Employment Adjustments to Increased Imports: Evidence from a Developing Country

Beyza Ural Marchand [*]

February 2024

Abstract

This paper examines the impact of imports from developed countries on industry-specific employment in India between 1983 and 2010. The identification strategy relies on comparing differential changes in import exposure across regions to the differential changes in employment within industries. The variation in the changes in imports to other developing countries is used to identify the component of the changes in imports driven by world demand. The results suggest that the increase in import exposure during the post-liberalization period reduced agricultural employment but increased employment in manufacturing, business, and social services. No significant impacts were found in the pre-liberalization period.

Keywords: Import Competition, Trade, Employment.
JEL Classification: F16, J21, J23, O33.

1   Introduction

International trade is one of the most commonly cited reasons for domestic job loss in both developed and developing countries. While the concern in developed countries is that jobs are being exported to low-wage countries, the primary concern in developing countries is that imports of more sophisticated products from advanced nations will wipe out entire sectors as the domestic industries are not able to compete. It has long been argued that developing countries have been experiencing 'jobless growth' and that globalization is responsible for this phenomenon. Despite the broad public discussion of these concerns, there is little conclusive empirical evidence on the effects of trade on employment and wages (Goldberg and Pavcnik, 2007; Hoekman and Winters, 2005).

This paper investigates how labor market outcomes adjust to changes in international trade in India. In particular, the paper focuses on differential changes in employment across regions in response to changes in import exposure from high-income OECD countries. The quinquennial changes in industry-specific employment across Indian regions are compared to changes in import exposure between the years 1983 and 2010. Each region experiences a differential growth in import exposure depending on the initial structure of the labor market. There is much heterogeneity across regions in terms of the composition of employment. For example, in 1994, the share of manufacturing sector employment varied between 15 and 54 percent across regions. By using this variation, the paper identifies the impacts on employment outcomes, not only in agriculture and manufacturing employment but also in service sector employment.

The general issue in identifying the effect of imports on domestic employment is that the demand conditions in local markets could affect both import demand and the labor market outcomes. The paper uses variation in the exports of high-income OECD countries to other developing countries in order to capture the component of import exposure that is driven by world demand. This approach follows the literature that investigates the response of U.S. manufacturing employment to increased imports from China (Autor et al., 2013 a,b). There is also other evidence from developed nations that are based on a quasi-experimental framework. For example, Brulhart et al. (2012) consider a positively sloped labor supply curve

to investigate how wages and employment have adjusted to trade liberalization in Austria. This paper contributes to the literature by studying the employment adjustments in a developing country in response to imports from developed countries. It aims to answer the question as to the extent to which increased imports from industrialized nations were responsible for the changes in the employment in traded and nontraded industries of a developing nation.

This question is of particular interest in India, as job growth has been very slow over the last ten years, particularly within the manufacturing industry. It is a wider concern that the increased imports are responsible for this 'jobless growth' that took place during the last decade. Some scholars argue that imports must be restricted in order to maintain the current level of domestic jobs. India experienced a comprehensive trade liberalization beginning in 1991, which substantially reduced tariffs and non-tariff barriers. The literature that studies the impact of trade liberalization has identified significant impacts on poverty reduction (Hasan et al., 2007). This paper uses import volume rather than changes in trade policy in order to compare the changes during both the pre-liberalization and post-liberalization periods. This approach allows us to provide evidence on the recent periods that are relevant to the current debate on the effects of trade on employment.

One important challenge in identifying the impact of trade on factor prices and quantities is that the trade effects manifest themselves within a general equilibrium mechanism. In developing countries, most of the evidence focuses on the manufacturing sector, particularly on direct effects, while omitting the spillover effects on labor market outcomes in other sectors of the economy. The evidence based on firm-level surveys also suffers from a very narrow focus, as they concentrate only on formal employment and do not capture the aggregate adjustments in the labor market outcomes. However, the labor force in developing countries tends to be concentrated in the agricultural sector where a large share of it is informal and unorganized. This paper contributes to the literature by using the most comprehensive household survey available for a developing country, the Indian National Sample Survey (NSS), in order to investigate the labor market adjustments in response to a substantial increase in imports. One of the advantages of using the NSS data is that it captures employment in the informal sector as well as the formal sector.

