

INDIA'S MANUFACTURING SECTOR EXPORT PERFORMANCE: A Focus on Missing Domestic Inter-sectoral Linkages

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INDIA'S MANUFACTURING SECTOR EXPORT PERFORMANCE DURING 1999-2013: A Focus on Missing Domestic Inter-Sectoral Linkages

Smitha Francis*

[Abstract: *Despite the significant trade liberalisation carried out multilaterally as well as under various preferential trade agreements, India's recent manufacturing sector export performance has been poor and been a matter of policy concern. The growing import dependence of the manufacturing sector is also problematic, not the least from the point of view of sustaining export performance. As global and technological challenges related to sustaining India's export growth are continuously on the rise, the focus in this paper is on the core factors which underpin dynamic export competitiveness at the sectoral level. The paper focuses on eight selected major manufactured export sectors for undertaking detailed study, six of which are also India's largest manufactured import sectors. After analysing India's current export competitiveness in these sectors, the paper argues that the lack of continued momentum and even deterioration in the export performance in these major export sectors points towards the dire need to formulate strategic policies to achieve further domestic industrial upgradation. Given that Indian firms already face substantial import and export competition from extensive trade liberalisation, a strategic use of industrial policy tools aimed at improving domestic manufacturing and technological capabilities, which also addresses the market failures in inter-sectoral coordination by interlinking the demand for upstream and downstream industries domestically is required to improve India's export performance.]*

Keywords: *India's manufactured exports, trade policy, import dependence, industrial policy, export competitiveness, market shares, non-tariff barriers, domestic linkages.*

JEL Classification: F140; L500; L600; O250

1. Introduction

Significant trade liberalisation has been carried out as part of India's economic policy reforms especially since 1991. This involved the removal of quantitative restrictions on

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importing capital goods and intermediates, and the reduction of import tariffs on manufactured products. By reducing the so-called anti-export bias of the policy regime in the previous decades, these reforms, together with the devalued currency, were expected to improve the export competitiveness of Indian firms and lead to increased contribution of exports to the Indian economy. The average tariff in the manufacturing sector was brought down steadily over the years, from 117 per cent in 1990–91 to 39 per cent in 1999–2000. By 2009 when some of the recent bilateral and regional free trade agreements (FTAs) and comprehensive economic cooperation/partnership agreements (CECAs/CEPAs) were being negotiated and finalised, India's MFN tariffs on as much as 91 per cent of non-agricultural products were already down to the 5–10 per cent range or below (including zero duty on some tariff lines).¹ However, despite this significant trade liberalisation unilaterally as well as under the various trade agreements, India's recent export growth performance has been a matter of policy concern.

When we consider export growth rates, it is observed that during the first decade of the reforms till 2001–02, India's merchandise exports in dollar terms grew only at the rate of about 8 per cent a year. But the country benefited from a growing world economy during 2003–07, and merchandise exports registered an average growth rate of 24 per cent in these five years before the global financial crisis. However, average export growth decelerated to 16 per cent in the succeeding five years. This period included negative export growth rates during 2009–10 and 2012–13, with adverse fallout on employment and economic growth. The revival in export growth in 2013–14 (at 4.4 per cent) can only be considered small after its decline by 1.8 per cent in 2012–13. The slowdown in export growth since 2009 clearly indicates that India's export performance has suffered despite the apparent additional opening up of markets through FTAs. This in turn implies that Indian exporters have been unable to compete in spite of the import liberalisation that has been carried out.

Meanwhile, the significance of exports of goods and services in the Indian economy has indeed been increasing steadily, and it has come to account for about one-fourth of GDP. When we consider merchandise exports alone, their share in GDP increased from about 8 per cent in 1999–2000 to 16.8 per cent in 2013–14. But even as the value of exports has increased along with rapid external integration of the economy due to increased trade and investment liberalisation, India's share in global merchandise exports has remained low. India's global share inched up from 0.5 per cent in 1990 to one per cent finally in 2006 and reached 1.8 per cent in 2013. This is at a time when developing countries' share in global merchandise exports increased from 24 per cent in 1990 to 38 per cent in 2006 and rose further rapidly to about 45 per cent in 2013.

On the other side, at 2.5 per cent in 2013, India's share in global merchandise imports stands higher than its share in global exports, reflecting the rising import dependence of the economy that has led to the growing trade deficit in the recent past. India's

¹ See Francis and Kallummall (2013).

merchandise trade deficit reached a high of 10.2 per cent of GDP in 2012–13. This declined to 7.2 per cent of GDP in 2013–14, on account of slower imports and the slight recovery in exports (against the negative growth in 2012–13). The growing import dependence of India's manufacturing sector in particular is a cause for major concern, not the least from the point of view of sustaining export performance.

Another issue constraining export performance is the proliferation in the use of non-tariff measures by both developed and developing countries. Non-tariff measures such as sanitary and phyto-sanitary standards (SPS) and technical barriers to trade (TBT) place important technological questions regarding India's ability to increase market access for agricultural and manufactured goods² in a highly competitive world market with an ever-accelerating pace of technological change.

Challenges related to sustaining India's export growth have increased considerably, also because global economic conditions are likely to be less favourable in the coming years than before for a variety of reasons. This includes the cut back of public expenditure in many countries with its adverse implications for employment and growth and, in turn, for demand originating in those markets. India will continue to face adverse market conditions in several or most of its export markets. Experience since the global financial crisis and the Great Recession has strengthened the evidence for long-term effects of recessions (Ball, 2014). Output in many countries remains highly depressed. Unless there is a large economic expansion, which must be necessarily led by fiscal stimulus, which pushes output and employment back to their pre-crisis levels or at least reverse the decline in the growth rates, the damage on economic output from the Great Recession presents a rather bleak picture of global demand.

Despite all these observable facts, the focus most often in the academic and policy literature is only on creating a "favourable" or "enabling" business environment for export promotion. The latter is generally understood to be covered by infrastructure development, creation of an integrated domestic market through tax reforms, labour market "reforms", and recently, trade facilitation³. Lagging infrastructure development is an important supply side factor impacting export competitiveness (just as it impacts the overall development of the country). Inefficient customs procedures and tax reforms that aim at a unified national market also need to be addressed appropriately. Labour market reforms, meant to address the so-called "rigidities" in the labour market, require a separate discussion, which is beyond the scope of this study.⁴ While such horizontal issues that cut across sectors have a

² See Kallummal (2006).

³ For a critical analysis on issues related to trade facilitation, see for instance, Banga (2014).

⁴ However, it is pertinent to note that case studies on India's success in sectors such as automobiles and pharmaceuticals by authors like Baskar (2005), Khan (2010), etc. have countered the argument that the post-1991 liberalisation was responsible for their development and export success, and that more liberalisation, particularly labour market "flexibility" is required to promote exports.

role to play in improving the overall competitiveness of firms, our focus in this paper is on the core factors which underpin dynamic export competitiveness at the sectoral level.

1.1 Some Conceptual Issues

By and large, literature neglects the fact that tariffs are only one among several factors determining export performance. There are several other factors that interplay and determine sustained export competitiveness of a country⁵ such as:

- the size of the economy and its stage of development;
- the level and nature of investments, both domestic and foreign direct investment (FDI);
- the level of technological capabilities and the extent of domestic production diversification, which enable the country to respond to changing patterns of external demand, faster product cycles, changing techno-economic paradigms, etc.;
- the nature of proliferating use of non-tariff measures with technological implications;
- the degree of trade and financial liberalisation that has moulded its development trajectory and keeps influencing macroeconomic and other policy decisions (which in turn impact industrial growth); etc.

Understanding the implications of these inter-linkages is crucially important in policymaking given that countries have become increasingly integrated into global value chains due to extensive trade and financial liberalisation and given the fact that there is increasing consolidation occurring in many product segments along such value chains at the same time. Both of these together have changed the competitive landscape facing Indian exporting firms.

Let us consider that a country's entry into export markets in any sector may come about from any combination of the following possibilities:⁶

1. Direct entry into export markets by indigenous firms;
2. An export strategy of foreign-owned/affiliated firms; or
3. Indirect entry of indigenous firms through sub-contracting or other non-equity forms of foreign alliance.

In any of the above scenarios, an increase in the price competitiveness of domestic products *vis-à-vis* export competitors becomes a necessary prerequisite for entry into export markets

⁵ Francis and Kallummal (2013).

⁶ This section draws on the analytical framework developed in Francis (2003), which critically examined the catching-up product cycle model underlying the 'flying geese paradigm' that was used to propagate FDI-led export growth strategies in the second tier NICs in South East Asia like Thailand.

and expansion in exports.⁷ Relative price competitiveness of a country's products may improve in either of the following ways:

1. Subsidisation of domestic production to offset higher productivity of export competitors in a variety of ways (such as tax concessions and subsidised credit);
2. Presence of exchange rate advantage for exports;
3. Increase in productivity; which could come about due to increased availability of competitive factor inputs because of the presence of a diversified domestic industrial structure and faster increase in labour productivity in comparison to wage rise, or through improved access to competitive imported inputs, etc.

In the case of the first two options, it is ambiguous as to what extent they could offer price advantages beyond the short term given that many countries are providing such tax or credit incentives, or when the currencies of economies that are competing in similar export segments may be depreciating simultaneously.⁸ Further, devaluation is not a policy option in an economy dependent on volatile foreign capital inflows to finance its current account deficit. It is also not an option in an economy with a growing external debt to GDP ratio. Equally importantly, devaluation may not lead to an increase in net export earnings, if exports are significantly import-dependent.⁹

Increase in productivity achieved through liberalised access to competitive imported inputs and intermediates will also not be long-lasting given that the importing country can end up in unsustainable trade deficit situation in the absence of domestic industrial upgradation.¹⁰ Within this scenario/framework, improved access to competitive imported inputs through trade liberalisation offers only transient competitive advantage.

⁷ Clearly, external demand is a critical determinant factor too, whether for entry into export markets or for expansion in exports of any product; whether of low value added or of high value added products. But external demand is an exogenous variable over which national policymakers have very little control. Whether a country's exports of products with high income elasticity will begin growing or not in response to a pick-up in world GDP growth will depend crucially on its price competitiveness vis-à-vis our competitors in the major export markets.

⁸ Price elasticity of exports for a product tells us how sensitive its exports are to a change in prices. If they are less price-elastic, the scope for maintaining or increasing export market share through a price reduction is low. This also implies that improving productivity is extremely important in order to achieve competitiveness. If exports are more price-elastic, there is scope for improving competitiveness through a price reduction. This again can be achieved either through an increase in productivity, or using exchange rate devaluation.

⁹ Further, because of the increase in capital inflows in the 2000s that peaked before the global financial crisis of 2007–08, Indian exports were facing a trend of appreciating real effective exchange rate. In this phase, it was primarily liberalised access to imported inputs and the increase in world demand growth that drove India's rapid export growth during the 2002–08 period. See for instance, Veeramani (2008).

¹⁰ See also Francis and Kallummal (2013).

Only domestic industrial upgradation and technological capabilities that make competitive factor inputs available domestically and enable the introduction of higher value-added and more advanced products successively, which leads to export competitiveness in a dynamic sense. Thus increasing the contribution of exports to domestic employment and income generation fundamentally depends on increasing domestic productive capacities and productivity *vis-à-vis* competitors. That is, the presence of a well-diversified domestic manufacturing production base with dynamic technological capabilities and a skilled labour force, which enable firms to respond to changing patterns of external demand, faster product cycles and changing techno-economic paradigms, regulatory standards, etc., become of prime importance in obtaining and maintaining export market access in the ever-changing global economy.

Therefore, policies towards export promotion cannot be viewed in isolation from the policies needed to support continuous production and technological upgradation as well as skill development across a broad spectrum of sectors to improve productivity, and policies to enable domestic forward and backward linkages to support sustainable industrial development and structural change towards higher value added activities. These clearly fall in the realm of industrial policy. The experiences of all successful old and new industrialisers and leading global exporters such as the US, EU, Japan, South Korea, Taiwan, etc. as well as China also show that sustainable export expansion (and industrial development) cannot be achieved without linking trade policy with a national industrial development strategy.¹¹

This is the major point of departure of this study; that export growth is not considered an end in itself. For a large country like India with its huge domestic market, if exports have to play their macroeconomic role of supporting balance of payments and serve as a competitive pressure on domestic firms to improve their productivity and technological capabilities at the micro level, there has to be strategic coordination between trade and industrial policies to foster domestic inter-sectoral linkages in increasing returns activities in a manner that reinforce scale economies and positive externalities.

1.2 Objectives and Methodology

This paper seeks to contribute to the contemporary policy discussion about factors constraining India's manufacturing sector export performance in order to make sectoral level policy suggestions. It presents an overview of India's export dynamics for the last 15 years covering the period 1999–2000 to 2013–2014 against the backdrop of the growing trade deficit. The focus is on the changing performance of manufactured exports at the 2 digit level. The fifteen years are split into two periods, 1999–2008 and 2009–2013, with the

¹¹ See Wade (1990), Amsden (1992), Lall (1996), Chang (2002), Shafaeddin (2006), UNCTAD (2014), etc. for extensive discussions of the continuous role played by strategically coordinated trade and industrial policies in the technologically advanced early and late industrialisers.

2008 global financial crisis as the truncating year. After identifying and merging the top ten 2 digit manufactured export sectors during the pre- and post-crisis periods, we create a combined list of India's major manufactured export sectors at the 2 digit level. In the context of the increased two-way trade in many sectors that was identified in Francis (2011), the paper also presents an analysis of India's imports at the 2 digit level. Covering the major manufactured sectors that are involved in exports and imports, the following eight manufactured sectors are identified and taken up for detailed sectoral analysis:

1. Gems and jewellery
2. Organic chemicals
3. Pharmaceutical products
4. Non-electrical machinery and parts
5. Electrical machinery and parts
6. Vehicles and parts
7. Iron and steel
8. Ores, slag and ash

In order to identify India's current export competitiveness in these sectors, the study assesses India's existing market share position in these sectors globally as well as in her top ten markets for each of these export sectors. The change in product composition at the 6 digit level between the pre- and post-crisis periods are also analysed for each of these sectors. The study uses the results of this detailed disaggregated analysis of exports together with analysis of imports and findings from secondary literature, to throw light upon the lack of domestic linkages in the Indian manufacturing sector and to make policy suggestions based on the analytical framework discussed above.

We have used the Export Import Databank available online from the DGCIS for the identification of India's major export sectors, their product composition, and their top markets. The same is also used for analysing overall trends in India's imports. This data is available according to the Indian Trade Classification (ITC) based on Harmonised System (HS). For the analysis of changes in India's competitive position in the global markets and in India's top ten export markets, data from WITS Comtrade based on Harmonised System (HS) is used. All trade data in this study that is based on the DGCIS Export-Import Databank refers to financial years. Thus the study period 1999–2013 covers the 15 financial years 1999–2000, 2000–01, and so on, till 2013–14. However, data from WITS Comtrade refers to calendar years. In this case, the period 1999–2013 refers to calendar years.

Evidently, understanding the export dynamics of the other sectors that are growing the fastest as well as sectors that constitute at least a one per cent share in India's total manufactured exports also remains important. However, examining along the conceptual framework discussed earlier, this study focuses on the selected eight manufactured sectors for undertaking detailed analysis.

This paper is organised as follows. In Section II, we analyse the growth trends in India's overall merchandise exports, placing them against the growth in imports and trade

balance. Subsequently, changes in the composition India's manufactured exports and imports are examined at the HS 2 digit level, following which the sectors for detailed analysis are identified. This section also analyses changes in the composition of India's export destinations. The third section examines the changes in India's global market share position in the selected manufactured export sectors. This section also presents the results of detailed market share analyses for India, for each these major manufactured export sectors in their respective top ten export markets. The fourth and the final section derives generic and sectoral policy implications against the backdrop of the findings and the conceptual framework.

