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INTER-LINKAGES BETWEEN EXPORTS AND EMPLOYMENT IN INDIA

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CONTENTS

	Page No.
List of Tables	5
List of Figures	7
List of Annexures	9
Executive Summary	11
1. Introduction	14
2. Review of Related Literature	17
2.1 Number of Jobs Supported by Exports in Different Countries	17
2.2 Major Highlights from Literature	28
3. Background on Exports and Employment: General Trends and Patterns	31
3.1 Trends and Patterns of Exports	31
3.2 Comparative Profile of Exports and Employment across Sectors	37
4. Estimation of Jobs Supported by Indian Exports: Data and Methodology	43
4.1 Input-Output Methodology for Estimating Export-Supported Jobs	43
4.2 Construction of Annual Times Series of Domestic Use Tables: Data and Methodology	45
4.3 Limitations of I-O based Estimation	51
5. Jobs Supported by Indian Exports: Estimation Results	53
5.1 Aggregate Level Estimates	53
5.2 Estimates for Broad Sectoral Groups	54
5.3 Disaggregated Level Estimates	58
References	61
Annexures	80

LIST OF TABLES

Table No.	Title	Page No.
1	Growth Rates of India's Exports (valued in US$ million, %)	66
2	Growth Rates of India's and World's Exports (valued in constant US$ million, %)	66
3	Average Annual Growth Rates and Composition of Merchandise Exports across Sections of Commodities	67
4	Average Annual Growth Rates of Services Exports across Categories current (US$, %)	68
5	Composition of Exports across Broad Sectoral Groups	68
6	Merchandise Export Composition according to Factor Intensity Classification (% share of total exports)	69
7	Composition of Merchandise Exports across 1-Digit Level, SITC (% shares of total exports)	70
8	Composition of Services Exports across Categories	71
9	Total Number of Indian Employment (millions) Supported by Merchandise plus Services Exports, and Total Employment in the Country	71
10	Growth Rates of Export-supported Jobs, Total Employment and Total Value of Exports	72
11	Number of Jobs per Billion Rupees (and per million dollar) Worth of Exports	72
12	Export-supported Jobs across Broad Sectors (millions)	73
13	Number of Jobs per Billion Rupees Worth of Exports in each Sector	73

LIST OF FIGURES

Figure No.	Title	Page No.
1	Share of Services Exports in Total Exports and Share of Oil Exports in Merchandise Exports	74
2	India's World Market Shares (%)	74
3	Annual Merchandise Export Growth Rate, India and World	75
4	Total Number of Employment Supported by Indian Exports, Millions	76
5	Number of Jobs Supported by Exports as a Share of Total Employment in the Country (%)	76
6	Share of Direct and Indirect Jobs in Total Number of Jobs Supported by Exports (%)	77
7	Total Employment (Millions) Supported by Indian Exports across Sectors	77
8	Distribution of Export-supported Employment Across Broad Sectors	78
9	Export-Supported Employment as a Share Total Sector Employment (%)	78
10	Direct Employment as a Share of Total Export-supported Employment in each Sector (%)	79

LIST OF ANNEXURES

Annexure No.	Title	Page No.
1	Agriculture and Allied Activities: Employment Coefficient and Composition of Exports and Employment	80
2	Mining, Quarrying and Petroleum: Employment Coefficient and Composition of Exports and Employment	81
3	Food Processing, Beverages and Tobacco: Employment Coefficient and Composition of Exports and Employment	82
4	Textiles and Leather: Employment Coefficient and Composition of Exports and Employment	82
5	Rubber, Plastics and Chemicals: Employment Coefficient and Composition of Exports and Employment	83
6	Metal and Metal Products: Employment Coefficient and Composition of Exports and Employment	83
7	Machinery: Employment Coefficient and Composition of Exports and Employment	84
8	Transport Equipments: Employment Coefficient and Composition of Exports and Employment	84
9	Other Manufactured Products: Employment Coefficient and Composition of Exports and Employment	85
10	Services: Employment Coefficient and Composition of Exports and Employment	86
11	IO Sector Codes and Description	87
12	Total Employment Supported by Exports: Agriculture and Allied Activities	90
13	Total Employment Supported by Exports: Mining, Quarrying and Petroleum Products	91
14	Total Employment Supported by Exports: Food Processing, Beverages and Tobacco	91
15	Total Employment Supported by Exports: Textile and Leather	92
16	Total Employment Supported by Exports: Rubber, Plastics and Chemicals	92
17	Total Employment Supported by Exports: Metal and Metal Products	93
18	Total Employment Supported by Exports: Machinery	93
19	Total Employment Supported by Exports: Transport Equipments	93
20	Total Employment Supported by Exports: Other Manufactured Products	94
21	Total Employment Supported by Exports: Services	95
22	Total Employment Supported by Exports, All Sectors, 1999-2000 to 2012-13, Millions	96

EXECUTIVE SUMMARY

Using input-output (IO) analysis, this study provides estimates of employment supported by India's merchandise and services exports during the period 1999-2000 to 2012-13. The major advantage of the IO framework is that, in addition to the direct effect of exports on employment within a given industry, employment generated in other industries as a result of indirect backward linkage effects can be taken into consideration. The study makes use of the official input-output tables (IOTs) for the benchmark years 1998-99, 2003-04, 2007-08 as well as the recently published Supply Use Tables (SUTs).

The IOTs and SUTs, compiled by CSO, do not distinguish imported inputs from domestic inputs. If imported inputs are not subtracted from total input use, we would overestimate the number of domestic jobs generated through backward linkage effects. Therefore, we use an imputation procedure to separate imported inputs from domestic inputs. Further, making use of detailed production and trade data from various official sources we construct domestic use tables for each year spanning the period 1999-2000 through 2012-13. For constructing these tables, we have made use of information on the changing input-output relations and other structural features as reflected in available official IOTs and SUTs. Using annual domestic use tables and detailed sector-wise employment coefficients (ratio of employment to output), we provide consistent time series estimates of direct and indirect jobs supported by India's exports for 112 sectors.

We find that the total number of jobs supported by aggregate Indian exports (merchandise plus services) increased from about 34 million in 1999-00 to 62.6 million in 2012-13, with a growth rate of 3.4% per annum. Throughout the period, export related jobs grew significantly faster than that of country's total employment: the share of export-supported jobs in total employment increased from little over 9% in 1999-00 to 14.5% in 2012-13. During the period 1999-2000 to 2009-10, the share of direct employment (that is, employment in a given sector attributed to its own exports) in total export related employment stood significantly higher

than that of indirect employment (employment in a given sector due to its linkage with other exporting sectors). However, the contribution of indirect job creation increased significantly in recent years, from 38% in 2007-08 to 50% in 2012-13. Backward linkages, particularly from manufacturing to agriculture and services, have become an important source of export related job creation in the country.

While the total number of jobs supported by exports increased significantly, jobs supported per million dollar (or billion Rupees) worth of exports declined over the years. Our detailed review of the literature suggests that this is consistent with the trends observed in several other countries. Our estimates suggest that US$ 1 million worth of exports supported 138 jobs in 2012-13. This value is significantly higher than those reported for other countries in earlier studies: for example, US$ 1 million worth of exports from US supported only 6.6 jobs in 2009 and 5.2 jobs in 2014. Estimates for China suggest that US$ 1 million worth of its exports supported 140 jobs in 2007 as compared to 191 jobs in India for the same year. The observed decline in the number of jobs per million dollars of exports can arise as a result of improvement in labor productivity (which in turn may mean higher wages) as well as due to the change in the composition of exports in favor of more skill and capital intensive products.

Turning to the estimates for the broad sectoral groups, we find that in 2003-04, agriculture accounted for the largest share of export-supported jobs (44.4%) followed by manufacturing (30%) and services (25.7%). Between 2003-04 and 2007-08, however, the share of services increased steadily to nearly 43% at the cost of agriculture and manufacturing whose shares declined to 40% and 17.5% respectively. The trend got reversed again since 2007-08 as the share of manufacturing steadily increased to 38.5% in 2012-13 while the share of services declined sharply to 19%. These changes in the sectoral composition of employment are consistent with the observed changes in the composition of exports[1].

We observe a major increase in aggregate export supported jobs during the period 2010-11 to 2012-13. This was mainly brought about by the manufacturing sector. Between 2010-11 and 2012-13, aggregate number of export supported jobs increased by 13.3 million. It can be seen that

[1]Export data reported in in IOT and SUT shows that, between 2003-04 and 2007-08, the share of manufacturing exports in total exports declined significantly while the share of services increased. However, between 2007-08 and 2012-13, the trend got reversed as manufacturing exports gained prominence in relation to services.

manufacturing sector contributed to over 75% (10.2 million) of this increase, followed by agriculture (4.4 million) while services contributed negatively with a decline in number of export supported jobs by 1.3 million. The high contribution of manufacturing sector is consistent with the fact that its share in India's exports increased significantly since the late 2000s. The percentage of total manufacturing employment that can be attributed to exports increased significantly from 19.6% in 1999-2000 to 24.5% in 2004-05 and 39.5% in 2012-13.

The significant growth of export related manufacturing employment between 2010-11 and 2012-13 has been brought about by sectors such as 'readymade garments & miscellaneous textile products' (with an employment growth of 4.5 million), gems & jewelry' (2.4 million), 'cotton textiles' (0.7 million), 'communication and electronic equipments' (0.6 million), 'motor vehicles' (0.5 million), 'miscellaneous food products' (0.4 million), miscellaneous metal products (0.4 million), 'leather footwear' (0.2 million) 'other non-metallic mineral products' (0.2 million), 'tobacco products' (0.2 million), and 'drugs and medicines' (0.2 million).

Direct employment accounts for a very high share – ranging from 73% to 85% - of total export-supported jobs in the manufacturing sector. In contrast, a significant share of employment generated in agriculture and services are attributed to indirect effects, implying that manufacturing export plays an important role in generating employment in agriculture and services sectors through backward linkage effects. For the year 2012-13, direct employment accounted for only 20% of total export linked jobs generated within the agriculture sector while as much as 80% of export related jobs in this sector is attributable to its linkages with other sectors, particularly manufacturing. Similarly, direct employment accounted for 48% of export-linked jobs within the services sector while the remaining 52% could be attributed to its linkages with manufacturing.

To sum up, our estimates suggest that exports have become an important driver of job growth in India. The study identifies a number of specific sectors where exports can contribute significant employment growth, directly as well as through backward linkages. At the broad sectoral level, manufacturing exports hold the largest potential to generate employment within the sector (direct effect) as well as in agriculture and services through backward linkage effects. Policies specifically targeting export growth from the manufacturing sector can reap rich dividends in terms of creating large scale employment opportunities for various skill categories. Viewed in this light, the manufacturing focus in "Make in India" initiative of the government is a move in the right direction.

1. INTRODUCTION

Recognizing the importance of a strong manufacturing sector for employment generation, the Prime Minister of India has recently launched "Make in India" campaign with an aim to boost India`s manufacturing sector. This campaign aims to transform India as a manufacturing powerhouse by promoting exports, encouraging Foreign Direct Investment (FDI), improving industrial productivity, and by lowering the barriers to doing business. The government hopes to create 100 million jobs by 2022 and to increase the share of manufacturing in GDP to 25%. Experience of other countries, particularly the successful countries from East Asia and South East Asia, shows that export-led growth is crucial for the attainment of a strong manufacturing sector, sustained employment generation and significant poverty reduction.

Despite India's fast economic growth since the 1990s, employment growth has been sluggish. During the period 1999-2000 to 2012-13, for example, employment grew at the rate of just 0.8% per annum, much slower than the growth rate of real GDP. However, export growth has the potential to generate large scale employment as India has a comparative advantage in labor-intensive products. In light of the crucial role that exports play in the process of employment generation, it becomes imperative to provide consistent time series estimates of the number of jobs supported by India's exports. In order to assess the possible role of foreign demand in generating employment in the future, it is necessary to know how important exports have been for job creation in the past. Utilizing an input-output (IO) model, this study provides estimates of the direct and indirect jobs supported by merchandise and services exports from the early 2000s. The estimates are provided both at the aggregate and detailed sectoral level.

The major advantage of the IO framework is that, in addition to the direct effect of exports on employment within a given industry, employment generated in other industries as a result of indirect backward linkage effects can be taken into consideration. The basic idea of the IO model is that the structural characteristics of a national economy can be quantitatively described in terms of "technical input

coefficients". Technical coefficient measures the requirement of some input per unit of some output - for example, the amount of steel needed to produce one automobile. The IO table (IOT) provides the data required for the computation of the technical input coefficients for all sectors of the national economy.

In India, the Central Statistics Office (CSO), under the Ministry of Statistics and Program Implementation, has been compiling and publishing IOT once in five years. The first IOT consistent with National Accounts Statistics was compiled for the year 1968-69. Since then, IOT have been prepared for the years 1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04 and 2007-08. IOT for the year 1968-69 was published with 60 sectors and subsequently the tables consisted of 115 sectors since 1973-74 till 1998-99. The IOTs for 2003-04 and 2007-08 contain 130 sectors. In addition to IOTs, the study makes use of the recently published Supply-Use Tables (SUT) for the years 2011-12 and 2012-13[2].

IOTs and SUTs classify the use (as an input into another sector's production or as final demand) of each sector's output. In other words, these tables show the value of industry i's output used (i) as an input by industry j, (ii) as final products by households and governments (consumption) or firms (stocks and gross fixed capital formation) and (iii) as exports. For estimating the number of export related jobs created through backward linkage effects, it is important to subtract imported input use from total input use in each sector. The IOTs and SUTs compiled by CSO, however, report total input use without separating imported inputs from domestically produced inputs. From the perspective of the present study, this is an important limitation. If imported inputs are not subtracted from total input use, we would overestimate the number of domestic jobs generated through backward linkage effects. We use an imputation procedure to separate imported inputs from domestic inputs.

The study aims to provide estimates of employment supported by exports for every year, using year-specific IOT, for the period 1999-00 to 2012-13. However, as mentioned above, official IOTs are available only for once in five years, not for every year. Therefore, making use of detailed production and trade data from various official sources we have constructed domestic use

[2]The SUTs are not available for previous years. A major difference between IOT and SUT is that the former contains equal number of rows and columns (square matrix) while the number of rows exceeds the number of columns in SUT. For example, the IOT for the year 2007-08 contains 130 rows and 130 columns while the SUT for 2011-12 and 2012-13 include 140 rows and 66 columns. Thus, the sectors represented by SUT columns are more aggregated than the sectors represented by SUT rows.

tables for each year spanning the period 1999-2000 through 2012-13. For constructing these tables, we have made use of information on the changing input-output relations and other structural features as reflected in available official IOTs since 2000 and the latest SUTs for the years 2011-12 and 2012-13. Section V discusses in detail the various assumptions, interpolations and extrapolations used in the construction of our times series of domestic use tables.

The study is organized as follows. Section 2 provides a review of related empirical literature on the effect of exports on employment from India and other countries. Section 3 provides a descriptive analysis of the trends and patterns of India's exports with a view to understanding its implications for employment. Section 4 discusses the data and methodology involved in the construction of annual IOTs and the basic IO model used to estimate the number of employment supported by exports. Section 5 presents the estimation results and discusses the trends and patterns of jobs tied to exports.

2. REVIEW OF RELATED LITERATURE

In what follows[3], based on existing studies, we first provide the estimates of the number of jobs supported by exports, in terms of absolute number and as a percentage of total employment, across different countries and over the years. We then summarize the major highlights of the literature review.

2.1: Number of Jobs Supported by Exports in Different Countries

2.1.1 United States

Using an I-O table for the year 1939, the pioneering estimation of export dependent employment was provided by Leontief (1946) for the U.S. It was estimated that exports generated about 1.1 million persons employment (accounting for about 3.6% of total employment) for the year 1939 in the US. Since then, using the I-O framework, a number of studies have provided such estimates for different countries and for different years.

Starting from the early 1960s, for a number of years, the U.S. Bureau of Labor Statistics (BLS) had estimated the labor force involved in producing exports. One of the earlier reports published in 1967 showed that goods and services exports supported about 2.8 million jobs in 1960 and 2.9 million jobs in 1965 (Roxon, 1967). Another report published in 1973 showed that the number of jobs generated by merchandise exports increased steadily from 2.3 million (accounting for 3.8% of total private employment) in 1963 to 2.9 million (accounting for 4.1% of total private employment) in 1972[4].

Using the 367-sector I-O table, Aho and Orr (1981) estimated the total employment supported by U.S manufacturing exports during the period 1964-1975. Their estimates show a steady increase of export-dependent employment from 1.2 million jobs in 1964 (accounting for 7% of total manufacturing employment) to

[3]This review covers only those studies which use I-O approach for estimating direct and indirect effects of exports on employment. We do not cover studies which analyze the effects of imports on employment and studies which have used alternative methodologies (regression analysis or accounting identity calculations) to estimate the employment effect of exports.

[4]See Eldridge and Saunders (1973). This and the previous estimates used 150 sector I-O table for the U.S.

2.4 million jobs in 1975 (accounting for 13% of manufacturing employment). Estimates for the period 1978 through 1982, provided by United States International Trade Commission (1983), showed that domestic jobs supported by aggregate US exports increased from 4.8 million work-years in 1978 to 5.4 million work-years in 1982. While the total number of jobs supported by export had increased, labor content per billion of US exports had declined over the years from 35200 work-years in 1978 to 26700 work-years in 1982[5].

The Economics and Statistics Administration of the U.S. Department of Commerce had estimated the number of jobs supported by U.S exports during the period 1983-1994 (Davis, 1992, 1996). These estimates showed that the number of US jobs supported by merchandise exports to all foreign markets reached 7.2 million by 1990. Merchandise exports contributed to 25 percent of the growth in U.S. civilian jobs between 1986 and 1990 (Davis, 1992). It is estimated that each billion dollars of merchandise exports supports about 25,000 jobs.

Leclair (2002) estimate the number of manufacturing employment arising from exports in ten key manufacturing industries during the period 1989-95. The total number of export-induced jobs created in these industries were estimated as 3.9 million 1995, up from 3 million in 1989. Throughout the period, Chemical and allied industries generated the largest number of jobs tied to exports. The results show that the employment impact of export is closely related export composition with exports of chemical and textiles industries resulting in far greater increase in employment than exports by the petroleum refining or steel industries.

The U.S. Department of Commerce has published updated estimates for the period 1993-2008 (see Tschetter, 2010). These recent estimates show that the number of jobs supported by US goods and services exports increased significantly from 7.4 million jobs in 1993 to 10.3 million jobs in 2008. Export-supported jobs accounted for 6.9 percent of total U.S. employment in 2008, consisting of jobs related to goods export (5 percent) and services exports (1.9 percent). Consistent with the trends observed earlier, the labor content per billion of US exports had declined over the years from about 11966 jobs in 1993 to 6076 jobs 2008. The International Trade Administration under the U.S Ministry of Commerce presented updated estimates of jobs supported by US exports for the period 1993-2011 using an updated

[5]The decline in employment per billion of exports could reflect growth in labor productivity and/or changes in the export composition in favor of more capital-intensive sectors.

I-O table (Rasmussen and Johnson, 2012). These estimates suggest that between 1993 and 2011, jobs supported by goods and services exports increased from 7.6 million to 9.7 million jobs. During the same period, the number of jobs supported by US$1 billion of exports fell nearly 60 percent, from 12,086 to 5,080 jobs[6]. The latest available estimates are provided in Rasmussen and Johnson (2015) for the period 2009-2014. The estimated jobs supported by exports in 2014 stands at 11.7 million, of which 7.1 million jobs are attributed to goods exports and the rest 4.6 million jobs are generated by services exports. The number of jobs supported by one billion dollars of goods exports has fallen from 6,582 jobs supported in 2009 to 5,210 jobs supported in 2014. It was found that services exports support more jobs per billion (7033 jobs) than goods exports (5210 jobs).

2.1.2 European Union

Sousa et al (2012) quantify how many jobs in the EU (and in each Member State) are supported (directly and indirectly) by sales of goods and services to the rest of the world, over the period 2000-2007. They find that EU exports to the rest of the world supported around 25 million jobs in 2007, up from 22 million jobs in 2000. Consistent with the trend observed in other countries, the number of jobs supported by 1 million euros (in constant prices) of exports to the rest of the world declined from 20 jobs in 2000 to 16.7 workers in 2007. While exports of manufactured products were the main engine for job creation, a phenomenon of "servicification" of the employment had been observed. Exports of manufactured goods supported around 15.7 million jobs in 2007. However, only 8.7 million jobs of these jobs generated within the manufacturing sectors while about 5.7 million jobs were created in services sectors through linkages.

The contribution of extra-EU exports to total employment has remained on average at around 10.3%. However, it was observed that the contribution of exports to total employment varies markedly across the member states within EU. In general the share of employment supported by extra-EU exports was found to be higher in smaller countries, notably Malta, Ireland (12.2% in 2007), Finland (11.6%), and Luxembourg (11.3%). Among the bigger economies, extra-EU exports made the largest contribution to total employment in Germany (9.6% in 2007), followed by the UK (8.1%), Italy (7.7%), and France (7.1%). In contrast, in Spain this ratio was notably lower (4.1%). In 2007, the largest number of jobs

[6]Their calculations show that three-quarters of the 60 percent decrease in jobs supported by US$1 billion of exports is accounted for by increases in labor productivity associated with exporting.

supported by extra-EU exports was found in Germany (3.8 million), UK (2.4 million), Italy (1.9 million), and France (1.8 million). Sousa et al (2012) also estimated the importance of "single market" – that is, the number of jobs associated with intra-European supply of goods and services that were subsequently used as inputs to produce goods and services for exporting to the rest of the world. Their calculation showed that "single market" effect had steadily increased over the period. The number of jobs associated with "single market" effect amounted to almost 9 million jobs in 2007, which represented around 35% of the total 25 million jobs that were supported by exports across the EU.

Using WIOD, a recent Report published by the European Commission provides estimates of jobs supported by EU's (as a whole and for each EU Member State) exports to the rest of the world for the period 1995-2011 (see Arto et al, 2015). This Report shows that the number of jobs supported by EU's exports to the rest of the world increased significantly from 18.6 million jobs in 1995 to 31.2 million jobs in 2011, registering a growth of 67%. For the year 2011, Germany (7.5 million) accounted for the largest number of jobs created, followed by U.K (3.6 million), Italy (3.1 million), France (2.7 million), Poland (1.6 million), Spain (1.5 million), Netherland (1.3 million), Romania (1.3 million) and so on. In 2011, 60% of EU employment supported by exports was in the services sector (up from 47% in 1995), 35% in the manufacturing sector (down from 45% in 1995) and 5% in primary industries (down from 8% in 1995). In 2011, 35% of EU jobs tied to exports was driven by sales to the US (15%), China (10%), Russia (6%) and Turkey (4%). Between 1995 and 2011, the share of jobs (in total EU employment) tied to exports increased from 9.3% in 1995 to 13.6% in 2011.

Turning to the skill composition of jobs tied to exports, it was found that in 2009, highly skilled jobs accounted for 24% of jobs supported by EU's exports to the rest of the world (up from 14% in 1995) and medium skilled jobs accounted for 51% (up from 48% in 1995). On the other hand, the share of low-skilled jobs declined to 25% in 2009 as compared to 38% in 1995. The Member States with high proportion of low-skilled employment included Bulgaria (73% of EU employment supported by Bulgaria's exports was low-skilled), Romania (72%), Portugal (67%), Malta (56%) and Spain (41%). In the other Member States, medium-skilled jobs were the main category of employment supported by their exports to the rest of the world. In 2009, 1 million euro worth of exports supported 11.9 jobs, of which 6.1 jobs were medium-skilled, 3 jobs were low-skilled and 2.8 jobs were high-skilled.

