Interestingly, a bulk of jobs created by India's exports of network products has been for high skilled workers, which is in sharp contrast to the corresponding share in case of overall manufacturing exports. Furthermore, between 2003-04 and 2013-14, while the share of employment created by exports for unskilled workers has declined, there has been a rise in the employment share of high skilled workers across all broad sectors. In case of Agriculture and allied activities, between 2003-04 and 2013-14, employment supported by exports for people with no formal schooling declined by 2.18%, whereas for people with Diploma and above, it increased by 4.19%. Similarly, in case of manufacturing, while the proportion fell by 1.63% for people with no formal schooling, it rose by 1.48% for people with Diploma and above. We observe a similar trend in case of services.

Therefore, creating four crore well-paid jobs by 2025 and eight crore by 2030 by integrating 'Assemble in India for the World' into 'Make in India', as predicted by the Economic Survey- 2019-20 may not be that easy unless we overcome existing structural bottlenecks. With the advent of transnational companies, the requirement for high-educated workers is only going to rise at the cost of uneducated and less educated. Therefore, while integrating into the GVC definitely seems to be the way forward, one must be mindful of the distributional consequences on the jobs so created. Past experiences show that employment and wage gains through GVC integration have been largely biased towards more skilled workers, which contrasts with the predictions of trade theory. Therefore, we need policies to ensure that the gains from trade will be shared evenly. To reduce workers' exposure to the risk of offshoring, the government must invest in skill development programmes. Education and training can also help firms increasingly and efficiently fragment their production process globally.

References

Aho, C. M., & Orr, J. A. (1981). Trade-sensitive employment: who are the affected workers. Monthly Lab. Rev., 104, 29.

Banerji, R. (1975), Exports of manufactures from India: an appraisal of the emerging pattern, Tubingen: J.C.B. Mohr.

Chishti, S (1981). Exports and employment in India. Economic and Political Weekly, 16 (42/43), 1710-1714.

Das, D. K. (2016). Trade policy and manufacturing performance: exploring the level of trade openness in India's organized manufacturing in the period 1990-2010. DRG Study, (41).

Dhir, G., & Veeramani, C. (2019). Exports, Global Production Sharing, and Job Creation in India. Ideas for India

EXIM Bank of India (2016) Inter-Linkages between Exports and Employment in India (EXIM Bank Occasional Paper 179): https://www.eximbankindia.in/Assets/Dynamic /PDF/Publication- Resources/ResearchPapers/Hindi/65file.pdf

Feenstra, R. C., & Hong, C. (2010). China's exports and employment. In China's Growing Role in World Trade (pp. 167-199). University of Chicago Press.

Goldar, B. (2002) "Trade liberalisation and employment: the case of India", Employment paper, no. 2002/34, ILO, Geneva.

Goldar, B., Das, D.K., Sengupta, S. and Das, P. (2017). Domestic value addition and foreign content: an analysis of India's exports from 1995 to 2011 (ICRIER Working Paper 332) http://icrier.org/pdf/Working_Paper_332.pdf

Kiyota, K. (2012). Exports and Jobs: The Case of Japan, 1975–2006. Contemporary Economic Policy, 30(4), 566-583.

Leontief, W. (1946). The pure theory of the guaranteed annual wage contract. Journal of Political Economy, 54(1), 76-79

Nambiar, R G (1979). Employment through Exports: a study of India. Indian Journal of Industrial Relations, 15 (1), 1-18.

Planning Commission. (2012). The manufacturing plan: Strategies for accelerating growth of manufacturing in India in the 12th five year plan and beyond. Report of the Industry Steering Committee for the Twelfth Five Year Plan, 2017.

Raj, S N and Sasidharan, S. (2015) "Impact of foreign trade on employment and wages in Indian manufacturing", South Asia Economic Journal, 16, 2, pp. 209-232.

Raj, S N, and Sen K. (2012) "Did international trade destroy or create jobs in Indian manufacturing?", European Journal of Development Research 24, pp. 359–381.

Roxon, D. (1967). Domestic Jobs Attributable to US Exports. Monthly Lab. Rev., 90, 12.

Sankaran, U., Abraham, V. and Joseph, K. J (2010) "Impact of trade liberalization on employment: the experience of India's manufacturing industries" Indian Journal of Labour Economics, 53, 4, pp. 587.

Sen, K. (2008), "International trade and manufacturing employment outcomes in India: a comparative study", Research Paper No. 2008/87, UNU-WIDER.

Singh, K., & Saluja, M. R. (2018). Input–Output Table for India 2013–2014: Based on the New Series of National Accounts Statistics and Supply and the Use Table. Margin: The Journal of Applied Economic Research, 12(2), 197-223.

Sousa, N., Rueda-Cantuche, J. M., Arto, I., & Andreoni, V. (2012). Extra-EU exports and employment. DG Trade Chief Economist Note, (2), 92.

Taylor W G (1976). Manufactured exports and employment creation in developing countries: some empirical evidence. Economic Development and Cultural Change. 24 (2), 355-373.

Topalova, P. (2007). Trade liberalization, poverty and inequality: Evidence from Indian districts. In Globalization and poverty (pp. 291-336). University of Chicago Press.

Vashisht, P. (2016) "Creating manufacturing jobs in India: Has openness to trade really helped?" Journal of Asian Economics, 42, pp 53-64.

Veeramani, C. and Dhir, G. (2019). Reaping Gains from Global Production Sharing: Domestic Value Addition and Job Creation by Indian Exports, IGIDR Working Paper No WP-2019-024, Mumbai (http:// www.igidr.ac.in/pdf/publication/WP-2019-024.pdf)

Vivarelli, M (2002) 'Globalisation, skills and within-country inequality in developing countries', Geneva: ILO, draft for ILO project on 'Understanding Globalisation, Employment and Poverty Reduction'.

Appendix

Table A-1: DVA and FVA share in India's exports (%): 2003-04 to 2013-14

		Goldar et. al. (2017)	Veeramani and Dhir (2019)	Present Study
DVA share (%)	2003-04	85	85	84.13
	2007-08	79	81	78.55
	2013-14	-	-	72.79
FVA share (%)	2003-04	15	15	15.87
	2007-08	21	19	21.45
	2013-14	-	-	27.21

Table A-2: Commodity-wise contribution to manufacturing DVA in total exports: 2003-04 to 2013-14

	Share in Manufacturing DVA (%)		
KLEMS product categories	**2003-04**	**2007-08**	**2013-14**
Food Products, Beverages & Tobacco	9.14	8.00	7.13
Textiles, Textile Products, Leather and Footwear	28.91	24.24	17.65
Wood and Products of Wood	0.10	0.12	0.10
Pulp, Paper, Paper Products, Printing and Publishing	0.69	0.64	0.77
Coke, Refined Petroleum Products and Nuclear Fuel	4.01	8.89	14.61
Chemicals and Chemical Products	14.24	14.95	11.83
Rubber and Plastic Products	3.07	3.07	3.57
Other Non-Metallic Mineral Products	1.49	1.29	4.41
Basic Metals and Fabricated Metal Products	11.07	15.20	7.06
Machinery, n.e.c.	6.14	5.87	4.64
Electrical and Optical Equipment	4.90	5.22	5.51
Transport Equipment	3.94	4.70	9.10
Manufacturing, n.e.c.; recycling	12.29	7.79	13.62
Total Manufacturing	100	100	100

Source: Authors' estimation based on the official I-O tables

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