Working Paper 303

Creating Manufacturing Jobs in India: Has Openness to Trade Really Helped?

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June 2015

INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS

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Abstract

After following inward oriented economic policies for nearly four decades, India opened up to international trade in the early 1990s. Since then, the trade integration of the Indian economy in general and the manufacturing sector in particular has increased phenomenally. Against this backdrop, this paper analyses the direct as well as indirect impact of trade on jobs in the Indian manufacturing sector. Using the growth accounting approach, we find that the direct impact of trade on manufacturing jobs has been positive. However, trade induced decrease in labour demand has neutralized direct job gains to a great extent. Therefore, unlike other Asian economies, the overall employment gain from trade has been minimal. The paper argues that supply side constraints should be addressed urgently to enhance job gains from international trade.

JEL Classification: *F16, J21, O57.*

Key Words: *Manufacturing Jobs, Employment, International Trade, India*

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1. Introduction

Economic development requires a shift in employment from the primary to the secondary sector. Economists, cutting across ideological lines, agree that developing countries cannot escape poverty without creating ample job opportunities in secondary sector in general and manufacturing sector in particular. However, the policy needed for structural transition of employment has remained an issue of great debate. Specifically, economists have passionately debated the role of international trade policy in promoting non-farm employment growth in developing countries. On the one hand, structural economists have argued that developing countries cannot achieve the target of structural transformation without imposing barriers on international trade. On the other hand, orthodox trade theory suggests that openness to international trade can be a strong positive force for job creations in developing countries. Conventional wisdom suggests that trade integration ensure resource allocation according to comparative cost advantage. Since developing countries, given their large unskilled labour pool, have comparative advantage in the production of low-skilled, labour intensive products, openness to international trade stimulates growth in low-skilled labour intensive sectors and hence, accelerates the rate of job creation.

India, over the last six decades, has experimented with both extremes of trade policy. Soon after independence, it opted for import substitution to stimulate output and employment growth in the manufacturing sector. Import substitution policies worked well initially; industrial growth in India was healthy during the 1950s, 1960s and 1970s. However, industrial growth during these three decades failed to generate the desired level of employment in the secondary sector. Consequently, there was not radical increase in the share of manufacturing in total employment and the composition of employment remained highly skewed in favour of the primary sector. India started overturning trade and foreign exchange controls in the 1980s before embarking on rapid trade and foreign exchange rate liberalization in 1990-91. Since then, the Indian government has gone on a sustained liberalization drive, with a number of policy measures that included the elimination of quantitative restrictions on imports, a gradual reduction in tariffs to below 10 per cent and the adoption of a market-determined exchange rate regime. These policy changes were widely welcomed and it was anticipated that openness to trade would increase employment opportunities in the manufacturing sector by realigning the production structure in favour of

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This paper is part of the World Bank sponsored "Jobs for Development" research project at ICRIER. Financial support from the World Bank is gratefully acknowledged. The author is also thankful to Dr. Pravakar Sahoo, Institute of Economic Growth and an anonymous referee from the World Bank for their valuable comments and suggestion on this paper. The earlier version of this paper was presented at the ICRIER – Jobs for Development workshop at ICRIER on December 5, 2014.

low-skilled, labour intensive industries. Whether it has actually happened or not has remained contentious. A few studies have reported that expectations of sustained and rapid output and employment growth under a liberal trade regime have not materialized (Nambiar et al., 1999 and Chaudhri, 2002). In fact, these studies argue that trade openness has shrunk India's manufacturing base, both in terms of value added and employment. However, these studies relied exclusively on pre and post-reform comparison of employment growth and did not make any effort link the post-reform employment growth with trade or trade liberalization. Sen (2008) made an effort in this direction and reported that international trade has neither changed the composition of India's trade of manufactured goods nor it has affected manufacturing employment in any significant way.

However, Sen's study is quite dated. It deals primarily with the 1980s and the first half of the 1990s and hence ignores some key policy changes such as the removal of quantitative restrictions on the import of consumer goods and the removal of reservation for small-scale units. These two policy changes held great potential to affect employment though trade. In fact, significant changes in trade and employment have been observed only after the 1990s. Against this backdrop, this paper re-examine the impact of trade on manufacturing employment in India. Using the growth accounting approach, we find that the direct impact of trade on manufacturing jobs has been positive. However, trade induced decrease in labour demand has neutralized direct job gains to a great extent. Paper argues that supply side constraints should be addressed to maximise the job gains from trade. The paper is structured as follow: Section 2 provides a comprehensive overview of existing literature on the impact of trade on domestic employment, while section 3 summarizes the major features of the Indian trade regime and the global integration of Indian manufacturing. Section 4 examines the growth and compositional changes in manufacturing employment in India. Section 5 illustrates the methodological approach and lists the data sources used, while section 6 deals with empirical findings. Finally, section 7 summarizes the main findings and suggests a few policy options.

2. Literature Review

Theoretically, the relation between trade and employment is a contentious issue. The theory of relative comparative cost advantage predicts that trade has a positive effect on employment in developing countries. It suggests that openness to international trade triggers a process of specialization in favour of abundant-factor-intensive goods. Since labour is an abundant factor of production in most developing countries, it implies that openness to trade increases the demand for labour and hence, employment, in developing countries.[1] However, this prediction is based on the very strong assumption of identical technology across countries. New trade theory, which takes technological differences into account, shows that openness to

[1] Here it should be noted that in its original form Hicks Ohlin model assumes full employment. Thus in that case, free trade could only increase the relative remuneration of abundant factor that is the real wage rate of labour in developing and not the level of employment. However, many economists use H-O model with more realistic assumptions such as labour market rigidities and presence of unemployment. Once we substitute the assumption of full employment with unemployment, H-O model predicts a possibility of increase in wage rate as well as an increase in total employment (for detail see Lall 2002 and Ghose 2000).

trade could lead to multiple equilibria (Grossman and Helpman 1990). In such a case, the impact of trade openness on employment depends on which equilibrium is reached. Similarly, models pertaining to technological catch-up shows that trade openness could introduce new technologies in developing countries that could potentially affect employment adversely through an increase in total factor productivity (Vivarelli 2002). Therefore, theoretically, there is no clarity regarding the impact of trade on employment in developing countries. On the one hand, trade openness could increase employment by increase output growth; on the other, it could hamper employment by enhancing total factor productivity. The final outcome depends on the interaction between these two competing effects. There is a possibility that trade-induced productivity growth could outweigh trade-induced output growth, leading to a decline in employment. This possibility is particularly strong in countries that are plagued by supply side constraints such as poor infrastructure, an inefficient labour market etc (Vivarelli 2002).