In order to isolate the impact of increased imports on the economy-wide labor market outcomes, it is important to carefully map the changes in import exposure to the overall changes in employment. This paper aims to capture how employment responds in all sectors, including the service sectors that are often excluded as non-traded goods in the trade literature. To this end, this paper uses an import exposure measure within each region which is common across industries, and it relates the changes in this import exposure to changes in each of the agriculture, mining, manufacturing, local services (including retail and wholesale trade), business services (including banking and finance), and social services (including education and health) categories. The relative size of the sectors within regions and the nationwide relative importance of a region for each industry are also considered in the estimation methodology. This approach makes it possible to determine which sectors are favored by trade, and whether displacement in one sector was complemented by an increase in other sectors.

The results suggest that the increase in import exposure in the post-liberalization period reduced employment in agriculture, but increased employment in manufacturing, business services, and social services. The estimates imply that 3.7 percent of the reduction in agricultural employment can be explained by the increased imports from OECD nations between 1994 and 2010. On the other hand, increased imports explain 30 percent of the employment increase in employment in the manufacturing sector, 15 percent of the increase in business services, and 16 percent of the employment increase in social services. These effects were not driven by the influence of previous changes in employment, and no significant impacts were found in the pre-liberalization period. The significant effects on the non-traded service sectors show that the focus in the previous literature on within-industry employment may have missed important aspects of the labor market adjustments to imports.

2   Description of the Data

The analysis of this paper relies on the Employment and Unemployment Surveys of the Indian National Sample Survey Organization (NSSO) conducted by the Indian Ministry of Statistics. This is one of the most comprehensive and well-

established labor surveys for a developing country, with the first round conducted in 1950. This paper relies on all of the following publicly available rounds: 1983 (38th round), 1987-1988 (43rd round), 1993-1994 (50th round), 1999-2000 (55th round), 2004-2005 (61st round), and 2009-2010 (66th round). Approximately six hundred thousand individuals are surveyed each round, and sampling weights are provided to achieve nationally representative estimates.

Using various rounds of the NSS makes it necessary to carefully construct the concordances for the industry classifications. The 38th and 43rd rounds use the 1970 version of the Indian National Industry Classification (NIC), whereas the 50th round uses NIC 1987, the 55th and 60th rounds use the NIC 1998, and the 66th round uses the NIC 2004. The consistency across industry classifications is obtained via concordance tables, where each version of the classification is converted to the 2-digit NIC 1987 classification. The definitions for the education classification and state codes were also changed over time. Therefore, these codes were made consistent across the years by using the tables provided by the Indian Ministry of Statistics.

The industries are grouped into six main categories. The three tradable categories include agriculture, mining, and manufacturing sectors, while the three nontradable service categories include local services, business services, and social services. The local services category is composed of utilities, construction, retail trade, wholesale trade, transportation and communication, whereas business services include banking, insurance, real estate, legal services and other business services. Finally, social services include public administration, sanitary services, education, health, and other social services.[1]

The sub-sample for this paper focuses on working-age individuals between the ages of 15 and 65. Among these observations, employed individuals are defined as those who are self-employed, either as an own-account worker or as a helper in the household enterprise, regular salaried employees, casual wage laborers in public works or in other types of work.[2] The industry in which these individuals

---

[1]The details of the 2-digit NIC categories and the contents of the six industry groupings are provided in Tables A.2 and A.3.

[2]The excluded individuals are those who are unemployed and seeking work, or attending educational institutions, attending domestic duties and/or free collection of goods, rentiers, pensioners, remittance recipients, and beggars.

5

are employed is determined by their primary industry affiliation.

The post-liberalization period consists of three time segments: 1994-2000, 2000-2005, and 2005-2010. The trade liberalization in India began in 1991, however, employment effects are expected to be long term and results could not be observed by 1993, when the NSSO started to implement the 50th round of the survey. In order to capture more precise results, this paper does not consider this round (and the 1988-1994 period difference) as a part of the post-liberalization period.

The composition of employment is presented in Table 1 across the six industry categories for each survey round. This table shows that the employment share of the agricultural sector tends to decline, in both the pre-liberalization and post-liberalization periods. In 1983, 59.4 percent of the workforce was employed in agriculture, which was reduced to 53.5 by 1994, with a 5.9 percentage point decline over the 11 years. After liberalization, agricultural employment has declined much faster, reaching 36.2 percent by 2010. This is equivalent to a 17.2 percentage point reduction between 1994 and 2010. This change is considerably larger than the pre-liberalization period if one focuses on the last ten years of the change, which is equal to a 13.5 percentage point reduction between 2000 and 2010. The decline in agricultural employment may be driven by many factors other than international trade, such as improvements in labor productivity. This paper aims to identify how much of these changes could be attributed to the increase in imports.