2. Major Trends in India's Merchandise Trade

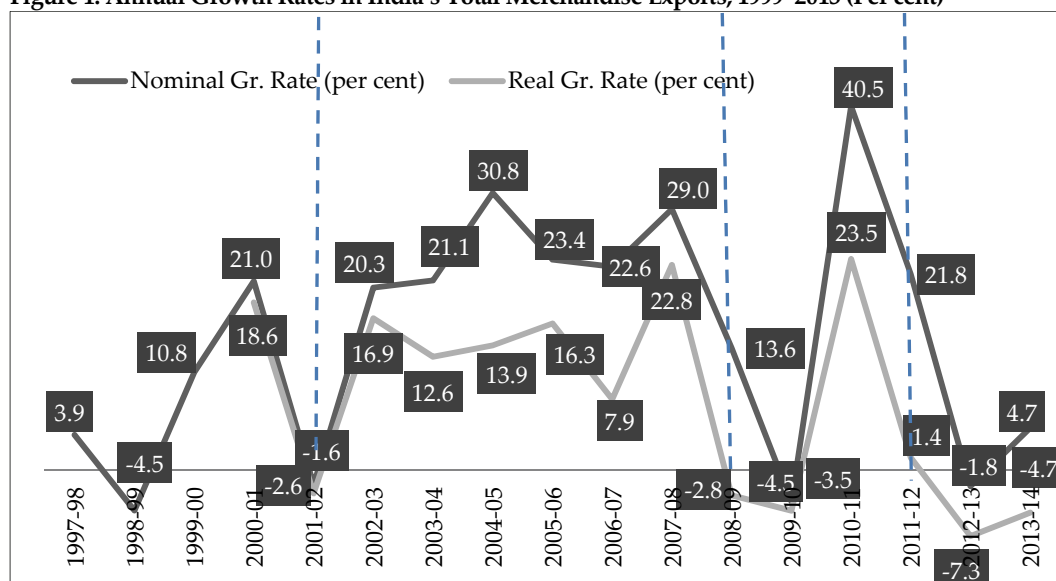
2.1 Growth in Merchandise Exports

To begin with, we examine the trends in the annual growth rates of India's merchandise exports over the fifteen year period, i.e., 1999–2013, in order to identify any structural breaks in their performance. Based on the observed annual trends (See *Figure 1*), the pre- and post-crisis periods, namely, 1999–2008 and 2009–2013, may be split into shorter sub-periods, namely, 1999–2001 (with an average annual growth rate of 10.1 per cent), 2002–2008 (23 per cent), 2009–11 (19.6 per cent), and 2012–13 (1.4 per cent). It is evident that except for the 2002–08 sub-period when the world economy was growing rapidly, Indian exports have seen significant fluctuations in growth rate. Further, this 15-year period saw four years of negative growth rate in exports, namely, 1998–99 (-4.5 per cent), 2001–02 (-1.6 per cent), 2009–10 (-3.5 per cent) and 2012–13 (-1.8 per cent); all linked in one way or the other to financial crises and associated economic slowdown.

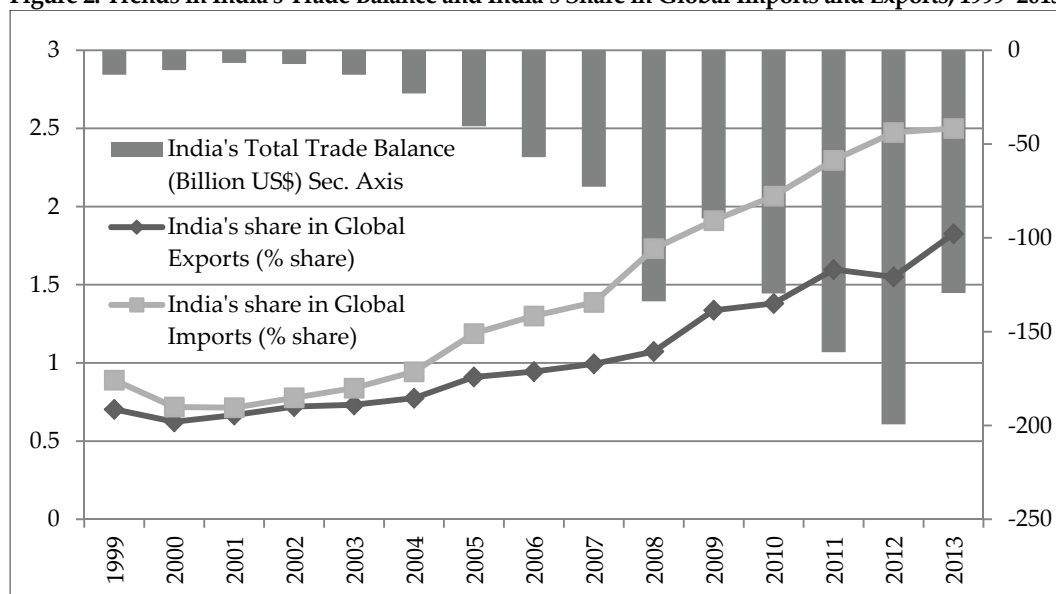
When we consider real growth rates in merchandise exports,¹² growth in India's exports were lower, and the downturns even sharper than those observed for nominal export growth rates. Moreover, even during 2013–14, India's merchandise exports registered a negative growth rate of 4.7 per cent (*Figure 1*) when considered in real terms.

At the same time, imports have been growing faster than exports. As a result, India's global trade deficit increased from US\$12.9 billion in 1999 to US\$190.3 billion in 2012, before declining to US\$135.8 billion in 2013 due to slower import growth. Further, as mentioned in the Introduction, even as India's share in global merchandise exports grew very slowly to 1.8 per cent by 2013, its share in global merchandise imports increased to 2.5 per cent in 2013 (See *Figure 2*).

¹² Nominal exports were deflated using the export price index series (base 1999–2000=100) available from the RBI.

Figure 1: Annual Growth Rates in India's Total Merchandise Exports, 1999–2013 (Per cent)

Source: Author's calculation based on DGCIS Export-Import Data Bank, Ministry of Commerce.

Figure 2: Trends in India's Trade Balance and India's Share in Global Imports and Exports, 1999–2013

Source: Author's calculation based on WITS Comtrade data.

2.2 Changing Composition of Merchandise Exports

In order to contextualise the performance of India's manufactured exports, we begin by analysing the changes in India's overall merchandise exports at the HS 2 digit level.

During both the 1999–2001 and 2002–2008 sub-periods, India's exports were dominated by gems and jewellery, with a 16 per cent share in the total. But there was a distinct change at the second rank between the two phases. During 1999–2001, the second largest export sector was articles of apparel and clothing (not knitted or crocheted) with a share of about 8 per cent in total exports. But this share dropped below 5 per cent during 2002–08, and petroleum and petroleum products came to occupy the second rank with a share of 11 per cent. In 2006–07 it already overtook gems and jewellery as India's largest merchandise exports; but this is not captured in the period average share.

Another significant change occurred in the case of cotton whose share dropped from the 3rd to the 10th rank between 1999–2001 and 2002–2008. The other top ten merchandise export sectors during 1999–2001 were: articles of apparel and clothing (knitted or crocheted); organic chemicals; non-electrical machinery; fish and crustaceans; electrical machinery; and other made-up textile and clothing articles.¹³ However, during 2002–08, fish and crustaceans and other made-up textiles and clothing articles moved out of the top ten ranks, replaced by iron and steel as well as ores, slag and ash.

For the three year period that immediately followed the 2008 global financial crisis, that is, during 2009–11, petroleum and petroleum products became the largest merchandise export sector, and gems and jewellery was pushed to the second rank. While articles of apparel and clothing (not knitted or crocheted) dropped down to the eighth rank, electrical machinery and parts gained in share and came up to the third rank. Three sectors: iron and steel; ores, slag and ash; and articles of apparel and clothing (knitted or crocheted) moved down from the top ten list, and were replaced by miscellaneous goods, vehicles and parts, and pharmaceuticals. Organic chemicals and non-electrical machinery continued to be significant; while cotton came into the top ten list again.

There was a further break in the composition of merchandise exports between 2009–11 and 2012–13. While petroleum and petroleum products continued to dominate and came to account for one-fifth of India's exports by 2012–13, for the first time the share of gems and jewellery showed a distinct decline—from about 16 per cent during 2009–11 to about 14 per cent during 2012–13 (See *Table 1*). On the other side, vehicles and parts increased its ranking from 7th during 2009–11 to 3rd during 2012–13, and organic chemicals retained its fourth rank. Further, non-electrical machinery and parts came up to the 5th rank, followed by pharmaceutical products and electrical machinery and parts.

But one of the most significant increase in share occurred in the case of cereals, with its share going up from 1.7 per cent to 3.3 per cent between 2009–11 and 2012–13. In fact, during 2012–13, cereals replaced articles of apparel and clothing (not knitted or crocheted) from the top ten merchandise exports list. With a slight increase in their shares, cotton as well as iron and steel came up to the top ten list again.

¹³ These changes are not observable in the given table.

It is seen that the cumulative share accounted by the top ten largest export sectors increased only slightly from 61 per cent of total exports to 62.5 per cent. This increase in concentration was mostly due to the increase in the share of petroleum and petroleum product exports, followed by agricultural products. This points towards the poor performance of India's manufactured exports in the post-crisis period, which we will establish again at the disaggregate level in later sections.

Table 1: India's Major Merchandise Exports at the HS 2-Digit Level, 1999–2013

(Period average percentage share in total merchandise exports; sectors arranged based on their ranks during 2012–13)

<i>SN Chapter Sector</i>	<i>1999–2001</i>	<i>2002–08</i>	<i>2009–11</i>	<i>2012–13</i>	<i>Difference between the 4th and 2nd phases</i>
1 27 Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	3.2	11.3	17.3	20.6	9.3
2 71 Natural or cultured pearls, precious or semiprecious stones, premetals, clad with premetal and articles thereof; imitation jewelry; coin	18.0	15.3	16.4	13.9	-1.4
3 87 Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	2.0	2.9	3.6	4.1	1.2
4 29 Organic chemicals	3.8	4.3	3.9	3.9	-0.4
5 84 Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	3.2	4.0	3.7	3.8	-0.1
6 30 Pharmaceutical products	2.3	2.5	2.8	3.4	0.9
7 85 Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts	2.7	3.2	4.0	3.4	0.2
8 10 Cereals	1.9	2.1	1.7	3.3	1.2
9 52 Cotton	5.3	3.1	2.8	3.1	0.0
10 72 Iron and steel	2.4	4.1	2.7	2.8	-1.3
Cumulative share of top ten sectors	44.7	52.9	58.7	62.5	9.6
11 62 Articles of apparel and clothing accessories, not knitted or crocheted	8.1	4.7	2.9	2.6	-2.1
12 73 Articles of iron or steel	2.2	2.7	2.4	2.3	-0.4
13 61 Articles of apparel and clothing accessories, knitted or crocheted	4.2	3.3	2.1	2.0	-1.3
14 39 Plastic and articles thereof	1.5	2.0	1.6	1.8	-0.2
15 63 Other made up textile articles; sets; worn clothing and worn textile articles; rags	2.5	2.0	1.3	1.4	-0.6
16 99 Miscellaneous goods	2.4	1.4	3.8	1.3	0.0

<i>SN Chapter Sector</i>	<i>1999– 2001</i>	<i>2002–08</i>	<i>2009–11</i>	<i>2012–13</i>	<i>Difference between the 4th and 2nd phases</i>
17 3 Fish and crustaceans, molluscs and other aquatic invertebrates	3.0	1.5	1.0	1.3	-0.2
18 2 Meat and edible meat offal	0.6	0.6	0.8	1.3	0.7
19 89 Ships, boats and floating structures	0.2	0.8	2.0	1.2	0.4
20 13 Lac; gums, resins and other vegetable saps and extracts	0.6	0.3	0.6	1.1	0.8
21 88 Aircraft, spacecraft, and parts thereof	0.1	0.2	0.7	1.1	0.9
22 23 Residues and waste from the food industries; prepared animal fodder	1.1	1.0	0.9	1.0	0.0
23 38 Miscellaneous chemical products	1.0	0.9	0.9	1.0	0.0
Cumulative share of 23 sectors*	72.2	74.4	79.9	81.8	7.4

Note: * These cover all the sectors which had an average share of at least one per cent in India's manufactured exports during the last sub-period 2012–13.

Source: Author's calculation based on DGCIS Export-Import Data Bank.

2.3 Changing Direction of Merchandise Exports

There is significant diversification in India's export destinations when we analyse the trends in the composition of India's export markets during 1999–2013. The cumulative export share accounted by India's top twenty export markets declined steadily between 1999–2001 and 2012–13, from about 75 per cent to 68 per cent respectively. Further, over this fifteen-year period, there has been a clear decline in the share of developed countries as destination for India's exports and an increase in the share of developing countries.¹⁴ The share of developed countries fell drastically from 80 per cent in 1999 to about 60 per cent in 2013. Simultaneously, the share of developing countries went up from about 20 per cent during 1999–2001 to 36.4 per cent in 2013.¹⁵

One of the striking aspects is that India's overall dependence on its largest traditional market—the US—has declined significantly. While the US singlehandedly accounted for more than a quarter (about 21 per cent) of India's global exports during 1999–2001, its share declined continuously and stood just above 12 per cent during 2012–13 (See *Table 2*).

Japan as well as the developed countries of the European Union (EU), i.e., the UK, Germany, Belgium, Italy and France, which were among the top ten export markets for

¹⁴ Developing countries consist of low income economies and middle income economies, and developed countries consist of high income economies as defined by the World Bank. For details, see http://data.worldbank.org/about-country-and-lending-groups#Lower_middle_income

¹⁵ The shares of developed and developing country categories do not add up to 100 per cent; the remaining being accounted for by 'unspecified countries'.

India during 1999–2001, also experienced a continuous decline in their shares in India's total exports. While the UK and Germany have remained among India's top ten markets, Japan, Belgium and Italy dropped in rank. However, another EU country, the Netherlands, has become one of the top ten markets.

Table 2: India's Top Ten Export Markets, 1999–2013

SN	Country	1999–2001	2002–2008	2009–11	2012–13
1	USA	21.0	15.9	10.8	12.2
2	UAE	5.7	9.1	12.9	10.9
3	China	1.8	5.7	6.2	4.6
4	Singapore	2.0	4.3	4.6	4.3
5	Hong Kong	6.0	4.3	4.2	4.1
6	Saudi Arabia	1.9	2.0	2.0	3.6
7	Netherlands	2.1	2.4	3.2	3.0
8	U K	5.2	4.4	3.1	3.0
9	Germany	4.4	3.5	2.8	2.4
10	Japan	4.0	2.5	2.0	2.1

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Meanwhile, the UAE, China and Singapore registered significant increase in their shares in India's total exports during 2002–08 and 2009–11. However, all the three markets saw a decline in exports from India during 2012–13.

The United Arab Emirates (UAE), which held a 5.7 per cent share in India's total exports during 1999–2001, more than doubled its share to nearly 13 per cent and had overtaken the US as India's biggest export market during the global recession period of 2009–11. Subsequently, it declined to the second rank behind the US during 2012–13.

China's share in India's total exports increased steadily from 2001 onward—from less than 2 per cent to more than 6 per cent during the second half of the 2000s—to become the third most important export market for India. However, there was a drop in China's share, too, during 2012–13 (*Table 2*).

At the same time, Hong Kong, which was the second largest market for India during 1999–2001, has seen a continuous decline in the share of total exports going to that country (even as it remains among the top ten export destinations). During 2012–13, Saudi Arabia also showed an increase in its share in India's total exports and became one of the top ten markets.

Among the other significant export destinations shown in *Table 3*, Brazil, South Africa, and Vietnam have shown increased shares in India's total exports between 1999–2008 and 2009–2013, while Malaysia held its share steady during the two periods. On the other side, Bangladesh and Indonesia have remained significant export destinations despite a minor fall in their shares between these two periods (*Table 3*).

Other countries with at least a one per cent share in India's total exports that showed an increase were Turkey, Iran, Kenya, Israel and Nepal, while there were marginal falls in the shares of Sri Lanka, South Korea and Thailand in the post-2008 period.

Country-wise growth rates estimated for India's exports also clearly establish that in the period under study (*Appendix Table 1*), there was a distinct decline in the growth rate of India's exports to the developed countries. At the same time, Indian exports to the developing country markets of Saudi Arabia, Brazil, Kenya, Vietnam, Turkey, Iran, Nepal and South Africa recorded above average growth rates during both 1999–2008 as well as 2009–2013 periods. India's exports to these markets are growing steadily. *Table 3* also reveals that Indian exports going to countries such as Indonesia, Malaysia, Sri Lanka, South Korea and Singapore—with which India has FTAs—have all declined in growth rates between the two periods, while Japan and Thailand were exceptions.¹⁶

Table 3: India's Other Major Export Markets, 1999–2013

SN	Country	1999–2001	2002–2008	2009–11	2012–13
1	Belgium	3.4	2.8	2.2	1.9
2	Brazil	0.5	1.0	1.6	1.9
3	Bangladesh	2.0	1.9	1.3	1.8
4	Indonesia	1.0	1.5	2.1	1.7
5	South Africa	0.8	1.3	1.4	1.7
6	France	2.3	1.9	1.9	1.6
7	Italy	2.9	2.5	1.8	1.6
8	Vietnam	0.5	0.8	1.1	1.5
9	Malaysia	1.4	1.4	1.5	1.4
10	Sri Lanka	1.4	1.8	1.4	1.4
11	South Korea	1.1	1.6	1.6	1.4
12	Turkey	0.6	0.9	1.0	1.4
13	Iran	0.5	1.3	0.9	1.3
14	Kenya	0.3	0.7	0.8	1.2
15	Israel	1.1	1.1	1.2	1.2
16	Thailand	1.3	1.2	0.9	1.2
17	Nepal	0.4	0.8	0.9	1.1

Note: Countries listed in Tables 2 and 3 together represent all destinations with at least a one per cent average share in India's exports during 2012–13.