Messerlin (1995) estimated that

number of jobs supported by French exports during 1977 to 1992. It was found that exports support roughly 3.8 millions of jobs in 1992 as compared to 3.2 million jobs in 1977. The number of jobs supported by one billion dollars of exports declined over the years: for 1992, this was estimated to be 25000 jobs. The estimates of the jobs directly and indirectly supported by exports were almost twice the amounts jobs directly supported by French exports, reflecting the importance of backward linkages. Export-supported jobs represent an increasing share of the French total civilian labor force, up from about 15 per cent in 1977 to about 17 per cent in 1992. In 1992, half the jobs in French manufacturing industry depended upon exports, compared with 35 per cent in agriculture, 25 per cent in energy and only 7 per cent in service.

A Report published by the Department for Business Enterprise & Regulatory Reform (2007) shows that the numbers of jobs supported by UK's exports to the world range from 7 to 8 million jobs during the period 1995 to 2004. For the year 2004, exports of goods and services generated about 7 million jobs, of which 4.6 million jobs were tied to exports of goods while services exports generated 2.4 million jobs. Of the 7 million jobs generated in 2004, about 3.6 million jobs were generated by UK's exports to EU while 3.3 million jobs were accounted by exports to non-EU countries. Manufacturing sector generated the largest number of jobs (2.9 million in 2004) followed by finance and business services (1.8 million jobs in 2004)[7].

2.1.3 Japan

Kiyota (2012) uses I-O tables for the period 1975-2006 to estimate the number of direct and indirect jobs supported by Japan's exports of goods and services. Estimation results indicate that the export dependence of Japan's employment gradually increased over the three decades. The total number of jobs (in terms of number of workers) supported by exports increased from 3.6 million in 1975 to 4.1 million in 1990 and to 6.4 million in 2006. The number of jobs supported by exports grew at a faster rate during 1990-2006 as compared to 1975-1990. In 2006, implied employment from exports (6.4 million workers) accounted for 9.9 percent of total employment. Among these 6.4 million workers, 4.8 million workers (7.5 on goods exports while the remaining 1.6 million workers (2.5 percent) relied on services exports.

[7]The effects that changes in the composition of trade have on employment have been estimated by Driver et al (1985) for the U.K. They utilized an input-output analysis to determine the employment effects of altering U.K trade to fit the pattern of West Germany. They concluded that approximately 230000 new jobs would be created if UK trade were reoriented towards the structure of West German exports and imports. Driver et al (1988) expressed reservations about the stability of the coefficients in the I-O model.

The share of employment effects tied to indirect effects exceeded those of the direct effects over almost the entire period with the former accounting for 49.3 – 56.9 percent during the period. Thus, more than half of the employment effects appeared through intra-industry linkages, with the indirect effect being larger for goods exports than for services exports[8]. The results show that even the industries which are not export-oriented sometimes have heavy export dependence of employment due to the intra-industry linkages with other export-oriented industries.

Using the global IO tables in the World Input Output Database (WIOD), Kiyota (2016) provides estimates of job tied to exports for the period 1995 through 2009. An advantage of the global IO table is that it separately reports domestic and imported intermediate inputs as well as exports for the intermediate and for the final use. Further, the global I-O table makes it possible to take into account both inter-industry and inter-country vertical linkages. Kiyota (2016) focuses on the estimates of jobs tied to exports for the final use only, not for intermediate use[9]. The number of jobs tied to exports (measured as total number of persons engaged) increased steadily from about 1.8 million in 1995 to 2.7 million in 2007 and then declined to 1.7 million in 2009[10]. Although manufacturing industries account for more than 85 percent of exports, a significant number of workers in non-manufacturing industries depend upon manufacturing exports through vertical inter-industry linkages. For example, while manufacturing industries accounted by 85.3% of Japanese exports in 2009, non-manufacturing industries accounted for 46.1 percent of the implied employment from exports. Another interesting finding is that in 2009 the share of implied employment from Chinese final demand for Japan's products exceeded that from the U.S. final demand.

2.1.4 China

Feenstra and Hong (2007) notes that for the period 1997–2002, with about 2.5 million jobs being added per year in China, the implied employment growth from exports had been modest. However, this situation had changed

[8]The indirect effect is not small even for services exports, accounting for approximately one-third of the total effect.

[9]Kiyota (2016) argues that exports of intermediate inputs are "endogenously" determined by the final demand.

[10]It may be noted that the total number of jobs supported by exports are much smaller than the previous estimates (Kiyota, 2012). This is due to the fact that the previous estimates are for total exports (final and intermediate) while the present estimates refers to jobs tied to exports for final use only. Given that Japan is a major supplier of intermediate inputs for other countries, it is likely that the numbers reported in Kiyota (2016) seriously underestimates the total number of jobs supported by exports in Japan.

significantly during 2000-2005 when exports grew much faster and, as result, exports added as much as 7.5 million jobs per year. The analysis shows that exports have become increasingly important in stimulating employment in China.

Using a 1995 I-O table for China, Lau et al (cited in Feenstra and Hong, 2007) estimate that US$ 1,000 of ordinary exports from China leads to 0.70 person-years of employment, and US$ 1,000 of processing exports leads to 0.06 person-years. Feenstra and Hong (2007) showed that the employment coefficients for ordinary exports had been falling over time. Using the IO table for 2000, they find that US$ 1,000 of ordinary and processing exports from China leads to 0.44 and 0.13 person-years of employment, respectively. Using the 2002 IO table, Lau et al (2006a, b) estimate that US$ 1,000 of ordinary exports from China leads to 0.36 person-years of employment, and US$ 1,000 of processing exports leads to 0.11 person-years. Estimates by Chen et al (2012) shows that the employment coefficients have declined drastically in 2007: it was found that US$ 1,000 of ordinary exports from China contributed to just 0.14 person-years of employment and US$ 1,000 of processing exports contributed to an even smaller 0.05 person-years of employment.

It may be noted that the effects of US$ 1000 of exports on employment would usually decrease over time due to two factors: (i) with inflation, US$ 1000 exports would represent decreasing real output over time; (ii) labor productivity usually rises over time. However, falling employment coefficients do not imply that the absolute number of jobs tied to exports had been falling. On the contrary, our estimation based on the employment coefficients shows that the actual number of jobs generated by exports has increased significantly over the years due to the fact that the growth of exports have more than offset the fall in the employment coefficient. Chen et al (2012) have estimated that US$ 1000 of aggregate (processing plus ordinary) exports led to 0.242 person-years of employment in 2002 and 0.096 person-years of employment in 2007. According to the WTO data, China's exports of merchandise and commercial services amounted to US$ 365 billion in 2002 and US$ 1342 billion in 2007. Applying the employment coefficient for aggregate exports, the values imply that China's exports have supported about 88 million jobs in 2002 and 129 million jobs in 2007. Jobs tied to exports as a proportion of total employment increased from 12% in 2002 to 17% in 2007.

Estimates by Kiyota (2016), using the global IO tables in the WIOD, shows that the total number of jobs supported by Chinese exports for final use increased from 62.1 million jobs in

1995 to 99.3 million jobs in 2007 and then showed some decline to 79.8 million jobs in 2009. These numbers are lower than the estimates provided above because Kiyota's (2016) estimates do not take into account China's exports of intermediate inputs[11]. While manufacturing industries account for more than 90 percent of the value of exports, non-manufacturing industries accounted more than 60 percent of the total jobs generated through exports. This reflects the high degree of inter-sectoral linkages between manufacturing and services sectors. Thus, an expansion of manufacturing exports can create significant employment not only within the manufacturing sector but also in non-manufacturing sectors through inter-industry linkages.

In a recent paper, Los et al (2015) estimate the impact of exports on driving employment growth in China since 1995 based on WIOD. They find that between 1995 and 2001, fast growth in exports was offset by strong increases in labor productivity with the net effect on employment growth being nil. This was reversed in the period 2001-2006 when exports grew more rapidly than labor productivity growth. Employment grew significantly during this period of rapid export growth, adding 71 million jobs tied to exports over the whole period of 2001-2006. It is noteworthy that the jobs tied to exports were generated mainly for workers with only primary education, reflecting China's export specialization in low-skilled labor-intensive industries and assembly related activities.

While Chinese exports mainly consist of manufacturing goods, jobs created to satisfy foreign demand has not been restricted to the manufacturing sector. Timmer et al (2015) find that in 1995 only 29% of the jobs induced by foreign demand originated in the manufacturing sector, while the majority (42%) originated in agriculture. This is not surprising given that production of traditional labor-intensive manufacturing industries such textiles and clothing has strong backward linkages into domestic agriculture. However, as China's export composition has shifted in favor of machinery industries, the sectoral distribution of export induced jobs has changed significantly. In 2009, manufacturing accounted for 37% of jobs induced by exports while the share of agriculture declined to 33%.

2.1.5 Indonesia

Fujita and James (2006) estimate the employment effects of merchandise (manufactured and primary goods)

[11]It may be noted that, being an assembly location for electronics and electrical machinery, exports for final use accounts for a significant share of China's total exports. Thus, Kiyota's (2016) procedure do not underestimate export linked jobs for China as much as it does for Japan, the latter being a major supplier of intermediate inputs for other countries.

exports from Indonesia for 1980, 1985 and 1990. It was found that exports were associated with about 2.7 million jobs in 1980, which was increased to 3.5 million in 1985 and 6 million jobs in 1990. The increase in the number of jobs has been entirely driven by manufactured exports, for which the number of jobs increased phenomenally from 0.7 million in 1980 to 4.8 million in 1990. In contrast, during the same period, the number of jobs generated by primary exports declined from 2.0 million to 1.2 million. More disaggregated analysis showed labor-intensive manufactured products had been the major driver of job growth tied to exports.

Aswicahyono and Manning (2011) have estimated the number of jobs induced by goods and services exports in Indonesia during 1985-2005. According to their calculations, employment in export activities increased from 4.7 million in 1985 to 10.3 million in 1995 and reached a peak at just below 18 million in 2000. However, as export growth slowed down in the aftermath of the Asian financial crisis, the number of jobs tied to exports declined to 15.8 million. The estimated contribution of exports to total employment increased consistently from 7% in 1985 to just below 12% in 1995 and to 19% in 2000. However, this proportion has declined to about 17% in 2005, partly as a result of a slow-down in export growth, and partly driven by a change in the composition of exports away from light industry and in favor of capital and resource intensive food processing, heavy industry and chemicals industry. Employment induced per the unit value of exports was similar in 2000 to that achieved during the height of the manufacturing export boom in 1990 but declined sharply during the subsequent years. The number of jobs induced by US$ 1 million value of exports was around 260 in 2000, which was declined to about 160 persons in 2005 reflecting the compositional shift in exports away from light industry. Export activities accounted for less than 10 per cent of all new jobs in 1985 but their share of all new jobs created was 27 and 67 percent in the period 1985-95 and 1995-2005 respectively. Nearly half of all export related jobs were created in services throughout the period, many of them through linkages with tradable sectors. Whereas in the period 1985-1995 nearly one-third of jobs were created in light manufacturing, in the following decade a similar proportion were provided in primary industry.

Estimates by Kiyota (2016), using the global IO tables in the WIOD, shows that the total number of jobs supported by Indonesia's exports for final use increased from 3.6 million jobs in 1995, reached a peak of 6.5 million jobs in 2000 and then gradually

declined to 4.1 million jobs in 2009. These numbers are much lower than the estimates by Aswicahyono and Manning (2011) due to the omission of intermediate exports by Kiyota (2016). While manufacturing industries account for more than 80 percent of the value of exports, non-manufacturing industries accounted for about 60 percent of the total jobs generated through exports.

2.1.6 Mexico

Ruiz-Nápoles (2015) provided some estimates of direct and indirect employment generated by exports for the Mexican economy during the period 1978-2000. It was found that exports (including the contribution from assembly plants knows as Maquiladoras) generated about 14 percent of total employment during 1995-2000. This figure is three times of that generated in the early 1980s. The contribution of exports from Maquiladoras alone increased from less than 1% during the early 1980s to close to 4% during the late 1990s. The analysis showed that, unlike in the case of several other countries, the direct effect of exports on jobs is always greater than the indirect effect. This could be mainly due to the relatively weak backward linkages between exports from Maquiladoras (which accounted for more than 40% of Mexico's total exports during the 1990s) and the domestic economy. The analysis suggests that the positive effects of exports on employment were accentuated by the North American Free Trade Agreement.

2.1.7 India

Taylor (1976) provided one of the earliest estimates of jobs supported by manufactured exports for a number of developing countries including India. His estimate for India for the year 1964/65 showed that manufactured exports generated about 2.2 million man-years of employment, accounting for 2.7% of total employment at that time. Among the countries for which estimates were made, the absolute number of jobs supported by exports was found to be the highest for India[12]. The results suggest that relatively more diversified and industrialized countries display stronger indirect, relative to direct, labor requirements per unit of exports.

Using the I-O table for 1964/65, Banerjee (1975) provided estimates of direct and indirect jobs associated with manufactured exports. Assuming that the structural relations in the economy, as captured by the I-O table for 1964/65, remained constant until

[12]The estimates for other countries, in terms of man-years are (years for which estimation was done are in parentheses): Brazil (1969) = 0.27 million; Egypt (1969/70) = 0.93 million; Mexico (1960) = 0.34 million; Philippines (1961) = 0.21 million; South Korea (1968) = 0.31 million; Taiwan (1969) = 0.52 million; and Yugoslavia (1968) = 0.38 million.

1980, the estimates were provided for three years: 1964, 1970 and 1980. The estimates showed that manufactured exports created about 2.2 million jobs in 1964, 2.4 million jobs in 1970 and 5.8 million jobs in 1980[13]. The analysis showed that indirect employments generated were considerably higher than direct employment. Employment generated through backward linkages (indirect effect) accounted for more than 85% of total exports tied to exports. The analysis illustrate that a shift in the commodity composition of exports toward labor-intensive goods would mean considerable gain in terms of employment creation. The amount of exports necessary to create one job in the economy has increased significantly over the years, which was mainly due a shift in the export composition towards capital-intensive commodities.

Estimations by Nambiar (1979) shows that employment associated with India's exports increased from 4.9 million jobs in 1963-64 to 5.4 million jobs in 1973-74[14]. Jobs tied to exports accounted for roughly 2 per cent of total domestic employment in 1973-74. For the year 1973-74, the sectors that contributed the largest number of export related employment included: agriculture & food grains (1.1 million); Jute textiles (0.61 million); tea & coffee (0.52 million); cotton textiles (0.49 million); transport other than railways (0.42 million); leather products (0.38 million) and vegetable oil (0.23 million). Industries which have the highest employment potential per million rupees worth of exports in 1973-74 were: agriculture; tea & coffee; cotton textiles; and jute textiles. This pattern was almost the same in 1963-64, indicating that the extent of structural change had been minimal. There had been some improvement in labor productivity as evident from the fact that about Rs.2,359 worth of exports could generate one job in 1963-64 while it required on an average Rs.3,356 worth of exports in 1973-74. Using the I-O table for the year 1968-69, Chishti (1981) calculated the total number of jobs supported by India's goods and services exports for the years 1970-71 and 1975-76. According to her estimates, India's exports had generated 5.4 million person-years of employment in 1970-71 and 7.2 million person-years of employment in 1975-76. Employment generated through backward linkages (indirect effect) accounted for 48% of total employment in 1970-71 and 40% in 1975-76. Jobs tied to exports contributed 3.72 percent of

[13]The numbers for the year 1980 were not actual but predicted values.

[14]These figures are larger than what was reported by Banerji (1975) due to differences in the coverage of export data. While Nambiar considered exports of both goods and services, Banerji's estimation was confined to manufactured exports.

total employment in 1970-71 and 4.3 percent of total employment in 1975-76. Thus the export sector gained some dynamism over the domestic sector during this period. Detailed sectoral level analysis revealed that sectors such as plantation crops, mineral ore production, paper products and textiles depend heavily on exports for employment generation. In these sectors, employment attributed to exports accounted for 15-27 percent of total employment. The contributions of export related employment in total employment were in the range of 7 to 8 percent for sectors such as railway transport equipment, machinery and apparatus, chemicals and pharmaceuticals. For agriculture sector, however, exports played a minor role in providing employment, accounting for 3.55 percent of employment.

To the best of our knowledge, estimates of jobs supported by exports, based on I-O analysis, are not available for India for the post 1980 period[15].

2.2 Major Highlights from Literature

(i) The absolute number of jobs supported by exports as well as the share of exported jobs in total employment generally shows an increase over the years for most of the countries. The extents of this increase vary from country to country, depending upon the difference in export growth. The countries that have experienced faster export growth have also recorded fasted growth of the number of jobs tied to exports. In general, the shares of export-induced jobs in all new jobs created are found to be higher than the share of export-induced jobs in total employment, reflecting the growing importance of exports for job creation.

(ii) In general, larger countries generate more number of jobs attributed to exports, which is expected as the absolute value of exports from larger countries tend to be higher than that from the smaller countries. However, the share of exports in total employment tends to be higher in countries that are smaller in size and are more open to trade. This is mainly due to two reasons: (a) relatively larger share of non-tradable sectors in the GDP of bigger countries; (b) relatively higher intensity of domestic, rather than foreign, trade in large and diversified countries.

(iii) It is generally observed that

[15]A couple of recent studies focusing on India's manufacturing sector have used growth accounting and regression based analysis (Goldar, 2002; Sen 2008; Sankaran et al 2010; Raj and Sen, 2012; Raj and Sasidharan, 2015). None of these studies have estimated the actual number of jobs supported by exports using the I-O framework. Using the IOT for 2003-04, UNCTAD (2013) provides some estimates of the impact of predicted changes in exports on employment for 10 sectors and for the years 2008-09, 2009-10, and 2010. As noted by Feenstra and Hong (2007) employment predictions based on IO framework can give highly unreliable estimates as export composition, employment coefficient and technology do not remain the same (see Section 4.3). Therefore, we do not attempt any forecasting exercise in our study.

employment shares of exports (the number of jobs supported by exports as a share of total employment) are generally lower than the corresponding output shares of exports (export as a share of GDP). This is mainly due to the fact that exports are usually measured in gross terms while GDP is a value-added concept. Thus, the importance of exports in GDP is overestimated when the former is measured in gross, rather than value added, terms. What really matters for employment generation is the share of domestic value added in gross exports.

(iv) The number jobs supported per million dollar of exports show a consistent decline over the years for most of the countries. This is mainly due to three reasons: (a) shift in the composition of exports towards capital and skill-intensive products; (b) growth of labor-productivity; and (c) introduction of labor saving technology in each sector. Falling number of jobs per million dollar of exports, however, do not imply that the absolute number of jobs tied to exports also tend to fall over the years. On the contrary, we find that the actual number of jobs generated by exports tend to increase over the years across countries including in those countries where labor productivity show consistent increase.

(v) The composition of exports matter a great deal in determining the number of jobs tied to exports. A shift in the composition toward capital-intensive sectors generally reduces the number of jobs created by exports. On the other hand, a shift in the composition towards labor-intensive products and the products with greater backward linkages help increase the number of jobs tied to exports. However, the pattern of specialization should be in alignment with the country's comparative advantage. A capital abundant-country is unlikely to increase the number of jobs tied to exports by specializing in labor-intensive sectors as such distorted specialization could reduce the volume of exports. Similarly, a labor-abundant country can reap greater employment gains by specializing in labor-intensive sectors where it holds comparative advantage.

(vi) The skill composition of jobs generated also depend crucially on the nature of each country's export specialization. In general, at the early stage of export growth in developing countries, most of the jobs tied to exports were generated for low-skilled workers. This is a result of specialization along the lines of comparative advantage in low-skilled labor-intensive industries and assembly related activities, as in the case of China. However, the skill composition of jobs would change over the years as wage rates go up and comparative advantage shifts towards relatively more skill intensive activities.

(vii) Several countries have experienced strong growth of labor productivity, reducing the number of jobs generated per dollar million worth of exports over the years. However, the total number of jobs supported by exports increases whenever the positive effect from faster growth of exports more than offset the negative effect from the rise in labor productivity. In other words, for total number of jobs to increase it is necessary that the value of exports grow faster than the rate of growth of labor productivity.

(viii) The indirect effect (through backward linkages) plays an important role in generating export related employment in most of the countries. While exports of manufactured products were the main engine for job creation in several countries, a phenomenon of "servicification" of the employment had been generally observed. A number of jobs have been created in non-tradable service sectors through their linkages with tradable sectors, mainly manufacturing. Indirect effect is generally found to be larger for goods exports than for services exports. This implies that a unit increase of goods exports would create more jobs in both goods and services producing sectors whereas a unit increase of services exports would generate more jobs within the service sector but may not create significant number of jobs in goods producing sectors. Exports of simple products such as processed food tend to have large impact on employment due to the strong linkage effect with agriculture. Export of traditional labor-intensive manufacturing industries such textiles and clothing create large number of employment in developing countries not only due to the fact these industries are highly labor intensive (direct effect) but also due to their strong backward linkages into domestic agriculture (indirect effect). While assembly related activities, usually carried out in export processing zones, generate significant number of direct employment for low-skilled workers, its contribution for indirect employment is generally not high due to the relatively weak backward linkages with rest of the economy. More diversified and industrialized countries generally display stronger indirect, relative to direct, labor requirements per unit of exports

(ix) Even the industries which are not export-oriented sometimes have heavy export dependence of employment due to the intra-industry linkages with other export-oriented industries. An implication is that industries which are less export-oriented are not necessarily protected from negative external shocks. While negative external shocks directly affects export oriented industries, relatively less export oriented industries are also adversely affected through backward linkages.

3. BACKGROUND ON EXPORTS AND EMPLOYMENT: GENERAL TRENDS AND PATTERNS

3.1 Trends and Patterns of Exports

During the first decade of economic reforms (1993-94 to 2001-02), India's merchandise exports in dollars grew at the rate of about 8% a year. This is slightly better than the average growth rate of 7% a year in the 1980s but pales in comparison with the growth rate of 18% a year in the 1970s (Veeramani, 2012). Table 1 shows the average annual growth rates of India's merchandise and services exports for various sub-periods during 2000-01 to 2015-16. Based on export growth performance, two different phases can be identified during the post-2000 period: (i) a relatively long period of high growth from 2000-01 to 2011-12, and (ii) the more recent period of negative growth from 2012-13 to 2015-16. The first phase (2000-01 to 2011-12) is further divided into two equal sub-periods of six years each: 2000-01 to 2005-06 and 2006-07 to 2011-12.

In stark contrast to the first decade of the reforms, India's merchandise exports recorded an exceptionally high growth rate of 20% a year during 2000-01 to 2011-12 (Table 1). During this period, oil exports grew faster than non-oil exports; share of the former in total merchandise exports increased steadily from virtually zero in 1999-00 to about 20 percent by 2012-13 (Figure 1). The growth rates reported in Table 1 are based on export data, in current US dollars, from Reserve Bank of India (RBI). Table 2 reports the growth rates based on export values in constant as well as current US dollars. Export values in current US dollars, obtained from WTO, have been deflated using US GDP deflator (base year: 2010). To provide a comparative perspective, Table 2 also reports the growth rates of world exports. It may be noted that the growth rates based on current dollar values in Table 1 and Table 2 do not match exactly as the WTO data used in Table 2 are on a calendar year (January to December) basis while the RBI data used in Table 1 are on a financial year basis (April to March). It can be seen that India's exports in real dollar terms grew at a respectable rate of 17.8% per annum during 2000-2011, the growth performance during the first half the 2000s being slightly higher (16.6%) than that for the second half (15.6%).