The share of manufacturing employment declined by 0.7 percentage points between 1983 and 1994, and it increased by 0.8 percentage points between 1994 and 2010. The upward trend after 1994 could be due to increased imports, particularly the intermediate good imports following trade liberalization. A large increase was experienced by the local services industry, which has more than doubled in size between 1983 and 2010 and grew particularly faster after trade liberalization. The shares of employment in business services and social services have also increased between 1983 and 2010, by 1.5 and 1.0 percentage points, respectively, while the share of business services has more than doubled during this period.

The import data are obtained from UN Comtrade at the 4-digit ISIC Revision 3 level, which is consistent with the 4-digit NIC 1998 and is converted to the 2-digit NIC 1987 using the concordance tables. All trade values are represented in 2000 USD. One consideration is that employment surveys are conducted over two years,

Table 1: Employment Shares by Industry

	1983	1988	1994	2000	2005	2010	$\Delta_{1994-1983}$	$\Delta_{2010-1994}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agriculture	0.594	0.546	0.535	0.497	0.453	0.362	-0.059	-0.172
Mining	0.007	0.007	0.008	0.006	0.006	0.008	0.001	-0.001
Manufacturing	0.119	0.121	0.112	0.117	0.122	0.12	-0.007	0.008
Trade, Construction, Transportation	0.154	0.182	0.183	0.228	0.257	0.327	0.028	0.145
Business Services	0.011	0.014	0.015	0.017	0.018	0.026	0.005	0.011
Social Services	0.115	0.129	0.147	0.134	0.144	0.156	0.032	0.010
Labor Force (millions)	305.40	331.2	370.4	407.9	464.5	468.1	65.0	97.7

<u>Notes</u>: Employment shares are computed using the 38th, 43rd, 50th, 55th, 61st, and 66th rounds of the Indian NSS data. Concordance tables are used to make the industry classifications consistent across rounds. The labor force statistics are available for India from the World Development Indicators (2013) since 1990. In the table, the 1990 values are reported for 1988. The value for 1983 is from Government of India (1985).

starting in April of the first year and continuing until April of the following year. In this paper, the import data of the survey completion year were considered. For example, import data for the year 2000 was considered for the 1999-2000 (55th round) survey. In what follows, these surveys are referred to by the completion year of the survey for simplicity.

The unit of observation in this paper is a region. Each state in India consists of as many as 7 regions, with each region consisting of as many as 37 districts. While district variation would provide more degrees of freedom, it was not considered in this paper for two reasons. First, the paper considers a 27-year period, over which time the boundaries of districts, and the number of districts within each region, tend to change. This is especially visible if one compares the number of districts within states across the years. Regions, on the other hand, are consistent across rounds. Second, the survey sample was not necessarily randomized within districts prior to the 2000 round, especially in urban areas. While a stratum was a village in rural areas, which is an administrative unit within districts, the urban stratum was determined based on factors such as the locations of hospitals and schools. The larger observation unit of a state was also not considered, as it would not have provided sufficient degrees of freedom for identification.

Having identified the unit of analysis, the employment surveys are first aggregated to the region and 2-digit industry level using the sampling weights, in order to determine the differential concentration of employment within each region. The import data are then merged by 2-digit industry and year.

3   Methodology

The estimation strategy compares the changes in import exposure per worker to the changes in employment shares within regions over time. The extent to which the regions are exposed to imports is based on their initial structure of production. If the imports in a particular industry disproportionately expand at the national level, the import exposure will increase more in regions that concentrate their production in that industry. In this paper, the focus is on the composition of employment rather than on production, since the aim of the paper is to estimate the employment impacts of import exposure.

Table 2: Changes in Import Exposure per Worker

	1994-2000	2000-2005	2005-2010
	(1)	(2)	(3)
Value of Imports (billion \$)	21.077	53.35	114.6
Growth in Imports (%)	0.319	1.531	1.148
Growth in Import Exposure per Worker by percentile			
100th	0.176	3.033	5.528
90th	0.055	1.746	3.150
80th	0.036	1.238	2.145
70th	0.016	0.789	1.776
60th	0.010	0.662	1.325
50th	0.006	0.432	0.890
40th	0.003	0.300	0.628
30th	-0.002	0.206	0.425
20th	-0.017	0.102	0.218
10th	-0.117	0.024	0.084
All	0.015	0.807	1.143

Notes: The trade data are for imports to India from high income OECD countries, which are obtained from the UN Comtrade database. Annual imports at the end of the period are reported (2000, 2005, and 2010). Concordance tables are used to merge the trade data with the NSS data using the end of the survey period. For example, the 66th round of the NSS began in 2009 and was completed in 2010. Therefore, the trade data for 2010 was used for this round. The changes in import exposure per worker are c omputed according to equation 1.