Source: Author's calculation based on DGCIS Export-Import Data Bank.

There is a case for arguing for further diversification of India's export markets, given that the greater the diversification, the lesser is the likelihood for adverse impacts on India's exports of any slowdown in demand from particular markets.

¹⁶ There was also a marginal increase in the shares of Indian exports going to these countries during 2012–13.

2.4 Changing Composition of Manufactured Exports

We now exclude agricultural products as well as oil products for identifying India's major 2-digit manufactured export sectors. The omitted sectors belong to the following chapters: 1–24, 27, 33, 35, 41, 43, and 50–53.¹⁷

It is observed that in the last two instances of sharp decline in India's merchandise export growth rates, that is, in 2009–10 and 2012–13, manufactured export growth declined sharper than the decrease in India's merchandise exports growth. While the average merchandise export growth rates were -3.5 per cent and -1.8 per cent respectively in these two years, average growth rates in manufactured exports were -5.3 per cent and -7.4 per cent respectively. This reflects the dismal performance of manufactured exports in the post-crisis period.

As seen in *Table 4*, gems and jewellery¹⁸ dominated India's non-oil manufactured exports throughout the study period 1999–2013. While articles of apparel and clothing (not knitted or crocheted) was the second largest contributor to non-oil manufactured exports during 1999–2008, there was a significant drop in its share between 1999–2008 and 2009–13, from nearly 8 per cent to 4 per cent. The other sectors that were among the top ten manufactured exports during the pre-crisis period (1999–2008) were: organic chemicals; non-electrical machinery & parts; iron and steel; electrical machinery & parts; articles of apparel and clothing (knitted or crocheted), ores, slag and ash; vehicles and parts; and articles of iron and steel (*Table 4*).

In the post crisis period during 2009–13, organic chemicals became the second largest manufactured export sector following gems and jewellery. Meanwhile, with a significant increase in its share, vehicles and parts came up to the third rank. While articles of apparel and clothing (not knitted or crocheted) dropped down to the 8th rank in the top ten list during 2009–13, pharmaceuticals and miscellaneous goods followed non-electrical and electrical machinery sectors into the higher ranks. On the other side, while articles of apparel and clothing (knitted or crocheted) and ores, slag and ash moved out of the top ten list, iron and steel as well as articles of iron and steel came to occupy the 9th and 10th ranks. Overall, as seen in *Table 4*, there was a slight increase in concentration among the top ten manufactured export sectors between the pre- and post-crisis periods, which was contributed mainly by the increase in the shares of vehicles and parts, gems and jewellery, electrical machinery and parts, as well as pharmaceuticals.

¹⁷ The WTO's classification of agricultural products excludes the fisheries sector and includes it in the manufacturing sector in the case of the negotiations on non-agricultural market access or NAMA under the WTO. However, we exclude fisheries exports also in this study as the focus is to capture manufactured exports.

¹⁸ In this paper, gems and jewellery is being used to refer to the sector 'Natural or cultured pearls, precious or semiprecious stones, precious metals, clad with precious metal and articles thereof; imitation jewellery; coin'. Similarly, non-electrical machinery and parts is being used to refer to the sector 'Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof'.

Table 4: India's Top Ten Manufactured Exports at the 2-Digit Level during 1999–2013*

(Period average percentage share in total manufactured exports; sectors arranged based on their ranks during 2009–2013)

<i>SN</i>	<i>Chapter</i>	<i>Commodity</i>	<i>1999–2000 to 2008–09</i>	<i>2009–10 to 2013–14</i>
1	71	Natural or cultured pearls, precious or semiprecious stones, precious metals, clad with precious metal and articles thereof; imitation jewellery; coin	21.8	23.0
2	29	Organic chemicals	5.7	5.9
3	87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	3.5	5.7
4	84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	5.1	5.7
5	85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts	4.2	5.6
6	30	Pharmaceutical products	3.4	4.6
7	99	Miscellaneous goods	2.3	4.2
8	62	Articles of apparel and clothing accessories, not knitted or crocheted	7.7	4.1
9	72	Iron and steel	4.9	4.1
10	73	Articles of iron or steel	3.5	3.6
Cumulative share of the above			62.0	66.5
Total manufactured exports (Billion US\$)			55.9	178.7

Note: *These exclude chapters: 1–24, 27, 33, 35, 41, 43, and 50–53.

Source: Author's calculation based on DGCIS Export-Import Data Bank.

The above compositional analysis of India's top ten manufactured exports at the HS 2-digit level during the pre- and post-crisis phases gave us the following combined list of 12 major manufactured export sectors:

1. Gems and jewellery
2. Organic chemicals
3. Vehicles and parts
4. Non-electrical machinery and parts
5. Electrical machinery and parts
6. Pharmaceutical products
7. Iron and steel
8. Articles of apparel and clothing accessories, not knitted or crocheted
9. Articles of iron or steel
10. Articles of apparel and clothing accessories, knitted or crocheted
11. Ores, slag and ash
12. Miscellaneous goods

Together they accounted for about 72 per cent of total manufactured exports.

It is significant to note that since the early 2000s there has been a huge gap in the share accounted for by India's largest manufactured export sector (gems and jewellery) and the second largest export sector, vehicles and parts (*Table 4*). This reflects the heavy dependence of India's manufactured sector export performance on the vagaries affecting a single sector, namely, the gems and jewellery sector. On the other side, it is also significant that with their post-crisis average shares in total manufactured exports (i.e., during 2009–10 to 2013–14) ranging between 5.6 per cent and 5.9 per cent, there was no significant difference in the average shares of the four export sectors occupying the 2nd, 3rd, 4th and 5th ranks, namely: vehicles and parts; organic chemicals; non-electrical machinery and parts; and electrical machinery and parts. This was followed by pharmaceuticals with an average share of 4.6 per cent.

However, it is pertinent to note that India's manufactured exports in the post-crisis years were not focussed on sectors that dominated global export growth. Indian manufactured sectors that recorded the fastest average export growth rates during the period 2009–13 (See *Appendix Table 2*) were: tin and its products; nickel and its products; lead and its products; railway or tramway locomotives, tracks and their parts; arms and ammunition and parts; pulp of wood or other cellulosic material, waste of paper, paperboard, etc. Additionally, aircraft, spacecraft and parts thereof; ceramic products; specialised textile products; and copper and its products were the other fast growing manufactured exports. Overall, the various metal and metal products industries were observed to have registered high growth in exports in the post-crisis phase. Among these, copper and its products were the only fast growing Indian export sector among the fastest growing global manufactured export sectors (See *Appendix Table 3*).

2.5 Changing Composition of Manufactured Imports

The composition analysis of imports shown in *Table 5* reveals that the gems and jewellery sector has also been the largest contributor to India's manufactured imports in both the pre- and post-crisis periods. The sector accounted for an average share of 17 per cent in total manufactured imports. It was followed by non-electrical and electrical machinery sectors, with average shares of about 8 per cent and 7 per cent of total manufactured imports during 2009–13. There was a slight drop in the import share of non-electrical machinery and parts, when compared to the pre-crisis period (*Table 5*). But the import share of electrical machinery and parts remained steady. Additionally, organic chemicals, iron and steel, as well as ores, slag and ash, which were among the top ten manufactured exports, were also among the top ten manufactured imports during 2012–13.

The other significant manufactured import sectors were: plastics and its products; ships, boats and floating structures; and the sector 'Optical, photographic cinematographic, measuring, checking, precision, medical or surgical Inst. and apparatus parts and accessories thereof'. The cumulative share of the top ten manufactured import sectors (*Table 5*) shows that India's manufactured imports have been much more diversified than manufactured exports (*Table 2*).

Table 5: India's Top Ten Manufactured Imports at the 2-Digit Level during 1999–2013*

(Period average percentage share in total manufactured exports; sectors arranged based on their ranks during 2009–2013)

SN	Chapter	Commodity	1999–2000 to 2008–09	2009–10 to 2013–14
1	71	Gems and jewellery	17.1	16.8
2	84	Non-electrical machinery and parts thereof	8.7	7.5
3	85	Electrical machinery and parts thereof	6.7	6.8
4	29	Organic chemicals	3.4	3.4
5	72	Iron and steel	2.5	2.7
6	39	Plastic and articles thereof	1.5	2.0
7	89	Ships, boats and floating structures	1.3	1.2
8	26	Ores, slag and ash	1.0	1.5
9	90	Optical, photographic cinematographic, measuring, checking, precision, medical or surgical Inst. and apparatus parts and accessories thereof	1.9	1.4
10	99	Miscellaneous Goods	0.3	1.0
Cumulative share of the above			44.5	44.2
Total manufactured imports (Billion US\$)			129.3	417.7

Note: *These exclude chapters: 1–24, 27, 33, 35, 41, 43, and 50–53.

Source: Author's calculation based on DGCIS Export-Import Data Bank.

What is more pertinent from the point of view of this study is that apart from miscellaneous goods, which is a residual sector, as many as 6 out of the top ten manufactured exports were also among the top ten manufactured imports. Among these, we take up the following six sectors, namely, gems and jewellery, non-electrical machinery and parts, electrical machinery and parts, organic chemicals, iron and steel, and ores, slag and ash, for a detailed analysis. In addition, to bring out the integral linkages that arise between organic chemicals and pharmaceuticals due to the manner of classification of pharmaceutical and related products,¹⁹ we include pharmaceuticals also. Moreover, pharmaceuticals were the sixth largest manufactured export sector in the post-crisis period. In addition, vehicles and parts, which were India's third largest export sector in the post-crisis period, are also included in order to cover all the top five manufactured export sectors. This sector also assumes significance in the context of inter-sectoral linkages.

In the next section, we will carry out an analysis of the changes in India's relative competitiveness between the pre- and post-crisis periods and the changes in their product composition at the 6 digit level, for each of these top eight manufactured export sectors.

¹⁹ This will be discussed later on.

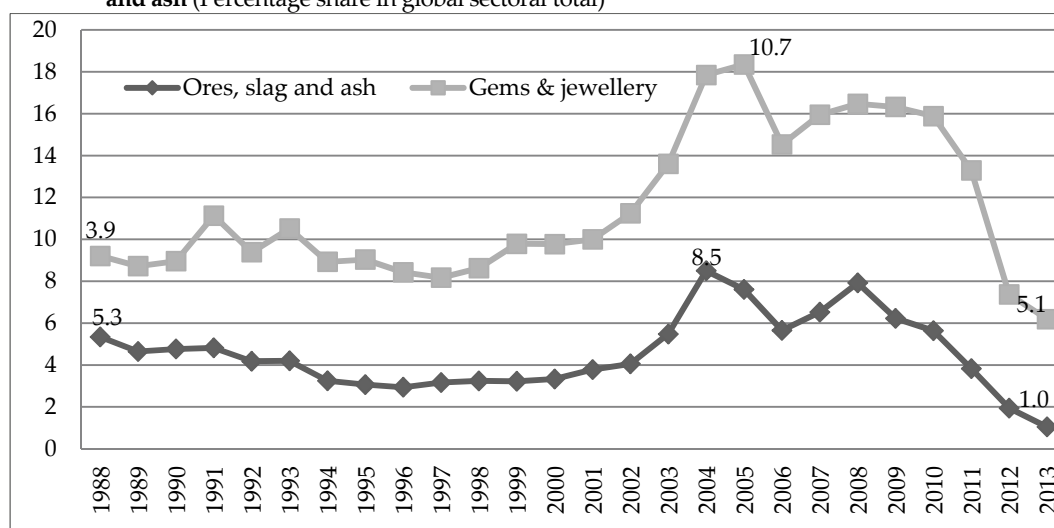
3. Analysis of India's Competitiveness in Major Manufactured Export Sectors

3.1 India's Global Market Share in the Selected Sectors

At the outset, in order to understand India's export market position globally, we undertake market share analysis for India in the global export markets for each of the eight major manufactured export sectors, six of which are also the largest manufactured import sectors. Using WITS Comtrade data, we consider data from 1988–90 onward to obtain a long-term perspective of India's global market position for these export sectors.

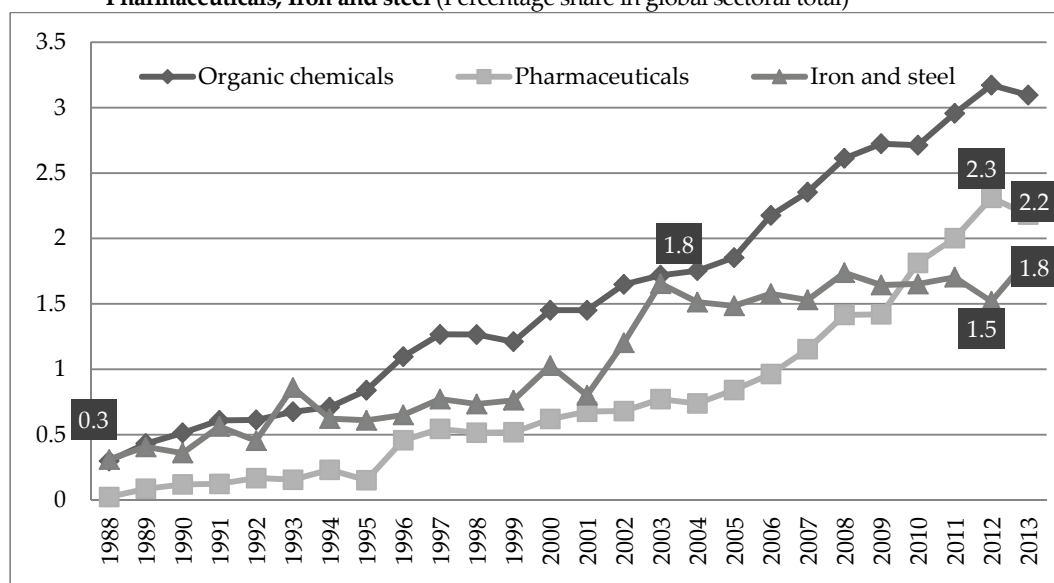
Analysis of India's global share in the selected export sectors clearly reveals (See *Figures 3, 4 & 5*) that the only two sectors in which India had any significant presence in the global export markets during 1988–90, before the economic reforms began in full swing, were ores, slag and ash (Chapter 26, with an average 4.9 per cent global share during 1988–90) as well as gems and jewellery (Chapter 71, with an average global share of 4 per cent). But India's global share of the ores, slag and ash sector declined subsequently, and rose again only during 2002–08 (*Figure 3*). Thereafter it declined drastically to just 1.5 per cent during 2012–13. Meanwhile, in the case of gems and jewellery, India's share in global exports rose more or less continuously. It peaked at 10.7 per cent in 2005, when India overtook Switzerland as the world's largest gems and jewellery exporter. However, from 2010 onward, India's global share in gems and jewellery declined steadily and it stood just above 5 per cent in 2013.

Figure 3: India's Share in Global Exports in the Top Export Sectors: Gems and jewellery; Ores, slag and ash (Percentage share in global sectoral total)



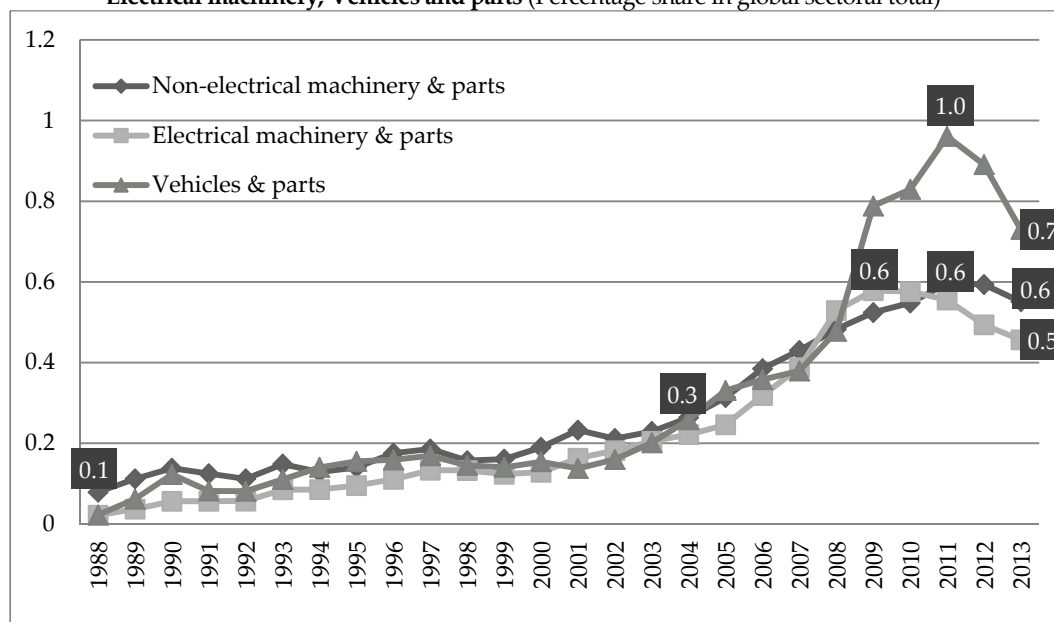
Source: Author's calculation based on WITS Comtrade data.