India's share in world exports of merchandise increased steadily from 0.66% in 2000 to 1.65% in 2011 (Figure 2). Since 2012, however, merchandise exports plummeted with a negative growth rate of 4.3%. The decline has been particularly steep for oil exports with a negative growth rate of almost 20% in current US dollars (Table 1) and, as a result, the share of oil exports in merchandise exports declined sharply from about 18% in 2014-15 to 12% in 2015-16. India's share in world merchandise exports remained more or less unchanged since 2012.

Services exports in current US dollars grew relatively faster than merchandise exports at the rate of 18% per year during 1993-94 to 2001-02 and at the rate of 24% a year during 2000-01 to 2011-12. In terms of constant US dollars, services exports still grew faster during 2000-2011 at the rate of 21.7% per annum as compared to merchandise which grew at the rate of 17.8% per annum. The growth rate of services exports had been markedly higher at 24.9% (in constant dollars) during the first half of the 2000s as compared to the growth rate of 10.9% during the second half.

Barring a small drop in 2009, India's share in world exports of commercial services increased steadily from 1.1% in 2000 to 3.3% in 2012 (Figure 2). The period 2012-15 witnessed significant slowdown in the growth rate of services exports with a growth rate of just 0.8% per annum. India's share in world exports of services declined for two consecutive years in a row - 2013 and 2014.

Turning to the importance of service exports in relation to merchandise exports, the share of the former in India's total exports increased rapidly from about 19% in 1993-94 to 27% in 2000-2001 and to 37% in 2006-07 (Figure 1). It may, however, be noted that, defying the trends observed during the earlier periods, merchandise exports grew faster (15.6% per annum) than services exports (10.9%) during the period 2006-11. As a result, the share of services exports in total exports declined from 37% in 2006-07 to 32% in 2011-12, though it increased again to 37% by 2015-16. In terms of magnitude, India exported US$ 158 billion worth of services in 2014-15 while the value of merchandise exports for the same year stood at US$ 310 billion.

Comparing the growth performance of Indian exports with that of the world, we find that during the period 2000-2011 Indian exports of both merchandise and services grew faster than world exports (Table 2). During 2000-11, when world merchandise and services exports grew at the rate of 8.4% and 8.8% respectively, India's exports recorded much higher growth

rate of 17.8% and 21.7% respectively. During 2012-15, world as well as Indian exports of merchandise recorded negative growth rates of 4.8% and 4.3% respectively. As far as services exports are concerned, during 2012-15, India's growth rate (0.8% per annum) was significantly lower than that of the world (1.8% per annum). The strong correlation of India's exports with world exports is evident from Figure 3, which depicts the annual growth rates of exports for India and World.

Table 3 shows the export growth rates across different groups of commodities disaggregated at the 1-digit Harmonized System (HS) classification level. It is evident that the growth acceleration during 2000-2011 was, by and large, broad-based with double digit growth in all but one commodity group (Section VIII: Hides, skins and leather). However, capital-intensive groups such as transport equipment (34% per annum), machinery (24 % per annum), and base metals (23%) registered higher than the average growth rate (20% per annum). In contrast, traditional labor intensive groups such as textiles (11 per annum), leather products (7% per annum) and footwear & umbrellas (13% per annum) witnessed significantly lower than average growth rates. The high growth of mineral products has been driven by petroleum products (HS 27), whose ex-ports skyrocketed from US$ 1.4 billion in 2000 to US$ 56.6 billion in 2011. It may, however, be pointed out that the average annual growth rate of India's aggregate exports during 2000-2011 is still high even if we do not take into account petroleum oil exports (Table 1).

The decline in the growth rate of exports during the recent period (2012-15) can be seen mostly across the board. Several commodity groups which account for the largest share of India's exports recorded negative growth rates. These groups include 'mineral products' (-16.5%), 'natural/ cultured pearls, gems, etc' (-4.1%), 'base metals' (-1.1%), 'machinery' (-1.7%), 'vegetable products' (-10.8%), 'foodstuffs, beverages and tobacco' (-10.1%), 'plastics and rubber' (-2.3%). Together, these seven commodity groups accounted for 62% of India's merchandise exports in 2006-11 and 60% in 2012-15. Growth rates remained positive but declined significantly for other major groups which include 'chemicals' (1.1%), textile and textile products (3.5%) and transport equipment (7.7%).

Table 4 reports the category wise breakup of services export growth from India. During the first half of the 2000s, the category of 'Miscellaneous services' (comprising of software, business services, financial services and communication) recorded the

highest growth rate (35% per annum) followed by 'insurance' (34%), transportation (26%) and travel (21%). During this period, 'Software services', the major category within 'Miscellaneous services', grew at the rate of 31% per annum. During the period 2006-07 to 2011-12, however, growth rates of exports from all services categories recorded a decline. Growth rates of services exports, across all categories, witnessed further decline during the more recent period (2012-13 to 2015-16), with negative growth rates for services categories such as 'transportation', 'insurance' and financial services.

Turning to the compositional changes in the export basket, using export data from India's official IOTs, Table 5 reports the composition of exports across three broad sectoral groups: (i) Agriculture, mining & allied activities; (ii) Manufacturing and (iii) Services. The percentage shares are reported for the years 1998-99, 2003-04, 2007-08 (years for which official IOTs are available) and for 2012-13 (the latest year for which SUT is available). It is clear that the share of 'Agriculture, mining & allied activities' declined consistently over the years from about 11% in 1998-99 and 2003-04 to less than 4% in 2012-13. The share of manufacturing declined from 68.7% in 1998-99 to 42.7% in 2007-08 and then rebounded to 63.6% in 2012-13. The share of services exports shot up from about 20% in 1998-99 to nearly 49% in 2007-08 and then showed a decline to about 32.5% in 2012-13. Manufacturing accounted for the largest share of exports for all years, except for 2007-08 when services recorded higher share (48.7%) than manufacturing (42.7%).

To further analyze the composition of merchandise exports, we classify traded products according to their factor intensities. According to the Heckscher-Ohlin model of trade, a country would specialize and export the products that use its relatively abundant resources intensively. Thus, for example, a country with abundant supply of labour has a comparative advantage in labour-intensive products. We use the factor intensity classification of the International Trade Centre (ITC), adapted by Hinloopen and van Marrewijk (2008), which distinguishes between five broad factor-intensity categories at the 3-digit level of Standard International Trade Classification (SITC)[16]. However, as explained below, we make a slight modification to this classification, but report the results according to both

[16]A total number of 240 items, at the 3-digit level, have been grouped into five categories (number of items in each category in parentheses): primary (83), natural resource-intensive (21), unskilled labour-intensive (26), human capital-intensive (43), technology-intensive (62), and unclassified (5). The detailed classification is available at: (http://www2.econ.uu.nl/users/marrewijk/eta/intensity.htm) (viewed on 11 July 2016).

the original ITC classification as well as the modified classification.

Table 6 reports the commodity composition of merchandise exports, according to factor intensity classification, for selected years (2000, 2005, 2010 and 2015). Both the original and modified classifications show a major increase in the shares of human capital and technology-intensive products and a consistent decline in the shares of natural resource and unskilled labor-intensive products. According to the original classification, the share of primary products increased significantly from 19% in 2000 to 32% in 2010, which, at first sight, may appear surprising. A closer look at the data reveals that the increasing share of primary products is explained by the rapid export growth of "refined petroleum products" (SITC 334), which, as per the original ITC classification, is included in the "primary" category. The share of SITC 334 in India's total exports increased from 3.3% in 2000 to 10.1% in 2010 and to a hefty 16.6% in 2010.

Since petroleum refining is a highly capital-intensive process, it is appropriate to include this product in the capital-intensive, rather than primary, category[17]. Accordingly, we define the capital intensive category as consisting of human capital-intensive products, technology-intensive products and SITC 334. Thus, according to our modified classification, the share of primary category is obtained by subtracting the share of SITC 334 from the original primary category. Overall, the most striking aspect of the structural change in India's exports is that while the share of capital-intensive products increased consistently from about 32% in 2000 to nearly 53% in 2015, the share of unskilled labor-intensive products declined from about 30% to 17%[18]. Shares of primary and natural resource-intensive products also declined significantly over the years. That India's export basket is biased towards capital and skill-intensive products is an anomaly given the fact that the country's true comparative advantage lies in semiskilled labor-intensive activities.

The declining share of unskilled labor intensive products is a matter of concern as these industries hold the potential to generate large scale direct employment for low skilled workers. At the same time, it is important to keep in mind that, though its share has declined, the absolute value of unskilled labor-intensive exports

[17]India imports crude oil and specializes in the capital-intensive segment (that is, refining) of the value chain.

[18]Capital intensive products accounted for only a quarter of India's exports in 1993 (Veeramani, 2012).

increased from US$ 12.6 billion in 2000 to US$ 32 billion in 2010 and US$ 45.8 billion in 2015. Thus, the total number of jobs supported by unskilled labor-intensive exports would have increased despite the decline in its share in the export basket. It is also important to keep in mind that though India's export basket has become increasingly capital intensive, it does not imply that the number of jobs supported by these exports are insignificant. Though, capital intensive industries may not create large number of direct jobs, these industries hold the potential to general large scale employment in other sectors through backward linkages.

Table 7 shows the changes in the shares of exports across nine major product groups disaggregated at the 1-digit SITC level. Consistent with the observations made above, the table displays a shift in the composition of exports in favor of relatively capital-intensive "mineral fuels and lubricants" (SITC 3), "chemical products" (SITC 5) and "machinery and transport equipment" (SITC 7). By contrast, it is evident that, the traditional agriculture and labor-intensive sectors such as "food and live animals" (SITC 0), "manufactured materials" (SITC 6) and "miscellaneous manufactured articles" (SITC 8) are losing their prominence. The combined share of traditional sectors (SITC 0, 6 and 8) declined from 72% in 1993 to 51% in 2015. By contrast, the combined share of capital-intensive categories (SITC 3, 5 and 7) has nearly doubled from 21% in 2000 to 42% in 2015. As noted earlier, the remarkable increase in the share of SITC 3 has been driven by refined petroleum products.

In the past, traditional developed country markets (comprising Australia and New Zealand, Europe, Japan, and North America) accounted for a major share of India's export basket. But their dominance has been steadily declining over the last two decades. The aggregate share of these markets in India's merchandise exports declined from about 63 per cent in 1993 to 35 per cent in 2010 (Veeramani 2012). The remaining group of countries (which include South and Central America, Caribbean, and the various regions of Asia and Africa), accounted for nearly two-thirds of India's merchandise exports in 2010. The share of the high-income OECD countries in India's total manufacturing exports declined sharply from 58 per cent in 2000 to 41 per cent in 2010.

The composition of services export across different categories is shown in Table 8. Miscellaneous services accounts for the largest and increasing share of India's services exports. The share of 'Miscellaneous services' in total services exports increased

from about 60% in 2000-01 to 76% in 2015-16. 'Software services' accounts for the largest share within the category of 'Miscellaneous services', accounting for 48% of total services exports in 2015-16. Next to software is 'business services' accounting for 19% of services exports in 2015-16.

3.2 Comparative Profile of Exports and Employment across Sectors

Annexures 1 to 10 provide a comparative profile of exports and employment across sectors and over time. The tables report the percentage distribution of exports and employment across 98 sectors and for three time points - 2003-04, 2007-08 and 2011-12 (or 2012-13). In addition, these tables report sector-wise employment coefficients – that is, the ratio of employment to value output (at current prices) (Rs. Crores). Estimates of the employment coefficients play a crucial role in the estimation of export-supported jobs.

Export data used for constructing Annexures 1 to 10 were taken from India's IOTs (for the benchmark years 2003-04 and 2007-08) and SUT for 2012-13. Data on employment were based on various rounds of Employment and Unemployment Surveys (EUS) by National Sample Survey Organization (NSSO), 2011-12 being the latest year for which employment data are available from these surveys. While export data is available for each of the 130 sectors included in the IOTs (140 sectors in SUT), it was necessary to club some of the sectors for obtaining comparable data on employment and other variables. The details involved in the construction of employment series and other variables are discussed in Section 5. For ease of presentation, we have clubbed different IOT sectors into 10 broad groups and separate tables have been created for each group.

It may be noted, at the outset, that the employment coefficients (number of workers employed per Rs 1 crore worth of output) have experienced a consistent decline over the years for almost all sectors. As mentioned earlier, this could be driven by two factors: (i) with inflation, 1 crore worth of output would represent decreasing real output over time; (ii) labor productivity would have increased over time. Comparing export and employment shares across sectors, we observe some asymmetry in that certain sectors which account for the major shares in total employment do not appear prominently in the export basket and vice versa. This mismatch between export and employment shares is related to two major sector-specific characteristics – factor intensity and 'tradability'. First, India's top exporting sectors are either capital-intensive (e.g., transport equipment,

iron and steel, chemicals, machinery etc), or skill intensive (e.g., computer & related activities, business services, legal services etc) or import intensive (e.g., petroleum products and gems & jewelry). Traditional labor-intensive sectors (e.g., readymade garments and miscellaneous manufacturing) rank below these sectors in the export basket. As compared to traditional labor-intensive industries, capital and skill intensive industries do not generate significant number of direct employment for low-skilled workers.

Petroleum products and gems & jewelry together account for nearly 23% of total exports in 2011-12. However, the contribution of these sectors for employment is very small; petroleum products account for just 0.03% of employment while gems and jewelry accounts for 0.52%. This mismatch in export and employment shares in petroleum and gems and jewelry is not surprising as exports from both these sectors are based on processing of imported materials. In such cases, net export earnings and domestic value added are much smaller than what the statistics on gross exports would indicate.

Another reason for the mismatch between export and employment shares is that a large number of sectors that contribute significantly to total employment are considered as non-tradable. For example, among the 25 sectors that rank top in terms of employment shares, as many as 16 sectors record export shares less than 1% and 6 sectors showed zero export shares[19].

It must be noted that while some of the top exporting sectors may not contribute much in terms of direct employment, they may contribute significantly to employment in other sectors through backward linkage effects. As pointed out earlier, the IO framework helps us capture not only the direct effect of exports on employment but also the indirect effects through backward linkages. Before moving to the analysis based on the IO framework, we report the major patterns, in terms of export and employment shares, for each of the 10 broad sector categories.

(i) Agriculture and allied activities: This group stands apart with its overwhelmingly high share (59% in 2003-04 and 49.6% in 2011-12) in total employment. However, its contribution to export was just 3% in 2012-13, down from 4.6% in 2003-04. Export values are almost zero or negligible for several sectors within this group. The sectors with the largest employment coefficient include 'tea', followed by 'cereals, pulses, fruits, vegetables

[19]All these 6 sectors with zero export shares are services sectors – trade, land transport via pipeline, education and research, public administration, education and research, hotels and restaurants, and medical and health.

and other crops' and 'sugarcane'. Export growth in these sectors could generate significant number of direct employment. At the same time, export growth in manufacturing could generate significant employment in agriculture through backward linkage effects. For example, export of readymade garments and textiles can generate employment in 'cotton'.

(ii) Mining, quarrying and petroleum: This group accounts for 14.6% of total exports in 2012-13 (up from 9.7% in 2003-04) while its share in employment was 0.6% in 2011-12 (down from 0.7% in 2003-04). The increase in export share was almost entirely brought about by 'petroleum products' (IO-63). Several other sectors within this group record zero or negligible export values. Within this group 'other non-metallic minerals' ranks top in terms of both employment share and employment coefficient while 'petroleum products' stands at the bottom. Mining and quarrying sector has the potential to create significant number of indirect employment through its strong linkages with manufacturing sector.

(iii) Food processing, beverages and tobacco: In 2012-13, this group accounted for 5.2% of total exports (up from 4.1% in 2003-04). This sector accounts for about 2% of total employment in 2011-12. Tobacco products and 'miscellaneous food products' are the top sectors in terms of both employment share and employment coefficient. These sectors, particularly the latter, also have significant presence in the export basket. While exports from this group can create significant number of direct employment, it also has the potential to create large number of indirect employment in agriculture sector through backward linkages.

(iv) Textiles and leather manufacturing: This group contributes significantly to exports as well as employment. This group's share in export as well as employment, however, has declined over the years – export share declined from 13.5% to 8.5% while employment share declined from 4% to 3%. In terms of both exports and employment, the most important sector within this group is 'readymade garments & miscellaneous textile products' followed by 'cotton textiles & handlooms'. The sectors with the highest employment coefficient include, 'readymade garments and miscellaneous textile products', 'leather footwear' and 'silk textiles'. Higher export growth in these sectors offer significant employment potential, particularly for the vast pool of India's low skilled workforce.

It is well known that, the road to export success of several East Asian countries, including China, started with traditional labor-intensive products, such as apparel, footwear, toys etc.

However, the share of these industries in India's export basket is much lower than what might be expected for a country with its level of per capita income, labor abundance and wage rate. Krueger (2010, pp 424) notes that "….India has not succeeded in attracting foreign investors to use India as an export platform in many of the unskilled-labour intensive industries that have been attracted to east and southeast Asia". Clearly, given its comparative advantage in labor-intensive activities, India's traditional labor intensive industries offer huge potential for export growth and employment generation.

(v) Rubber, plastics and chemicals: This group accounts for a large share in the export basket (8.9% in 2012-13). However, being capital-intensive, its contribution to employment is relatively small (0.7%). In terms of contribution to export, 'organic and inorganic heavy chemicals' (3.2% in 2011-12) tops the list followed by 'drugs and medicines' (2.2%) 'plastic products & synthetic fibers, resin' (1.2%) and 'rubber products' (0.6%). However, the ranking is quite different in terms of contribution to employment: 'plastic products & synthetic fibers, resin' and 'drugs and medicines' account for the largest shares in employment (0.17% each) followed by 'rubber products' (0.11%), other chemicals (0.08%) and 'Soaps, cosmetics & glycerin' (0.08%). Most of the sectors, within this group, show relatively low employment coefficient. In particular, 'organic and inorganic heavy chemicals', the largest contributor to export within this group, record one of the lowest employment coefficient.

(vi) Metal and metal products: This group, mainly on account of 'iron and steel', has a notable presence in the export basket (5% in 2012-13). In terms of employment share, the sector which comes first in the list is 'miscellaneous metal products' (0.55% share in 2011-12). On the basis of employment coefficient, the sectors with the greatest employment potential include 'hand tools, hardware' and 'miscellaneous metal products'.

(vii) Machinery: For the year 2012-13, this group accounts for 5.2% of total exports and 1% of total employment. In terms of employment coefficient, the sectors with significant employment potential within this group include 'communication and electronic equipment' and 'electrical appliance and other electrical machinery'. Together, these two sectors account for nearly 2% of exports in 2012-13.

Since the early 1990s, the export promotion policies of China and other East Asian countries relied heavily on a strategy of integrating their domestic industries with global production networks (GPNs) in electrical and

non-electrical machinery. This led to a remarkable increase in the share of machinery items, particularly electrical machinery, in their export baskets. Reflecting the differences in comparative advantage among the East Asian countries, the more advanced countries (Japan, South Korea and Taiwan) became large exporters of parts and components while low wage countries like China specialize in final assembly.

However, India has been locked out of the vertically integrated global and regional supply chains in machinery. Athukorala (2014) notes that India has so far failed fitting into global production networks in electronics and electrical goods, which have been the prime movers of export dynamism in China and other high-performing East Asian countries. A number of large MNEs in electronics and electrical goods industries have set up production bases in India, but they are mainly involved in production for the domestic market. Based on imported parts and components, India has a huge potential to emerge as a major hub for final assembly in a range of machinery items, where the manufacturing process is internationally fragmented and is mainly controlled by multinational enterprises (MNEs) within their GPNs. Being highly labor-intensive, assembly activities offer the potential for creating large scale of direct employment for relatively low-skilled workers.

(viii) Transport equipment: This group has witnessed significant export growth in the recent period and as a result its share in India's export basket has increased from 1.9% to 3.4%. This growth was mainly driven by 'motor vehicles' (which accounts for the largest share in export) followed by 'ships and boats'. In terms of employment, 'motor vehicles' records the largest share (0.61%) followed by 'other transport equipment' (0.17%) and 'motor cycles and scooters' (0.16%). Employment coefficient is found to be the highest for 'motor vehicles' followed by 'ships and boats', and 'motor cycles and scooters'. In the case of automobile industry, studies suggest some growth in India's integration with GPNs (Tewari and Veeramani, 2016; Athukorala, 2014). A number of leading automobile companies have established assembly plants in India and some of them have begun to use India as an export base within their GPNs. Since the early 2000s, India's exports of assembled cars (completely built units) have increased at a much faster rate than automobile parts (Athukorala, 2014).

(ix) Other manufactured products: This is an important group in India's export basket. Its share in the export basket increased from 10.8% in 2003-04 to 13.7% in 2012-13. Gems and Jewelry is the most important sector accounting for 10% of India's exports in 2012-13. The sectors with high

employment share within this group include 'wood and wood products' (0.82%), 'gems and jewelry' (0.52%) and 'structural clay products and other non-metallic mineral products' (0.47%). These sectors also report high employment coefficients.

(x) Services: India is recognized globally for its competitiveness in certain services such as information technology and business process outsourcing. It is also important to recognize that the share of service activities necessary for manufacturing production has increased in recent years. Business services such as legal, accounting, advisory, data processing and ICT services constitute a growing share of intermediate inputs for manufacturing firms. This trend has been termed as the "servicification" or "servicizing" of manufacturing (USITC, 2013, Chanda, 2016). Given this strong linkage between the two, export growth from manufacturing sector has the potential to create large number of jobs in the service sector.

Over the years, the composition of India's services exports has changed considerably, with a declining share of traditional segments such as travel and transport and a growing contribution of "other commercial services". Within the group of services, the top exporting sectors include 'computer & related activities' (15%), followed by 'business services' (12.5%). However, these are not the top sectors in terms of employment. The employments shares are the highest for traditional sectors such as construction (10.7%), trade (8.9%), 'community, social, personal other services' (4.4%), land transport (3.5%), education and research (3%), public administration (1.7%) and 'hotels and restaurants' (1.7%). Several of these sectors are non-tradable as evident from their zero shares in the export basket. Though these sectors do not directly engage in trade, exports from manufacturing can generate jobs in several of these services sectors through linkages.

4. ESTIMATION OF JOBS SUPPORTED BY INDIAN EXPORTS: DATA AND METHODOLOGY

Making use of the IO based method outlined below, we estimate the number of jobs supported by India's merchandise and services exports during the period 1999-2000 to 2012-13. To this end, we construct annual time series of domestic use tables spanning the period 1999-2000 to 2012-13. The use tables are based on officially published IOTs and SUTs merged with detailed national accounts data and international trade statistics. This section discusses in detail the data and methodology involved in the construction of these tables and the IO model used for estimating the number of jobs supported by exports.

4.1 Input-Output Methodology for Estimating Export-Supported Jobs

Looking across the rows in the absorption matrix of IOT, we can observe how the output of each product *i* (GVO_i) is used for intermediate consumption by the various industries *j* and for the final demand purposes (i.e., for private consumption, government consumption, investment and exports). Each row records the total flows, meaning that the flows recorded as intermediate and final demand refer not only to domestically produced inputs but also to imported inputs. Each column record a given sector *j*'s purchase of inputs from each sector *i* for producing the output of sector *j* (GVO_j). Sector *j*'s purchase of inputs represents total flows – that is, without separating domestically sourced inputs from imported inputs. We can obtain the value of total output produced by each sector either by summing all entries in a given row (demand side) or by summing all entries in a given column (supply side).