The lack of theoretical consensus has meant that the issue of the impact of trade on employment has largely become an issue of empirical investigation. Since the mid 1960s, a number of attempts to have been made to empirically evaluate the impact of growing trade integration on employment, both in developing as well as in developed countries. However, most empirical studies conducted during the 1970s and 1980s focused exclusively on developed countries. In developing countries, the issue of employment and trade caught the imagination of economic researchers only in the 1990s, when a large number of developing countries switched from an import substitution model to an export- oriented economic regime. Since then, several attempts have been made to analyse the impact of trade or trade liberalization on employment in various developing countries. However, these studies have reported divergent results.

Most of the studies related to African and Latin American economies have reported that trade integration has a negative impact on domestic employment. Estimating a labour demand equation, Ravenga (1994) reported that trade liberalization had a small but negative impact on manufacturing employment in Mexico. Rama (1994) reported similar results for Uruguay. Using four digit manufacturing data, she found that a 1 per cent decline in protection rate was associated with 0.4 to 0.5 per cent reduction in employment. Mesquita and Najberg (2000) also indicated that trade liberalization had a negative impact on employment in Brazil. Their analysis showed that trade liberalization in Brazil, during the early 1990s, coincided with a decline in industrial employment. They found that employment declined by 32.4 per cent in capital-intensive industries, while it went down by 13.3 per cent and 3 per cent in the labour-intensive and natural resource based industries respectively. However, these scholars asserted that the decline in employment could not be entirely attributed to trade liberalization as increase in productivity was also responsible. Chile also witnessed a reduction in employment after the introduction of trade reforms. According to Levinsohn (1999), trade liberalization along with severe macroeconomic shocks resulted in an eight per cent decline in net manufacturing employment between 1979 and 1986. Rattso and Torvik (1998) reported that trade reforms had a severe negative impact in Zimbabwe. They found that rapid trade

reforms introduced in early 1990s increased imports and the trade deficit, which resulted in a reduction in output and employment.

In contrast to the studies mentioned above, several studies have reported that trade liberalization had a favourable effect on employment in a few Asian economies. Milner and Wright (1998) found that a reduction in tariff in Mauritius led to a significant increase in employment in export-oriented industries, without having any negative impact on employment in import-competing industries. Orbeta (2002) reported similar positive results for the Philippines. His analysis showed that an increase in export intensity as well as an increase in import penetration increased demand for labour in the Philippines. Since imports, theoretically, substitutes for domestic production, a positive relation between import penetration and labour demand is surprising. However, Orbeta pointed out that domestic production in the Philippines is highly dependent on imports and hence, the positive relationship between imports and labour demand is not unexpected.

The contrasting experiences of developing countries suggest that perhaps mere openness to international trade cannot solely ensure job gain and other domestic polices to increase the competitiveness of low-skilled, labour intensive industries also play an important role (Lee 2005). Countries that supplement their liberal trade policy with better institutions, better infrastructure, and better functioning labour and financial markets gain from trade.

3. Trade Regime and Global Integration of Indian Manufacturing

India, like most British colonies, inherited a very liberal trade regime from its colonial rulers (Panagariya 2004). However, the liberal economic regime was short-lived as India started moving towards protectionism from the mid-1950s onward. This shift from a liberal to a restrictive trade regime was triggered by a foreign exchange crisis in 1956 and further intensified by the growing popularity of the structural school of economic thought, which highlighted import protection as an essential prerequisite for industrialization in developing countries. Starting from 1956, India progressively increased restrictions on imports. All most all imports were either brought under strict and discriminatory import licensing or were canalized through state trading corporations. For the purpose of licensing, imports were divided into three categories; (i) consumer goods (ii) capital goods and (iii) intermediate goods. Imports of consumer goods were almost totally banned. Only a handful of consumer goods were allowed to be imported through state trading agencies. The imports of capital and intermediate goods were further divided into four sub-groups; (i) banned, (ii) limited permissible (iii) automatic permissible and (iv) Open General Licence (OGL). The import of goods falling under group one was completely banned, while a mandatory certificate of essentiality and a mandatory clearance from Chief Controller of Imports and Exports (CCI&E) was required for the imports of goods falling under group two. In order to import goods classified as automatic permissible, only a clearance for CCI&E was required. In contrast, goods coming under OGL were allowed to be imported without any clearance. However, the coverage of OGL list was extremely narrow. Until 1976-77, only 79 capital goods and a handful of intermediate goods were listed under OGL. This extensive coverage

of non-tariff barriers built an unscalable wall of import protection and ensured that import of manufactured products remained virtually stagnant during the 1960s and 1970s (Table 1).

Although imports were considered unnecessary during the pre-1980 period, a sharp distinction was made between imports of consumer goods and capital goods. Capital goods deemed necessary for industrialization were allowed to be imported under OGL category. Moreover, the exchange rate was kept artificially high to facilitate the import of capital goods at lower prices (Tendulkar and Bhavani 2007). The overvalued exchange rate, along with very high tariff and non-tariff protection, worked as a disincentive for exports (Srinivasan and Tendulkar 2003). Consequently, exports of manufactured products also remained low and stagnant during pre-1980s (Table 1).