Figure 4: India's Share in Global Exports in the Top Export Sectors: Organic chemicals; Pharmaceuticals; Iron and steel (Percentage share in global sectoral total)



Source: Author's calculation based on WITS Comtrade data.

Figure 5: India's Share in Global Exports in the Top Export Sectors: Non-electrical machinery; Electrical machinery; Vehicles and parts (Percentage share in global sectoral total)



Source: Author's calculation based on WITS Comtrade data.

In organic chemicals, the increase in India's global export share has been among the most consistent (Figure 4). From an average share of 0.4 per cent during 1988–90, India's share

grew to 1.4 per cent during 1999–2001. It grew faster from 2000 onward and stood at 3.1 per cent in 2013. This was a marginal decline from the 3.2 per cent share India held in 2012.

India has seen a consistent increase in global share in the case of pharmaceuticals too (*Figure 4*), a sector that is considered technologically advanced. India's global share began rising slowly from the second half of the 1990s to an average 0.6 per cent during 1999–2001 (from 0.1 per cent during 1988–90) and increased through the first half of the 2000s to 0.9 per cent during 2002–08. However, the rise in global share became faster from 2006 onward and India's share in pharmaceutical exports (in this Chapter)²⁰ stood at an average of 2.2 per cent in 2013. Here again, there was a marginal drop from 2.3 per cent in 2012.

Apart from the sectors discussed so far, India's global shares did constitute even 2 per cent for the remaining major export sectors. This was true even for iron and steel. India's share in the global exports of iron and steel stood at 1.8 per cent in 2013. Further, despite an overall rising trend, it has seen intermittent fluctuations (*Figure 4*).

In the three sectors of non-electrical machinery, electrical machinery and vehicles and parts—usually considered technologically advanced, India's global export share was insignificant (*Figure 5*). In the first two sectors, India's average global share registered only a very slow increase—from 0.1 per cent during 1999–2001 to 0.6 per cent and 0.5 per cent respectively, during 2012–13. In the case of vehicles and parts, India's global share did show a rise after 2003 and further in the post-crisis phase during 2009–11. However, after peaking at one per cent of global exports in 2011, this share dipped to 0.7 per cent in 2013 (*Figure 5*).

Overall, it is noteworthy that among all these 8 manufactured export sectors, the only sector in which India had about five per cent global share in 2013 was gems and jewellery. It is also important to note that despite an increasing trend earlier, most of India's major export sectors saw a drop in global export shares in the downturn after the global financial crisis, reflecting the inability to compete with major competitors. Iron and steel was the only sector that saw an increase in India's global share in 2013.

3.2 India's Market Share in her Top Ten Export Markets for the Selected Sectors

In this sub-section, the study analyses changes in India's market share positions in her major export markets for each of the eight sectors.²¹ In the first step, using DGCIS data on

²⁰ There are definitional/classification issues with regard to pharmaceutical industry exports. As we will see in the next sub-section, the majority of exports from the organic chemicals sector (Chapter 29) from India consist of active pharmaceutical ingredients (APIs), intermediates in the pharmaceutical industry.

²¹ The discussion on market share analyses draws from a study carried out by the author for the Department of Commerce, Ministry of Commerce and Industry, Government of India, titled 'Study of Elasticity of Demand for Exports of Top Ten Commodity Groups of India: An Analysis of India's Merchandise Export Performance during 1999–2013', March 2015.

country-wise distribution of India's exports, we identify the top ten export markets for India in each of these sectors based on their average share during the last phase of the study, namely, 2012–13 to 2013–14. In the second step, the trends in India's import market shares in those top ten export markets are analysed for each of the sectors. As we require data for different countries' import flows in these sectors, this analysis is done using WITS Comtrade data.

3.2.1 Gems and Jewellery (Chapter 71)

The US was the largest export market for gems and jewellery exports during 1999–2001 and 2002–08. But its share in India's gems and jewellery exports dropped by half to just 14 per cent in the immediate post-crisis period, 2009–11 (See *Table 6*). At the same time, UAE has shown a dramatic increase in its share between these phases to more than 42 per cent of the sectoral total during 2009–11 (from less than 5 per cent during 1999–2001). However, while the share of exports going to the US picked up during 2012–13, it fell in the case of the UAE. Meanwhile, Hong Kong, which was the second important destination behind the US during 1999–2008, also increased its share during the last phase 2012–13 and continued to be the second largest export destination (with about 26 per cent share).

Given the huge expansion in exports to the UAE, all the other markets for India's gems and jewellery exports, both developed and developing countries (except Hong Kong), recorded a fall in their shares in India's exports from this sector (*Table 6*). Thus there is a dramatic increase in India's dependence on a single export market in this sector.

Table 6: Phase-wise Analysis of India's Top Ten Export Markets for Gems and Jewellery, 1999–2013
(Percentage share of India's total exports in this sector; Period averages)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	UAE	4.5	20.0	42.4	36.9
2	Hong Kong	22.8	21.2	21.8	25.5
3	U SA	38.1	28.4	14.2	17.1
4	Belgium	12.5	9.4	6.4	6.0
5	Israel	4.0	4.6	2.6	2.9
6	Thailand	2.3	2.0	1.1	1.6
7	Singapore	1.4	2.9	1.5	1.4
8	UK	2.1	1.9	1.0	1.1
9	Japan	5.6	3.0	0.8	0.8
10	Australia	0.4	0.6	0.6	0.7
Total exports in this sector (Billion US\$)		7.5	16.4	40.1	42.7

Source: Author's calculation based on DGCIS Export-Import Data Bank.

The import market analyses for these top ten markets summarised in *Table 7* reveals that India's competitiveness in the exports of gems and jewellery was the strongest in the UAE followed by Israel and the USA, countries with which we do not have any FTA in goods.

With India holding a 44 per cent share in the UAE market in 2011, there was no significant competitor in that market.

Table 7: India's Market Share for Gems and Jewellery in her Top Ten Markets, 1999–2013

(As percentage share of each country's total imports in Chapter 71)

SN	Country	1999–2001	2002–08	2009–11	2012–13
1	UAE	19.3	30.7	43.4	NA
2	Hong Kong, China	24.3	23.9	23.3 [#]	10.8 [*]
3	Australia	2.1	2.7	2.7	4.6
4	USA	11.2	13.3	12.5	12.9
5	Belgium	7.2	10.2	12.7	10.3
6	Japan	7.1	5.6	3.5	4.0
7	Singapore	9.3	11.6	7.8	7.9
8	Thailand	11.6	8.9	3.9	3.4
9	UK	1.7	2.3	2.1	0.9
10	Israel	4.3	8.8	12.3	13.5

Note: # Represents average for 2009–10 only (as there is a significant drop in 2011). * Represents data for 2012 only.

Source: Author's calculation based on WITS Comtrade data.

As seen in *Table 7*, in the US market, India has held an average share of about 13 per cent in all the three phases after increasing its share from 11 per cent during 1999–2001. On the contrary, despite the fact that Hong Kong has been India's second largest market, India's share in Hong Kong's imports in this sector, which was holding steady at an average of 23–24 per cent, declined heavily in 2011 and 2012 to about 11 per cent. India was gaining share in the import market of Belgium, except in 2012–13, as well as in the UK and Israel. It also gained market share in Australia, although Australia's share was still less than one per cent of India's total exports from this sector in 2013. However, India has been steadily losing market shares in Thailand and Japan. It is clear that neither the Indo-Thai Early Harvest Program in 2003, which was followed by the India-ASEAN FTA in 2010, nor the India-Japan CEPA in 2011 benefited India to increase its market share in those markets.

Earlier, we saw that gems and jewellery is one of the major sectors in which India's share in global exports rose more or less continuously from the 1990s. India's share peaked at 10.7 per cent in 2005, when India overtook Switzerland as the world's largest gems and jewellery exporter. What is disconcerting, however, is the fact that India's global share in gems and jewellery exports declined steadily after 2010 and stood just above 5 per cent in 2013. While there is no data available for the UAE market after 2011, the loss of India's market share in mainly Hong Kong and Thailand followed by Japan seem to have contributed to this declining trend in India's global market share for gems and jewellery.

It is pertinent to note that while Switzerland has been the single largest global player in gems and jewellery exports, the UAE has become the second largest exporter of gems and jewellery from the late 2000s (after overtaking UK, Belgium, South Africa and India). Given the huge growth in India's exports of gems and jewellery to the UAE which is a leading

global exporter in this sector, it appears that India is exporting intermediate products to the UAE.

When we examine the composition of gems and jewellery exports from India at the 6-digit level (See *Table 8*), it is seen that the product category 'Others' has been the single largest exports in this sector. This category consists of cut or otherwise worked diamonds, but not mounted or set'; that is, intermediate products. With this dominant category's share declining from 83 per cent during 1999–2001 to 54 per cent during 2012–13, there was a decline in concentration within gems and jewellery sector exports. Meanwhile, the product category of 'articles of other precious metals, not plated or clad' doubled its share to 27 per cent between 1999–2001 and 2012–13.

Table 8: Composition of India's Gems and Jewellery Exports at the 6 digit Level, 1999–2013
(Percentage share in sectoral total)

SN	HS code	Commodity	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	710239	Others	82.8	69.1	61.0	53.9
2	711319	Articles of other precious metal not plated or clad	12.6	21.9	25.6	26.6
3	710812	Other unwrought forms	0.0	0.0	0.6	8.6
4	710231	Non-industrial diamonds unworked—simply sawn cleaved or bruted	0.4	1.9	1.8	4.1
5	711311	Articles of jewellery and parts thereof of silver w–n plating–clad with other precious metal	0.6	0.7	1.2	2.1
6	710391	Otherwise worked rubies sapphires and emeralds	0.7	0.5	0.2	1.0
7	711299	Waste and scrap of other precious metal or of metal clad with precious metal	0.0	0.3	0.8	0.8
8	710110	Natural pearls	0.0	0.0	0.0	0.5
9	711890	Other coin	0.0	0.2	4.0	0.5
10	710399	Otherwise worked other precious and semi-precious stones	1.8	1.1	0.5	0.5
Total of the above			98.9	95.7	95.8	98.5

Source: Author's calculation based on DGCIS Export-Import Data Bank.

This seems to point towards two things: (1) With the huge exports of intermediate products, India is a part of the gems and jewellery global production network; (2) With the rising share of articles of other precious metals, the country may also be capturing some markets for these products.

When we analysed the global imports of the intermediate product category ('cut or otherwise worked diamonds, but not mounted or set'; HS 710239), it is observed that the UAE, Hong Kong and the USA have more or less consistently been the three largest global

importers in these intermediate products. In India's second largest export product category too ('articles of other precious metals, not plated or clad'; HS 711319), the USA, the UAE and Hong Kong have alternatively occupied the top three ranks among the largest global importers in the post-crisis phases. Thailand was the fourth largest global importer in this product category. However, the market share analysis discussed earlier showed that among these global importers, India successfully maintained import market share only in the USA. At the same time, the following analysis shows that India is diversifying its exports to the UAE market also towards 'articles of other precious metals, not plated or clad'.

Given that the UAE has been the single largest market for India in gems and jewellery, we also examined bilateral flows between India and the UAE in this sector at a disaggregated level. While there is no WITS data available for the UAE's imports in this sector after 2011, we used WITS data on India's exports to the UAE in this sector for this.²² It is observed that the movement in the shares of the two dominant product categories 'others' and 'articles of other precious metals, not plated or clad' (HS 7102 and HS 7113) in India's exports to the UAE captures the change in composition in India's total gems and jewellery exports. Despite the fact that the UAE became the single largest global importer in the 'others' product category (710239), the share of the former shows a distinct drop from about 45 per cent of India's total exports in gems and jewellery exports to the UAE during 2009–11, to about 30 per cent during 2012–13. On the other side, the share of 'articles of other precious metals, not plated or clad' increased from about 41 per cent to 55 per cent between these two periods.

This, along with the market share analysis carried out earlier seems to point towards two things: (1) India's competitiveness as part of the gems and jewellery global production network centred around the UAE, Hong Kong and Thailand diminished in the post-crisis period; and (2) While the country seem to be diversifying away from diamond-based trade (in which it is losing competitiveness) with the rising share of articles of other precious metals in the sectoral total, the overall decline in India's global share is worrying.

Given that two of India's largest markets are the UAE and Hong Kong both of which are also trading countries, together with the huge imports India has seen in the gems and jewellery sector, these trends need to be explored in further detail using bilateral trade flows of exports and imports at the 8-digit level to understand the nature of India's involvement in production networks and entrepot trade. In the meantime, policy thrust has to be on improving incentives for domestic value addition in gems and jewellery production by improving design capabilities and undertaking investments in a larger range of higher-end products.

²² There was a drop in the value of India's gems and jewellery exports to the UAE in 2010, 2012 and 2013. The value peaked in 2011, which is the reason that the sub-period average shares of different markets for India's exports in Table 4 do not capture these yearly variations.

3.2.2 Organic Chemicals (Chapter 29)

We now consider India's second largest manufactured export sector, organic chemicals, which was also the fourth largest manufactured import sector. The US has remained the top-most destination for India's exports of organic chemicals, followed by China (*Table 9*). The other top ten markets are the EU countries and increasingly, the South East Asian countries of Indonesia, Malaysia and Singapore, exports to which have grown faster than those to the developed country markets.

Table 9: Phase-wise Analysis of India's Export Markets for Organic Chemicals, 1999–2013
(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	USA	13.1	11.6	13.9	12.7
2	China	6.1	8.3	7.4	8.0
3	Germany	6.8	6.9	4.9	4.7
4	Indonesia	2.5	5.7	5.4	4.5
5	Malaysia	0.8	2.2	3.0	4.4
6	Singapore	2.8	2.9	2.9	3.5
7	Belgium	1.8	1.8	2.5	3.1
8	Netherlands	3.3	2.8	3.3	3.1
9	South Korea	2.8	2.7	3.1	2.9
10	Spain	3.0	2.9	2.6	2.8
Total exports in this sector (Billion US\$)		1.6	4.8	9.4	12.1

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Market share analysis showed that it was in the Malaysian market for organic chemicals that India gained market share at the fastest rate (See *Table 10*). With its share increasing from 1.7 per cent during 1999–2001 to 14 per cent in 2012–13, India has become the second largest import supplier in Malaysia (along with China with 14.4 per cent share).²³

In the Chinese market, which increased its share of Indian exports, India was only a marginal player with an import market share of less than 2 per cent (*Table 10*). The Chinese market was dominated by South Korea, followed by Japan and Other Asia n.e.s. (Taiwan, China).

In the Indonesian market, India registered a small increase in share. But with an average share of 2.2 per cent during 2012–13, again it remained a marginal player. In Singapore's market, India doubled its share between 1999–2001 and 2012–13. With a share of 6 per cent, India ranked 5th in that market during 2012–13. But China remains a close competitor for India in the Singaporean market, which is dominated by Saudi Arabia, Switzerland and the USA. Although India had increased its market share slightly in South Korea, its average

²³ With 21 per cent share, Singapore dominated the market during 2012–13, while China, followed by South Korea, Thailand and the USA remain major competitors for India.

share remained below 3 per cent during 2012–13 (*Table 10*). South Korea was dominated by Japan, followed by China and the USA.

Table 10: India's Market Share in Organic Chemicals in her Top Ten Markets, 1999–2013

(As percentage share of each country's total imports in Chapter 29)

SN	Country	1999–2001	2002–08	2009–11	2012–13
1	Malaysia	1.7	5.3	8.0	14.0
2	Singapore	3.4	3.5	4.4	6.0
3	USA	1.0	1.8	3.4	4.1
4	Spain	1.4	2.0	3.2	3.8
5	South Korea	2.2	2.1	2.9	2.8
6	Germany	0.9	1.7	2.1	2.6
7	Indonesia	1.4	2.2	2.4	2.2
8	China	1.5	1.8	1.5	1.8
9	Netherlands	0.8	0.6	1.1	1.0
10	Belgium	0.3	0.5	0.7	0.9

Source: Author's calculation based on WITS Comtrade data.