Let z_{ij} denote the intermediate use of product *i* by industry *j*, F_i denote the final use of product *i* and m_i denote total import of product *i* for intermediate and final use. Note that F_i includes exports from sector *i* (x_i) along with final household consumption, government consumption and investment by firms. Assuming that there are *n* sectors in an economy, the gross value of output of each product *i* (GVO_i) can be obtained by subtracting the value of imports from the sum of all row entries (i.e., the sum of all z_{ij} and F_i in a given row). This can be expressed for year *t* as follows.

$$GVO_{it} = z_{i1t} + z_{i2t} + \ldots + z_{iit} + \ldots z_{imt} + F_{it} - m_{it} \quad (1)$$

Similarly, by the supply perspective, the output of each product j (GVOjt) can be obtained by summing the column entries – that is, the sum of the value of all input purchases and value added in sector *j*:

$$GVO_{jt} = z_{1jt} + z_{2jt} + \ldots + z_{jjt} + \ldots z_{njt} + t_{jt} + v_{jt} \quad (2)$$

where t_{jt} stands for net indirect taxes, v_{jt} stands for value added, defined as payments made for labor and capital.

The total direct and indirect employment supported by exports can be estimated as follows:

$$l = \hat{L}\left(I - A^d\right)^{-1} x \quad (3)$$

where

x = vector of exports from different sectors

$\hat{L}$ dia.gonal matrix of sectoral employment coefficients (labor/output ratios)

$\left(I - A^d\right)^{-1}$ = inverse Leontief matrix that measures the total direct and indirect uses of each commodity *i* by each sector *j*[20]

I = identity matrix with ones on the diagonal and zeros elsewhere

A^d= matrix of (domestic) technical input coefficients

l = resulting vector of employment supported by exports

The total employment effect in (3) can be decomposed into direct and indirect effects as shown below.

$$l_1 = \hat{L}\left(I - \hat{A}^d\right)^{-1} x \quad (4)$$

$$l_2 = l - l_1 \quad (5)$$

where

l_1 = vector of direct employment effects

$\left(\hat{I} - A^d\right)^{-1}$ = a matrix consisting of the diagonal elements of $\left(I - A^d\right)^{-1}$ and zeros elsewhere

l_2 = vector of indirect employment effects.

It is clear that the direct and indirect effects on employment of a given level of exports will depend on two factors: (i) the composition of exports and (ii) average level of labor productivity.

[20]Each element of inverse Leontief matrix indicates input requirement from i^{th} sector if there is a unit increase of the final-use (consumption, foreign trade, or investment) of j^{th} sector's output.

Other thing remaining constant, if there is a change in export composition in favor of capital intensive sectors, the employment attributable to exports will decrease. Similarly, employment generated by exports will decrease if sectoral labor-output ratios decrease (implying an increase in sectoral productivity levels).

At this juncture, it may be noted that most of the existing studies, reviewed earlier, have computed the Leontief inverse using the matrix of total (domestic plus import) technical coefficient (A) rather than domestic technical coefficient *(A^d)*. As mentioned above, use of *A* matrix in lieu of A^d would overestimate the true number of jobs tied to exports. Our estimates are devoid of such bias as we use the A^d matrix.

4.2 Construction of Annual Times Series of Domestic Use Tables: Data and Methodology

While the official IOTs for the years 2003-04 and 2007-08 consist of 130 sectors, the annual domestic use tables that we have constructed contain 112 sectors. In order to obtain a consistent time series data on domestic use, it was necessary to club some of the IOT sectors. Annexure 11 shows the sectoral classification, with description and IO codes of 112 sectors, used for constructing the annual time series of domestic use tables.

4.2.1 Time Series on Gross Value of Output (GVO)

The first step in the construction of the domestic use table is the compilation of time series data on GVO (at current prices) for 112 sectors. National Accounts Statistics (NAS), published by the CSO, along with Annual Survey of Industries (ASI) and unorganized sector surveys of NSSO are the main sources of data used to construct the GVO series (at current prices) of different sectors. The NAS data used for the purpose correspond to 2004-05 series for the whole period[21].

For manufacturing industries, time series on GVO is obtained by adding the values for registered and unregistered segments of manufacturing. The NAS estimates of GVO for manufacturing industries are at a more aggregate level. Therefore, in order to obtain data at the disaggregated industry level, we used the ASI plant level data for registered manufacturing

[21]For the period 1999-2000 to 2003-04, we used the data from NAS back series which provide output data for this period as per 2004-05 base year. Note that the output values in official IOT for the year 2003-04 are as per 1999-00 base year and those in SUTs for 2011-12 and 2012-13 are according to 2011-12 base year. We have converted the sectoral output values in these tables as per the 2004-05 series by distributing aggregate output values (as per 2004-05 series) using the percentage shares of IO sectors in total output. The output values in 2007-08 IOT are already as per 2004-05 series.

sector and the NSSO surveys for unregistered manufacturing sectors. Using these two sources, we obtain GVO data at the 5-digit NIC level for the period 1999-2000 to 2012-13. Using concordance tables between NIC and IOT classification, data at the 5-digit level have been aggregated to obtain GVO for 112 sectors. The NIC, used for reporting industrial production data, had undergone three revisions during the study period: NIC 1998 was used until 2003-04, followed by NIC 2004 until 2007-08 and NIC 2008 thereafter. We have prepared concordance tables to match the 112 sectoral classifications in our domestic use tables with the 5-digit codes in each version of the NIC.

We retrieved the 5-digit NIC level data on GVO for registered and unregistered manufacturing sectors as follows. First, using the ASI plant level data, we obtain 5-digit level data on GVO for the period 1999-2000 to 2012-13. We notice that the aggregate GVO estimated from ASI plant level data match well with the values reported for registered manufacturing sector in the NAS. Nevertheless, to make sure that discrepancies with NAS data are zero, we split the NAS value of aggregate registered manufacturing output (in current prices, 2004-05 series), on the basis of the percentage distribution of output at the 5-digit NIC level for each year.

For the unregistered manufacturing sector, using the NSSO surveys, we obtain the percentage distribution of output at the 5-digit NIC level for four years: 1999-00 (55th round), 2000-01 (56th round), 2005-06 (62nd round) and 2010-11 (67th round). For the years for which the NSSO surveys have not been conducted, we assume that the percentage distribution of output at the 5-digit level remain constant for different sub-periods[22]. Unlike for registered manufacturing sector, we notice that aggregate GVO estimated from NSSO surveys differ significantly from that reported in NAS[23]. The NAS provides the break-up of gross output for about 21 broad industry groups, with the corresponding NIC codes, within the unregistered manufacturing sector[24]. Having identified the 5-digit NIC codes corresponding to each of the broad industry groups for which

[22]Specifically, we assume that the percentage distribution for the year 2000-01 holds for the period 2001-02 to 2004-05, the percentage distribution for the year 2005-06 holds for the period 2006-07 to 2008-09 and the percentage distribution for the year 2010-11 holds for the period 2008-09 to 2012-13. It was not possible to interpolate the shares for the intervening years of the NSSO survey rounds since the product classifications used to record data vary across the different rounds of the survey: data for the year 2000-01, 2005-06 and 2010-11 were recorded according to NIC 1998, NIC 2004 and NIC 2008, respectively.

[23]In general, NAS reports significantly higher aggregate GVO than the values estimated from NSSO surveys.

[24]For unregistered manufacturing, value of output data is not available in NAS back series. Therefore, we used splicing technique to convert the data for the period 1999-00 to 2003-04 as per 2004-05 base year.

data are available in NAS, we split the NAS value of output for each of the 21 industry groups based on the percentage distribution at the 5-digit level. The above procedures ensure that the aggregate GVO for the manufacturing sector in our database is identical to those reported in NAS.

The NAS disaggregated statements provide detailed product level data on GVO for primary sectors (including agriculture, livestock, forestry & logging, fishing, and mining & quarrying) and for construction. Output series for all these sectors have been obtained directly from the NAS. For railways, gross earnings, as reported in NAS, is taken as a measure of output. For the rest of the sectors, however, the NAS provides only gross value added (GVA) but not GVO. In the case of these sectors ('electricity, gas & water supply'; 'trade, hotels & restaurants'; 'transport & storage'; 'communication'; 'banking & insurance'; 'real estate, ownership of dwellings & business services'; and 'other services') estimates of gross output were derived by applying output to value added ratios obtained from the official IOTs for the benchmark years 1998-1999, 2003-04 and 2007-08 along with the latest SUTs prepared by the CSO for the years 2011-12 and 2012-13. The GVA to GVO ratios obtained for these years are then linearly interpolated for the intervening years and applied to time series of GVA from NAS at current prices to obtain the output estimates at current prices. Using a concordance table to match the sectoral classification in our domestic use tables with the product classification in NAS, we obtain the time series on GVO at current prices for different product groups under primary and tertiary sectors.

We validate our data by comparing our estimates of GVO with the corresponding values available in the official IOTs for the benchmark years 2003-04 and 2007-08[25]. For these years, our estimate of GVO matches almost exactly with the corresponding values in IOTs at the aggregate level. However, we notice certain discrepancy for some of the individual sectors, due to the fact that the concordance tables that we have used to obtain output values at the IO sector level may not exactly match with the ones used by the CSO for preparing the IOT[26]. In order to rectify sector level discrepancy, we adopt the following procedure. First, we identify all the sectors for which the extent of mismatch between our estimates and the IOT estimates is above 1% and

[25]For this validation exercise, we compared data with the same base year as the IO table.

[26]At the aggregate level, our value of gross output is lower than the reported value in the IOT by 0.13% for the year 2003-04 and by 0.7% for the year 2007-08. We notice mismatch for some the individual sectors but did not exceed 8% for any of the sectors.

these sectors were then grouped into three broad categories: (i) agriculture, livestock and food manufacturing (ii) other manufacturing and (iii) services[27]. Second, using official IOT and SUT data for benchmark years, we calculate output shares of sectors for which we find more than 1% mismatch within each of these broad categories[28]. Output shares of these sectors for the intervening years have been obtained through linear interpolation. Third, we sum the output of sectors (with more than 1% mismatch) within each of the above mentioned three broad categories and then the sum of each category was split among sectors based on their shares within each category. This procedure ensures that sector level mismatch in our final dataset remain below 1% for every sector.

4.2.2 Export and Import Data

Having obtained the time series on GVO for 112 sectors, the next task is to construct a time series of import and export for each of the sectors. Trade data used for this purpose comes from Directorate General of Commercial Intelligence and Statistics (DGCI&S) for merchandise and from the Reserve Bank of India (RBI) for services. Aggregating merchandise and services data from the two sources gives total export (and import) which matches exactly with the total export (and import) data given in the IOTs and SUTs for the benchmark years. The percentage share of each of the 112 sectors in total exports (and imports) have been computed using the IOTs for the benchmark years 1998-99, 2003-04, 2007-08 and SUTs for 2011-12 and 2012-13. Shares for the intervening years have been obtained through linear interpolation. Using these shares, we have distributed the aggregate value of exports (and imports) across 112 sectors to obtain sector-specific export (and import) values in Rupees[29]. Thus, we obtain a time series containing GVO, export and imports for 112 sectors for the period 1999-2000 to 2012-13.

[27]We find exact match between our data and IOT data for forestry and logging, fishing, mining & quarrying, construction, almost all of the service sectors, and several manufacturing sectors. The sectors for which we get less than 1% mismatch are not included in the three broad categories considered here. We group food manufacturing with agriculture and livestock as we notice that the description of some of the agriculture and livestock related sectors also include some food products with certain degree of processing (for e.g., rice and wheat milling).

[28]The SUT provides output data for 140 sectors. The values were aggregated to obtain output for 112 sectors based on a concordance table.

[29]In order to obtain the sectoral values of exports and imports, we experimented with an alternative approach using a concordance table that we have prepared between 6-digit codes of Harmonized System (HS) and our 112 sector classification. Using this concordance table, we estimated sector-wise merchandise export and import data for the corresponding non-service IOT sectors. However, for the majority of the non-service sectors, we noticed that our estimates were significantly higher than the corresponding values in the IOT. Given that our aggregate data (merchandise plus services) matches exactly with IOT aggregate (merchandise plus services), the mismatch that we observe for non-service sectors may imply that some portion of merchandise trade could have been assigned to services sectors while preparing the official IOTs. Due to these issues, we did not follow this approach for obtaining sectoral values of exports and imports.

4.2.3 Construction of Domestic Use Tables and Domestic Technical Coefficient Matrices (A^d)

Our next step is to construct the annual time series of domestic use tables. To this end, using official IOTs, we calculate the ratio of intermediate use to total availability (imports plus industry output) for each sector *i* and year *t*. This ratio *(r_{it})* is defined as:

$$r_{it} = \frac{IIUSE_{it}}{GVO_{it} + m_{it}} \quad (6)$$

where $IIUSE_{it}$ stands for total intermediate use of sector *i*'s output for year *t* (i.e., the sum of all z_{ij}'s in equation 1 for a given sector *i* and for a given year *t*); GVO is gross value of output, and *m* is imports.

For calculating this ratio, we have made appropriate adjustments for the change in stocks (CIS)[30]. We obtain these ratios for all sectors and for all years by interpolation[31]. Using these ratios, we can obtain total domestic use *($DIIUSE_{it}$)* – that is, the total amount of a given sector's GVO used by other sectors for year *t*.

$$DIIUSE_{it} = r_{it} \times GVO_{it} \quad (7)$$

Note that $DIIUSE_{it}$ does not include imported intermediates. It is possible to obtain total imported intermediate use *($MIIUSE_{it}$)* in an analogous manner.

$$MIIUSE_{it} = r_{it} \times m_{it} \quad (8)$$

By summing the two, we get total use:

$$IIUSE_{it} = DIIUSE_{it} + MIIUSE_{it} \quad (9)$$

We distribute the value of $DIIUSE_{it}$ across cells within a row on the basis of the share of each sector j in the total intermediate use of sector i's output – that is by using the following identities for each sector *i*.

$$IIUSE_{it} = z_{i1t} + z_{i2t} + \ldots + z_{iit} + \ldots z_{int} \quad (10)$$

Therefore, for each sector *i*

$$1 = \frac{z_{i1t}}{IIUSE_{it}} + \frac{z_{i2t}}{IIUSE_{it}} + \ldots + \frac{z_{iit}}{IIUSE_{it}} + \ldots \frac{z_{int}}{IIUSE_{it}} \quad (11)$$

We use the ratios in (11) to distribute $DIIUSE_{it}$ across sectors *j*[32]. The ratios used for distributing $DIIUSE_{it}$ have been computed for the years 1998-99, 2003-04 and 2007-08 using the IOTs and for 2011-12 and 2012-13 using SUTs. It may be noted that, unlike IOTs,

[30]Whenever CIS is negative we have proportionately subtracted CIS value from IIUSE on the basis of percentage shares of IIUSE in total (final plus intermediate) use. Note that output (GVO_{it}) values in IOT are already net of CIS whenever CIS is negative.

[31]The ratios estimated from the IOTs for 2003-04 and 2007-08 have been interpolated for the intervening years. For the period 1999-2000 to 2002-03 we used the same ratios as that of 2003-04 and for the period 2008-09 to 2012-13 we used the same ratio as that of 2007-08.

[32]The same 'proportionality assumption' can be used to distribute $MIIUSE_{it}$ across sectors *j*.

the SUTs are not available as square matrices with equal number of rows and columns. The SUTs, prepared by the CSO for the years 2011-12 and 2012-13, contain 140 rows and 66 columns. We have converted the SUTs into square matrices (with 112 rows and columns) by splitting 66 SUT columns and by aggregating 140 SUT rows[33]. Thus, using 112×112 absorption matrices, we compute the ratios in (11) for years 1998-99, 2003-04, 2007-08, 2011-12 and 2012-13. The ratios thus obtained have been interpolated for the intervening years. Using these shares and $DIIUSE_{it}$ values, we obtain the annual time series of domestic use tables for the period 1999-00 to 20012-13.

Thus, equation (1) can be now written as:

$$y_{it} = z_{i1t} + z_{i2t} + \ldots + z_{iit} + \ldots z_{int} + F_{it} - m_{it}$$
$$= (d_{i1t} + m_{i1t}) + (d_{i2t} + m_{i2t}) + \ldots + (d_{iit} + m_{iit}) + \ldots (d_{int} + m_{int}) + F_{it} - m_{it} \quad (1.1)$$

Having obtained the domestic use tables, we are now in a position to estimate the domestic technical coefficient matrix (A^d) needed for computing the number of jobs tied to exports. The elements of the A^d matrix (denoted as a_{ijt}) measure the amount of input from sector *i* required to produce one unit of output in sector *j*[34].

$$A^d = \begin{bmatrix} a_{11t} & a_{12t} & \ldots & a_{1nt} \\ a_{21t} & a_{22t} & \ldots & a_{2nt} \\ \ldots & \ldots & \ldots & \ldots \\ a_{n1t} & a_{n2t} & \ldots & a_{nnt} \end{bmatrix} = \begin{bmatrix} \frac{d_{11t}}{y_{1t}} & \frac{d_{12t}}{y_{2t}} & \ldots & \frac{d_{1nt}}{y_{nt}} \\ \frac{d_{21t}}{y_{1t}} & \frac{d_{22t}}{y_{2t}} & \ldots & \frac{d_{2nt}}{y_{nt}} \\ \ldots & \ldots & \ldots & \ldots \\ \frac{d_{n1t}}{y_{1t}} & \frac{d_{n2t}}{y_{2t}} & \ldots & \frac{d_{nnt}}{y_{nt}} \end{bmatrix}$$

where y1t, y2t....ynt stands for GVO from each sector.

4.2.4 Estimation of Employment Coefficients

An important requirement for estimating export supported employment is the availability of sector-wise employment coefficient – that is, employment to output ratio for sector *i* and year *t*. We use unit level data from various rounds of Employment and Unemployment Surveys (EUS) by NSSO for estimating employment by sector. The study has used the unit-level data provided in the 55th (1999-2000), 60th (2003-2004), 61st (2004-2005), 62nd (2005-2006), 64th (2007-2008), 66th (2009-2010) and 68th (2011-12) rounds of EUS that have been conducted by the NSSO.

[33]Each of the 66 columns in SUT has been split into subcategories using a concordance table between our 112 sectors and 66 broad groups. The z_{ij} values at the broad group level have been split on the basis of the percentage shares (as per IOT for 2007-08) of sub categories within each broad group. Similarly, the 140 SUT rows have been aggregated and converted to 112 sector rows using a concordance table. The IOT for 1998-99 contains 115 sectors while the IOTs for 2003-04 and 2007-08 include 130 sectors. We have used a concordance table prepared by the CSO (available in CSO's website) for matching the sector descriptions in 1998-99 IOT with those in 2003-04. Some of the aggregate sectors in 1998-99 IOT have to be split into subcategories based on their percentage shares (as per IOT for 2003-04) within each of the aggregate sectors.

[34]The import coefficient matrix (A^m) can be constructed in an analogous manner. Note that our estimation method does not make use of A^m matrix. For estimation, we use A^d which is net of imports.

In the EUS, the persons employed are classified on the basis of their activity status into usual principal status (UPS), usual principal and subsidiary status (UPSS), current weekly status (CWS) and current daily status (CDS). We use the measure based on UPSS, which is the commonly used measure for tracking employment trends. Using the unit level data, we obtained estimates at the 5-digit level of NIC for the years mentioned above.

In order to obtain estimates for the remaining years, using the 5-digit level data from the EUS, we linearly interpolated the percentage shares of employment at the 5-digit level for the intervening years. Using 56th through 59th rounds of NSSO surveys on "Household Consumption Expenditure and Employment-Unemployment Situation in India", we obtained employment data at the 2-digit NIC level for the period 2000-01 to 2003-04. We split the employment numbers for each of the 2-digit NIC industry group based on the percentage distribution at the 5-digit NIC level. For the remaining years (2006-07, 2008-09, 2010-11 and 2012-13) estimates of aggregate employment, obtained through linear interpolation and extrapolation, were split based on percentage shares at the 5-digit NIC level. Thus, we obtain the estimates of employment at the 5-digit level for the entire period. Using a concordance table between NIC 5-digit codes and our 112 sector classification, we obtain a time series of sector-wise employment for the period 1999-2000 to 2012-13. Finally, matching employment data with output at the sector level, we obtain the time series estimate of employment coefficients for the 112 sectors.

4.3 Limitations of I-O based Estimation

The calculations based on I-O tables cannot be described as full general equilibrium estimates of the impacts of exports on employment. From a dynamic perspective, it is important to consider the various positive spillover effects from exports such as learning by exporting, exploitation of economies of scale, gains from innovation etc. The estimate of indirect employment does not include various 'multiplier' effects. That is, we do not consider the employment generated as a result of the purchase of food, clothing and housing by workers whose jobs are attributable to exports. Also, the employment required to produce the capital equipment purchased by export industries are not taken into account. These considerations would suggest that analysis based on a static I-O framework may underestimate the true magnitude of employment induced by exports.

The I-O based estimation assumes that the labor content of a dollar of export-related output in each industry is equal to the industry's

total employment divided by the total dollar value of the industry's output. However, if the exporting firms are more productive compared to firms selling in the domestic market, we may slightly overestimate the number of jobs tied to exports. Finally, one should be careful while using the static employment coefficients for predicting future growth in employment from the future growth in exports or domestic demand. Feenstra and Hong (2007) have shown that employment coefficients estimated from current data are highly unreliable for the purpose of employment forecasting as export composition, labor productivity and technology do not remain constant.

5. JOBS SUPPORTED BY INDIAN EXPORTS: ESTIMATION RESULTS

5.1 Aggregate Level Estimates

Table 9 and Figure 4 shows the total number of employment (in millions) supported by India's aggregate merchandise and services exports during the period 1999-00 to 2012-13. Table 9 also reports the total employment in India – that is, employment supported by exports plus domestic demand. The average annual growth rates pertaining to the number of jobs tied to exports and other indicators (total economy wide employment and total exports) for different periods are shown in Table 10. It is evident that the total number of jobs supported by Indian exports increased from about 34 million in 1999-00 to 62.6 million in 2012-13, with a growth rate of 3.4% per annum. The total number of jobs tied to exports increased steadily at the rate of 7.6% per annum during the first half of the 2000s. Export-supported jobs declined briefly in 2009-10, in the aftermath of the global financial crisis. During the period 2006-07 to 2012-13, consistent with declining growth rate of export values (in US$), growth rate of employment tied to exports fell to 2.6% per annum. Nevertheless, it may be noted that export related jobs grew significantly faster than total employment throughout the period (Table 10). As a result, the share of export-supported jobs in total employment in the country increased from little over 9% in 1999-2000 to 14.5% in 2012-13 (see Figure 5).

Turning to the relative importance of direct and indirect effects for export-related job creation, we find that direct employment contributed more than indirect employment during the period 1999-2000 to 2009-10. However, the share of indirect jobs increased significantly in recent years with its contribution being similar to that of direct jobs (see Figure 5, Figure 6). The share of indirect jobs in total export-supported jobs increased from about 38% in 2007-08 to 52% in 2010-11. During 2011-12 and 2012-13, the share of indirect employment stood at about 50%. During the period 1999-00 to 2005-06, direct and indirect jobs tied to exports grew at the rate 8.4% and 6.5% per annum, respectively. However, during 2006-07 to 2012-13, while job creation through indirect linkage channels registered a growth rate of above 8% per annum, the

growth rate of direct job creation has been negative (-1.9%).

Table 11 shows that the number of export-supported jobs per billion rupees (and per million dollars) worth of exports show a steady decline over the years. The results show that one billion rupees worth of exports supported 14706 jobs in 1999-2000 and 2544 jobs in 2012-13. A similar trend can be observed in terms of jobs supported per million dollar of exports. One million dollar worth of exports supported 638 jobs in 1999-2000, which has declined to 138 in 2012-13. The number of jobs supported per million dollar worth of exports from India is significantly higher than those reported for other countries in earlier studies: for example, US$ 1 million worth of exports from US supported only 6.6 jobs in 2009 and 5.2 jobs in 2014. Estimates for China suggest that US$ 1 million worth of its exports supported 140 jobs in 2007 as compared to 191 jobs in India for the same year.