Table 1: Trade Integration of Indian Manufacturing Sector

Year	Exports	Export Output Ratio	Imports	Import Output Ratio	Total Trade
1962	0.69	--	1.37	--	1.98
1973	1.57	6.70	1.69	7.22	3.26
1980	4.42	6.23	5.35	7.54	9.77
1990	14.77	10.80	14.29	10.46	29.06
1998	30.40	15.90	28.22	14.74	58.68
2000	38.40	19.36	27.68	13.96	66.08
2005	88.36	20.50	85.85	19.92	174.21
2006	108.03	20.32	105.69	19.88	213.72
2007	129.02	19.22	133.65	19.91	262.67
2008	161.14	22.40	181.69	25.26	342.82
2009	154.17	21.00	165.94	22.60	320.11
2010	196.28	20.35	213.16	22.09	409.44
2011	263.19	22.62	270.43	23.25	533.63

Source: Compiled and calculated from UNCOMTRADE and Annual Survey of Industry

Note: Export, imports and total trade values are in billion US$

After experimenting with restrictive trade policies and an overvalued exchange rate for nearly two-and-a-half decades, the Indian government initiated a process of trade policy liberalization in the late 1970s. Aiming to modernize the manufacturing sector, the Indian government started relaxing restrictions on the imports of capital goods and key raw materials. Between 1976 and 1988, the scope of the OGL list was expanded from 79 to 1170 and the import duty on select capital goods, such as those for power and fertilizer projects, was reduced. Apart from this, imports of all items, except a few products which were listed in negative list, were de-canalized. In line with these measures, the import of manufactured goods increased from US$5.35 billion in 1980 to US$14.29 billion in 1990 (Table 1). However the import to output ratio did not increase much during this period and remained fluctuating roughly between 8 per cent and 11 per cent (Table 1). In contrast, the export

intensity of the manufacturing sector increased impressively during the 1980s (Table 1). The turnaround in manufactured exports can be attributed primarily to a massive devaluation of the Indian rupee. Apart from devaluation, export promotion schemes, such as a reduction in the interest rate on export credit from 12 per cent to 9.5 per cent, extension of pre-shipment credit from 90 days to 180 days, introduction of the export import-pass book scheme and the establishment of four more EPZs etc. also played a role in increasing manufactured exports.[2]

Although the process of trade liberalization started in the 1980s, the real turning point came in 1991 when India resorted to rapid trade liberalization under its structural adjustment programme. The post-1990-91 trade reforms have been carried out in two broad phases – one from 1991-92 to 1997-98 and the second from 1998-99 onwards. The first phase of trade reform was marked by the removal of quantitative restrictions (QR) on intermediate and capital goods along with a rapid reduction in tariff rates. After marginally reducing the coverage of QR through an expansion of the OGL list in 1991, the Export Import Policy (EXIM) 1992-97 announced the most sweeping changes in the import regime. In a bold step, it abolished all sorts of licensing requirements for the import of all intermediate and capital goods, except for some items of dual use such as computer equipment. Even these restricted capital goods were allowed to be imported under a Special Import Licence (SIL), issued to leading exporters. The EXIM policy was revised in 1993 to de-canalize the imports of a few goods listed in negative list such as kerosene oil, liquid petroleum gas and phosphatic and potassic fertilizers. A further revision was carried out in April 1994 when the imports of second hand capital goods were allowed under SIL. After liberalizing the imports of capital and intermediate goods, the import policy revision of April 1995 freed the imports of 78 consumer goods. In April 1996, for the first time, India announced a tariff line wise import policy. According to this policy, out of 10202 tariff lines at 10 digits level of HS classification, 6161 tariff lines were freely importable as of April 1, 1996. Another 488 tariff lines were freed during 1996-97 and 391 during 1997-98. Nonetheless, QR on the imports of a predominating majority of consumer goods remained intact.

Apart from the removal of QRs, a rapid reduction and rationalization of tariff rates was also implemented during 1992 to 1997. The speed of tariff liberalization in post-1990 period can be gauged from the fact that within seven years (1990 to 1997), the average industrial tariff rate was brought down from approximately 81 per cent to less than 31 per cent (Table 2). The reduction in tariff rates was complemented with harmonization of tariff rates across all tariff lines. As a result, the standard deviation of tariff rates in all major categories of imports declined sharply (Table.2). Interestingly, despite the massive reduction in tariff rates and the removal of QRs, the import intensity of the manufacturing sector increased only by four percentage points between 1991 and 1998 (Table 1).

[2] In 1983, the Government of India decided to establish four more EPZs, one each in Madras, Kochi, Noida and Falta, Calcutta. However, here it should be noted that there is a debate on the contribution of EPZs to India's exports. Many researchers have pointed out that these EPZs have failed to make any significant contribution to Indian exports, particularly traditional exports (for detail see Aggrawal 2004).

Table 2: Average Basic Import Duty (MFN Rate): Selected Industrial Products

		1990	1997	2001	2004	2012
Consumer Goods	Average Duty	92.2	36.3	35.9	31.5	10.3
	Minimum Duty	0.0	0.0	0.0	0.0	0.0
	Maximum Duty	355.0	260.0	210.0	182.0	150.0
	Standard Deviation	36.3	20.4	15.3	18.5	24.5
Intermediate Goods	Average Duty	82.2	30.2	32.7	29.3	11.2
	Minimum Duty	0.0	0.0	0.0	0.0	0.0
	Maximum Duty	300.0	260.0	210.0	182.0	150.0
	Standard Deviation	40.0	9.1	8.5	6.8	7.5
Capital Goods	Average Duty	72.6	24.2	26.6	25.3	5.5
	Minimum Duty	0.0	0.0	0.0	0.0	0.0
	Maximum Duty	300.0	50.0	105.0	105.0	100.0
	Standard Deviation	51.0	7.7	8.2	7.5	9.8
Industrial Products	Average Duty	81.6	30.1	31.6	27.8	9.7
	Minimum Duty	0.0	0.0	0.0	0.0	0.0
	Maximum Duty	300.0	50.0	170.0	160.0	100.0
	Standard Deviation	42.1	9.3	8.6	7.5	8.5