The region-level import exposure per worker is calculated as follows:

$$\Delta IE_{rt} = \frac{1}{N_{rt}} \sum_j \eta_{rjt} \Delta M_{jt} \tag{1}$$

where

$$\eta_{rjt} = N_{rjt}/N_{jt} \tag{2}$$

and where N_{rjt} is the employment in region r, 2-digit industry j at time t, and N_{jt} is the national employment in industry j and time t. Then, η_{ijt} is defined as the employment share of region i in the national employment of industry j. ΔM_{jt} is the change in the national-level imports in industry j at time t. The import exposure, ΔIE_{rt}, is the weighted imports where weights are the share of industry employment out of the national employment, and divided by the number of workers. Both N_{rt} and η_{rjt} represent the values in the beginning of the period.

As in Autor et al. (2013a), the employment composition is measured by comparing the size of the industry-specific employment within a region to the national employment of that industry. This provides the across-region distribution of employment within each particular industry category. The alternative measure used in the literature is the within-region composition of employment across industries, found by computing the employment share within regions and ignoring the across-region distribution. This approach has been used by Hasan et al. (2007), MacCaig (2011), and Kovak (2013). The advantage of using the η_{ijt} is that it also accounts for the importance of a region in national production. A region may be highly concentrated in an industry, but if the share in national employment in that industry is relatively small, then a within-region distribution may lead to an overestimation of the impacts.

This paper focuses on the impacts of imports from developed countries, particularly from high-income OECD countries.[3] Table 4 shows that India's imports from high-income OECD countries have expanded substantially in the post-liberalization period. In 2000, the value of total imports was \$21 billion, while this number increased to \$53 billion in 2005 and \$115 billion in 2010. The growth rate

---

[3]The High Income OECD Country classification of World Bank is used.

of imports was 32 percent between 1994 and 2000, 153 percent between 2000 and 2005, and 115 percent between 2005 and 2010. Indian trade liberalization was not the sole factor in this expansion of imports. As discussed below, OECD exports to other developing countries have also increased substantially.

The values for ΔM_{jt}, both nationwide and across percentiles, are also presented in Table 4. Between the years 1994 and 2000, the import exposure was relatively small, which is consistent with a smaller growth in imports during this period. Regions in the lowest percentiles even experienced a reduction in their import exposure.[4] In all of the three periods, there was substantial variation across regions. Figure 1 shows the regions with high and low import exposure between the last period of 2005-2010, with darker colors indicating higher exposure. As expected, the high-growth regions are in the industrial or coastal states that are close to major ports, such as Delhi, Tamil Nadu, and Karnataka. The lowest exposure growth regions were in relatively less industrial and inland states, such as Assam.[5]

The main estimating equation is the following:

$$\Delta N_{rt}^m = \gamma_t + \Delta IE_{rt}\alpha + X'_{rt}\beta + \delta_r + \lambda_t + \varepsilon_{rt} \qquad (3)$$

where X'_{rt} includes the set of control variables. In order to identify the component of imports that is driven by world demand, the growth in high income OECD imports to India is instrumented with the growth in high income OECD imports to other developing countries. The following non-India exposure variable is computed:

$$\Delta IE_{rt}^d = \frac{1}{N_{r,t-5}} \sum_j \eta_{rj,t-5}\Delta M_{jt}^d \qquad (4)$$

The developing countries for this variable in equation 4 were selected from the middle-income countries according to the World Bank classification. As India is classified as a lower-middle-income country, other middle-income developing countries would be more similar to India in terms of their capital and labor intensity.

---

[4]Employment in these regions was more concentrated in industries that experienced a reduction in imports from the OECD countries.

[5]The ranking of regions that experienced the highest and lowest import exposure growth are provided in Table A.1.