The above trend (that is, decline in the number of jobs per million dollar worth of exports), is consistent with the general pattern observed for other countries (see Section 2). This is partly driven by the improvement in labor productivity. Further, this can arise as a result of a change in the composition of exports in favor of more skill and capital intensive products. As seen in Table 6, the share of technology and human capital intensive products in India's merchandise exports has increased significantly at the cost of traditional labor-intensive products over the years. A similar trend was observed in the services export basket with the increasing share of more skill intensive software and business services at the cost of traditional services (Table 8). The trends observed in Table 11 are consistent with these changes in the composition of India's exports.

5.2 Estimates for Broad Sectoral Groups

Table 12 and Figure 7 shows export-supported number of jobs (in millions) for three broad sectoral groups – agriculture, mining & allied activities, manufacturing and services. The total number of export-supported jobs for agriculture, mining & allied activities (henceforth, agriculture) increased from 16 million in 1999-2000 to 26.6 million in 2012-13. Figure 8 shows the shares of these broad sectoral groups in total export supported jobs. The composition of employment across the broad sectors underwent significant changes during the period. In 1999-2000, agriculture accounted for the largest share of export-supported jobs (47.1%) followed by roughly equal shares for services (26.8%) and manufacturing (26.2%). By 2003-04, the share of manufacturing increased to about 30% while that of agriculture and services declined to 44.4% and

25.7% respectively. Between 2003-04 and 2007-08, however, the share of services increased steadily to nearly 43% at the cost of agriculture and manufacturing whose shares declined to 40% and 17.5% respectively[35]. The trend got reversed again since 2007-08 as the share of manufacturing steadily increased to 38.5% in 2012-13 while the share of services declined sharply to 19%. Despite the changes noted above, agriculture accounted for the largest share of employment throughout the period except for 2007-08. During the more recent years, the share of manufacturing increased significantly at the cost of services.

Within the manufacturing sector, the total number of jobs tied to exports increased from 8.9 million in 1999-2000 to 14 million in 2004-05. The second half of the 2000s, however, witnessed a decline in the growth of manufacturing jobs with 10.3 million jobs being created in 2009-10[36]. This trend has reversed during the more recent years as exports supported 13.9 million jobs in 2010-11 and 24.1 million jobs in 2012-13. During 2000-2001 to 2003-04, manufacturing sector's share in total export-supported jobs remained higher than that of services. However, during 2004-05 to 2009-10, services sector recorded higher share than manufacturing. For the years 2010-11, 2011-12 and 2012-13, manufacturing accounted for higher share of export-supported jobs than services.

It can be seen that the major increase in aggregate export supported jobs observed during the period 2010-11 to 2012-13 was mainly brought about by the manufacturing sector. Between 2010-11 and 2012-13, aggregate number of export supported jobs increased by 13.3 million. It can be seen that manufacturing sector contributed to over 75% (10.2 million) of this increase, followed by agriculture (4.4 million) while services contributed negatively with a decline in number of export supported jobs by 1.3 million. The high contribution of manufacturing sector is consistent with our earlier observation that its share in India's exports increased significantly since the late 2000s.

Detailed examination of data at the IO sector level reveals that the growth of manufacturing employment since 2010-11 has been mainly brought about by sectors such as ''readymade

[35]This trend in employment is consistent with the changes in the composition of exports (see Table 5). Between 2003-04 and 2007-08, the share of manufacturing in India's exports declined significantly while the share of services increased. However, between 2007-08 and 2012-13, the trend got reversed as manufacturing exports gained prominence in relation to services.

[36]Export related jobs in manufacturing reached the lowest level of 8.6 million in 2007-08. This is primarily due to the fact the share of manufacturing in total exports declined significantly from 53.7% in 2003-04 to 42.7% in 2007-08 (see Table 5). In contrast, employment in services reached the peak of 20.9 million in 2007-08 as services share in total exports increased to 48.7% in 2007-08 compared to 35.4% in 2003-04.

garments & miscellaneous textile products' (IO- 53+54), gems & jewelry' (IO-103), cotton textiles (IO-46+47), communication and electronic equipments (IO-92+94), motor vehicles (IO-97), 'miscellaneous food products (IO-43), miscellaneous metal products (IO-82), leather footwear (IO-59) 'other non-metallic mineral products' (IO-76), tobacco products (IO-45), and drugs and medicines (IO-70)[37]. Referring to Annexure 1-10, it can be seen that employment growth in many of these sectors (for example, IO-103, IO-46+47, IO-97, IO-43, IO-59, IO-45 and IO-70) occurred as a result of an increase in export growth which in turn is reflected in their share in export basket. Between 2007-08 and 2012-13, the share of IO-103 in the export basket shot up remarkably from 1.8% to 10.2%, that of IO-46 + 47 increased from 1.5% to 2.1% and that of IO-97 increased from 1.3% to 2.2%. Employment growth in few other sectors (IO-53+54 and IO-92+94) occurred as a result of an increase in employment coefficient. For example, despite a decline in the export share from 4.7% to 3.9%, export supported employment increased in IO-53+54, primarily due to an increase in employment coefficient from 31.5 in 2007-08 to 78.5 in 2011-12. Employment growth in sectors such as IO-82 and IO-76 occurred primarily due to its linkages with other sectors.

The percentage of total manufacturing employment that can be attributed to exports increased from 19.6% in 1999-2000 to 24.5% in 2004-05 and then declined to about 16.7% in 2007-08 (Figure 9). The share of manufacturing employment attributable to exports increased rapidly since 2007-08, reaching as high as 39.5% in 2012-13. Among the three sectors, it is in manufacturing where we observe the share of employment attributable to exports to be the highest throughout the time period. Further, in the recent years, manufacturing sector witnessed a sharp increase in the share of employment attributable to exports.

While agriculture accounted for the largest number of export supported employment in absolute terms, export supported jobs as a share of total sectoral employment is found to be the lowest for agriculture until 2010-11. The share of export supported

[37]These sectors accounted for almost 90% of the total increase of export supported jobs in manufacturing sector between 2010-11 to 2012-13, with the largest contribution from readymade garments & miscellaneous textile products' (4.5 million), gems & jewelry' (2.4 million), cotton textiles (0.7 million), communication and electronic equipments (0.6 million), motor vehicles (0.5 million), 'miscellaneous food products (0.4 million), miscellaneous metal products (0.4 million), leather footwear (0.2 million) 'other non-metallic mineral products' (0.2 million), tobacco products (0.2 million), and drugs and medicines (0.2 million). Within agriculture, the largest contribution to the increase in employment during the same period came from 'wheat' (IO-2, 1.8 million), 'sugarcane' (IO-8, 1.5 million), 'cotton' (IO-13, 0.9 million), 'fruits and vegetables' (IO-18+19, 0.6 million), 'other oilseeds' (IO-11, 0.5 million), and 'coffee' (IO-15, 0.2 million).

jobs in total agricultural employment increased steadily during the first half of the 2000s, from about 7% in 1999-2000 to 10.5% in 2005-06. This proportion has declined to 8.4% in 2007-08 and then recorded a major increase in 2011-12 (12.1%) and 2012-13 (13%).

Within the services sector, the total number of export-supported jobs increased steadily from 9.1 million in 1999-2000 to 20.9 million in 2008-09 and then declined sharply to 11.9 million in 2012-13. Within the service sector, the share of jobs attributable to exports increased from less than 10% in 1999-00 to the peak of about 16.7% in 2006-07 and 2007-08 and then declined sharply to 7.2% in 2012-13.

Figure 10 depicts the share of direct employment in total export-supported jobs within each of the broad sectoral categories. We observe that manufacturing sector is clearly different from both services and agriculture in terms of direct employment shares. Direct employment accounts for a very high share – ranging from 73% to 85% - of total export-supported jobs in the manufacturing sector. In contrast, a significant share of employment generated in agriculture and services are attributed to indirect effects, implying that manufacturing export plays an important role in generating employment in agriculture and services sectors through backward linkage effects. For agriculture, the share of direct employment remained in the range of 50% to 60% during the period 1999-2000 to 2007-08. However, this proportion has declined significantly since the late 2000s. For the year 2012-13, direct employment accounted for only 20% of total export linked jobs generated within the agriculture sector while as much as 80% of export related jobs in this sector is attributable to its linkages with other sectors, particularly manufacturing. Services sector record a similar pattern with a significant decline in the share of direct employment since 2007-08. For the year 2012-13, direct employment accounted for 48% of export-linked jobs within services sectors while much of the remaining 52% could be attributed to the linkages of services with manufacturing.

While we presented the aggregate estimates of number of jobs created per million dollar or billion rupees of exports, in Table 13 we present similar estimates for each sector. It can be seen that 1 billion rupees worth of agricultural exports could generate nearly 25,000 jobs in 2012-13. Compared to agriculture, the number of jobs that 1 billion worth of manufacturing or services exports could generate is much smaller – that is about 1500 jobs in 2012-13. However, it must be noted that employment generated

in manufacturing and services could be better paying compared to that in agriculture. Improvements in labour productivity have partially resulted in jobs attributable to 1 billion worth of exports declining by a factor of 3.1, 4.6 and 7.2 times in agriculture, manufacturing and services over the period 1999-00 to 2012-13.

5.3 Disaggregated Level Estimates

Having discussed the trends and patterns at the aggregate and broad sector level, in what follows, we summarize the trends and patterns of export-supported employment across IOT sectors. For ease of presentation, we have clubbed different IOT sectors into 10 broad groups and separate tables have been created for each group (see Annexures 12 to 21). Each table reports sector-wise estimates of total export–supported employment as well as the percentage contribution of direct employment to total export-supported employment for the sector. The estimates are reported for the four selected years – 1999-2000, 2003-04, 2007-08 and 2012-13[38]. Time series estimates for all 112 sectors covering the entire period (1999-2000 to 2012-13) is reported in Annexure 22.

(i) Agriculture & allied activities: The total number of export linked jobs in this group increased from 14.9 million in 1999-00 to 25.8 million in 2012-13. The increase was driven by sectors such as 'cotton' (IO-13), 'fruits & vegetables' (IO-18+19), 'other crops' (IO-20), 'wheat' (IO-2), sugar cane (IO-8), gram & pulses' (IO-6+7), 'other oil seeds' (IO-11), and Maize (IO-5) 'etc. It can be seen that employment growth in several of these sectors can be attributed primarily to their linkages with manufacturing. For example, in the case of cotton, the contribution of direct employment is zero, implying that the whole employment created in this sector is due to its backward linkages with other sectors in manufacturing, particularly textiles and garments.

(ii) Mining, quarrying and petroleum: Export supported employment increased from about 1 million in 1999-00 to over 5 million in 2003-04. It then declined to 2.8 million in 2007-08 and to below 1 million in 2012-13. The sectors that contribute significantly to employment include 'other non-metallic minerals' (IO-37), 'coal and lignite' (IO-27), petroleum products and 'natural gas & crude petroleum' (IO-28+29). The recent decline of employment in this group was entirely driven by IO-37. As expected, we observe that employment generation

[38]The years 1999-2000 and 2012-13 are selected as these are respectively the first and terminal years of our analysis; 2003-04 and 2007-08 are selected as the estimates for these years are based on official IOTs.

in these sectors have been mainly driven by linkages with other sectors.

(iii) Food processing, beverages and tobacco: Total employment in this group increased from about 0.4 million in 1999-2000 to 1.6 million in 2012-13. This increase was almost entirely driven by 'miscellaneous food products' (IO-43) and 'tobacco products' (IO-45). Direct employment accounted for a high share of total employment for both these sectors - 100% for tobacco products and 96% in the case of 'miscellaneous food products' for the year 2012-13.

(iv) Textile and Leather: Between 1999-00 and 2012-13, the total number of jobs in this group increased significantly from 4 million to nearly 11 million. This increase can be mainly attributed to 'readymade garments and made up textile goods' (IO – 53+54). Other sectors which contribute significantly to export linked employment within this group include 'cotton textiles', 'leather footwear', 'leather and leather products' and 'silk textiles'. It can be seen that, as expected, the bulk of the employment created in these sectors are due to the direct effects of exports rather than through backward linkages. At the same time, this sector has a potential for generating large number of employment in agriculture sector through backward linkage effects.

(v) Rubber, plastics and chemicals: The total number of export-supported jobs in this group has increased from about 0.5 million in 1999-00 to about 0.8 million in 2012-13. It can be seen that, this increase has been mainly brought about by 'drugs and medicines' (IO-70), 'plastic products & synthetic fibers and resins' (IO–62+72) and 'rubber products' (IO–61). As expected, while employment growth in IO-70 is the direct effect of export growth in this sector, backward linkage effect plays an important role for generating employment in IO-62+72.

(vi) Metal and Metal products: Export-linked employment in this group has increased from 0.5 million to around 1.2 million which can be attributed mainly to 'miscellaneous metal products' (IO-82), 'hand tools, hardware' (IO – 81) and 'iron and steel' (IO – 77+78+79). It can be seen that employment growth in this sector is mainly driven by its strong linkages with other sectors, such as machinery and transport equipment.

(vii) Machinery: Export supported employment in this group has increased significantly from less than 0.4 million in 1999-00 to 1.5 million in 2012-13. The major sectors which have contributed to this increase are 'communication equipment & electronic equipment' (IO – 92+94),

'industrial machinery and other non-electrical machinery' (IO – 85 +87), and 'electrical appliances & other electrical machinery' (IO – 91+93). Direct effect seems to play a more important role than indirect effect in creating employment within this group.

(viii) Transport equipments: This group has witnessed significant export growth in recent years and, as a result, export related employment increased from less than 0.3 million to over 1 million. In particular, employment has increased in sectors such a motor vehicles' (IO – 97), 'ships and boats' (IO – 95), and 'motor cycles and scooters' (IO – 98).

(ix) Other manufactured products: This group includes some of the important labor intensive sectors. We see a significant growth of employment from about 3 million in 1999-00 to nearly 7 million in 2012-13. Sector wise data shows that bulk of this increase has been brought about by 'gems and jewelry' (IO – 103) followed by 'miscellaneous manufacturing' (IO – 105). It may be noted that as expected, almost all employment generated in gems and jewelry is driven by direct effect of exports. This is evident from the fact that direct employment accounts for almost 100% of total employment generated in this sector. However, both direct and indirect effects play an important role in generating employment in miscellaneous manufacturing.

(x) Services: This group witnessed a major increase in export related employment from 9.2 million in 1999-00 to about 21 million in 2007-08 and then declined to about 12 million in 2012-13. As expected, we find that the top sectors for export related employment within services include business services (IO – 123) and 'computer related services' (IO – 124). These two sectors show a steady increase of export related jobs, the increase being primarily driven by the direct effect. Another sector that witnessed significant growth of export related jobs include 'construction' (IO-106) where jobs have been created primarily through its linkages with other sectors. We find that sectors such as 'other commercial, social & personal services' (IO – 128+ 129), banking (IO-118), land transport' (IO – 110), insurance (IO-119), 'hotels and restaurants' (IO-117), 'communication' (IO-115) also create significant export related employment primarily through the linkage effects .

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Table 1: Growth Rates of India's Exports (valued in US$ million, %)

Period	Merchandise			services	Merchandise plus services
	Oil	Non-Oil	Total		
2000-2001 to 2011-12	39.8	18.4	20.4	24.1	21.5
2000-2001 to 2005-06	45.2	18.1	19.8	30.7	23.1
2006-07 to 2011-12	21.0	17.0	17.6	12.6	15.9
2012-13 to 2015-16	-19.6	-0.9	-4.1	2.2	-2.0

Note: Growth rates are calculated using semi-logarithmic regressions; data on financial year (April to March) basis.

Source: Author's estimation using data from RBI (BoP Statistics).

Table 2: Growth Rates of India's and World's Exports (valued in constant US$ million, %)

Period	India		World	
	Merchandise	Services	Merchandise	Services
2000-2011	17.8 (20.4)	21.7 (24.4)	8.4 (10.8)	8.8 (11.3)
2000-2005	16.6 (19.3)	24.9 (27.7)	8.9 (11.4)	9.6 (12.1)
2006-2011	15.6 (17.4)	10.9 (12.7)	4.4 (6.1)	5.1 (6.8)
2012-2015	-4.3 (-2.9)	0.8 (2.3)	-4.8 (-3.4)	1.8 (3.3)

Note: Growth rates are calculated using semi-logarithmic regressions; figures in parentheses are growth rates in current US$; data on calendar year basis.

Source: Author's estimation using data from WTO

Table 3: Average Annual Growth Rates and Composition of Merchandise Exports across Sections of Commodities

Section	Description	Growth Rates (current US$)				Composition of Export (%)			
		2000-11	2000-05	2006-11	2012-15	2000-11	2000-05	2006-11	2012-15
I	Live animals and products	11.3	5.0	19.1	10.5	2.5	3.1	1.9	3.1
II	Vegetable Products	14.5	12.1	18.3	-10.8	5.5	6.4	4.6	6.6
III	Fats and Oils	16.5	9.1	24.1	-1.7	0.3	0.4	0.3	0.3
IV	Foodstuffs, beverages and tobacco	20.4	12.5	14.1	-10.1	2.5	2.4	2.6	2.3
V	Mineral products	36.8	46.6	18.2	-16.5	15.0	9.6	20.4	19.0
VI	Chemical products	20.1	20.6	15.5	1.1	9.9	9.9	10.0	11.1
VII	Plastics and rubber products	19.0	28.6	13.3	-2.3	2.7	2.9	2.6	2.7
VIII	Hides, skins and leather	7.3	6.7	6.3	4.0	1.9	2.5	1.3	1.2
IX	Wood and cork	20.1	28.2	8.6	16.2	0.1	0.1	0.1	0.1
X	Paper and paper products	16.6	19.5	14.5	3.2	0.5	0.6	0.4	0.5
XI	Textile and textile products	10.8	9.2	10.6	3.5	17.3	21.6	13.1	12.4
XII	Footwear, umbrellas, etc	13.1	11.3	9.5	10.7	1.2	1.4	1.0	1.0
XIII	Stone, glass, cement, etc	14.3	14.0	8.0	11.0	1.0	1.1	0.8	0.9
XIV	Natural/cultured pearls, gems, etc	18.2	17.3	25.1	-4.1	15.8	17.1	14.5	13.8
XV	Base metals and products	22.5	30.6	8.4	-1.1	8.8	8.1	9.4	7.8
XVI	Machinery	24.0	22.2	19.5	-1.7	7.1	6.4	7.8	7.5
XVII	Transport equipment	34.2	34.1	34.0	7.7	4.2	2.9	5.5	7.3
XVIII	Instruments and apparatus	17.7	20.5	17.2	4.3	0.7	0.8	0.7	0.8
XIX	Arms and ammunition	25.4	-9.3	43.1	45.4	0.0	0.0	0.0	0.0
XX	Miscellaneous manufactures	19.7	23.4	13.9	7.2	0.5	0.6	0.5	0.6
XXI	Works of arts	51.1	268.7	-14.2	-12.3	0.2	0.3	0.2	0.1
XXII	Project goods and Misc. Goods	24.4	0.2	56.6	-17.5	2.1	1.9	2.4	0.9
	Total	20.2	19.1	17.9	-3.3	100.0	100.0	100.0	100.0

Growth rates are calculated using semi-logarithmic regressions.

Source: Author's estimation using data from COMTRADE-WITS

Table 4: Average Annual Growth Rates of Services Exports across Categories current (US$, %)

Categories	2000-01 to 2011-12	2000-01 to 2005-06	2006-07 to 2011-12	2012-13 to 2015-16
Travel	18.0	21.2	14.0	6.5
Transportation	23.4	26.4	16.0	-6.1
Insurance	23.6	34.2	14.0	-2.8
G.n.i.e[1].	0.5	-12.3	14.5	1.3
Miscellaneous	26.1	35.3	11.8	2.7
- of which, Software services	24.8	30.9	13.2	4.1
Business services	n.a	n.a	10.4	0.6
Financial services	n.a	n.a	16.0	-1.6
Communication				
services	n.a	n.a	-9.9	5.9
Total	24.1	30.7	12.6	2.2

[1]G.n.i.e: Government not included elsewhere

Growth rates are calculated using semi-logarithmic regressions.

Source: Author's estimation using data from RBI (BoP Statistics)

Table 5: Composition of Exports across Broad Sectoral Groups

	Percentage share (%)			
	1998-99	2003-04	2007-08	2012-13
Agriculture, mining & allied activities	11.1	10.9	8.6	3.8
Manufacturing	68.7	53.7	42.7	63.6
Services	20.2	35.4	48.7	32.5
Total	100	100	100	100

Source: Central Statistical Organization (IOTs and Supply-Use Table for 2012-13).

Table 6: Merchandise Export Composition according to Factor Intensity Classification (% share of total exports)

	Original ITC Classification				Modified Classification			
	2000	2005	2010	2015	2000	2005	2010	2015
Primary	**19.4**	**26.6**	**31.8**	**25.9**	**16.2**	**16.5**	**15.2**	**14.4**
Natural-resource intensive	**20.3**	**16.4**	**15.8**	**12.9**	**20.3**	**16.4**	**15.8**	**12.9**
Unskilled labor intensive	**29.8**	**19.9**	**14.5**	**17.3**	**29.8**	**19.9**	**14.5**	**17.3**
Capital Intensive	**28.4**	**36.0**	**35.8**	**41.0**	**31.7**	**46.1**	**52.4**	**52.6**
- of which								
Technology-intensive	14.6	17.8	19.1	23.4	14.6	17.8	19.1	23.4
Human capital-intensive	13.8	18.2	16.7	17.7	13.8	18.2	16.7	17.7
Refined Petroleum (SITC 334)	-	-	-	-	3.3	10.1	16.6	11.5
Unclassified	**2.0**	**1.1**	**2.1**	**2.9**	**2.0**	**1.1**	**2.1**	**2.9**
Total	100	100	100	100	100	100	100	100

Note: As per the original ITC classification, “refined petroleum products” (SITC 334) is grouped under primary category. In the modified classification, we club SITC 334 under capital-intensive group as India mostly imports crude oil and specialize in the capital intensive segment (refining) of the value chain.