Source: Extracted from World Integrated Trade Solution Database, available http://wits.worldbank.org/WITS/WITS/Results/Queryview/QueryView.aspx?Page=DownloadandViewResults&Download=true

Another turning point in Indian trade policy came in 1997 when the Disputes and Settlement Body of the WTO ordered India to abolish all QRs. In accordance with this, India started removing QRs on the remaining items in 1998-99. A total of 894 tariff lines were freed in 1998-99, followed by another 714 on March 31, 2000. Finally, with the removal of 714 tariff lines from the restricted list on March 31, 2001, the import licensing system or QR regime came to an end. To monitor the impact of a QR-free regime, tariff reforms were put on hold between 1998 and 2004. In fact, from 1997 to 2001, tariff rates were increased through the use of para-tariff such as special duty, surcharge and special additional duty. After carefully observing the impact of the QR-free regime, the Indian government resumed its policy of gradual tariff cuts in 2004 and gradually brought down the average industrial tariff rate to below 10 per cent in 2012. The removal of QRs and reduction in tariff had a significant impact on India's imports of manufactured products. The volume of manufactured imports, which was less than US$29 billion in 2001, shot up to more than US$270 billion in 2011. Consequently, the import intensity of manufacturing sector increased sharply from 2001 onward (Table 1).

Import liberalization in the 1990s was accompanied by substantial liberalization of the export regime. Almost all export controls were gradually removed during 1991-92 to 1997-98, except for items on the negative list whose exports were restricted on the basis of heritage, socio-cultural and ecological considerations. Apart from this, export promotion steps such as

100 per cent foreign equity participation in export promotion zones (EPZ), introduction of Exim scrips and removal of the phased manufacturing programme were also introduced. However, once again the most significant boost to export competitiveness came from the de-valuation of rupee in July 1991 and the subsequent shift from a fixed to floating exchange rate regime in March 1993.[3] All these measures helped sustain the momentum in manufactured exports that was gained in the mid-1980s. The export intensity of manufacturing witnessed an impressive jump of around ten percentage points from 1990 to 2011 (Table 1).

3.1 Composition of Trade

In the previous section, we examined the increase in the volume of manufactured trade since the adoption of liberal trade regime. In this section, we look at the structure or composition of manufactured trade. Standard trade theory suggests that developing countries should specialize in the export of low skilled labour intensive products while their imports should consist of high skilled labour intensive products. In order to examine this proposition, we classify 55 three-digit manufacturing sub-sectors into different groups according to the skill intensity of their production. Following Sachs et al. (1994), we use the share of non-production workers (white collar workers) in total workforce as an indicator of skill intensity. A higher ratio indicates higher skill intensity and vice-a-versa. We arranged all industries according to their skill intensity and then classified the 55 industries into eleven groups, each group containing five industries. Group one includes the five most skilled labour intensive industries while group eleven includes five least skilled labour intensive industries. After that, we calculated the share of each group in India's total manufactured imports and exports.

Table 3: Composition of Imports and Exports of Manufactured Goods by Skill Intensity

Year	Composition of Exports			Composition of Imports		
	1990-91	1998-99	2013-14	1990-91	1998-99	2013-14
Group 1	1.41	0.85	3.69	7.31	6.59	11.76
Group 2	0.88	1.62	2.11	6.32	5.13	5.95
Group 3	5.89	7.48	8.40	27.10	23.81	20.71
Group 4	11.66	7.62	33.81	33.82	40.05	34.32
Group 5	3.03	2.70	5.14	3.42	2.19	3.58
Group 6	3.08	4.76	6.32	9.05	4.82	5.45
Group 7	9.98	9.88	8.84	5.08	9.01	8.65
Group 8	5.64	5.45	2.83	3.34	3.09	2.24
Group 9	1.94	1.59	1.19	1.38	1.98	0.88
Group 10	28.32	26.36	15.77	1.36	2.07	5.34
Group 11	28.16	31.68	11.89	1.82	1.26	1.15
Total	100	100	100	100	100	100

Source: Calculated from UNCOMTRADE database

[3] In 1992, India introduced the Liberalized Exchange Rate Management System (LERS). Under LERS, dual exchange rates – government determined exchange rate for selected government and private transaction and a market determined exchange rate for other transactions – were adopted (See Pandit and Siddharthan 2004).

The result of this exercise is shown in Table 3. It is evident from the table that the composition of Indian manufactured exports has witnessed a significant change after 1997-98. Prior to trade liberalization, India's exports of manufactured products were dominated by low skilled labour intensive products. In 1990-91, ten least skilled labour intensive industries had an approximately 57 per-cent share in total exports; this share remained constant until 1997-98. However, the share of these industries declined to below 28 per cent in 2013-14. In contrast, the combined share of five relatively high skilled labour intensive industries[4] in total manufactured exports has zoomed from less than eight per cent in 1997-97 to more than 33 per cent in 2013-14. This compositional shift in manufactured exports clearly suggests that India is increasing specializing in the exports of relatively skilled labour intensive products, which does not augur well for an unskilled labour abundant country like India.

The composition of manufactured imports, on the other hand, has remained comparatively stable (Table 3). The only noticeable change in the composition of manufactured imports is that the share of high skill intensive industries in total imports has increased roughly by four percentage points, which is quite expected.