In all the developed country markets of Germany, Spain, USA and the Netherlands, India shows a trend of increasing market share, even though there was market diversification away from these countries as seen in *Table 9*. But in all of them, India's import market share remained less than 5 per cent of the respective totals. Meanwhile, China has increased its share and rank in all these countries.

Indeed, China has become the global market leader in organic chemicals, overtaking the major European exporters since the early 2000s and the US as the largest global supplier since 2010. Thus while organic chemicals is the only sector in which India's global exports share has climbed steadily since the early 2000s, (with India's global market share standing at above 3 per cent of the global total in 2013), it faces tough competition from China, which has been expanding exports at a much faster rate.

However, one of the strengths seems to be that India's exports from the organic chemicals sector are relatively diversified (*Table 11*). The dominant product category at the 6-digit level is 'Other organic compounds', all of which are inputs to the pharmaceutical industry. But its share declined from 28 per cent during 1999–2001 to 15 per cent in 2012–13. Other product categories which increased its share in organic chemical exports such as other derivatives of pyridine are also intermediates to the pharmaceutical industry. That is, these chemicals, which are themselves derived from the petroleum sector, are essentially active pharmaceutical ingredients (APIs) that are being exported.²⁴

²⁴ Pharmaceutical products consist of two main components - (i) bulk drugs or Active Pharmaceutical Ingredients (APIs); and (ii) the formulation segment (i.e., final dosage forms for retail sale).

Table 11: Composition of India's Organic Chemicals Exports at the 6-digit Level, 1999–2013
(Percentage share in sectoral total)

SN	HS code	Description	1999– 2000 to 2001–02	2002–03 to 2008– 09	2009–10 to 2011– 12	2012–13 to 2013– 14
1	294200	Other organic compounds : Cefadroxil and its salts, Ibuprofane, Nifedipine, Ranitidine, Danes salt of d(-) pheny	27.6	32.1	25.8	15.2
2	290243	P-xylene	1.8	8.4	6.8	7.5
3	290220	Benzene	0.9	3.8	5.1	6.4
4	294190	Other: Rifampicin and its salts	4.4	3.5	4.7	4.7
5	290611	Menthol	3.4	1.9	2.0	2.7
6	293399	Other heterocyclic compounds with nitrogen hetero atom (s) only	0.0	0.3	1.1	2.5
7	293499	Other heterocyclic compounds	0.0	0.4	1.1	2.4
8	290241	O-xylene	0.1	1.6	2.8	2.4
9	293339	Other: derivatives of pyridine	0.5	0.7	1.4	2.3
10	290244	Mixed xylene isomers	0.0	0.8	0.9	1.7
Total of the above			38.6	53.4	51.7	47.9

Source: Author's calculation based on DGCIS Export-Import Data Bank.

The shares of P-Xylene and Benzene have also seen significant increases and they stood at about 8 per cent and 6 per cent respectively during 2012–13 (*Table 9*). Xylene (an aromatic hydrocarbon) and heterocyclic compounds, have many industrial uses such as in polymers as well as medical/pathological uses.

There are clear forward and backward linkages between the organic chemicals sector and the pharmaceutical industry, polymers, and petroleum industry. As we saw earlier, petroleum and petroleum products sector has been India's largest merchandise export sector since 2006–07, while pharmaceuticals have been among the top ten manufactured exports. On the other side, organic chemicals and plastic and plastic products are among India's top ten merchandise imports. These forward and backward linkages between the organic chemicals, pharmaceuticals, polymers, and the petroleum industry need to be examined in detail at the product level to put in place coordinated sectoral policies with a view to developing and strengthening these linkages domestically.

It should be also noted that the literature on Pollution Haven Hypothesis²⁵ categorises both petroleum and chemical industries as highly polluting industries. It has been pointed out that those developing countries with less stringent environmental standards have a "comparative advantage" when the cost of environmental pollution is not taken into

²⁵ Pollution Haven Hypothesis refers to the migration of dirty industries (highly polluting industries) from developed countries with stringent environmental regulation to developing countries with laxer regulations.

account and this leads to a shift in the pattern of trade of dirty industries.²⁶ Given that India will have to eventually deal with the environmental consequences, rather than diluting environmental norms, the policy focus should be on putting in place efficient environmental regulations and implementing them with a view to stimulating environment-friendly technological innovations in the upstream organic chemicals and petroleum refining activities.

3.2.3 Pharmaceuticals (Chapter 30)

As a case to explore some of the forward linkages of the organic chemicals industry, in this sub-section we consider the pharmaceutical sector, which was the sixth largest export sector during 2012-13.

India's pharmaceutical exports have seen increased dependence on the single largest market, namely, the US. The share of Indian pharmaceutical exports going to the US market nearly quadrupled from about 8 per cent to about 31 per cent between 1999–2001 and 2012–13 (See *Table 12*). Among the other top ten markets, the shares of India's exports going to the UK, South Africa, Kenya and Ghana also increased, while the export shares of Russia, Nigeria, Germany, Netherlands and Brazil saw a decline.

Table 12: Phase-wise Analysis of India's Export Markets for Pharmaceuticals, 1999–2013
(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	USA	7.9	16.9	27.1	30.8
2	Russia	10.4	7.9	5.4	5.2
3	South Africa	1.3	2.3	3.9	3.9
4	UK	2.6	4.4	4.6	3.7
5	Nigeria	7.4	4.3	3.1	3.0
6	Germany	3.7	2.5	2.4	2.2
7	Kenya	1.5	1.5	2.3	2.1
8	Netherlands	2.7	1.7	1.9	1.7
9	Brazil	2.3	2.6	1.5	1.6
10	Ghana	1.1	1.1	1.8	1.5
Total exports in this sector (Billion US\$)		1.0	2.8	6.8	10.6

Source: Author's calculation based on DGCIS Export-Import Data Bank.

The market share analysis shows that India's market share in pharmaceutical imports has been increasing in all the major markets, except Russia (*Table 13*). Meanwhile, India has become the single largest import supplier for Nigeria (despite the decline in the share of our pharmaceutical exports going to Nigeria), South Africa, Kenya and Ghana.

²⁶ See Prema, Kallummal and Varma (2014).

Table 13: India's Market Share for Pharmaceuticals in her Top Ten Markets, 1999–2013

(As percentage share of each country's total imports in Chapter 30)

SN	Country	1999–2001	2002–08	2009–11	2012–13
1	Nigeria	16.5	26.5	30.4	37.9*
2	Ghana	28.7	36.2	39.0	28.8
3	South Africa	1.7	4.9	11.1	15.7
4	USA	0.2	1.4	4.0	7.0
5	Russia	10.8	7.2	5.5	5.7
6	Brazil	1.2	3.0	2.0	2.4
7	UK	0.2	0.8	1.4	0.8
8	Germany	0.2	0.2	0.6	0.8
9	Netherlands	0.1	0.1	0.7	0.6
10	Kenya	15.9	24.3	39.2	NA

Note: * The value is for 2012 only.

Source: Author's calculation based on WITS Comtrade data.

India was the largest supplier in Nigeria with a market share of 38 per cent in 2012. In Ghana too, India has been the dominant supplier from 1999–2001 and its average share stood just below 40 per cent during 2009–11. However, there was a sharp decline in India's share during 2012–13, while there was a dramatic jump in Denmark's share. In the South African market, India gained in share at the expense of the UK, Switzerland, and the Netherlands, and became the largest supplier during 2012–13 with a 16 per cent share. The US and other European countries (Germany, France and Italy) are major competitors for India. In Kenya too, India has been the dominant player. India's share in the Kenyan pharmaceutical market has increased steadily and stood at 39 per cent during 2012–13.

In Brazil, although India showed an increase in share, India was ranked only 10th during 2012–13 with a share of about 2.4 per cent. On the other side, in the Russian market, India's share dropped to nearly half between 1999–2001 and 2012–13, wherein the European countries and the USA were the leading players.

As seen in *Table 13*, India continues to be a marginal player in the European developed country markets (with a share below one per cent of the respective country total). However, in the USA, India's market share has been steadily increasing at the expense of mainly the UK, followed by France and Italy. India's share in the US market stood at an average 7 per cent during 2012–13 and it was ranked 5th in this phase.²⁷

It is clear that India is a leading player in the African markets, but it is not a dominant market player in the developed country markets. Thus globally, India's share remains very low at 2.2 per cent despite the consistent increase it witnessed.

²⁷ The US market continues to be dominated by Germany (17 per cent during 2012–13), while Switzerland, Ireland and Israel have also increased their shares significantly. Apart from Israel and Canada, the European countries remain major competitors for India in the US market.

The analysis of the composition of pharmaceutical exports in *Table 14* (as per Chapter 30 alone) shows that in general Indian exports have been focussed on formulations (packaged medicines for sale). The single product category of 'other medicine put up for retail sale' accounted for an average 47 per cent of Indian pharmaceutical exports during 1999–2001. The share of this dominant product category ('other medicine put up for retail sale') in total pharmaceutical exports went up further to as much as 70 per cent during 2012–13. The shares of almost all other formulations such as medicines containing antibiotics, medicines containing hormones, those containing penicillin, vitamins, insulin, etc. have seen a decline. Thus there has been a dramatic increase in the concentration of India's pharmaceutical exports.

Table 14: Composition of India's Pharmaceutical Exports at the 6-digit Level, 1999–2013
(Percentage share in sectoral total)

SN	HS code	Product Description	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	300490	Other medicine put up for retail sale	46.5	54.2	63.8	70.3
2	300420	Medicaments containing other antibiotics and put up for retail sale	11.3	12.1	10.3	8.1
3	300410	Medicaments containing penicillins–derivatives thereof with a penicillanic acid structure–streptomycin or their derivatives put up for retail sale	8.4	5.5	4.3	4.4
4	300220	Vaccines for human medicine	4.1	3.9	3.4	4.2
5	300390	Other medicaments (excl. heading 3002,3005,3006)for therapeutic prophylactic uses not put up for retail sale	15.3	7.0	4.2	3.7
6	300450	Other medicaments containing vitamins or other products of heading 2936	5.4	5.1	3.6	2.3
7	300431	Medicaments containing insulin	0.2	0.7	0.8	1.3
8	300439	Other: pituitary hormones; prednisolone; dexamethasone; danazol; other progestogen and oestrogen group hormones	1.7	0.9	0.9	0.9
9	300339	Other medicaments containing hormones or other product of heading 2937 excl. antibiotics	1.9	3.3	2.9	0.8
10	300691	Appliances identifiable for ostomy use	0.0	0.0	0.1	0.6
Total of the above			94.7	92.9	94.2	96.6

Source: Author's calculation based on DGCIS Export-Import Data Bank.

When considered along with the increase in API exports seen in Chapter 29, these compositional changes in Indian pharmaceutical exports seem to be related to the changes within the Indian pharmaceutical industry following the introduction of process patents in

2005 as well as the changed nature of foreign investments that occurred from the mid-2000s.

Abrol (2014) showed that the response of industry and institutions to the introduction of incentives in the form of tax benefits for R&D, stronger intellectual property rights (IPRs) through the introduction of the product patent regime, encouragement to outward foreign direct investment, and tax rebates for export promotion have been disappointing with regard to technological learning, innovation making and value addition in pharmaceutical manufacturing.

In the meantime, as Kallummal and Bugalya (2012) pointed out, there were some major structural shifts in India's pharmaceutical industry in terms of shareholding and controlling patterns, with a movement towards more foreign control in the existing companies. It is likely that these M&As have caused major changes in the forward and backward linkages by undermining domestic inter-linkages between the producers of formulations (medicines) and API producers.²⁸ Khan (2010) has also shown how after India signed TRIPS compliant laws in 2005, Indian pharmaceutical companies were forced into moving down the value chain and becoming contract assemblers for multinationals. Indeed, Kallummal and Bugalya (2012) found that there was growing import dependence of the pharmaceutical sector during 2001–2010 over the period 1996–2000 with the subsector of bulk drugs and intermediates witnessing an import surge. This was particularly true in the case of pharmaceutical imports from China, which shifted towards products that have a high share in India's imports.²⁹

At the same time, we saw from the analysis of exports from Chapter 29 that India has been exporting a number of active pharmaceutical ingredients (APIs). It is evident that the intra-industry trade being observed in the pharmaceutical sector needs an in depth analysis to understand the changing nature of intermediate trade. Further, the analysis of exports from the organic chemical and pharmaceutical sectors reveals the dire need for sectoral policies which would develop and strengthen their inter-sectoral linkages domestically if India has to improve its competitiveness in both these sectors.

The introduction and monitoring of technical standards for the domestic market—particularly in the case of operational processes within the API bulk drug subsector—and policy measures aimed at incentivising technological upgradation for meeting the same may be considered towards enabling such linkages. This will lead to the production (and export) of higher value-added pharmaceutical products from India and increase India's global market share. Further, as suggested by Abrol (2014), given the evidence of lack of adequate response among the domestic private sector producers to the product patent

²⁸ See also CCI (2010), 'Competition Law and Indian Pharmaceutical Industry', Centre for Trade and Development (Centad), New Delhi.

²⁹ China has been an important producer of APIs required for the manufacture of several essential drugs. See the detailed import analysis in Kallummal and Bugalya (2012).

regime that was supposed to accelerate technological innovation within the country and the growing incidence of mergers and takeovers within the pharmaceutical sector, there is a strong case for increasing public investment in R&D for the development of complex molecules and new products.³⁰ Meanwhile, India should exercise extreme caution about making any commitments on IPRs beyond the present TRIPS regime, as they could have implications on development and ownership of new technologies within the country, which in turn have adverse impact on India's ability to sustain pharmaceutical exports.

We now take up two of the machinery sectors that have been among India's topmost import and export sectors.

3.2.4 Non-Electrical Machinery (Chapter 84)

Although it witnessed a marginal decline in share among India's export markets, the USA has remained the single largest market for India's non-electrical machinery exports (See Table 13). At the same time, while its share showed only a marginal increase, the UAE became the second largest market, overtaking European markets like that of the UK and Germany. On the other side, the export share of China has gone up continuously, followed by Saudi Arabia and Thailand.

Table 15: Phase-wise Analysis of India's Export Markets for Non-Electrical Machinery, 1999–2013
(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	USA	14.8	17.1	13.2	13.6
2	UAE	5.2	7.0	6.7	6.1
3	Germany	6.6	6.0	5.4	4.9
4	UK	6.6	6.1	4.8	4.6
5	China	0.9	2.9	3.8	3.9
6	Saudi Arabia	1.5	2.7	2.3	3.3
7	Singapore	4.0	4.4	5.0	3.2
8	Thailand	1.1	1.7	1.9	2.7
9	Italy	2.2	2.6	2.6	2.5
10	Nigeria	4.2	2.8	2.1	2.5
Total exports in this sector (Billion US\$)		1.3	4.5	9.0	11.8

Source: Author's calculation based on DGCIS Export-Import Data Bank.

³⁰ As Abrol (2014) has emphasised, there is also an urgent need to strengthen the system of public sector science to play its due role in drug discovery, preclinical and clinical research. Similarly it is necessary to get the firms to build their firm specific assets and ties with the public sector science with a view to strengthen the national system of innovation for the benefit of both foreign and domestic markets.

When we analysed India's market share in the import markets of each of these top ten markets for non-electrical machinery exports, it is seen that India made incremental improvements in its share in all of them, except Nigeria (See *Table 14*). However, India's import shares in the respective markets remain abysmally small. Nigeria was the only country in which India held a more than five per cent share during 2012-13. India's market share in the UAE was about 2 per cent (during 2009-11). In the case of markets like Saudi Arabia and Thailand, India's average import market share for 2012-13 was less than two per cent, while it was less than one per cent in China, Germany and the USA.

Table 16: India's Market Share for Non-Electrical Machinery in her Top Ten Markets, 1999-2013
(As percentage share of each country's total imports in Chapter 84)

SN	Country	1999-2001	2002-08	2009-11	2012-13
1	Nigeria	8.2	5.6	5.8	6.0
2	Saudi Arabia	0.5	1.2	1.3	1.9
3	Thailand	1.0	1.3	1.3	1.4
4	Italy	0.2	0.4	0.7	0.9
5	USA	0.1	0.4	0.6	0.7
6	UK	0.2	0.5	1.0	0.6
7	Singapore	0.7	0.4	0.7	0.6
8	Germany	0.2	0.3	0.5	0.5
9	China	0.1	0.2	0.3	0.4
10	UAE	1.6	2.2	2.1	NA

Source: Author's calculation based on WITS Comtrade data.