Source: Author’s estimation using data from COMTRADE-WITS

Table 7: Composition of Merchandise Exports across 1-Digit Level, SITC (% shares of total exports)

SITC Codes	Product Groups	2000	2005	2010	2015
0	Food and live animals	11.2	8.0	7.0	9.9
1	Beverages and tobacco	0.5	0.3	0.5	0.4
2	Crude materials, inedible, except fuels	3.8	7.5	6.8	3.2
3	Mineral fuels and lubricants	3.4	10.5	17.2	11.9
4	Animal and vegetable oils	0.6	0.3	0.4	0.4
5	Chemical products	10.2	11.3	10.9	13.8
6	Manufactured goods classified chiefly by materials	40.5	34.3	28.5	26.2
7	Machinery and transport equipment	7.3	10.5	14.5	16.4
8	Miscellaneous manufactured articles	20.5	16.2	12.2	14.8
9	Commodities and transactions not classified according to kind	2.0	1.1	2.1	2.9
		100	100	100	100

Source: Author's estimation using data from COMTRADE-WITS

Table 8: Composition of Services Exports across Categories

Categories	2000-01	2005-06	2015-16
Travel	21.5	13.6	13.8
Transportation	12.6	11.0	9.1
Insurance	1.7	1.8	1.3
G.n.i.e[1].	4.0	0.5	0.4
Miscellaneous	60.3	73.0	75.5
- of which,			
Software services	39.0	40.9	48.1
Business services	n.a	16.1	18.8
Financial services	n.a	2.1	3.2
Communication	n.a	2.7	1.4

[1] G.n.i.e: Government not included elsewhere

Source: Author's estimation using data from RBI (BoP Statistics)

Table 9: Total Number of Indian Employment (millions) Supported by Merchandise plus Services Exports, and Total Employment in the Country

	Export Supported Employment			Total Employment in India
	Total employment	Direct employment	Indirect employment	
1999-00	34.0	19.9	14.1	368.2
2000-01	37.9	23.0	14.9	369.1
2001-02	41.2	25.7	15.4	417.1
2002-03	43.5	26.8	16.7	396.1
2003-04	43.6	27.5	16.1	393.5
2004-05	52.1	32.6	19.6	408.3
2005-06	53.5	32.6	20.8	402.9
2006-07	53.5	33.0	20.5	405.2
2007-08	49.0	30.6	18.5	407.5
2008-09	54.1	31.1	23.0	403.8
2009-10	44.5	23.2	21.3	400.0
2010-11	49.3	23.6	25.7	410.2
2011-12	58.0	29.0	28.9	420.5
2012-13	62.6	31.4	31.2	430.7

Table 10: Growth Rates of Export-supported Jobs, Total Employment and Total Value of Exports

	Jobs supported by exports			Total employment in India	Dollar value of merchandise and services exports
Period	Total	Direct	Indirect		
1999-2000 to 2012-13	3.4	1.6	5.8	0.8	20.1
1999-00 to 2005-06	7.6	8.4	6.5	1.5	20.5
2006-07 to 2012-13	2.6	-1.9	8.4	0.9	14.5

Growth rates are calculated using semi-logarithmic regressions.

Table 11: Number of Jobs per Billion Rupees (and per million dollar) Worth of Exports

Year	No of jobs per billion rupees worth of exports	No of jobs per million dollar worth of exports
1999-00	14706	638
2000-01	13420	614
2001-02	13949	666
2002-03	12076	584
2003-04	10203	468
2004-05	9059	406
2005-06	7412	328
2006-07	5845	264
2007-08	4756	191
2008-09	4022	184
2009-10	3379	160
2010-11	2845	129
2011-12	2676	128
2012-13	2544	138

Table 12: Export-supported Jobs across Broad Sectors (millions)

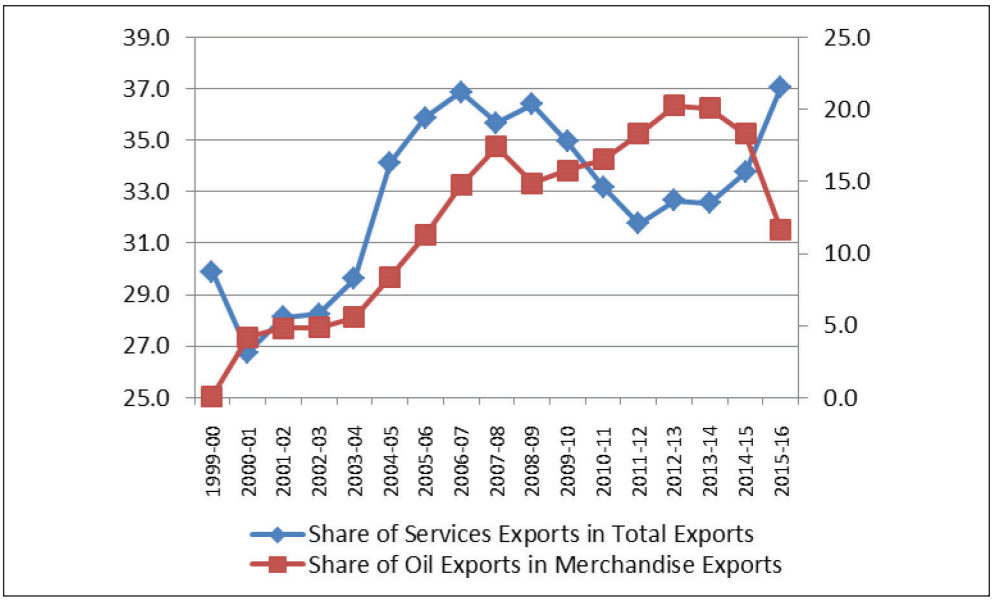
	Agriculture, mining & allied activities			Manufacturing			Services		
	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect
1999-00	16.0	8.0	7.9	8.9	7.0	1.9	9.1	4.8	4.3
2000-01	16.9	8.8	8.1	11.2	9.0	2.2	9.8	5.3	4.6
2001-02	19.0	10.4	8.6	12.1	10.1	2.0	10.0	5.2	4.8
2002-03	19.6	10.6	9.0	12.7	10.4	2.3	11.3	5.8	5.4
2003-04	19.3	11.6	7.7	13.0	10.2	2.9	11.2	5.8	5.5
2004-05	23.6	13.3	10.2	14.0	11.3	2.7	14.6	7.9	6.7
2005-06	24.5	14.0	10.4	11.0	8.3	2.7	18.0	10.3	7.7
2006-07	23.0	13.2	9.9	10.1	7.4	2.7	20.4	12.5	8.0
2007-08	19.6	11.3	8.4	8.6	5.9	2.6	20.9	13.4	7.5
2008-09	22.7	10.9	11.8	10.6	7.8	2.7	20.9	12.4	8.5
2009-10	19.1	7.2	11.9	10.3	7.9	2.4	15.1	8.2	7.0
2010-11	22.2	5.8	16.4	13.9	11.2	2.7	13.2	6.5	6.6
2011-12	24.1	4.2	19.9	22.6	19.2	3.4	11.4	5.6	5.7
2012-13	26.6	5.4	21.2	24.1	20.3	3.9	11.9	5.7	6.1

Table 13: Number of Jobs per Billion Rupees Worth of Exports in each Sector

Year	Agriculture	Manufacturing	Services
1999-00	76107	6967	11073
2000-01	62650	7218	9805
2001-02	64589	7522	9588
2002-03	52038	6520	8808
2003-04	41638	5668	7432
2004-05	39729	4764	6546
2005-06	34775	3171	5929
2006-07	27380	2420	4913
2007-08	22052	1945	4154
2008-09	22243	1637	3494
2009-10	22245	1458	2870
2010-11	23443	1366	2126
2011-12	25145	1622	1674
2012-13	24474	1529	1537

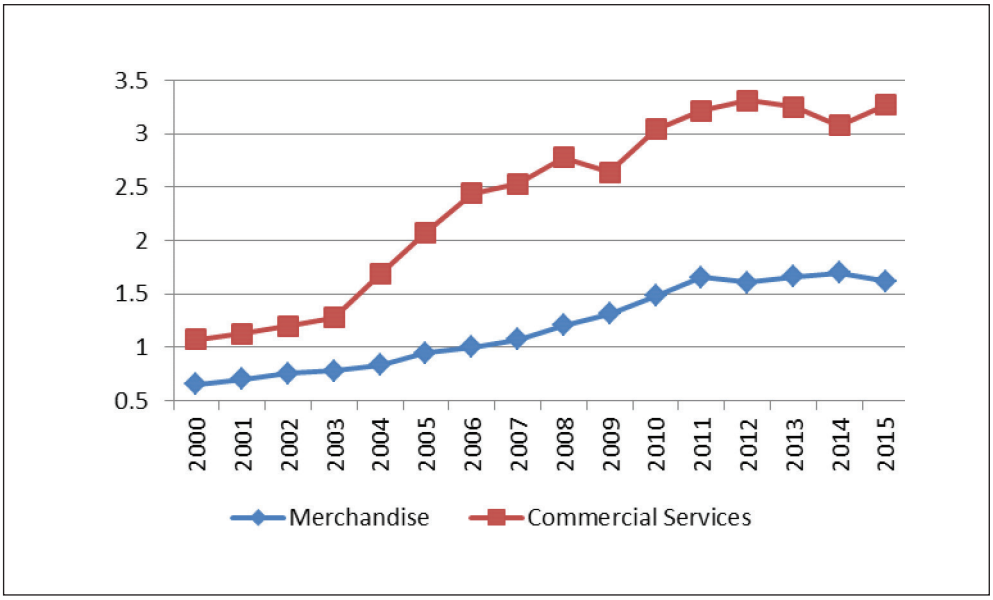
Note: Number of export supported jobs in each sector divided by total exports from each sector

Figure 1: Share of Services Exports in Total Exports and Share of Oil Exports in Merchandise Exports



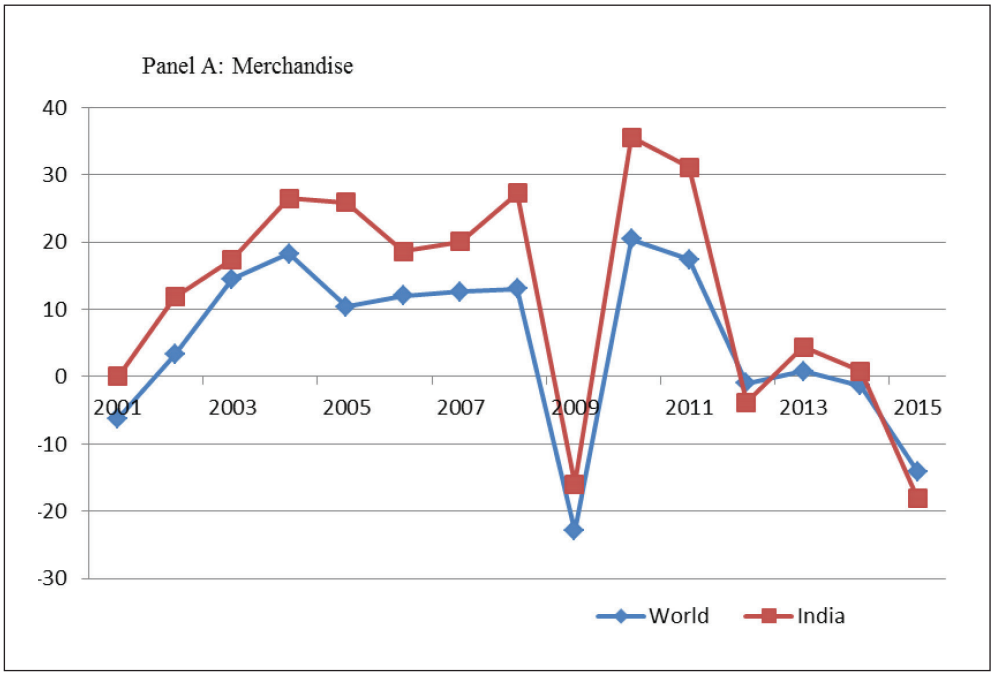
Source: Author's estimation using data from RBI (BoP Statistics)

Figure 2: India's World Market Shares (%)



Source: Author's estimation using data from COMTRADE-WITS

Figure 3: Annual Merchandise Export Growth Rate, India and World



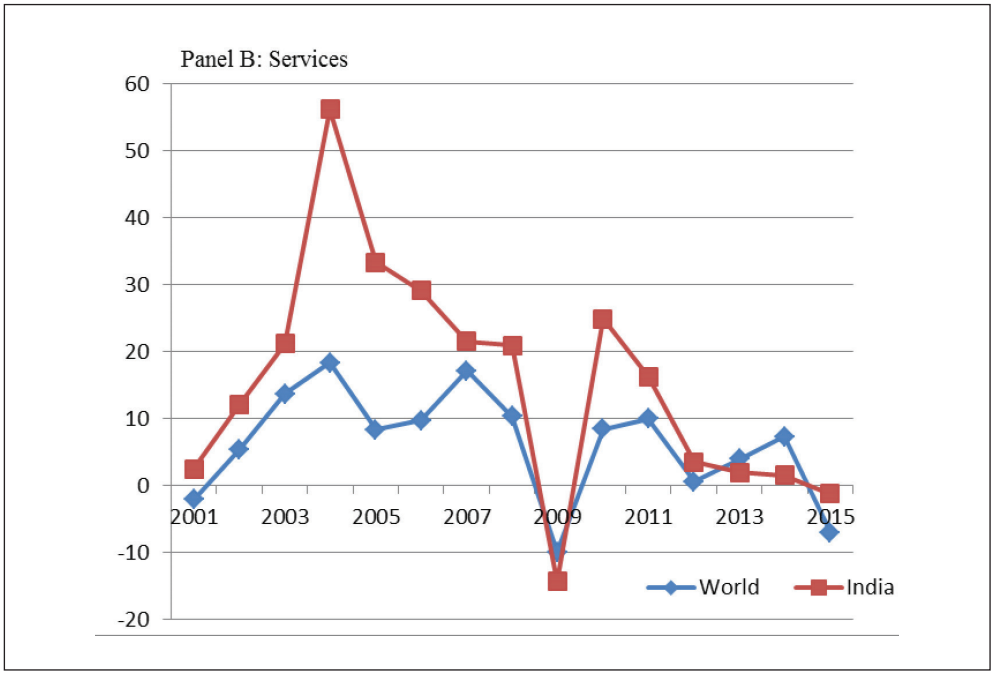


Figure 4: Total Number of Employment Supported by Indian Exports, Millions

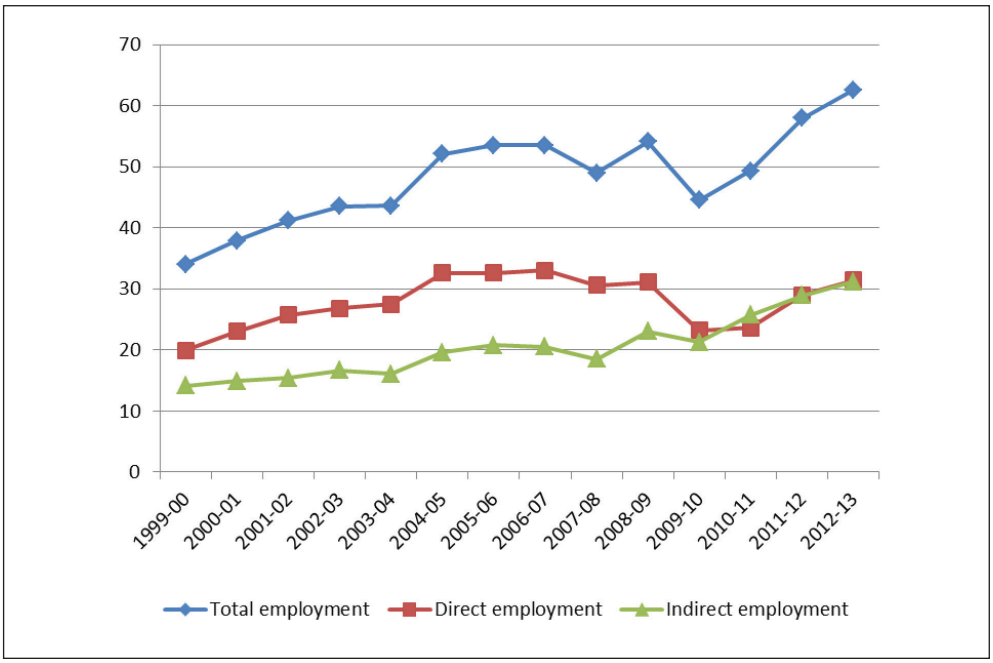


Figure 5: Number of Jobs Supported by Exports as a Share of Total Employment in the Country (%)

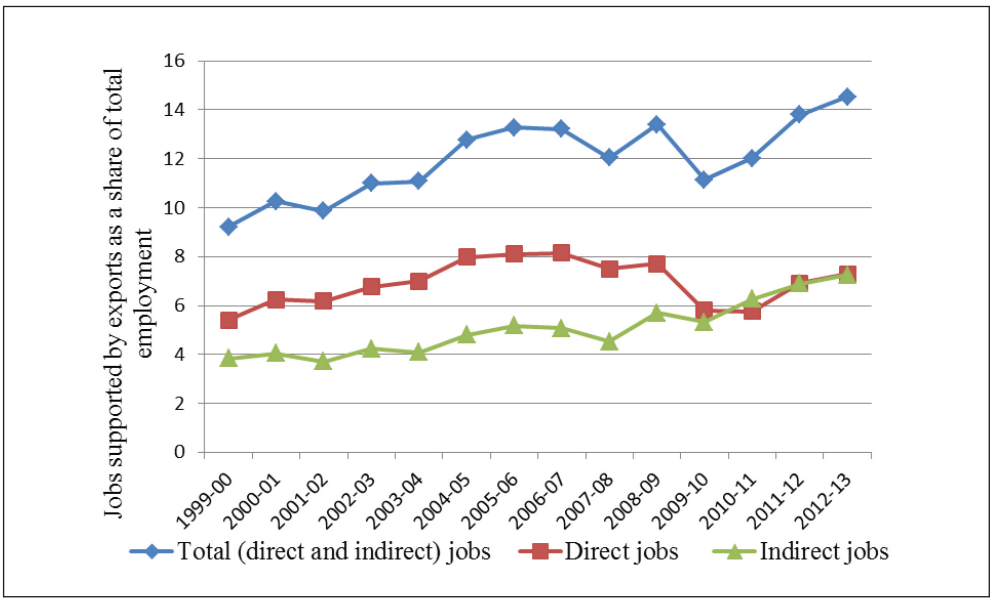


Figure 6: Share of Direct and Indirect Jobs in Total Number of Jobs Supported by Exports (%)

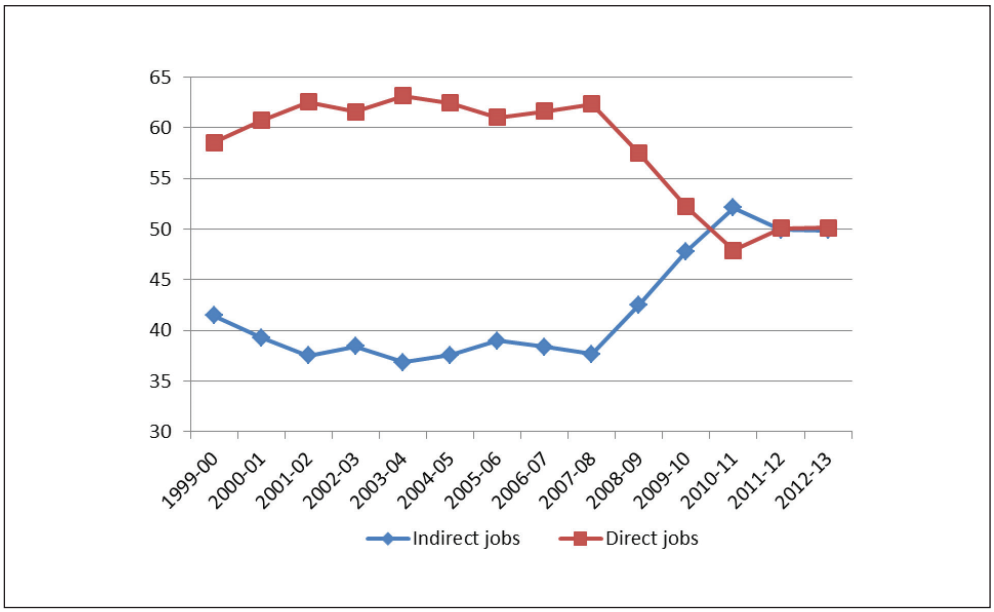


Figure 7: Total Employment (Millions) Supported by Indian Exports across Sectors

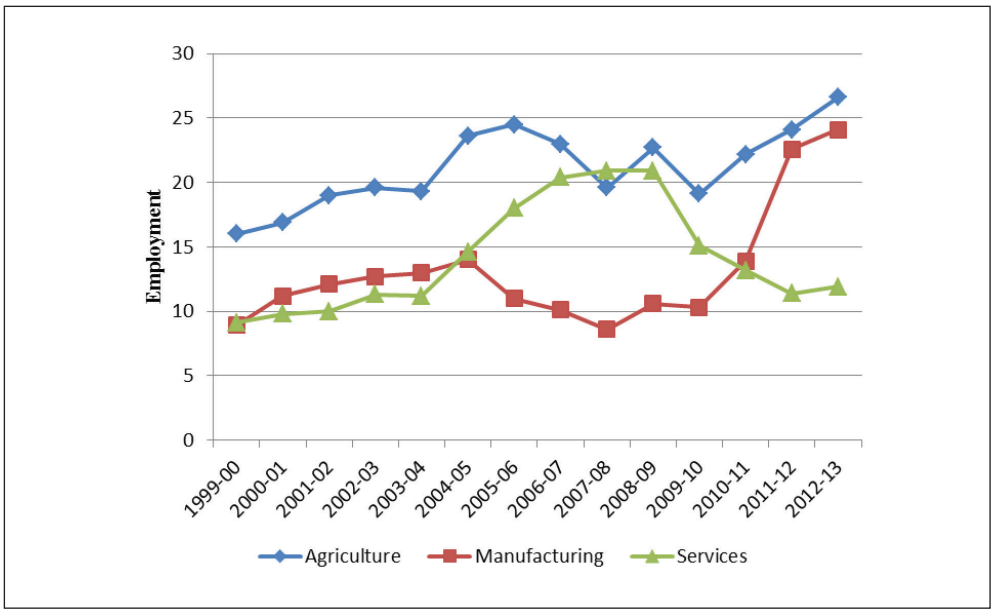


Figure 8: Distribution of Export-supported Employment Across Broad Sectors

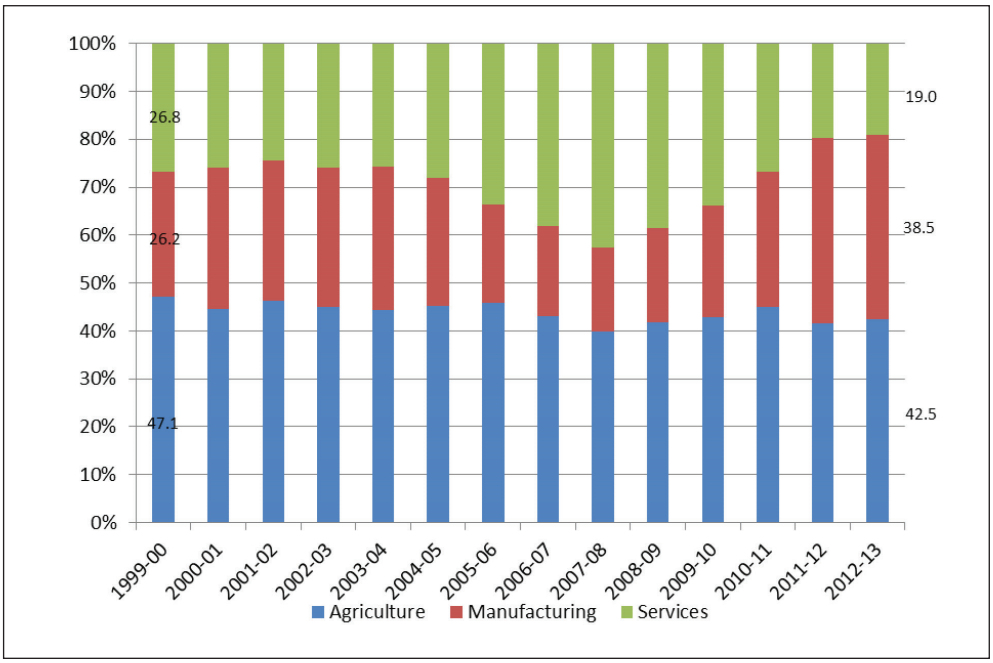


Figure 9: Export-Supported Employment as a Share Total Sector Employment (%)