4. Manufacturing Employment: Some Stylized Facts

Manufacturing employment growth has remained an issue of intense debate in India over the last few years. Manufacturing employment witnessed a healthy growth during the 1970s when it grew at an annual rate of 4.6 per cent per annum (Table 3). However, employment growth lost momentum in the 1980s. During this period, employment in the organized manufacturing sector remained almost stagnant. Interestingly, the decade of the 1980s witnessed an impressive growth in manufacturing output. Various economists attributed this jobless growth in organized manufacturing sector to various reasons. While some economist highlighted policy-induced labour market rigidities as the main culprit (Fallon and Lucas, 1991), others attributed the stagnation in employment to an increase in the real wage rate (Ahluwalia, 1991, World Bank, 1989). Yet another set of studies pointed out the increase in the mandays worked per worker and increase in the actual hours worked per worker as the reasons behind employment stagnation in the 1980s (Nagraj, 1994; Papola, 1994 and Bhalotra 1998). Whatever the reason, the fact remained that organized manufacturing employment registered its worst performance in the 1980s. Against this backdrop, a series of economic reforms were introduced in the 1990s to revive employment growth in organized manufacturing sector. It was expected that opening up of the economy to foreign trade and investment will improve job opportunities in the organized manufacturing sector by altering the production structure in favour of low skilled labour intensive industries.

An analysis of manufacturing employment in the post-reform period shows that employment growth, at an aggregate level, did increase after the adoption of a liberal economic regime. However, it has not shown any consistent trend. Employment growth remained respectable during the first half of the 1990s, when it grew at an annual rate of 2.91 per cent per annum

[4] These five industries are General Purpose Machinery, Other Chemical Products, Refined Petroleum Products, Domestic Appliance and basic precious and non-ferrous metals.

(Table 4). A pickup in manufacturing employment growth in the first half of the 1990s signalled that perhaps the process of structural adjustment was going to be a painless process. This optimism was short-lived as employment growth turned negative in 1997-98. The down turn became more pronounced in the following years when India removed quantitative restrictions on the imports of consumer goods. From 1997-98 to 2003-04, employment in organized manufacturing sector declined at an annual rate of 1.85 per cent. Employment growth recovered in 2003-04 and since then, it has been growing at an impressive rate of around 7 per cent per annum (Table 4).

Table 4: Growth Rate of Employment in Organized Manufacturing Sector

Time Period	Average Annual Growth Rate
1973-97 to 1979-80	4.61
1979-80 to 1989-90	-0.07
1989-90 to 2011-12	2.31
1989-90 to 1997-98	2.91
1997-98 to 2003-04	-1.85
2003-04 to 2011-12	6.83

Source: Calculated from Annual Survey of Industry

At a disaggregated level, post-reform employment growth has varied substantially across sectors. Employment growth has been negative in eleven manufacturing sub-sectors during the post reform period, while in the remaining industries; employment growth has varied from a meagre 0.06 per cent per annum to 12.22 per cent per annum. As expected, industries that have registered negative growth in the post-reform period are mainly import competing industries.[5] An Analysis of manufacturing employment by type of industry shows that employment in all import-competing industries put together has grown at a modest rate of 1.31 per cent per annum. In contrast, the employments in export-oriented and other industries have grown at a much better rate (Table 4). Consequently, the composition of manufacturing employment has witnessed a small but significant change as the share of import-competing industries in total employment has declined by more than three percentage points (Table 5).

The employment gain in export-oriented industries at the cost of import-competing industries clearly shows that trade liberalization has indeed ensured some structural adjustment within the manufacturing sector. However, it should be noted that structural change in employment has occurred only in the second phase of trade liberalization, when India removed

[5] Following Ghose (2000), we have used net export as a ratio to total domestic output to identify the import-competing and export-oriented industries. Industries with net imports in access to five per cent of their domestic output are categorized as import-competing, while industries with net exports in access to five per cent of their domestic output are classified as export oriented. All other industries are classified as others.

quantitative restriction on imports of consumer goods (QRs). During the first phase of liberalization, that is from 1991-92 to 1997-98, despite massive tariff reduction, the composition of manufacturing employment remained almost unchanged (Table 5).

Table 5: Post-reform Growth Rate of Employment by Type of Industries

	Growth Rate of Employment	Share in total Employment		
		1989-90	1997-98	2011-12
Export Oriented	3.13	26.45	26.59	27.86
Import Competing	1.31	30.95	30.29	27.69
Other industries	2.47	42.60	43.12	44.45
Total	2.31	100	100	100

Source: Calculated from Annual Survey of Industry

5. Methodology and Data Sources

Two methodological approaches have been widely used in literature to quantify the impact of trade on employment. These are the simple growth accounting approach and the labour demand equation approach. Both these approaches provide valuable information and have their strengths and weakness. Keeping this in mind, we employ both these approaches in this paper.

5.1 Growth Accounting Approach

The growth accounting approach decomposes employment growth into the change in domestic demand, change in exports, change in import penetration and change in labour productivity. This approach begins with the following accounting identity.

$$Q_{it} = D_{it} + X_{it} - M_{it} \qquad 1$$

where Q = domestic output, D = domestic demand, X = exports, M = imports, i stands for ith sector and t stands for time. At any time t, labour has an average productivity. Therefore, the employment in any industry at a given point of time can be calculated as follows:

$$L_{it} = A_{i1}(D_i + X_{it} - M_{it}) \qquad 2$$

Where L_{it} is employment in industry i at time t and $A_{it} = L_{it} / Q_{it}$

Now using equation 2, the change in employment between two points of time can be decomposed into change in domestic consumption, change in import penetration, change in exports and change in labour productivity as follows.

$$\Delta L_{it} = A_{i1}(1 - s_{i0})\Delta D_i + A_{i1}\Delta X_{it} + A_{i1}(s_{i0} - s_{i1})D_{i1} + \Delta A_i\, Q_{i0} \qquad 3$$

where s is share of imports in total domestic consumption.

Equation 3 shows that change in employment is the sum of four components: the change in domestic consumption, the change in of exports, the change in import penetration and change in labour productivity.