Globally, as we saw, India's share did show a rise from the second half of the 2000s from a very low base. However, it remains rather insignificant. Meanwhile, growth in China's exports in this sector has been very high and it has been the largest global exporter since mid-2000s.

The analysis of product composition of India's non-electrical machinery exports at the 6 digit level shows that they are highly diversified. During 1999-2001, the product category 847330 held the largest share of about 12 per cent (See *Table 15*). These are the parts and accessories for computers and other automatic data processing equipments and devices. Technically, these products fall under the electronics industry.³¹ It is seen that the share of this category, which used to dominate India's exports in the non-electrical machinery sector, declined steadily after 2002 and stood at just one per cent during 2012-13. This clearly reflects the loss of competitiveness in India's computer parts and accessories segment in these products after it liberalised imports in 165 products belonging to the

³¹ The key segments of the electronics industry are generally defined as computer and other data processing/office equipments, telecommunications, consumer electronics, industrial electronics and the electronics components industry.

electrical and non-electrical machinery industries under the Information Technology Agreement (ITA-1) of the WTO.³²

Table 17: Composition of India's Non-electrical Machinery Exports at the 8-digit Level, 1999–2013

(Percentage share in sectoral total)						
SN	HS code	Product Description	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	848180	Other appliances	3.7	5.2	4.5	6.0
2	840999	Parts of other engines (dsl–smi dsl) other than parts for aircraft engines	4.6	5.7	5.4	4.2
3	840710	Air-craft engines	0.1	0.5	1.3	3.3
4	841480	Other pumps, compressors etc	0.1	1.2	2.9	3.1
5	840890	Other engines ⁹⁹	4.6	2.5	2.3	2.5
6	848190	Parts of the items under heading 8481	0.9	1.6	2.2	2.4
7	843149	Other machinery parts of heading no. 8426,8430–8439	0.2	0.9	1.9	2.3
8	840991	Parts suitable for use solely– principally with spark-ignition internal combustion piston engines other than parts for aircraft engine	2.8	2.8	1.9	2.1
9	847989	Parts of other machinery and mechanical appliances, having individual functions	2.6	1.9	1.7	1.9
10	841391	Parts of pumps	1.5	1.5	1.7	1.9
21	847330	Parts and accessories of machines of heading no.8471	12.0	4.8	1.7	1.0
Total of the above			33.2	28.5	27.5	30.7

Source: Author's calculation based on DGCIS Export-Import Data Bank.

As established in Kallummal and Francis (2014), although the tariff liberalisation implemented as part of ITA-1 was partial for India in the late 1990s and liberalisation was total only from 2005 onward,³³ imports of these products into India had begun surging beginning in the late 1990s. While imports grew at 18 per cent during the first post-ITA-1 phase (1997–2000), in the second phase (2001–2005) import growth rate almost doubled to

³² The ITA-1's product coverage straddles the above mentioned five segments of the electronics industry, apart from software.

³³ As a result, the average MFN applied tariff for India's 165 ITA-1 products saw scheduled reduction as per the commitments made under the ITA-1. India had an average base duty of 66.4 percent in July 1997; this dropped to almost half of the base rate in March 1998. The average tariff continued to drop at regular intervals to 12 percent in 2000 and further to 10 percent in 2004, and was completely eliminated by 2005 (Kallummal and Francis, 2014).

touch nearly 38 per cent. Thus it was seen that the rapid tariff-alone liberalisation of trade in ITA products under the ITA-1 contributed to the erosion of the domestic IT hardware sector in India. The fact that any potential for increase in export market access for domestic producers was affected by the substantial increase in protectionism by way of technical barriers to trade (TBTs) used by ITA-1 signatories, also contributed to their decline in competitiveness. Among the top 31 ITA-1 member countries that notified TBT measures in this sector to the WTO, 92 per cent of notifications by developed countries with technological advantage were national standards, as compared to 77.5 per cent for developing countries.³⁴ On the other side, India did not figure in the top 31 WTO-notified users of TBT measures of ITA-1 products, which reveals how successive governments failed to provide strategic industrial policy support to domestic producers in this segment. As argued in Kallummal and Francis (2014), this was in major part due to the influence of the excellent export performance of the Indian IT software segment, which led the governments to offer duty free access to computers and accessories for 100 per cent software exporting firms. This in turn led to loss of opportunities to the domestic IT hardware segment to benefit from the growth in demand for IT products (especially beginning from the late 1980s to early 1990s) and achieve the scale economies and technical capabilities to remain competitive once imports of these products were liberalised under the ITA-1. Indeed, as observed earlier, non-electrical machinery has been among the largest manufactured imports of India.

Meanwhile, by 2012–13, the category "other appliances" (HS 848180) came to account for the largest share within India's non-electrical machinery exports (6 per cent) (*Table 15*). This category consists of taps, cocks, etc. of iron and steel and non-ferrous metals, industrial valves, inner tube valves for bicycles, etc. The major markets for these are Singapore, the USA, Germany, the UK, and the UAE. By 2003–04, when there was a growth in exports of other appliances, Saudi Arabia became one for the top five markets. Interestingly, by 2012–13, the UAE and Saudi Arabia became the second and third largest markets following the USA at the top rank. Other markets such as Kuwait, Qatar, Oman China, etc. also became significant in the last two years.

With its share remaining more or less steady, engine parts other than for aircraft engines remained the second largest export in the non-electrical machinery sector, in most phases. At the same time, exports of aircraft engines as well as pumps and compressors etc. have grown faster from a very low base and were the third and fourth largest exports. While exports of aircraft engines have grown fast (in particular from 2007–08), exports of other engines have nearly halved in share.

³⁴ National standards/measures are those specific legislations that need to be adhered to by foreign producers to operate or sell in those markets; these may be different from the internationally harmonised standards by the ISO. If we eliminate Canada and the US, 100 per cent of the notifications by the other 11 developed countries consisted of national standards. *Ibid.*

Analysis of the composition of exports of engine parts (other than for aircraft engines) at the HS 8 digit level revealed that these mostly consist of needle and roller bearings, pistons, piston assemblies, component parts for diesel engines, fuel injection equipment, etc., all of which are parts used in the automobile industry. This point towards the competitiveness achieved by India's automobile parts segment.

At the same time, it is observed from items 6 and 7 in *Table 17* and their analysis at the 8 digit level that parts of other appliances (such as taps, cocks, industrial valves, etc.) along with other machinery parts used in mining, agricultural, food processing machinery and equipment have also shown an increase in share.

In the case of aircraft engines (840710), there is a single product listed at the 8 digit level by the same name, namely, aircraft engines. The USA, France, UK, Switzerland, Singapore, Malaysia, Japan, etc. are the major markets for aircraft engines.

There are two observations that can be made from the analysis of export composition and market share analysis. Firstly, within the computer parts and accessories segment, India has seen a near total erosion of competitiveness due to rapid tariff liberalisation carried out before supportive industrial measures were made use of to upgrade technological capabilities among domestic producers and a lack of strategic vision to domestically link the export performance in the IT software segment with domestic hardware producers. Secondly, the export data does reflect India's technological expertise in a broad range of other engineering segments within the non-electrical machinery sector. But it very important to note that as several authors have pointed out, the development of latter capabilities occurred during India's import substitution decades due to the heavy emphasis on indigenous technical and engineering capabilities through institutions of higher learning. However, the fact that India's position in her major export markets is very low relative to her competitors points to the lack of continuous capability building even in segments in which India had built up technological capability base.

3.2.5 Electrical Machinery (Chapter 85)

Although the US has remained the largest market for Indian exports of electrical machinery also in all the four phases in terms of average share of India's exports, the share of the UAE market was catching up (See *Table 18*). The top markets that gained in share in India's exports were the UAE, followed by Saudi Arabia, the Netherlands and China. The markets that lost in shares were the USA, the UK and Germany. Interestingly, Hong Kong and Singapore, which were the second and third largest markets respectively during 1999–2001, were no longer among the top ten list during 2012–13.

The market share analysis shows that India has been increasing its average market share in the top ten markets since the early 2000s, except for 2012–13. However, as in the case of the non-electrical machinery sector, it is only in the developing country market of Nigeria that India held a more than 5 per cent share even during 2012–13 (See *Table 19*). India held about 4 per cent share in the markets of UAE and Saudi Arabia. In all the other top ten

markets, India's market share was abysmally low. While it held a one per cent share in Netherlands, its share in China, the USA, Germany, and the UK were all below one per cent. Even in Nigeria, where India's share stood at about 6 per cent during 2012–13, China singularly dominated the market with a share of about 41 per cent.

Table 18: Phase-wise Analysis of India's Export Markets for Electrical Machinery, 1999–2013
(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	USA	16.6	16.9	14.9	13.9
2	UAE	5.0	6.8	7.9	9.2
3	Netherlands	3.1	4.0	4.7	4.8
4	Germany	4.9	7.0	5.6	4.6
5	UK	6.0	6.0	3.4	3.8
6	Saudi Arabia	1.1	1.8	2.2	3.2
7	Nigeria	1.9	1.4	3.2	2.8
8	China	0.9	1.5	2.8	2.6
9	France	2.1	1.3	2.0	2.6
10	South Africa	0.8	1.1	1.7	2.4
Total exports in this sector (Billion US\$)		1.1	3.9	9.6	10.6

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Table 19: India's Market Share for Electrical Machinery in her Top Ten Markets, 1999–2013
(As percentage share of each country's total imports in Chapter 85)

SN	Country	1999–2001	2002–08	2009–11	2012–13
1	Nigeria	4.5	2.6	4.7	5.7
2	UAE	1.4	2.0	3.8	NA
3	Saudi Arabia	0.7	1.4	3.6	3.6
4	South Africa	0.4	1.0	2.6	3.9
5	Netherlands	0.2	0.7	1.1	1.0
6	Germany	0.2	0.4	0.8	0.7
7	USA	0.1	0.4	0.6	0.5
8	UK	0.2	0.4	0.6	0.3
9	France	0.1	0.3	0.5	0.6
10	China	0.0	0.1	0.2	0.1

Source: Author's calculation based on WITS Comtrade data.

The same trend is observable in India's global market share for electrical machinery exports too. As we saw, India's share in the global export market remained very low at 0.5 per cent in 2013. Once again, China is the single largest global exporter in this sector. While Japan and the USA have lost global market shares to China dramatically, Taiwan Province of China and South Korea have also overtaken Japan and the US since the late 2000s.

The compositional analysis of electrical machinery exports from India (See Table 20) shows that it is mainly the sudden surge in "telephones for cellular networks or for other wireless

networks" after 2008 that seem to explain the increase in India's global share in this sector. Apart from this single product category, India's exports in this sector are spread across technologically less sophisticated items as electrodes, static converters, electric conductors, heavy-duty electric boards, etc.³⁵

Table 20: Composition of India's Electrical Machinery Exports at the 8-digit Level, 1999–2013
(Percentage share in sectoral total)

<i>SN</i>	<i>HS code</i>	<i>Product description</i>	<i>1999–2000 to 2001–02</i>	<i>2002–03 to 2008–09</i>	<i>2009–10 to 2011–12</i>	<i>2012–13 to 2013–14</i>
1	851712	Telephones for cellular networks or for other wireless networks	0.0	3.5	22.4	21.7
2	851770	Parts (of machines for reception, conversion and transmission of voice, images, data etc.)	0.0	0.1	4.6	5.9
3	854511	Electrodes of a kind used for furnaces	0.7	2.5	2.5	3.4
4	850440	Static converters	0.5	4.5	3.9	3.3
5	853890	Other parts of heading 8538	0.4	1.5	3.0	3.1
6	850300	Parts suitable for use solely—principally with the machines of heading no.8501 and 8502	2.3	2.1	3.0	2.6
7	852380	Other:	0.0	0.8	3.4	2.4
8	854460	Other electric conductors, for a voltage exceeding 1000 v :	0.1	0.9	1.4	2.1
9	853710	Boards etc for a voltage≤1000 volts	0.2	0.8	1.2	2.1
10	854140	Photosensitive semiconductor devices, incl. photovoltaic cells w–n assembled in modules– made up into panels; light emitting diodes	2.3	4.4	4.3	2.0
Total of the above			6.5	21.1	49.7	48.6

Source: Author's calculation based on DGCIS Export-Import Data Bank.

It must be noted that the increase in telecom exports is mostly explained by the expansion in mobile handset production by Nokia's Chennai plant set up in 2006. By 2009, this single factory had overtaken China as a unit-wise volume producer of Nokia cell phones for the global market. However, with the factory - which generally accounted for about 70 per cent

³⁵ The extent of the diversification of exports from this sector is reflected in the relatively low cumulative share of the top ten export product groups (as seen in Table 25), even though there is an increase over the phases.

of handset exports from India³⁶—closing down in November 2014,³⁷ India's electrical machinery exports is likely to witness a significant drop.

Analysis in Kallummal and Francis (2015) showed that tariff liberalisation and elimination under ITA-1 has proved fatal for the home grown IT hardware (as we saw in the analysis on non-electrical machinery sector exports) and electronics industry in developing countries like India with no industry standards *vis-à-vis* developed countries (who have been the technology leaders) or those developing countries already linked to the international production networks in the electronics industry—such as the East Asian countries including China).³⁸ On the one hand, Indian domestic electronics industry firms did not have sufficient technological capabilities required to meet the technical standards that were erected by developed countries. On the other hand, while the country eliminated the tariffs on ITA products, it did not put in place national technical standards in place to protect and maintain its domestic electronics firms. This led to the undermining of the domestic production base in these sectors given that there was no strategic policy focus on supporting the development of a domestic supplier base in parts, components, accessories, etc.

The analysis of exports from the electrical and non-electrical machinery sectors clearly establish that liberalisation of imports and greater access to export markets do not by themselves ensure that a country's firms achieve greater competitiveness. The latter require specific industrial policy support to build up capabilities.

3.2.6 Vehicles and Parts (Chapter 87)

In vehicles and parts, there appears to be significant dispersion in India's export markets. The share of the USA, which was the largest export market during 1999–2001, declined significantly by 2012–2013 (See *Table 21*). Similar is the case with Sri Lanka, Bangladesh and Nigeria, whose shares declined between 1999–2001 and 2012–13. On the other side, the export shares of South Africa, Algeria, Colombia, Turkey, Mexico, and the UK increased between the two periods.

³⁶ Estimate according to the Telecom Equipment & Services Export Promotion Council quoted in <http://www.bgr.in-manufacturers-nokia-nokia-plant-uncertainty-may-hit-india-telecom-exports-by-40>

³⁷ See http://www.business-standard.com-article-companies-black-friday-for-workers-as-nokia-shuts-chennai-factory-114103100284_1.html

³⁸ Developed countries have put in mandatory measures like technical regulation—standards—certification (Technical Barriers to Trade or TBTs). They have been increasingly using national standards (as opposed to international standards), many of which were introduced even before 2004, when India eliminated tariffs under the ITA fully (See Kallummal and Francis, 2014).

Table 21: Phase-wise Analysis of India's Export Markets for Vehicles and Parts, 1999–2013
(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	USA	12.1	12.5	7.9	8.2
2	South Africa	1.5	4.5	5.1	8.0
3	UK	5.7	5.2	6.0	6.3
4	Mexico	3.1	2.8	1.6	4.5
5	Algeria	0.4	3.6	2.9	3.8
6	Sri Lanka	7.7	7.6	6.9	3.5
7	Bangladesh	6.4	3.3	3.2	3.4
8	Nigeria	4.3	1.8	2.8	3.3
9	Turkey	1.5	1.7	2.6	3.2
10	Colombia	0.7	2.3	2.6	3.1
Total exports in this sector (Billion US\$)		0.8	3.3	8.8	12.6

Source: Author's calculation based on DGCIS Export-Import Data Bank.

The market share analysis reveals that across all the top ten markets, India's market share has shown an increase during 2012–13, except in the UK and Sri Lanka (Table 22). But India's share has been increasing most significantly in the African markets of South Africa, Algeria and Nigeria.

Table 22: India's Market Share in Vehicles and Parts in her Top Ten Markets, 1999–2013
(As percentage share of each country's total imports in Chapter 87)

SN	Country	1999–2001	2002–08	2009–11	2012–13
1	Sri Lanka	18.1	39.0	50.8	43.8
2	Bangladesh	21.4*	28.4	41.3	NA
3	South Africa	0.5	2.0	5.4	9.9
4	Algeria	1.0	5.0	4.8	6.1
5	Nigeria	5.2	3.2	2.7	9.5
6	Colombia	0.5	1.9	2.1	2.4
7	UK	0.2	0.3	1.7	0.6
8	Turkey	0.4	0.6	1.5	1.8
9	Mexico	0.1	0.5	0.7	1.5
10	USA	0.1	0.2	0.4	0.4

Note: * Average for 2000–01. In the case of Bangladesh, import data for 2012 and 2013 were unavailable.