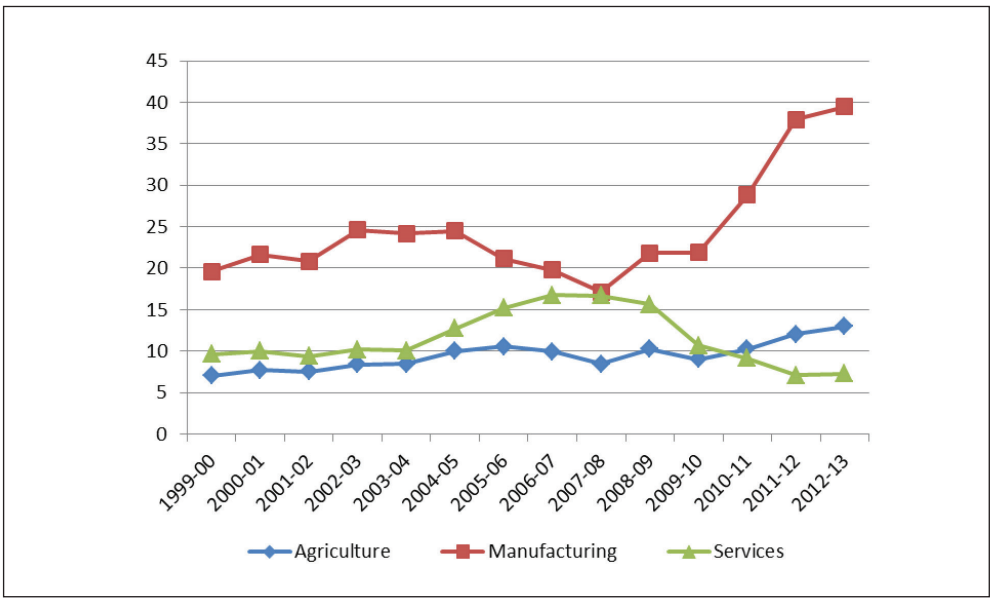
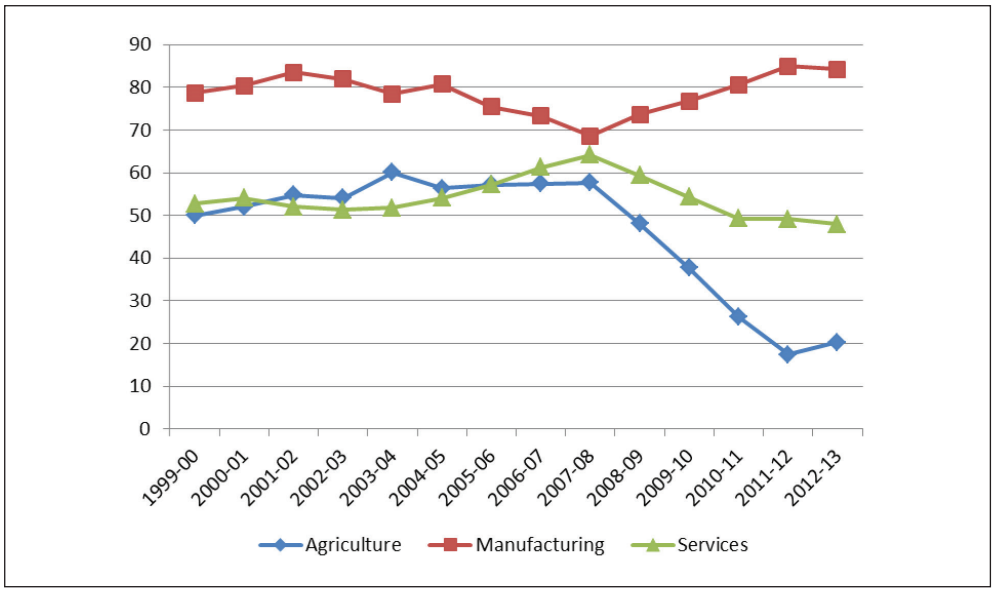


Figure 10: Direct Employment as a Share of Total Export-supported Employment in each Sector (%)



ANNEXURES

Annexure 1: Agriculture and Allied Activities: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
8	Sugarcane	0.00	0.00	0.00	0.94	1.39	2.19	161.1	151.1	115.1
9+11	Groundnut & other oil seeds	0.29	0.05	0.49	1.30	1.15	2.08	123.4	71.0	84.9
14	Tea	0.00	0.00	0.00	0.30	0.34	0.30	433.0	372.8	171.4
15	Coffee	0.00	0.00	0.13	0.13	0.08	0.12	379.4	126.0	61.4
16	Rubber	0.04	0.04	0.00	0.19	0.26	0.21	218.3	151.2	42.6
17	Tobacco	0.13	0.08	0.00	0.12	0.19	0.20	223.3	297.9	96.3
1+2+3+4+5+6+7+10+12+13+18+19+20+51	Cereals, pulses, fruits, vegetables and other crops	2.45	2.14	1.11	50.39	49.62	41.19	461.6	282.8	143.0
23	Poultry & eggs	0.06	0.03	0.03	0.05	0.07	0.05	14.2	10.3	4.0
25	Forestry and logging	0.27	0.14	1.04	0.35	0.20	0.14	55.8	8.6	3.8
26	Fishing	0.96	0.40	0.11	0.41	0.33	0.33	50.3	29.3	17.7
21+22+24	Milk, animal services and other livestock products	0.37	0.11	0.09	4.48	4.02	2.77	105.0	65.0	26.6
	Total	4.6	3.0	3.00	58.7	57.7	49.6			

Annexure 2: Mining, Quarrying and Petroleum: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
27	Coal and lignite	0.04	0.02	0.06	0.17	0.12	0.13	19.4	9.8	5.6
28+29	Natural gas & crude petroleum	0.05	0.47	0.00	0.01	0.01	0.04	1.7	0.7	1.5
30	Iron ore	0.67	1.23	0.40	0.02	0.02	0.02	16.2	3.2	2.2
31	Manganese ore	0.01	0.00	0.00	0.00	0.01	0.00	39.2	24.6	2.9
32	Bauxite	0.03	0.08	0.03	0.00	0.00	0.00	1.1	0.0	0.0
33	Copper ore	0.00	0.00	0.00	0.00	0.00	0.00	17.3	3.5	8.2
34	Other metallic minerals	0.11	0.21	0.09	0.00	0.01	0.00	8.7	13.4	2.9
35	Lime stone	0.00	0.00	0.01	0.01	0.01	0.03	31.3	15.8	26.9
36	Mica	0.02	0.00	0.00	0.00	0.00	0.00	94.7	852.1	0.0
37	Other non-metallic minerals	5.46	3.67	0.33	0.43	0.35	0.33	207.7	65.2	37.5
63	Petroleum products	3.35	7.29	13.62	0.03	0.03	0.05	0.8	0.3	0.2
	Total	9.7	13.0	14.6	0.7	0.6	0.6			

Annexure 3: Food Processing, Beverages and Tobacco: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
38+39	Sugar & Khandsari, boora	0.20	0.36	0.38	0.09	0.09	0.09	10.8	8.4	5.6
40+41	Edible oils & vanaspati	0.85	0.81	0.02	0.04	0.04	0.03	3.9	2.0	1.3
42	Tea and coffee processing	0.42	0.24	0.26	0.01	0.02	0.05	3.3	5.5	8.7
43	Miscellaneous food products	2.53	1.03	4.25	0.73	0.64	0.81	21.0	14.8	9.1
44	Beverages	0.02	0.02	0.09	0.09	0.06	0.09	14.0	7.3	3.7
45	Tobacco products	0.06	0.05	0.21	0.97	0.81	1.03	333.1	132.7	92.5
	Total	4.1	2.5	5.2	1.9	1.7	2.1			

Annexure 4: Textiles and Leather: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
46+47	Cotton textiles & handlooms	1.90	1.50	2.08	0.68	0.79	0.65	46.6	28.9	16.5
48	Woolen textiles	0.09	0.10	0.04	0.01	0.11	0.02	14.1	44.8	9.7
49	Silk textiles	0.28	0.11	0.03	0.23	0.10	0.22	535.4	87.7	24.9
50	Art silk, synthetic fiber textiles	1.06	0.60	0.99	0.19	0.18	0.08	23.4	12.2	3.1
52	Carpet weaving	0.63	0.40	0.32	0.21	0.19	0.12	217.5	116.1	14.7
53+54	Readymade garments & miscellaneous textile products	8.09	4.70	3.94	2.14	1.17	1.35	105.7	31.5	78.5
59	Leather footwear	0.14	0.07	0.46	0.18	0.19	0.20	128.8	67.3	34.3
60	Leather and leather products	1.29	0.67	0.65	0.11	0.09	0.12	38.8	14.3	16.0
		13.5	8.1	8.5	3.8	2.8	2.8			

Annexure 5: Rubber, Plastics and Chemicals: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
62+72	Plastic products & synthetic fibers, resin	1.46	1.11	1.15	0.18	0.14	0.17	11.2	4.8	3.0
65+66	Organic and inorganic heavy chemicals	3.12	2.78	3.63	0.04	0.04	0.03	2.7	1.6	0.3
61	Rubber products	0.99	0.69	0.62	0.12	0.10	0.11	18.4	7.5	5.7
67	Fertilizers	0.01	0.01	0.02	0.02	0.02	0.03	2.2	2.0	2.1
68	Pesticides	0.34	0.21	0.00	0.00	0.01	0.00	2.1	2.9	0.5
69	Paints, varnishes and lacquers	0.52	0.33	0.48	0.02	0.03	0.02	4.9	5.0	1.6
70	Drugs and medicines	1.67	1.52	2.24	0.09	0.10	0.17	7.2	6.5	4.1
71	Soaps, cosmetics & glycerin	0.35	0.20	0.44	0.07	0.11	0.08	9.2	10.2	4.4
73	Other chemicals	0.40	0.45	0.28	0.14	0.12	0.08	17.1	13.9	2.4
	Total	8.9	7.3	8.9	0.7	0.7	0.7			

Annexure 6: Metal and Metal Products: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
77+78+79	Iron and steel	3.45	3.70	3.47	0.22	0.25	0.30	6.4	2.9	1.6
80	Non-ferrous basic metals	1.00	1.67	0.89	0.07	0.07	0.05	9.0	4.1	1.0
81	Hand tools, hardware	0.33	0.21	0.16	0.18	0.16	0.16	56.2	20.6	24.9
82	Miscellaneous metal products	0.97	0.58	0.47	0.42	0.45	0.55	36.9	16.6	16.4
	Total	5.7	6.2	5.0	0.9	0.9	1.1			

Annexure 7: Machinery: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
83	Tractors and agri. implements	0.10	0.14	0.20	0.08	0.06	0.08	28.4	9.4	6.7
84	Industrial machinery for food and textile industry	0.29	0.20	0.12	0.02	0.02	0.02	10.3	4.8	6.9
86	Machine tools	0.29	0.21	0.08	0.02	0.04	0.03	4.8	4.0	2.3
85+87	Other industrial and other non-electrical machinery	2.47	1.88	2.37	0.22	0.23	0.25	14.4	5.4	4.1
88	Electrical industrial machinery	0.37	0.65	0.42	0.05	0.08	0.07	5.1	5.8	2.5
89	Electrical wires & cables	0.08	0.15	0.31	0.02	0.02	0.01	3.4	4.1	1.9
90	Batteries	0.06	0.03	0.04	0.01	0.02	0.02	6.6	16.2	5.9
91+93	Electrical appliance and other electrical machinery	0.65	0.66	0.78	0.24	0.23	0.16	22.2	14.6	10.2
92+94	Communication and electronic equipment including TV	1.20	0.59	0.91	0.10	0.10	0.32	6.8	6.1	24.5
	Total	5.5	4.5	5.2	0.8	0.8	1.0			

Annexure 8: Transport Equipments: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
95	Ships and boats	0.13	0.81	0.85	0.01	0.01	0.01	33.2	4.0	10.5
96	Rail equipments	0.01	0.03	0.03	0.02	0.03	0.03	8.9	5.8	1.9
97	Motor vehicles	1.34	1.32	2.16	0.38	0.42	0.61	22.1	12.0	11.5
98	Motor cycles and scooters	0.30	0.16	0.38	0.18	0.21	0.16	39.1	24.2	9.7
99+100	Other transport equipments	0.07	0.04	0.01	0.20	0.23	0.17	146.8	86.2	2.9
	Total	1.9	2.4	3.4	0.8	0.9	1.0			

Annexure 9: Other Manufactured Products: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
55	Furniture and fixtures-wooden	0.06	0.10	0.11	0.24	0.35	0.47	117.0	34.3	24.0
56	Wood and wood products	0.05	0.04	0.07	1.07	0.79	0.82	495.8	107.2	46.1
57	Paper, paper prods. & newsprint	0.26	0.16	0.22	0.16	0.12	0.12	26.2	9.7	4.9
58	Printing and publishing	0.08	0.07	0.07	0.22	0.17	0.20	41.2	20.0	19.2
64	Coal tar products	0.05	0.03	0.21	0.01	0.01	0.01	5.9	2.9	0.6
75	Cement	0.14	0.05	0.05	0.03	0.04	0.02	5.9	3.1	0.5
74+76	Structural clay products and other non-metallic mineral products	0.64	0.44	0.51	0.99	0.98	0.47	96.4	45.6	23.5
101	Watches and clocks	0.06	0.01	0.02	0.04	0.04	0.03	79.3	29.9	9.8
102	Medical, precision &optical instruments	0.20	0.10	0.47	0.01	0.02	0.02	7.7	4.4	2.7
103	Gems & jewelry	8.48	1.84	10.22	0.43	0.53	0.52	38.2	17.3	14.2
104	Aircraft & spacecraft	0.08	0.28	0.50	0.01	0.01	0.01	72.2	32.6	17.5
105	Miscellaneous manufacturing	0.67	1.18	1.30	0.28	0.17	0.25	57.1	12.7	14.0
	Total	10.8	4.3	13.7	3.5	3.2	2.9			

Annexure 10: Services: Employment Coefficient and Composition of Exports and Employment

IO codes	Sector	Share in total exports (%)			Share in total employment (%)			Employment coefficient		
		2003-04	2007-08	2012-13	2003-04	2007-08	2011-12	2003-04	2007-08	2011-12
106	Construction	0.00	0.59	0.19	5.62	6.42	10.66	50.1	23.4	22.2
107	Electricity	0.00	0.00	0.00	0.22	0.20	0.25	5.9	4.8	2.1
108	Water supply	0.00	0.00	0.00	0.04	0.04	0.06	20.0	8.9	8.2
109	Railway transport services	1.04	0.56	0.00	0.27	0.20	0.22	19.2	11.2	8.6
110	Land transport including via pipeline	5.19	4.07	0.00	3.15	3.31	3.49	38.9	22.4	16.5
111	Water transport	0.15	2.08	1.45	0.03	0.04	0.03	11.7	9.9	3.3
112	Air transport	0.25	1.44	0.84	0.01	0.03	0.02	3.6	4.9	0.4
113	Supporting and auxiliary transport activities	0.48	1.17	0.00	0.11	0.22	0.24	19.7	21.7	13.7
114	Storage and warehousing	0.00	0.00	0.00	0.03	0.04	0.05	44.2	34.6	15.0
115	Communication	0.02	1.10	0.43	0.37	0.41	0.36	25.4	19.0	11.7
116	Trade	7.26	8.04	0.00	7.78	7.87	8.85	67.4	35.8	21.0
117	Hotels and restaurants	2.20	0.00	0.00	1.30	1.40	1.65	49.7	24.1	18.4
118	Banking	0.33	0.00	1.43	0.50	0.55	0.65	11.8	9.2	5.3
119	Insurance	0.47	0.63	0.63	0.16	0.19	0.26	14.5	12.9	13.3
121	Education and research	0.00	0.00	0.00	2.34	2.48	2.99	84.5	54.5	31.5
122	Medical and health	0.00	0.00	0.00	0.70	0.63	0.88	37.5	22.0	19.5
123	Business services	1.44	7.99	12.50	0.43	0.48	0.68	43.2	24.6	11.3
124	Computer & related activities	14.30	16.63	14.93	0.16	0.29	0.45	8.0	6.7	5.3
125	Legal services	0.00	0.26	0.00	0.14	0.14	0.16	114.4	34.3	20.5
127	Renting of machinery & equipment	0.00	0.00	0.00	0.11	0.12	0.12	202.0	105.6	39.9
120+126	Ownership of dwellings and real estate	0.00	0.00	0.00	0.08	0.15	0.20	2.2	2.2	1.6
128+129	Community, social, personal other services	2.27	4.14	0.09	2.75	3.68	4.42	122.1	109.4	59.1
130	Public administration	0.00	0.00	0.00	2.03	1.84	1.68	51.2	31.9	14.1
	Total	35.4	48.7	32.5	28.3	30.7	38.4			

Annexure 11: IO Sector Codes and Description

IO Code	Description
1	Paddy
2	Wheat
3	Jowar
5	Maize
6+7	Gram and Other Pulses
8	Sugarcane
9	Groundnut
10	Coconut
11	Other oilseeds
12	Jute
13	Cotton
14	Tea
15	Coffee
16	Rubber
17	Tobacco
18+19	Fruits and Vegetables
20	Other crops (including Bajra)
21	Milk and milk products
23	Poultry & Eggs
22+24	Animal services(agricultural) and Other livestock products
25	Forestry and logging
26	Fishing
27	Coal and lignite
28+29	Natural gas and Crude petroleum
30	Iron ore
31	Manganese ore
32	Bauxite
33	Copper ore
34	Other metallic minerals
35	Lime stone
36	Mica
37	Other nonmetallic minerals
38+39	Sugar and Khandsari,boora
40+41	Hydrogenated oil and Edible oils other than vanaspati
42	Tea and coffee processing
43	Miscellaneous food products
44	Beverages

45	Tobacco products
46+47	Khadi,cotton textiles and Cotton textiles
48	Woolen textiles
49	Silk textiles
50	Art silk, synthetic fiber textiles
51	Jute, hemp, mesta textiles
52	Carpet weaving
53+54	Readymade garments and Miscellaneous textile products
55	Furniture and fixtures-wooden
56	Wood and wood products
57	Paper, paper prods. & newsprint
58	Printing and publishing
59	Leather footwear
60	Leather and leather products
61	Rubber products
63	Petroleum products
64	Coal tar products
65+66	Inorganic and organic heavy chemicals
67	Fertilizers
68	Pesticides
69	Paints, varnishes and lacquers
70	Drugs and medicines
71	Soaps, cosmetics & glycerin
62+72	Plastic products and Synthetic fibres
73	Other chemicals
74	Structural clay products
75	Cement
76	Other non-metallic mineral prods.
77+78+79	Iron and steel ferro alloys, Iron and steel casting and forging and Iron and steel foundries
80	Non-ferrous basic metals
81	Hand tools, hardware
82	Miscellaneous metal products
83	Tractors and agri. implements
84	Industrial machinery(F & T)
86	Machine tools
85+87	Industrial machinery and Other non electrical machinery
88	Electrical industrial Machinery
89	Electrical wires & cables
90	Batteries

91+93	Electrical appliances and Other electrical machinery
92+94	Communication equipments and Electronic equipments
95	Ships and boats
96	Rail equipments
97	Motor vehicles
98	Motor cycles and scooters
99+100	Bicycles, cycle-rickshaw and Other transport equipments
101	Watches and clocks
102	Medical, precision &optical instruments
103	Gems & jewelry
104	Aircraft & spacecraft
105	Miscellaneous manufacturing
106	Construction
107	Electricity
108	Water supply
109	Railway transport services
110	Land transportation including via pipeline
111	Water transport
112	Air transport
113	Supporting and auxiliary transportation activities
114	Storage and warehousing
115	Communication
116	Trade
117	Hotels and restaurants
118	Banking
119	Insurance
120	Ownership of dwellings
121	Education and research
122	Medical and health
123	Business services
124	Computer & related activities
125	Legal services
126	Real estate activities
127	Renting of machinery & equipment
128+129	Other commercial, social & personal services and other services
130	Public administration

Annexure 12: Total Employment Supported by Exports: Agriculture and Allied Activities

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
13	1.87	1.58	1.63	4.52	3%	0%	0%	0%
18+19	1.60	2.38	2.18	3.97	51%	53%	51%	22%
20	1.43	1.50	2.03	3.57	16%	25%	39%	18%
1	5.24	2.95	5.95	3.53	85%	79%	90%	2%
2	1.15	2.64	0.59	2.77	18%	67%	4%	59%
8	0.08	0.16	0.65	2.22	2%	0%	0%	0%
6+7	0.38	0.33	0.67	0.88	21%	1%	25%	0%
11	0.14	0.32	0.34	0.86	33%	30%	11%	67%
22+24	0.38	0.48	0.54	0.85	25%	35%	14%	6%
5	0.06	0.20	0.71	0.70	32%	68%	92%	76%
14	0.64	0.22	0.25	0.37	0%	0%	0%	0%
9	0.08	0.17	0.13	0.36	28%	42%	0%	85%
21	0.09	0.18	0.21	0.33	0%	0%	1%	0%
15	0.03	0.02	0.05	0.28	0%	0%	0%	69%
16	0.16	0.26	0.30	0.18	4%	16%	18%	0%
25	0.14	0.18	0.04	0.11	44%	36%	30%	77%
26	0.23	0.23	0.15	0.11	92%	90%	81%	39%
3	0.01	0.02	0.04	0.07	4%	0%	16%	7%
10	0.85	0.09	0.08	0.07	88%	0%	0%	56%
17	0.12	0.14	0.26	0.05	92%	97%	97%	0%
23	0.01	0.01	0.01	0.01	29%	34%	34%	28%
12	0.22	0.11	0.00	0.00	2%	2%	0%	0%
Total	14.92	14.17	16.83	25.81	48%	47%	52%	20%

Annexure 13: Total Employment Supported by Exports: Mining, Quarrying and Petroleum Products

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
37	0.92	4.97	2.54	0.52	90%	98%	97%	57%
27	0.07	0.11	0.10	0.12	2%	3%	2%	7%
63	0.05	0.03	0.04	0.09	14%	44%	68%	74%
28+29	0.01	0.01	0.01	0.06	2%	3%	24%	0%
30	0.02	0.05	0.05	0.04	89%	89%	86%	71%
35	0.01	0.00	0.00	0.01	2%	6%	17%	52%
34	0.01	0.01	0.04	0.01	55%	74%	83%	73%
31	0.01	0.00	0.01	0.00	27%	38%	17%	10%
33	0.00	0.00	0.00	0.00	0%	0%	1%	2%
32	0.00	0.00	0.00	0.00	52%	81%	0%	0%
36	0.00	0.01	0.04	0.00	0%	100%	97%	0%
Total	1.09	5.18	2.82	0.86	79%	95%	92%	48%

Annexure 14: Total Employment Supported by Exports: Food Processing, Beverages and Tobacco

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
43	0.15	0.27	0.26	0.96	90%	91%	66%	96%
45	0.16	0.09	0.07	0.47	100%	100%	100%	100%
38+39	0.01	0.02	0.04	0.07	16%	49%	72%	68%
42	0.02	0.01	0.02	0.05	96%	93%	92%	97%
44	0.01	0.01	0.01	0.01	24%	18%	22%	69%
40+41	0.02	0.02	0.02	0.01	82%	80%	84%	10%
Total	0.37	0.41	0.42	1.57	90%	89%	74%	95%