The growth accounting approach is very simple to follow and provides very useful information. However, this approach has been subject to a lot of criticism. Martin and Evan (1981) asserted that the growth accounting approach is purely arbitrary and different identities may provide completely different results. Moreover, this approach also ignores the cross-effect of variables. It has been argued that the increase in imports could force domestic producers to raise the labour productivity.[6] In that case, a part of employment loss due to increased labour productivity may be attributed directly to change in import competition. Despite this criticism, the growth accounting approach has been widely used in literature because it provides useful insights into the relationship between domestic demand, employment, trade and labour productivity.

5.2 Labour Demand Equation

A number of recent studies have used regression techniques to examine the effect of trade on employment. These studies derive a labour demand equation from the production function and then use it to quantify the impact of trade on demand for labour within a firm or industry. This approach has an advantage on growth accounting approach since it has a theoretical base; besides, it captures the indirect effect of trade on employment. Following Greenaway et al. (1999) and other similar studies, we also derive a labour demand equation and use it to quantify the possible effects of trade on employment. The labour demand equation can be derived as follows. Assume we have a Cob Douglas production function, given below.

$$Q_{it} = A^{\gamma} K^{\alpha}{}_{it} L^{\beta}{}_{it} \qquad 4$$

where Q is output, K is capital, L is labour, α and β are the factor shares of capital and labour respectively, and A is technology; γ allows the factor changing the efficiency of the production process, i stands for i^{th} industry and t stands for time. In a competitive market, a profit maximizing firm will employ factors of production such that marginal revenue product of labour equals the wage (w) and marginal revenue product of capital equals it user cost (c). Applying the above condition and solving equation 4 to eliminate capital gives us the following equation.

$$Q_{it} = A^{\gamma} \left(\frac{\alpha L_{it}}{\beta}\frac{W_i}{c}\right)^{\alpha} L^{\beta}{}_{it} \qquad 5$$

Taking the log of both sides and rearranging equation 5 gives us a derived labour demand equation where the demand for labour depends on the real wage rate and scale of production.

[6] Advocates of this approach tried to negate this criticism by pointing out that there was no significant relation between labour productivity and import penetration (See Kruger 1980)

Labour demand is expected to have a negative relation with the wage rate and a positive relation with the volume of production.

$$lnL_{it} = \theta + \theta_1 lnW_{it} + \theta_2 lnQ_{it} \qquad 6$$

In order to quantify the impact of trade, equation 6 could be augmented with variables related trade. Trade is expected to affect the demand for labour through changes in technical efficiency or technological progress in following way.

$$A_{it} = e^{\delta 0 ti} M_{it}^{\delta_1} X_{it}^{\delta_2} \qquad \delta_0 \delta_1 \delta_2 > 0$$

where t = time, M = imports, X = exports. This implies the following:

$$lnL_{it} = -\mu_0 T - \mu_1 lnX_{it} - \mu_2 lnM_{it} + \theta_1 lnW_{it} + \emptyset_2 lnQ_{it} \qquad 7$$

Since there is a cost associated with labour adjustment, it is common to use a lagged employment variable while estimating labour demand. The inclusion of lag is also necessary to capture labour market rigidities. Nickell (1986) stresses that lagged employment should also be used to capture the heterogeneity effect. Thus, including a lagged employment variable and adding fixed effect and a random error term, the final dynamic labour demand equation could be defines as follow.

$$lnL_{it} = -\mu_0 T - \mu_1 lnX_{it} - \mu_2 lnM_{it} + \theta_0 lnN_{it-1} + \theta_1 lnW_{it} + \emptyset_2 lnQ_{it} + \tau_i + \epsilon_{it} \qquad 8$$

5.2.1 Estimation Technique

Fixed effect and random effect are two estimation approaches used with panel data. However, in the case of a dynamic panel, where a lagged dependent variable is also included as an explanatory variable, the use of fixed effect and random effect model is problematic. A major concern is that the lagged dependent variable on the right-hand side might be serially correlated and hence correlated with the error term, which makes the LSDV and GLS estimators biased and inconsistent (Baltagi 2005). Two alternative approaches have been used to deal with this problem. One set of studies have used various versions of biased corrected LSDV estimators while other set of studies have relied on Generalized Method of Moments (GMM) and its variants to address the issue in estimating dynamic panel data. However, GMM estimators were developed for situation with large N and small T (number of cross-sections and number of time-periods respectively). Alvarez and Arellano (2003) note that there is no real advantage of GMM when T and N are of a similar dimension and that the within-group estimator is clearly better when T > N. Further, Bun and Kiviet (2005) notes that in small sample models with dynamic feedbacks, method of moments and least squares estimates are biased, as the former is more biased with higher number of moment conditions employed. Since we have data on 50 manufacturing industries, spreading over a period of 22 years, the N in our data is modest and should be treated as fixed. Various Monte Carlo simulations have shown that with a dynamic panel such as ours, the biased corrected LSDV estimator outperform the GMM estimators (Judson and Owen (1999). Hence, we obtained the

bias-corrected LSDV (Least Squares Dummy Variable) estimates, using Bruno (2004). To test for the serial correlation in the idiosyncratic errors of our panel-data model while performing the estimation given by Bruno (2004), we follow the method discussed by Wooldridge (2002). Drukker (2003) presents simulation evidence that this test has good size and power properties in reasonable sample sizes.

5.3 Data Sources

Since, this study aims to examine the impact of international trade on manufacturing employment in India, it requires data on trade, employment, output and any more variables. However, there is no single database available on the Indian economy that provides data on all these variables at one place. Therefore, we have used two different data sources to compile the final data set required for the study. The data sources used in this study are (i) the Annual Survey of Industries, published by Central Statistical Organization and (iii) UNCOMTRADE.