Source: Author's calculation based on WITS Comtrade data.

In fact, despite the fall in the share of India's vehicle exports going to those countries, India is the dominant import supplier in two neighbouring SAARC countries, Sri Lanka and Bangladesh. In these two cases, the preferential and free trade agreements (like SAFTA, APTA, India-Sri Lanka FTA) in place appear to have played a role in supporting Indian auto producers' expansion in those markets. However, India remained a marginal player in the US, the UK, Turkey, Colombia, and Mexico.

Analysis of product composition of India's automobile exports reveals that auto parts and accessories were the dominant export category in the late 1990s and early 2000s (See *Table 23*). After a decline during 2009–11, its share stood again at 20 per cent during 2012–13. Meanwhile, the share of passenger car exports which was insignificant during 1999–2001, has risen steadily to become the largest segment, with a share of 24 per cent during 2012–13. Other product categories that have seen significant increase in shares are motor cycles, followed by tractors.

Table 23: Composition of Vehicles and Parts Exports at the 6-digit Level, 1999–2013
(Percentage share in sectoral total)

SN	HS code	Product description	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	870322	Vehicles with spark-ignition internal combustion reciprocating piston engine of cylinder capacity>1000cc but not<1500cc	0.6	14.7	25.3	23.9
2	870899	Other parts and accessories of vehicles of heading 8701–8705	21.4	20.2	15.4	20.0
3	871120	Motor cycles etc, with reciprocating internal combustion piston engine of cylinder capacity>50 cc to 250 cc	5.7	7.8	9.6	11.1
4	870321	Vehicles with spark-ignition internal combustion reciprocating piston engine of cylinder capacity<=1000cc	7.5	10.9	15.2	8.4
5	870190	Other tractors	1.9	4.4	6.1	6.2
6	870323	Vehicles with spark-ignition internal combustion reciprocating engine of a cylinder capacity>1500 cc but<=3000	1.8	2.7	1.3	3.9
7	870410	Dumpers designed for off-highway use	0.2	0.9	3.6	3.2
8	870421	Goods vehicles, with compression ignition internal combustion piston engine (diesel–semi diesel), g.v.w.<=5ton	4.0	2.5	1.7	2.4
9	870840	Gear boxes	0.3	2.0	1.7	2.1
10	870600	Chassis fitted with engines, for motor vehicles of headings no.s 8701 to 8705	6.4	3.5	1.9	1.9
Total of the above			49.9	69.7	81.7	83.0

Source: Author's calculation based on DGCIS Export-Import Data Bank.

It should be remembered that the automobile sector is one of the strategically protected sectors across the world one way or the other. It is considered a strategic sector precisely because of its substantial potential for backward linkages with several upstream industries such as metal, plastics, glass, electronics, machinery parts and tools, etc. In India too, this sector enjoyed strategic import protection for a considerably longer period of time than other sectors. Simultaneously, the condition on increasing domestic content and the effective government monitoring of its implementation had the effect of ensuring that rents in the protected large domestic market (which attracted some multinationals) were converted into local capabilities (Khan, 2010). This played a critical role in the rise of the Indian auto component sector.³⁹ Similarly, tariff protection remains relatively high for particular products in this sector—under the WTO as well as under the existing FTAs. As a result, domestic firms, both indigenous and foreign, driven by the growth in domestic demand, continue to focus on the large domestic market. But as we saw, India has dominant market positions in two of the SAARC neighbours (Bangladesh and Sri Lanka) and significant market shares in other developing countries like South Africa, Algeria and Nigeria.

However, despite the fast growth from the mid-2000s, India's global share in vehicles and parts exports remained below an insignificant 0.7 per cent of global exports. Further, it does not bode well that even this share dipped after 2011.⁴⁰

Meanwhile, against the backdrop of Indian auto companies' outward investments (outward FDI) in other countries,⁴¹ there are two conflicting trends that will decide future changes in the composition and direction of trade in this sector. At one level, the foreign sales of Indian automakers could increasingly be made through their subsidiaries or joint-ventures in other countries, and this could lead to a drop in exports in certain product segments. At another level, Indian automakers' outward FDI could lead to an increase in exports of auto components from India, if the Indian auto component suppliers also do not set up plants in those countries. Either way, the competitiveness of the automobile sector (including in the small car segment which dominates India's exports currently) depends on the competitiveness of the domestic auto component firms, which need to be incentivised towards greater quality and productivity improvements. The main policy thrust in this

³⁹ Under the Phased Manufacturing Programme, which was in place till 1991, domestic Original Equipment Manufacturers (OEMs) had to increase their proportion of domestic inputs to 70 per cent within three years. Meanwhile, quantitative restrictions on imports of auto products remained until 2000. See Khan (2010) and Nag (2011).

⁴⁰ While the USA remains the undisputed market leader globally, its share has shown a significant decline from as high as 40 per cent in 1990 to below 20 per cent in 2013 due to the changed production geography in this industry. While Germany has retained its second rank globally, China has been increasing its share rapidly and became the fourth largest global player, closely following the UK in the third position.

⁴¹ It is pertinent to note that increased competition in the domestic market through sales of foreign firms in some of the segments may be driving Indian FDI outflows in this sector.

sector should therefore be to implement and monitor policy measures aimed at incentivising technological upgradation along the entire production chain of the automobile parts and components industry.

3.2.7 Iron and Steel (Chapter 72)

While the USA was the single largest export market for India's exports of iron and steel, its share declined dramatically from 20 per cent during 1999–2001 to just 6 per cent during 2012–13 (*Table 24*). During 2002–08, there was a sharp increase in the share of Indian exports going to China. However, subsequently, export shares of Nepal, South Korea, Thailand, and Vietnam have increased rapidly. As a result, India's export markets for iron and steel are currently much diversified and as such this appears to be its strength.

Table 24: Phase-wise Analysis of India's Export Markets for Iron and Steel, 1999–2013
(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	UAE	6.0	5.7	5.6	6.3
2	USA	20.5	11.6	6.1	6.0
3	Italy	5.5	5.5	5.6	5.6
4	South Korea	2.9	3.3	5.0	4.9
5	Thailand	3.3	2.8	2.1	4.7
6	Nepal	0.5	1.5	3.4	4.4
7	Belgium	1.3	6.1	5.5	4.1
8	China	1.5	13.3	8.1	3.6
9	Saudi Arabia	2.0	1.3	2.4	3.4
10	Vietnam	1.1	1.4	1.1	3.1
Total exports in this sector (Billion US\$)		1.0	4.6	6.7	8.7

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Analysis of India's market share position in her top ten markets in this sector showed that out of the three markets with rising share in India's exports of iron and steel, it is mainly in Nepal that India has a dominant market share. India's market share in Nepal for iron and steel was as high as 94 per cent in 2011 (See *Table 25*). Other markets where India gained market share are in Belgium, followed by Saudi Arabia, Italy, Thailand and South Korea.

Globally, despite an overall rising trend, India's share stood at less than 2 per cent during 2012–13. The heavy domination by a single exporter namely, Japan, has come down significantly. As of 2013, China and Germany, followed by South Korea and Russia have all become the other major players. There are significant fluctuations in China's global market share, which is a reflection of the Chinese government policies to ensure domestic availability of iron and steel.

Table 25: India's Market Share for Iron and Steel in her Top Ten Markets, 1999–2013
(As period average percentage share of each country's total imports in Chapter 72)

<i>SN</i>	<i>Country</i>	<i>1999–2001</i>	<i>2002–08</i>	<i>2009–11</i>	<i>2012–13</i>
1	Nepal	40.3*	89.6**	89.9	NA
2	Belgium	7.2	10.2	12.7	10.3
3	UAE	8.5	6.0	7.8	NA
4	Italy	0.8	1.5	2.2	2.5
5	Saudi Arabia	2.6	2.1	2.1	4.7
6	USA	1.4	2.4	1.8	1.9
7	Thailand	1.3	2.2	1.6	2.7
8	China	0.3	2.5	1.4	1.4
9	South Korea	1.0	1.2	1.3	1.8
10	Vietnam	1.2*	1.8	1.1	1.4##

Note: * Average for 1999–2000; ** Value only for 2003; # Average for 2000–01; ## Value for 2012

Source: Author's calculation based on WITS Comtrade data.

India's iron and steel exports show a diversified structure at the product category level also (See Table 26), with the top two product categories during 2012–13 holding shares of about 11 per cent each. The single most important export product category since 1999–2001 has been “other products of iron–non-alloy steel, plated–coated with zinc”, although its share has shown intermittent variations. The other product category which rapidly increased its share to 11 per cent is ferro-silico-manganese. This is a basic intermediate into the production of special steel products such as those that are corrosion-resistant and high temperature-resistant steel products. Meanwhile, exports of several types of flat-rolled products have grown fast and increased their shares. However, products of high-speed steel—used in the manufacture of various cutting tools and fine hand tools—that were important with about 6 per cent share of total iron and steel exports during 1999–2001, became insignificant by 2012–13.

Table 26: Composition of India's Iron and Steel Exports at the 6-digit Level, 1999–2013
(Period average percentage share in sectoral total)

<i>SN</i>	<i>HS Code</i>	<i>Commodity</i>	<i>1999–2000 to 2001–02</i>	<i>2002–03 to 2008–09</i>	<i>2009–10 to 2011–12</i>	<i>2012–13 to 2013–14</i>
1	721049	Other products of iron–non-alloy steel otherwise plated–coated with zinc	12.4	17.6	10.7	11.0
2	720230	Ferro-silico-manganese	1.6	2.6	8.7	10.8
3	720241	Ferro-chromium carbon containing>4% by wt	1.4	4.6	11.3	7.1
4	720810	Flat-rolled products, in coils not further worked thin hot-rolled with pattern in relief	4.8	0.6	0.5	5.4
5	720719	Other products containing by wt<0.25% of carbon	0.5	3.1	2.9	4.7
6	722220	Bars and rods, cold-formed or cold-finished	4.3	4.8	5.5	4.6
7	721041	Corrugated products, otherwise plated–coated with zinc	2.5	3.3	4.2	3.7

SN	HS Code	Commodity	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
8	720839	Flat-rolled products in coils of a thickness of <3mm not further worked thin hot-rolled excl pckld	0.8	4.7	1.6	3.3
9	720110	Non-alloy pig iron containing ≤0.5% phosphorous	2.2	3.3	5.4	3.3
10	722300	Wire of stainless steel	3.1	2.8	3.5	3.1
11	721070	Products painted, varnished-coated with plastics	0.0	1.0	2.7	2.8
12	720918	Flat-rolled products, in coils not further worked thin cold-rolled (cold reduced) of thickness <0.5 mm	1.7	2.4	2.9	2.4
Total of the above			35.4	50.8	60.0	62.2

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Thus India's iron and steel exports consist mainly of raw materials or of low value-added intermediates. The main challenge in this sector also is to increase value addition through technological upgradation.⁴²

3.2.8 Ores, Slag and Ash (Chapter 26)

During 1999–2001, the largest markets for India's exports of ores, slag and ash were China with a share of 38 per cent, followed by Japan with a share of 28 per cent (*Table 27*). Among these, while Japan remained the second largest destination, its share has declined significantly to just 12 per cent during 2012–13. Meanwhile, China's share in India's exports in this sector increased dramatically after 2001 to as high as 75 per cent during 2002–08 and further to 86 per cent during 2009–11, before declining to 76 per cent again during 2012–13. Thus clearly, India's export performance in this sector seems to be tied to the high growth momentum and import demand from a single country, China.

The market share analysis shows that in China, India's single largest market for this sector, India's market share has declined continuously after 2008 (*Table 28*). During 2012–13, India's share in China's imports stood at just 2 per cent. While Australia continues to dominate the Chinese market, followed by Brazil, India has also been losing out to competition from a host of other developing countries such as Indonesia, Peru, Mexico, etc.

⁴² See also the discussion on the engineering goods sectors in Ministry of Finance (2014) and Department of Commerce (2011). The former pointed out that first and foremost, there was an urgent need to expand India's production capacity in ferrous (and non-ferrous) metals in order to match China's production scale, in addition to moving up the value chain.

Table 27: Phase-wise Analysis of India's Export Markets for Ores, Slag and Ash, 1999–2013

(Period average percentage share in India's total exports in this sector)

SN	Country	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	China	37.7	74.9	86.5	75.5
2	Japan	28.0	11.7	4.8	12.3
3	South Korea	5.8	4.4	2.1	2.4
4	Netherlands	0.9	0.6	0.7	2.1
5	Oman	0.1	0.0	0.1	1.2
6	Iran	3.9	0.1	0.0	0.9
7	Saudi Arabia	0.1	0.2	0.1	0.6
8	Malaysia	0.0	0.1	0.1	0.6
9	UAE	1.4	0.5	0.7	0.6
10	Philippines	0.1	0.0	0.1	0.5
Total exports in this sector (Billion US\$)		0.5	4.0	5.8	2.3

Source: Author's calculation based on DGCIS Export-Import Data Bank.**Table 28: India's Market Share for Ores, Slag and Ash in her Top Ten Markets, 1999–2013**

(As percentage share of each country's total imports in Chapter 26; period averages)

SN	Country	1999–2001	2002–08	2009–11	2012–13
1	China	12.3	18.4	9.7	2.3
2	Japan	6.0	3.9	2.0	1.3
3	South Korea	3.2	2.8	0.9	0.5
4	Netherlands	3.2	2.4	1.6	1.5
5	Oman	0.7	1.1	11.3	2.2
6	Iran	47.4	5.4	0.3 [#]	NA
7	Saudi Arabia	2.0	1.9	0.4	1.6
8	Malaysia	0.1	0.3	0.1	1.5
9	UAE	21.3	22.6	5.5	NA
10	Philippines	0.4	0.3	0.0	0.4

Notes: # Represents average for 2009–10 only.*Source:* Author's calculation based on WITS Comtrade data.

Similarly, India's share has declined heavily in the Japanese market too. Here, India lost out to competition mainly from Australia, Brazil, South Africa, Chile and Peru.

While India had very high import shares during 1999–2001 in the UAE and Iran too, it has seen market erosion. With a 47 per cent share during 1999–2001, India was the single dominant supplier to Iran in that phase; but by 2010–11, India's share dropped to just 0.3 per cent. Germany, Italy and the UAE came to occupy the top three ranks in that market. In the UAE, while India's share dropped from 21 per cent during 1999–2001 to 5.5 per cent during 2009–11, Brazil came to dominate with a 43 per cent share.

It is only in the South East Asian countries of Malaysia and the Philippines that India has seen a marginal rise in market share. But India's market share in this sector remains abysmally low at just 1.5 per cent and 0.4 per cent respectively in these two markets.

The loss in India's market share in particular export markets is related to the large increase in concentration globally in this sector, with the shares of Australia followed by Brazil growing rapidly after the mid-2000s due to the consolidation among global mining firms.

The analysis of the product composition reveals a heavily concentrated product mix for India's exports in this sector (See *Table 29*). During 1999–2001 itself, the product group non-agglomerated iron ores and concentrates (other than roasted iron pyrites) constituted the single largest exports from this sector with a share of 69 per cent. This went up to as high as 88 per cent during 2009–11, before declining to about 65 per cent during 2012–13. These changes in product composition seem to parallel India's huge growth in exports to China since 2001 and the slow down after 2011.

Table 29: Composition of India's Ores, Slag and Ash Exports at the 6-digit Level, 1999–2013
(Percentage share in sectoral total; period averages)

SN	HS code	Description	1999–2000 to 2001–02	2002–03 to 2008–09	2009–10 to 2011–12	2012–13 to 2013–14
1	260111	Iron ores and concentrates non-agglomerated other than roasted iron pyrites	68.6	79.0	88.0	64.5
2	261000	Chromium ores and concentrates	10.2	3.9	1.9	2.5
3	260112	Iron ore and concentrates agglomerated	9.1	5.7	0.4	5.7
4	260600	Aluminium ores and concentrates	3.5	2.5	0.2	5.2
5	261400	Titanium ores and concentrates	2.5	1.1	2.6	9.5
6	260200	Mineral ores and concentrates including ferruginous minerals ores and concentrates with minimum concentration of 20 per cent or more calculated on the dry weight	2.1	0.5	0.3	0.2
7	260800	Zinc ores and concentrates	1.4	3.6	1.1	1.8
8	262030	Ash and residues containing mainly copper	0.9	0.4	0.7	0.0
9	260300	Copper ores and concentrates	0.5	0.1	0.2	1.2
10	260700	Lead ores and concentrates	0.5	1.0	1.0	0.0
Total of the above			96.0	96.3	96.9	98.6

Source: Author's calculation based on DGCIS Export-Import Data Bank.