Annexure 15: Total Employment Supported by Exports: Textile and Leather

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
53+54	2.03	3.87	1.78	8.19	97%	98%	92%	92%
46+47	0.74	0.91	0.80	1.27	61%	48%	61%	72%
59	0.18	0.10	0.07	0.38	99%	80%	74%	99%
60	0.27	0.27	0.15	0.35	93%	94%	86%	76%
49	0.30	0.76	0.17	0.20	86%	87%	66%	12%
50	0.08	0.20	0.17	0.15	62%	60%	52%	58%
52	0.31	0.60	0.49	0.11	98%	98%	98%	99%
51	0.05	0.03	0.07	0.11	47%	38%	34%	57%
48	0.02	0.01	0.08	0.04	62%	68%	64%	27%
Total	3.97	6.76	3.78	10.80	88%	88%	81%	87%

Annexure 16: Total Employment Supported by Exports: Rubber, Plastics and Chemicals

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
70	0.04	0.07	0.15	0.31	96%	95%	93%	96%
62+72	0.12	0.23	0.16	0.22	26%	40%	49%	40%
61	0.07	0.11	0.08	0.12	68%	74%	72%	75%
71	0.05	0.02	0.03	0.05	93%	86%	75%	95%
65+66	0.05	0.05	0.07	0.05	73%	76%	79%	62%
73	0.08	0.12	0.18	0.05	35%	27%	38%	35%
69	0.03	0.02	0.03	0.03	67%	69%	59%	76%
67	0.01	0.01	0.01	0.01	2%	1%	3%	8%
68	0.00	0.01	0.02	0.00	71%	68%	46%	0%
Total	0.47	0.63	0.71	0.84	56%	55%	61%	70%

Annexure 17: Total Employment Supported by Exports: Metal and Metal Products

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
82	0.21	0.26	0.23	0.62	61%	61%	46%	31%
81	0.14	0.14	0.12	0.29	54%	58%	39%	36%
77+78+79	0.08	0.18	0.21	0.25	39%	61%	64%	61%
80	0.10	0.11	0.13	0.06	16%	41%	61%	41%
Total	0.53	0.69	0.69	1.23	47%	57%	53%	39%

Annexure 18: Total Employment Supported by Exports: Machinery

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
92+94	0.05	0.07	0.09	0.74	58%	63%	48%	77%
85+87	0.12	0.20	0.16	0.35	74%	81%	73%	79%
91+93	0.11	0.11	0.16	0.25	61%	60%	64%	76%
83	0.00	0.01	0.02	0.04	80%	82%	80%	85%
88	0.01	0.02	0.05	0.03	54%	57%	85%	77%
84	0.01	0.03	0.02	0.02	59%	49%	59%	79%
90	0.00	0.00	0.01	0.02	42%	40%	36%	27%
86	0.01	0.01	0.02	0.02	48%	53%	42%	25%
89	0.02	0.00	0.01	0.02	25%	30%	61%	84%
Total	0.35	0.45	0.54	1.50	63%	69%	65%	76%

Annexure 19: Total Employment Supported by Exports: Transport Equipments

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
97	0.08	0.18	0.23	0.76	73%	78%	80%	84%
95	0.00	0.02	0.05	0.24	0%	86%	85%	88%
98	0.02	0.06	0.08	0.13	91%	92%	79%	89%
96	0.00	0.02	0.02	0.00	6%	3%	13%	48%
99+100	0.14	0.14	0.16	0.00	75%	36%	25%	32%
Total	0.25	0.43	0.54	1.14	76%	63%	61%	85%

Annexure 20: Total Employment Supported by Exports: Other Manufactured Products

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
103	1.10	1.80	0.47	4.91	98%	100%	98%	100%
105	0.14	0.29	0.25	0.53	53%	56%	62%	83%
76	0.99	0.17	0.23	0.46	94%	60%	73%	63%
56	0.43	0.79	0.39	0.39	12%	12%	11%	22%
104	0.01	0.03	0.10	0.21	99%	99%	100%	100%
74	0.05	0.25	0.06	0.13	51%	81%	15%	15%
58	0.07	0.07	0.07	0.11	29%	20%	21%	33%
55	0.02	0.04	0.12	0.10	48%	68%	32%	67%
57	0.09	0.12	0.08	0.08	59%	31%	25%	33%
102	0.00	0.01	0.01	0.04	75%	82%	62%	79%
101	0.01	0.02	0.03	0.01	100%	100%	16%	55%
64	0.00	0.00	0.00	0.01	9%	42%	24%	50%
75	0.01	0.01	0.01	0.00	21%	54%	23%	16%
Total	2.93	3.60	1.83	6.98	78%	69%	56%	87%

Annexure 21: Total Employment Supported by Exports: Services

IO Code	Total Employment (millions)				Direct Employment (% of total employment)			
	1999-00	2003-04	2007-08	2012-13	1999-00	2003-04	2007-08	2012-13
123	0.25	0.59	2.35	3.40	58%	56%	92%	92%
106	0.31	0.47	0.70	1.87	0%	0%	23%	5%
124	0.31	0.52	1.19	1.78	99%	99%	98%	100%
128+129	1.30	1.81	5.83	1.27	69%	69%	84%	10%
118	0.21	0.29	0.32	0.72	1%	7%	0%	24%
110	1.32	1.68	2.02	0.69	49%	54%	49%	0%
119	0.03	0.09	0.18	0.46	34%	32%	48%	41%
117	0.42	0.70	0.61	0.45	70%	67%	0%	0%
115	0.13	0.18	0.46	0.43	5%	1%	48%	29%
121	0.01	0.06	0.37	0.16	0%	0%	0%	0%
109	0.12	0.18	0.15	0.16	34%	51%	42%	0%
107	0.11	0.12	0.15	0.14	0%	0%	0%	0%
111	0.01	0.01	0.22	0.11	58%	58%	98%	99%
125	0.04	0.22	0.22	0.07	0%	0%	44%	0%
127	0.01	0.04	0.08	0.06	0%	0%	0%	0%
113	0.05	0.08	0.32	0.05	45%	53%	82%	0%
122	0.01	0.04	0.09	0.03	0%	0%	0%	0%
108	0.01	0.01	0.01	0.01	0%	0%	0%	0%
112	0.01	0.01	0.08	0.01	49%	57%	90%	79%
126	0.00	0.00	0.01	0.00	0%	0%	0%	0%
114	0.02	0.02	0.03	0.00	0%	0%	0%	0%
116	4.38	4.12	5.47	0.00	56%	51%	55%	0%
120	0.00	0.00	0.00	0.00	0%	0%	0%	0%
130	0.00	0.00	0.00	0.00	0%	0%	0%	0%
Total	9.07	11.24	20.86	11.87	0.53%	0.51%	0.64%	0.48%

Annexure 22: Total Employment Supported by Exports, All Sectors, 1999-2000 to 2012-13, Millions

IO Code	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
1	5.24	5.23	4.99	4.29	2.95	4.37	5.12	6.03	5.95	5.68	3.85	3.53	2.54	3.53	63.3
2	1.15	1.48	1.95	2.49	2.64	2.68	2.02	1.37	0.59	0.81	0.78	1.02	1.04	2.77	22.8
3	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.5
4+20	1.43	1.49	1.63	1.67	1.50	2.01	2.13	2.26	2.03	2.68	2.65	3.59	4.28	3.57	32.9
5	0.06	0.09	0.14	0.18	0.20	0.37	0.50	0.66	0.71	0.93	0.85	1.02	1.06	0.70	7.5
6+7	0.38	0.39	0.41	0.41	0.33	0.51	0.58	0.69	0.67	0.80	0.69	0.81	0.73	0.88	8.3
8	0.08	0.10	0.13	0.16	0.16	0.28	0.54	0.64	0.65	0.71	0.55	0.69	2.00	2.22	8.9
9	0.08	0.13	0.15	0.19	0.17	0.25	0.20	0.19	0.13	0.21	0.24	0.30	0.66	0.36	3.3
10	0.85	0.75	0.60	0.37	0.09	0.11	0.11	0.10	0.08	0.11	0.10	0.11	0.11	0.07	3.5
11	0.14	0.18	0.23	0.27	0.32	0.47	0.42	0.40	0.34	0.41	0.35	0.39	0.74	0.86	5.5
12	0.22	0.19	0.18	0.16	0.11	0.10	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	1.1
13	1.87	1.80	1.90	1.88	1.58	1.93	1.91	1.88	1.63	2.45	2.60	3.63	4.25	4.52	33.8
14	0.64	0.58	0.49	0.36	0.22	0.41	0.42	0.36	0.25	0.32	0.27	0.33	0.48	0.37	5.5
15	0.03	0.03	0.03	0.03	0.02	0.02	0.07	0.07	0.05	0.09	0.10	0.13	0.16	0.28	1.1
16	0.16	0.19	0.24	0.27	0.26	0.33	0.34	0.35	0.30	0.32	0.24	0.25	0.21	0.18	3.6
17	0.12	0.14	0.15	0.15	0.14	0.26	0.27	0.29	0.26	0.15	0.05	0.03	0.05	0.05	2.1
18+19	1.60	1.84	2.16	2.48	2.38	3.00	2.88	2.77	2.18	2.85	2.63	3.34	3.45	3.97	37.5
21	0.09	0.11	0.14	0.18	0.18	0.28	0.26	0.25	0.21	0.23	0.19	0.25	0.25	0.33	3.0
22 + 24	0.38	0.40	0.46	0.49	0.48	0.69	0.64	0.64	0.54	0.65	0.62	0.94	1.09	0.85	8.9
23	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1
25	0.14	0.14	0.11	0.11	0.18	0.51	0.70	0.06	0.04	0.06	0.06	0.09	0.11	0.11	2.4
26	0.23	0.35	0.15	0.25	0.23	0.23	0.25	0.21	0.15	0.15	0.11	0.11	0.08	0.11	2.6
27	0.07	0.08	0.06	0.08	0.11	0.13	0.12	0.11	0.10	0.14	0.14	0.14	0.10	0.12	1.5
28 + 29	0.01	0.05	0.02	0.03	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.06	0.3
30	0.02	0.06	0.02	0.10	0.05	0.02	0.09	0.08	0.05	0.09	0.11	0.10	0.06	0.04	0.9
31	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.1
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.04	0.00	0.00	0.1
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.1
34	0.01	0.03	0.01	0.02	0.01	0.00	0.01	0.03	0.04	0.03	0.02	0.01	0.01	0.01	0.2
35	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.1
36	0.00	0.00	0.00	0.00	0.01	0.00	0.23	0.20	0.04	0.24	0.21	0.14	0.00	0.00	1.1
37	0.92	0.99	2.63	2.87	4.97	4.54	4.50	3.28	2.54	2.42	1.55	1.13	0.48	0.52	33.3
38+39	0.01	0.02	0.02	0.02	0.02	0.02	0.05	0.05	0.04	0.05	0.05	0.06	0.07	0.07	0.6
40+41	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.3
42	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.01	0.02	0.03	0.03	0.04	0.08	0.05	0.3
43	0.15	0.25	0.20	0.31	0.27	0.33	0.41	0.35	0.26	0.39	0.40	0.53	0.74	0.96	5.5
44	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1

45	0.16	0.15	0.28	0.09	0.09	0.08	0.09	0.08	0.07	0.13	0.17	0.26	0.42	0.47	2.6
46+47	0.74	0.83	0.62	0.77	0.91	0.69	0.67	0.68	0.80	0.65	0.50	0.58	0.68	1.27	10.4
48	0.02	0.02	0.01	0.01	0.01	0.02	0.08	0.09	0.08	0.28	0.42	0.77	0.28	0.04	2.1
49	0.30	0.36	0.29	0.39	0.76	0.60	0.34	0.23	0.17	0.15	0.14	0.15	0.17	0.20	4.2
50	0.08	0.12	0.12	0.19	0.20	0.19	0.07	0.14	0.17	0.22	0.18	0.23	0.14	0.15	2.2
51	0.05	0.05	0.03	0.03	0.03	0.04	0.08	0.07	0.07	0.06	0.04	0.04	0.10	0.11	0.8
52	0.31	0.41	0.36	0.53	0.60	0.52	0.42	0.45	0.49	0.29	0.16	0.13	0.09	0.11	4.9
53+54	2.03	3.80	4.20	4.68	3.87	5.52	2.96	2.62	1.78	2.61	2.54	3.68	7.67	8.19	56.2
55	0.02	0.03	0.06	0.05	0.04	0.08	0.09	0.12	0.12	0.12	0.08	0.07	0.08	0.10	1.1
56	0.43	0.60	0.40	0.50	0.79	0.52	0.49	0.37	0.39	0.32	0.29	0.32	0.33	0.39	6.1
57	0.09	0.11	0.14	0.12	0.12	0.09	0.14	0.11	0.08	0.09	0.07	0.07	0.07	0.08	1.4
58	0.07	0.08	0.05	0.07	0.07	0.08	0.09	0.08	0.07	0.09	0.09	0.11	0.11	0.11	1.2
59	0.18	0.10	0.12	0.07	0.10	0.06	0.04	0.04	0.07	0.07	0.08	0.14	0.34	0.38	1.8
60	0.27	0.23	0.30	0.23	0.27	0.44	0.28	0.23	0.15	0.23	0.22	0.25	0.32	0.35	3.8
61	0.07	0.07	0.06	0.10	0.11	0.07	0.08	0.09	0.08	0.09	0.05	0.06	0.11	0.12	1.2
62+72	0.12	0.11	0.09	0.12	0.23	0.14	0.12	0.14	0.16	0.15	0.12	0.13	0.23	0.22	2.1
63	0.05	0.03	0.02	0.02	0.03	0.02	0.02	0.03	0.04	0.04	0.04	0.04	0.06	0.09	0.5
64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.0
65+66	0.05	0.05	0.09	0.08	0.05	0.05	0.14	0.13	0.07	0.12	0.10	0.11	0.09	0.05	1.2
67	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1
68	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.1
69	0.03	0.03	0.04	0.03	0.02	0.01	0.03	0.04	0.03	0.03	0.01	0.01	0.02	0.03	0.4
70	0.04	0.04	0.08	0.06	0.07	0.09	0.07	0.10	0.15	0.15	0.13	0.14	0.21	0.31	1.7
71	0.05	0.04	0.05	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.5
73	0.08	0.09	0.16	0.13	0.12	0.17	0.16	0.17	0.18	0.12	0.06	0.06	0.05	0.05	1.6
74	0.05	0.08	0.12	0.17	0.25	0.19	0.17	0.12	0.06	0.09	0.08	0.10	0.13	0.13	1.8
75	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.1
76	0.99	0.82	0.64	0.44	0.17	0.19	0.21	0.22	0.23	0.24	0.20	0.25	0.38	0.46	5.4
77+ 78 + 79	0.08	0.12	0.07	0.11	0.18	0.13	0.13	0.17	0.21	0.20	0.16	0.17	0.23	0.25	2.2
80	0.10	0.12	0.05	0.06	0.11	0.06	0.10	0.10	0.13	0.13	0.13	0.13	0.06	0.06	1.4
81	0.14	0.16	0.14	0.16	0.14	0.19	0.24	0.19	0.12	0.16	0.14	0.18	0.25	0.29	2.5
82	0.21	0.26	0.25	0.31	0.26	0.27	0.30	0.29	0.23	0.28	0.23	0.27	0.48	0.62	4.3
83	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.04	0.04	0.2
84	0.01	0.01	0.01	0.02	0.03	0.02	0.01	0.01	0.02	0.02	0.03	0.04	0.03	0.02	0.3
85+87	0.12	0.13	0.17	0.19	0.20	0.24	0.25	0.22	0.16	0.25	0.26	0.33	0.41	0.35	3.3
86	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.03	0.03	0.04	0.03	0.02	0.3
88	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.05	0.05	0.09	0.08	0.08	0.04	0.03	0.5
89	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.1
90	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.1
91+93	0.11	0.09	0.13	0.13	0.11	0.15	0.14	0.19	0.16	0.29	0.26	0.30	0.26	0.25	2.6
92+94	0.05	0.07	0.04	0.05	0.07	0.06	0.05	0.07	0.09	0.11	0.11	0.15	0.66	0.74	2.3

95	0.00	0.00	0.00	0.01	0.02	0.03	0.07	0.07	0.05	0.09	0.10	0.12	0.11	0.24	0.9
96	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.1
97	0.08	0.09	0.13	0.14	0.18	0.19	0.16	0.19	0.23	0.25	0.24	0.31	0.61	0.76	3.6
98	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.11	0.10	0.13	1.0
99 + 100	0.14	0.15	0.15	0.15	0.14	0.15	0.16	0.16	0.16	0.04	0.02	0.01	0.00	0.00	1.5
101	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.01	0.01	0.00	0.01	0.2
102	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.2
103	1.10	1.13	1.98	1.72	1.80	1.66	1.50	0.98	0.47	1.14	1.46	2.47	4.89	4.91	27.2
104	0.01	0.02	0.01	0.02	0.03	0.06	0.01	0.05	0.10	0.09	0.07	0.10	0.19	0.21	1.0
105	0.14	0.15	0.26	0.23	0.29	0.25	0.31	0.27	0.25	0.35	0.44	0.63	1.00	0.53	5.1
106	0.31	0.37	0.41	0.45	0.47	0.55	0.63	0.70	0.70	1.14	1.28	1.47	1.67	1.87	12.0
107	0.11	0.13	0.09	0.12	0.12	0.14	0.20	0.18	0.15	0.15	0.11	0.11	0.11	0.14	1.9
108	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.2
109	0.12	0.15	0.14	0.21	0.18	0.23	0.19	0.18	0.15	0.21	0.20	0.20	0.14	0.16	2.5
110	1.32	1.50	1.33	1.74	1.68	1.79	2.05	2.13	2.02	2.08	1.54	1.27	0.72	0.69	21.9
111	0.01	0.02	0.13	0.02	0.01	0.03	0.12	0.18	0.22	0.17	0.09	0.09	0.10	0.11	1.3
112	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.04	0.08	0.04	0.02	0.01	0.01	0.01	0.3
113	0.05	0.08	0.05	0.06	0.08	0.08	0.12	0.22	0.32	0.27	0.15	0.10	0.04	0.05	1.7
114	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.03	0.02	0.01	0.01	0.00	0.00	0.2
115	0.13	0.12	0.11	0.09	0.18	0.29	0.38	0.44	0.46	0.53	0.44	0.51	0.41	0.43	4.5
116	4.38	4.53	4.97	4.67	4.12	5.23	5.42	5.84	5.47	5.09	3.04	1.69	0.00	0.00	54.4
117	0.42	0.54	0.57	0.79	0.70	0.70	0.69	0.68	0.61	0.57	0.41	0.38	0.41	0.45	7.9
118	0.21	0.21	0.21	0.23	0.29	0.31	0.33	0.33	0.32	0.46	0.47	0.57	0.66	0.72	5.3
119	0.03	0.03	0.04	0.07	0.09	0.10	0.15	0.17	0.18	0.24	0.24	0.30	0.45	0.46	2.5
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
121	0.01	0.03	0.03	0.05	0.06	0.16	0.22	0.30	0.37	0.31	0.22	0.20	0.16	0.16	2.3
122	0.01	0.02	0.03	0.04	0.04	0.06	0.07	0.08	0.09	0.07	0.04	0.03	0.02	0.03	0.6
123	0.25	0.34	0.30	0.51	0.59	1.11	1.56	2.06	2.35	2.55	2.00	2.18	3.33	3.40	22.5
124	0.31	0.42	0.24	0.40	0.52	0.70	0.67	0.94	1.19	1.30	1.23	1.42	1.77	1.78	12.9
125	0.04	0.07	0.08	0.16	0.22	0.13	0.19	0.21	0.22	0.20	0.13	0.11	0.10	0.07	1.9
126	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.0
127	0.01	0.01	0.03	0.04	0.04	0.08	0.12	0.11	0.08	0.09	0.06	0.06	0.06	0.06	0.9
128 + 129	1.30	1.21	1.25	1.59	1.81	2.88	4.84	5.58	5.83	5.37	3.43	2.45	1.20	1.27	40.0
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Total	34.0	37.9	41.2	43.5	43.6	52.1	53.5	53.5	49.0	54.1	44.5	49.3	58.0	62.6	676.8

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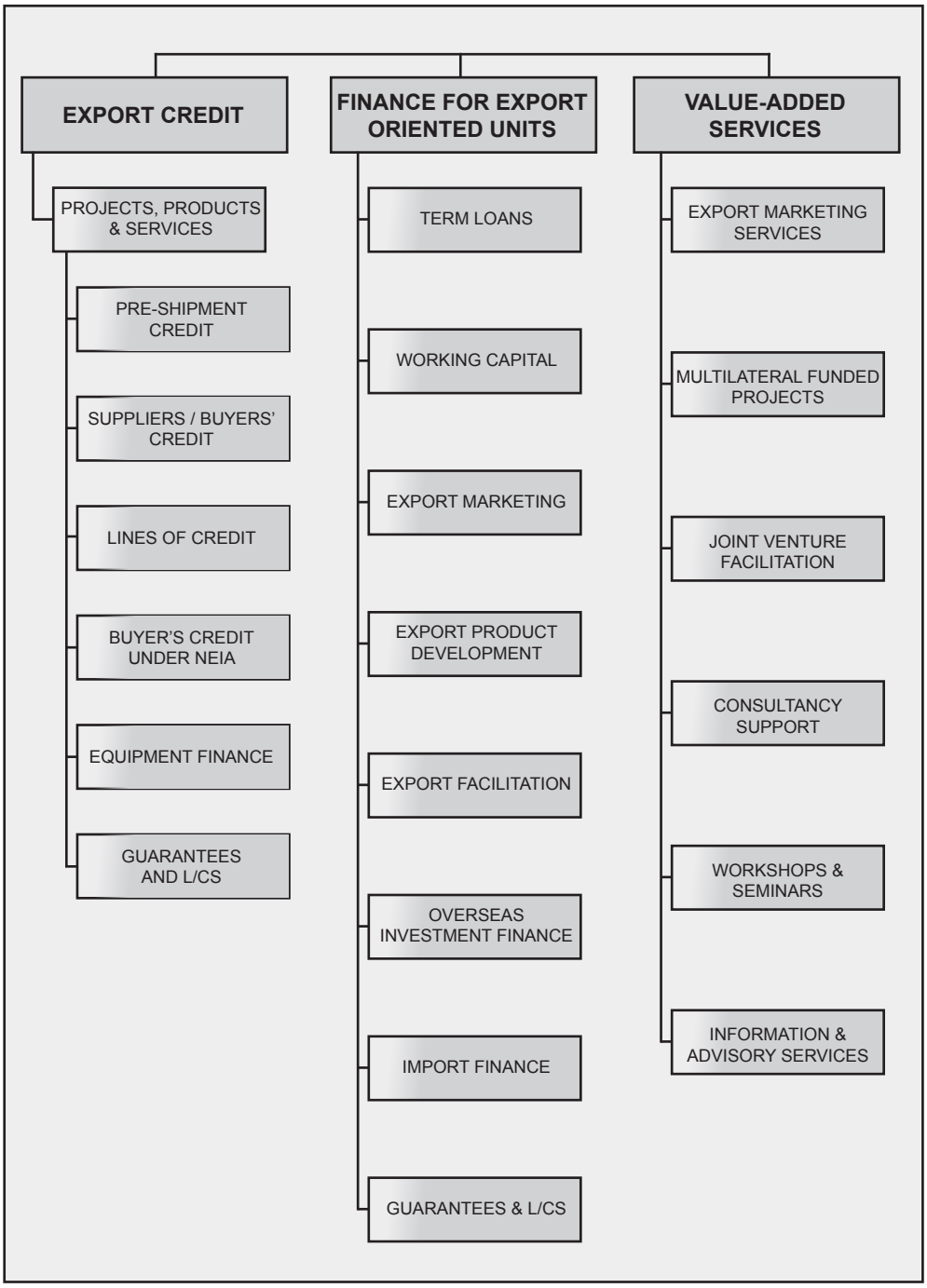

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