The Annual Survey of Industry (ASI) provides the most reliable and comprehensive disaggregated data on the manufacturing sector in India. However, there have been frequent changes in National Industrial Classification (NIC),[7] which makes the older series and new series of ASI data incomparable. Therefore, for any meaningful time series analysis of the manufacturing sector, it is essential to work out a concordance between different National Industrial Classifications. The Economic and Political Weekly Research Foundation (EPWRF) has created a consistent electronic database by using the summery results of ASI from 1973 to 2003-04. We draw data up to 2003-04 from EPWRF CD Volume II. For the remaining years, we have taken the data from ASI summary results, after working out a concordance using the concordance table provided by the Central Statistical Organization (CSO).

The industry wise imports and exports data have been collected from UNCOMTRADE. This database provides industry wise information on total imports and exports at both the 3-digit and 4-digit level of the International Standard Industrial Classification (revision 3), which is comparable to NIC 1998. Apart from aggregate imports and exports, this database also enables us to differentiate imports to and exports from different countries and country grouping.

6. Empirical Results

6.1 Decomposition of Employment Growth

The Indian organized manufacturing sector has created more than 5.6 million jobs in the post-reform period. Using equation 3, we decompose this employment growth into four components – change in domestic demand, change in exports, change in import penetration and change in labour productivity. The results of our accounting analysis are summarized in

[7] The NIC classification is a standardized categorization of economic activities, according to which economic data is tabulated

Table 6 for 1990 to 2012 and for selected sub-periods. It is evident from the table that growth in domestic demand has been the most important driver of job creation in Indian manufacturing. In contrast, the increase in labour productivity has destroyed more than 11.8 million jobs. Turning to two trade indicators, we found that exports have been a significant source of job creation in Indian manufacturing. During the entire 22 years of the post-reform period, growth in exports has created more than 3.7 million jobs in Indian manufacturing sector. However, the positive effect of exports on employment generation, to some extent, has been neutralized by the negative effect of import penetration. The increase in import penetration, in the post-reform period, has replaced around 1.4 million jobs. Despite this, increased trade integration has still been a net positive force for employment generation in Indian manufacturing.

The direction of Indian trade has witnessed a radical change over the last two decades. With the rise of China, the share of developing countries in India's total manufacturing trade has increased at the cost of developed countries. There are some media reports which suggest that imports from China are destroying jobs in Indian manufacturing. In fact, there are theoretical reasons to believe that the impact of trade on employment can vary substantially according to the level of economic development of the trading partner (Wood 1994). In order to examine these propositions, we estimated the direct impact of trade with OECD countries and China on employment generation in the Indian manufacturing sector. Our analysis showed that the net effect of trade with OECD countries on employment creation in India has been positive. Over the last 22 years, trade with OECD countries have created around one million manufacturing jobs in India. In contrast, trade with China has destroyed more than half a million jobs. Indian exports to China have created only 85 thousand jobs, while imports from China have replaced more than 607 thousand jobs.

Table 6: Decomposition of Employment Growth

		1990 - 2012	**1990 - 1999**	**1999-2004**	**2004 -2012**
Absolute Numbers (in 000's)					
Change in Employment		5645	1289	-755	5111
Change in Domestic Demand		15217	5075	1635	8507
Change in Labour Productivity		-11882	-4639	-2907	-4336
Export Growth	Total	3714	1065	703	1945
	OECD Countries	1992	665	372	955
	China	85	10	24	51
Import Penetration	Total	-1403	-212	-186	-1005
	OECD Countries	-998	-327	-524	-147
	China	-692	-36	-95	-561
Net Job Creation From Trade	Total	2311	853	517	940
	OECD Countries	994	338	-152	808
	China	-607	-26	-71	-510

Source: Author's own calculation based on equation 1

Note: Other Manufacturing Industries have been excluded from the sample

6.2 Labour Demand Estimation

The growth accounting approach shows that the direct impact of trade on manufacturing jobs has been positive. However, trade can also affect employment indirectly through a change in the efficiency of labour use. In order to examine the indirect effect of trade on employment, we estimated a labour demand equation for Indian manufacturing. The results of our dynamic labour demand estimation are presented in Table 7 and 8. Starting with our base equation, we have estimated five different versions of the labour demand equation. We started our estimation with the base labour demand equation and used simple OLS, simple LSDV and bias-corrected LSDV to estimate it. The results of these three estimation procedures are given in the first three columns of Table 7. The results show that our equation is well specified as all coefficients are significant with the expected signs. Moreover, the signs of the estimated coefficients are consistent across all specifications. A negative and significant coefficient of real wage rate vindicates the theoretical proposition, which states that, other things remaining the same, any increase in the real wage rate causes a decline in demand for labour. The coefficient of output is positive and significant at the one per cent level, which underlines the positive scale effect of increase in output on labour demand. The coefficient of lagged dependent variable is also positive and highly significant indicating the presence of rigidities in the Indian labour market. However, as expected, the magnitude of coefficients, especially the coefficient of the lagged dependent variable, varies across estimates. The magnitude of coefficient of the lagged dependent variable is biggest in the case of Ordinary Least Square (OLS) estimates while it is least in the case of simple Least Square Dummy Variable (LSDV) estimates. Given the known fact that OLS provides estimates that are biased upwards and simple LSDV provides estimates that are biased downwards, the magnitude of unbiased coefficient of the lagged dependent variable should lie between the range set by OLS and simple LSDV. The biased corrected LSDV estimates confirm this proposition and hence, confirm that the bias-corrected LSDV is the most appropriate method for our dynamic panel. Therefore, in the following discussion, we will interpret the results obtained by the bias-corrected LSDV method only.