On the other side, the shares of chromium ores and concentrates as well as agglomerated iron ore and concentrates have declined continuously after 2001. At the same time, shares of ores and concentrates of both aluminium and titanium have increased significantly, with the latter growing faster than the former.

4. Policy Implications

The case for an export-led growth strategy (and in turn, export promotion policies) is based on the argument that exposure to external competition through trade liberalisation will push domestic firms to become competitive. This study attempted to examine the Indian experience by analysing the pattern and nature of India's manufactured export

performance over the last fifteen years. This involved a systematic and rigorous analysis of India's market share position globally as well as in her top ten export destinations for top eight manufactured export sectors at the HS 2 digit level, six of which were also among India's largest manufactured import sectors.

Overall, it was found that the performance of manufactured exports was dismal in the recent periods. While the total merchandise export growth rates in 2009–11 and 2012–13 were -3.5 per cent and -1.8 per cent respectively, corresponding growth rates in manufactured exports were -5.3 per cent and -7.4 per cent respectively. It was also seen that the sole manufacturing sector in which India's global share stood above 5 per cent was gems and jewellery; but this share declined steadily from 2010 and stood at 5.1 per cent in 2013. Among the selected major sectors, the increase in India's global export share has been amongst the most consistent for organic chemicals and pharmaceuticals, though India's shares stood at 3.1 and 2.2 per cent in 2013. India's shares in global exports in none of the other major exports of India constituted even 2 per cent of global exports. India's global share in iron and steel stood at 1.8 per cent in 2013. In the two sectors of non-electrical and electrical machineries—usually considered technologically advanced, India's global export shares in 2013 stood at only 0.6 and 0.5 per cent respectively. In vehicles and parts, India's global share stood at 0.7 per cent in 2013, which was a drop from the one per cent share it had reached in 2011.

India's poor export performance across the major manufacturing sectors reveals that in a highly competitive global economy dynamics based on technology-centred competition, export promotion policies such as tax holidays and allowing duty-free imports for export-oriented firms will only go thus far. Export promotion policies in themselves are not sufficient to improve the manufacturing and technological capabilities in exporting sectors to enable firms to become competitive in a dynamic sense.

There is preliminary evidence that India's manufactured exports have been growing mostly on the basis of the productivity gains obtained through easier access to competitive imported inputs following trade liberalisation in the nineties that accelerated in the 2000s. This has been borne out by the evidence of rapidly rising imports, especially since the mid-2000s. The subsequent slow down in export growth clearly shows that such a pattern of import-dependent export competitiveness has not been sustainable.

India's experience of import-dependent export growth and its subsequent slow down also clearly shows that export markets have not served as a significant competitive pressure on domestic firms to invest and improve their technological capabilities and productivity. The principle reason behind this has been that successive Indian governments failed in understanding the crucial linkages between industrial policy measures and capability development in enabling and sustaining manufacturing sector export competitiveness. The focus on rapid economic growth and horizontal issues such as infrastructure development has meant that the crucial link between industrial policy, capability development and firm-level export competitiveness has been left out or misread.

While there are crucial differences in the interpretations of India's performance in the manufacturing and services sectors in the post-liberalisation phase, there is widespread acknowledgement that the capabilities which India had accumulated on the eve of the 1990s' reforms is the legacy of her industrial policies. Without claiming that all the policies implemented during the pre-1980s were successful, Felipe et al (2010) has argued that the stock of capabilities and technologies that were built as a part of heavy machinery-led industrialization strategy adopted after independence provided India with a foothold especially in the heavy machinery, metals, and the chemical sectors, which became the building blocks to exploit other products once the license-permit raj was gone. The creation of a scientific and a technical infrastructure, as well as the setting up of institutes of higher education, especially in engineering and management provided the much needed know-how and highly skilled low-cost labour for industrial development. In the absence of such policies, it would have been impossible for a country like India to acquire comparative advantage in sophisticated activities by simply following its comparative advantage (which lie in labour-intensive sectors).

There is also widespread agreement that particular sectors such as pharmaceuticals (including the successful export of active pharmaceutical ingredients from the organic chemical sector that we saw), or automobiles and parts, which have shown some resilience in export performance to varying extents, are sectors where government policy intervention has occurred in one way or another. As Khan (2009) showed, trade liberalisation worked in the first two sectors in the context of very strong policies for capability development. Presenting a detailed analysis of the capability development in the automobile sector, Augustin and Shoreder (2014) also established the same.

The lack of continued momentum in export performance in all these major export sectors points towards the dire need to formulate strategic policies for further industrial upgradation. Against the backdrop of the growing trade deficit, available evidence on India's technological lag, absence of broad-based industrial growth and falling value addition (Chandrasekhar and Ghosh, 2008; Joseph and Reddy 2009; Ranganathan and Murthy 2013; Rao and Dhar 2014; Banga 2014; etc.) also clearly points to continuing market failures in the absence of coordinated industrial policy support to address structural weaknesses in the pattern of industrial growth during the period of trade and investment liberalisation.

Against this backdrop, this paper argues that given that Indian firms already face substantial import and export competition, a strategic use of industrial policy tools aimed at improving domestic firms' manufacturing and technological capabilities and addressing the market failures in inter-sectoral coordination to foster forward and backward linkages domestically is required to improve India's export performance. In this process, India must leverage its large domestic market that offer unexploited opportunities to domestic firms to achieve economies of scale and obtain the necessary technical skills and managerial experience required to be competitive. It may be argued that Indian firms competing successfully in LDCs and some of the other developing countries also become a channel for

obtaining external market experience. But it needs to be noted that the increase in developing countries' share in India's export markets has come at the cost of a distinct decline in the growth in India's exports to the developed countries. This might be a reflection of the challenges Indian firms face in maintaining their competitiveness in the advanced markets that are generally considered to be technologically more mature markets.

An example of the disconnects between trade policy and India's manufacturing sector development priorities is the case of inverted duty structures faced by manufacturers of end products. The latter has resulted from India's non-strategic tariff liberalisation commitments under the WTO and bilateral or regional FTAs. Inverted duty structures arise in a downstream sector when import duties on end products are low or even zero, while tariffs on its intermediate parts and components are high. Clearly, as other studies have also pointed out, the latter makes it unviable for end product manufacturers in India to invest in production based on high-cost parts and components competing against cheap imports of final products.

The policy focus currently is on how inverted duty structure makes our final products exporters uncompetitive. However, bringing in intermediate goods at reduced tariffs to improve competitiveness in the domestic manufacturing of final products will go only so far. The ultimate objective should be to ensure that locally produced intermediates achieve the necessary productivity to be competitive against imported intermediates. If the government brings down the tariffs on parts and components further to improve the competitiveness of end products manufacturers, it will reduce whatever possibilities there exist for promoting domestic production of parts and components. The government can provide incentives for investments in specific parts, components and machinery deemed important for import-substituting local production by tying firms' access to government funds to the meeting of specific technical standards, which could be related to environmental standards, backward region development, etc. At the same time, larger funds should be offered for skill development and training.

Meanwhile, it is of critical importance that the government is careful while negotiating new trade agreements not to include commitments that rule out such policies in future. The ongoing Parliamentary Committee review of India's existing trade agreements needs to keep in view the strategic need to keep policy options to support industries/selected products that have important forward and backward linkages. As we saw, except for Japan and Thailand, growth rate in India's exports going to its major FTA partners have been lower than the growth in India's total merchandise exports. As such, the implementation of those trade agreements does not appear to have helped Indian exporters significantly.

Similarly, India should exercise extreme caution about making any commitments on IPRs beyond the present TRIPS regime, as they could have implications on development and ownership of new technologies within the country, which in turn will have adverse impact on India's ability to sustain exports. For example, as TDR (2014) has suggested, varying

patentability standards, such as the granting of narrow patents for incremental innovations that build on more fundamental discoveries, may be useful for adapting imported technologies to local conditions. Encouraging such patents might incentivise greater innovation activities.

Thus the challenging task before India is to coordinate trade, investment, education, skill development, taxation, technological, infrastructure, environmental and energy-use policies to address the market failures across a diverse range of sectors for developing dynamic competitiveness in a broader spectrum of manufacturing industries. These need to be coordinated at the sectoral level as well as between sectors to interlink the demand for upstream and downstream industries domestically. This will generate the economies of scale necessary to make domestic firms competitive. These coordinated policies need to be continuously monitored for compliance and reviewed periodically to keep up with technological developments globally. This will generate favourable conditions to make domestic industries dynamically competitive. Most of the sectoral suggestions have been put forth from this perspective.

For instance, we saw that the organic chemicals sector has clear forward and backward linkages with the pharmaceutical industry, polymers, and the petroleum industry. Towards this end, the government could consider providing tax incentives for technological upgradation so that there is greater motivation for investing in environment-friendly technological innovations in the upstream organic chemicals and petroleum refining activities that outweigh the initial cost of complying with the stringent environmental regulations. These could also lead to forward production linkages and create demand for technologically advanced products in other sectors such as electrical and non-electrical machinery (and also vehicles and parts) industries and generate sufficient economies of scale to make them competitive.

The most pressing policy challenge in the pharmaceutical sector is to encourage India's pharmaceutical firms to re-establish the linkages between domestic producers of bulk drugs/APIs and producers of formulations. Towards this end, The introduction and monitoring of technical standards for the domestic market—particularly in the case of operational processes within the API subsector—and policy measures aimed at incentivising technological upgradation for meeting the same may be considered. Public investment in R&D for the development of complex molecules and new products should be increased.

In the non-electrical machinery sector, the overall policy focus need to be on putting in place advanced technical standards and in incentivising domestic investments and production of higher value-added products and parts to meet those standards. R&D capabilities in this segment should also be strengthened through funds dedicated to supporting energy-efficient products.

The large domestic market should be leveraged for expanding demand for domestically produced electronic products as well as electrical and non-electrical machinery products. It

is known that the application of information and communication technology (ICT) in sectors as diverse as education, health, agriculture, environment, taxation, governance, etc., does increase the aggregate demand for IT and telecommunication products. Whether this translates into demand for domestic products will depend on putting in place enabling conditions for the creation of domestic production linkages. One way to ensure is through the formulation of national standards for products wherever such standards are not in place and to ensure necessary initial demand through government procurement that will help generate the necessary economies of scale to make them competitive vis-à-vis imports. These could be technical standards related to energy efficiency or other environmental standards. At the same time, the government could provide incentives for expansion of investment in local production of the required machinery as well as for their parts and accessories while tying this support to the meeting of specific standards.

In the case of the vehicles and parts sector, the phased introduction of tougher fuel emission standards for vehicles along with the specification of associated technical requirements for parts and components is one of the ways in which technological upgradation along the entire production chain of the automobile parts and components industry can be attempted. Investments for technological upgradation can be supported by allowing firms to access government funds under a dedicated clean energy fund conditional on the production of more fuel-efficient vehicles/parts and components that meet the technical standards. This will have a spin-off technological upgradation impact on the related metal, plastics, glass, electronics, machinery parts and tools, too. Consumers could be offered incentives for shifting to the higher technology products. A relevant example would also be the Indonesian government's provision of tax incentives to consumers for a fuel-efficient and environmentally friendly vehicle — the low-cost green car (LCGC). Meanwhile, it is important that existing strategic protection in this sector should be relaxed only in a phased manner even in the case of FTAs.

Given the significant two-way trade in the iron and steel sector, there is a need to examine the nature of exports and imports at a disaggregated level to understand the supply mismatches so as to make the iron and steel industry more competitive. Given that this sector feeds into many other engineering sectors such as non-electrical and electrical machinery sectors, as well as the transport equipment sector, improving the technological base in the iron and steel sector should get increased focus. Towards this, banking on India's engineering base and skills, research and investment into material science research and engineering processes need to be incentivised and commercialisation of improved technologies should be encouraged. Technological innovation needs to be prioritised with a focus on cleaner technologies that lead to a reduction in emissions and energy-saving technologies. On the backward integration side, the policy focus in the ores, slag and ash sector needs to be re-considered with a view to make these raw materials available domestically to the ferrous and non-ferrous metal industries at internationally competitive prices. This will help in improving competitiveness across the machinery, transport equipment and ancillary sectors.

The magnitude of the challenge before India to increase investments for improving productive capacities and capabilities on a large enough scale to improve its manufacturing sector competitiveness globally is humungous. This cannot be envisioned without a significant increase in revenue mobilisation by the government, which also calls for changes in tax policies and macroeconomic policy stance. A detailed examination of the nature of Indian manufacturing sector's import dependence at the disaggregated level will help in identifying priority products and industries with important forward and backward linkages that need immediate policy focus.

An important caveat while interpreting the findings of this study is that these are based on market share analysis of India's gross exports at the 2-digit level. The particular product categories that dominate our exports and imports in the major sectors need to be studied in depth at the disaggregated level to understand all the relevant issues in terms of net benefits to the economy. In the context of increased two-way trade across many sectors of export importance and liberalised FDI inflows and outflows, such a study will also need to take into account production structure and ownership pattern in these sectors to unravel the production dynamics and net value addition to the economy that accompanies an expansion in exports in any particular sector.

Appendix Tables

Appendix Table 1: Country-wise Growth Rates in India's Total Exports, 1999–2013 (Per cent)

<i>SN</i>	<i>Country</i>	<i>1999–2000 to 2008–09</i>	<i>2009–10 to 2013–14</i>
1	Saudi Arabia	24.2	35.2
2	Vietnam	31.8	29.3
3	Kenya	38.2	28.6
4	Turkey	29.0	28.2
5	Bangladesh	15.4	26.1
6	Iran	36.3	25.5
7	Brazil	40.8	23.0
8	South Africa	32.0	23.0
9	Nepal	33.6	22.8
10	Thailand	17.9	22.2
11	U S A	12.5	19.1
12	Sri Lanka	22.5	17.2
13	Israel	17.1	16.6
14	Japan	9.5	15.5
15	Singapore	36.6	14.2
16	Hong Kong	12.9	12.0
17	U K	16.5	11.3
18	Belgium	16.1	10.6
19	Malaysia	21.8	9.7
20	Indonesia	26.5	8.9
21	Italy	17.3	8.7
22	Netherlands	26.4	8.0
23	Germany	15.9	7.5
24	UAE	32.0	5.7
25	France	15.5	5.5
26	South Korea	30.4	5.5
27	China	42.9	3.6
Average of the above		24.5	16.3
Growth rate in total exports		20.8	14.0

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Note: These are all the countries with at least a one per cent average share in India's exports during 2012–13.

Appendix Table 2: India's Top Ten Manufactured Export Sectors in terms of Growth Rates, 2009–13
(Period average growth rate in per cent)

SN	Chapter	Sector	2009–10 to 2011–12	2012–13 to 2013–14	2009–10 to 2013–14
1	80	Tin and articles thereof	-29.3	612.2	227.3
2	75	Nickel and articles thereof	99.6	127.5	110.8
3	78	Lead and articles thereof	121.8	14.3	78.8
4	86	Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical	50.0	30.1	42.0
5	93	Arms and ammunition; parts and accessories thereof	26.1	62.4	40.6
6	47	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard	100.4	-57.9	37.0
7	88	Aircraft, spacecraft, and parts thereof	23.5	52.3	35.0
8	69	Ceramic products	24.2	19.0	22.1
9	59	Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use	17.1	28.3	21.5
10	74	Copper and articles thereof	36.6	-1.1	21.5
Total manufactured exports			16.4	-1.6	9.2

Note: Same as in Table 8.

Source: Author's calculation based on DGCIS Export-Import Data Bank.

Appendix Table 3: Top Ten Global Manufactured Export Sectors in terms of Growth Rates, 2009–13
(Period average growth rate in per cent)

SN	Chapter	Sector	2009–11	2012–13	2009–13
1	72	Iron and steel	7.4	223404.1	89366.0
2	48	Paper and paperboard; articles of paper pulp, of paper or of paperboard	-2.7	28579.9	11430.3
3	40	Rubber and articles thereof	12.3	13451.5	5388.0
4	85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television Image and sound recorders and reproducers, and parts	4.7	12129.2	4854.5
5	84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	4.9	2887.0	1157.7
6	66	Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof	6.1	2726.0	1094.1
7	74	Copper and articles thereof	80.5	2310.7	972.6
8	25	Salt; sulphur; earths and stone; plastering materials, lime and cement	7.8	2017.9	811.8
9	42	Articles of leather, saddlery and harness; travel goods, handbags and similar containers, articles of animal gut (other than silk-worm gut)	393.5	1276.3	746.6
10	73	Articles of iron or steel	2.5	1064.4	427.3

Source: Author's calculation based on WITS Comtrade data.

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