In order to estimate the impact of trade on domestic employment, we have augmented the basic labour demand equation with two trade ratios. The results of this exercise are given in column 4. It is evident that the specification is robust to the introduction of trade ratios as the sign as well as the magnitude of coefficient remains almost the same. Now turning to the trade ratios, the coefficient of import to output ratio turned out to be negative and significant at the 1 per cent level. This indicates that an increase in imports following trade liberalization has led to a reduction in labour demand in the manufacturing sector. Interestingly, the coefficient of export output ratio also turned out to be negative and significant. A negative coefficient of export share indicates that there are export-induced efficiencies in the use of labour in export-oriented industries.

Table 7: Dynamic Labour Demand Equation for Indian Manufacturing

	1	2	3	4
	OLS	**LSDV**	**LSDV-BC@**	**LSDV-BC@**
Constant	*1.209**	*4.627**		
	(3.23)	*(3.86)*		
LnL $_{t-1}$	*0.891**	*0.685**	*0.718**	*0.688**
	(33.56)	*(14.17)*	*(18.00)*	*(19.04)*
Ln Real Wage	*-0.110**	*-0.399**	*-0.385**	*-0.409**
	(-3.6)	*(-4.04)*	*(-6.29)*	*(-8.44)*
Ln Real Output	*0.097**	*0.255**	*0.231**	*0.208**
	(4.21)	*(5.84)*	*(6.37)*	*(9.11)*
Ln Export Output Ratio				*-0.030***
				(-1.98)
Ln Import Output Ratio				*-0.050**
				(-3.29)
Time Dummy	*Yes*	*Yes*	*Yes*	*Yes*
Industry Dummy	*No*	*Yes*	*Yes*	*Yes*
R Square	*0.98*	*0.97*	*--*	*--*
No. of Observation	*1050*	*1050*	*1050*	*1050*

Note: *1. *, ** significant at 1 and 5 per cent respectively*

2. Coefficient of time dummy has not been reported

3. @ Bias correction initiated by Anderson and Hsino estimator

4. Real emoluments per person engaged is used as an indicator of real wage

The growth accounting approach has shown that the direct effect of trade with OECD countries has been positive for manufacturing employment in India while trade with China has destroyed more than half a million jobs. In order to test whether the indirect effect of trade with OECD and China differ significantly, we have re-estimated the labour demand equation by replacing aggregate import and export ratios with import and import ratios by their destination and origin. The results are shown in Table 8. The results clearly show that imports originating from OECD countries as well as China have a negative indirect effect on labour demand in Indian manufacturing. However, the coefficient of imports originating from OECD countries is marginally higher than the coefficient of imports from China. This indicates that imports originating from developed countries are somewhat more harmful for employment than imports from developing countries.[8] Turning to exports by destination, Column 6 shows that that impact of exports does vary according to destination as the coefficient of exports to OECD and China have different signs. However, none of these coefficients is statistically.

[8] These results should be interpreted with caution as import and export ratio by origin and destination are somewhat collinear.

Table 8: Dynamic Labour Demand Equation for Indian Manufacturing: Trade by Origin

	6
	LSDV-BC
Ln L $_{t-1}$	0.681*
	(19.24)
Ln Real Wage	-0.398*
	(-8.44)
Ln Output	0.228*
	(8.61)
Ln Export to OECD	-0.017
	(-0.99)
Ln Export to China	0.005
	(0.19)
Ln Imports from OECD	-0.039**
	(-2.22)
Ln Imports from China	-0.033**
	(-2.25)
Time Dummy	Yes
Industry Dummy	Yes
R Square	--
No. of Observation	1050

Note: *1. *, ** significant at 1 and 5 per cent respectively*

2. Coefficient of time dummy have not been reported

3. @ Bias correction initiated by Anderson and Hsino estimator

4. Real emoluments per person engaged is used as indicator of real wage

7. Conclusion and Policy Suggestions

After following inward oriented economic policies for nearly four decades, India opened up to international trade in the early 1990s. The reduction of trade barriers has resulted in a significant increase in the global integration of Indian manufacturing sector. Against this backdrop, this paper has examined the impact of international trade on manufacturing employment in India. Using the growth accounting approach, we found that the direct impact of trade on employment in the Indian manufacturing sector has been positive as trade has created more than 2.3 million net jobs. However, the growth accounting approach suffers from serious limitation as it does not capture the indirect impact of trade on employment. It is now widely acknowledged that openness to trade could introduce new technologies in developing countries that could potentially have a negative impact on employment through an increase in total factor productivity. In order to examine the indirect impact of trade on employment, we estimated the dynamic labour demand equation and found that the indirect effect of trade on employment has been negative as an increase in export orientation as well

as increase in import penetration has reduced the derived labour demand. Therefore, overall job creation from trade in India manufacturing has been less than satisfactory.

Our analysis clearly shows that despite complete liberalization, India, unlike other labour surplus Asian economies, has not experienced any major surge in the exports of low skill labour intensive products. In contrast, it has been increasingly specializing in the exports of high skilled labour intensive products such as general purpose machinery, petroleum refinery and chemical products etc., which have low employment potential. These findings suggest that merely opening up to international trade does not guarantee an increase in the exports of low skilled labour intensive industries. Moreover, even at the aggregate level, after an impressive jump between 1990 and 2000, the export intensity of Indian manufacturing has remained stagnant. It suggests that perhaps the devaluation of the rupee during the early 1990s increased the competitiveness of Indian firms and enabled them to compete in the global market. However, currency devaluation alone cannot ensure a perpetual increase in competitiveness unless it is supplemented with measures to unblock the supply side constraints that determine competitiveness in long run.

Studies, in Indian context, have repeatedly highlighted poor public infrastructure, rigid labour laws and lack of access to finance as the main impediments to the competitiveness of labour intensive industries (Gupta et al. 2009). Poor infrastructure affects labour intensive industries more because these are dominated by small and medium enterprises that do not have the financial resources to overcome the challenges of poor public infrastructure facilities such as the availability of sufficient and reliable supply of electricity. Therefore, infrastructure and financial constraints along with other institutional impediments should be addressed urgently to gain labour market benefits from international trade.

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