Figure 1: Changes in Import Exposure across Indian Regions: 2005-2010
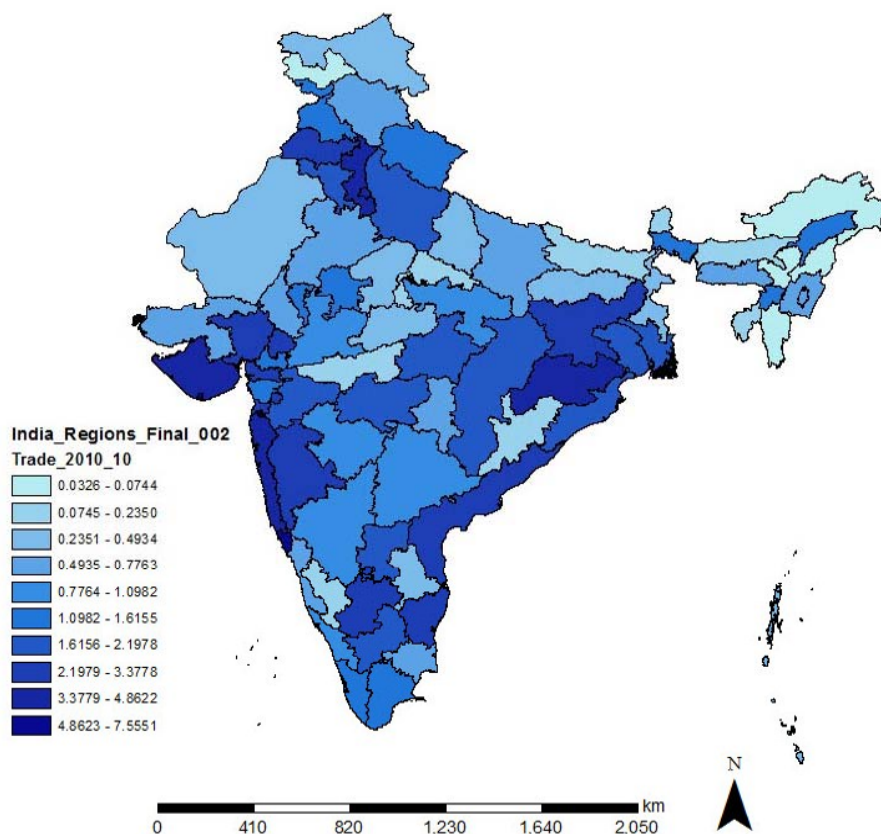
A total of 108 lower-middle and upper-middle-income countries are ranked according to their OECD imports in constant USD. The top ten importers among these countries are consistent across the years 2000, 2005, and 2010. Within these top ten countries, India and China are excluded, and the eight remaining countries are used to compute ΔM_{jt}^{d}.[6] In order to construct this instrument, the 5-year lags of the employment values are used, as the contemporaneous employment values may be correlated with imports.

---

[6]These countries include Brazil, Indonesia, Malaysia, Mexico, the Philippines, the Russian Federation, Thailand, and Turkey.

4 Effect of Import Exposure on Employment

The estimation strategy identifies the effects of the component in OECD imports that are driven by world demand. Trade costs associated with Indian tariffs and non-tariff barriers were substantially reduced during the trade liberalization in 1991. This allows for testing the employment and trade relationship before and after this liberalization, in order to verify that the results are not driven by trends in the composition of employment, or other factors that could influence both the changes in imports and the changes in employment.

Table 3 presents the results for the six industry categories between 1999 and 2010. These results are based on the stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 periods, with indicator controls for each of the 5-year periods. State-fixed effects are included to account for the state-specific periodic changes that are constant over time. The effect on agricultural industries is estimated to be -0.203, which indicates that a thousand-dollar exogenous quinquennial increase in a region's import exposure reduces agricultural employment per working-age population by 0.203 percentage points. The impact on mining employment is found to be insignificant, while the effect on manufacturing employment is positive and significant. A thousand-dollar increase in imports is found to increase manufacturing employment by 0.119 percentage points. The results also indicate positive and significant effects of imports in business services and social services, with an increase of 0.063 and 0.059 percentage points, respectively.

Agricultural employment had been decreasing in India prior to the trade liberalization. In order to ensure that the results are not driven by an underlying long-term trend, the same model is also estimated for the pre-liberalization period. These regressions are based on stacked first differences of the 1983-1988 and 1988-1994 periods. As mentioned before, trade liberalization took place in 1991, but the long-run effects may not manifest themselves by 1993, when the 50th round of the survey had started. The growth between the 43rd and 50th rounds are thus considered as a part of the pre-liberalization period. The insignificant effect of import exposure on industry employment, presented in the second panel of Table 3 indicates that these effects were not present prior to trade liberalization.

One concern is that the reduction of employment within an industry could

Table 3: Changes in Employment and Changes in Import Exposure per Worker in NSS regions

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
	(1)	(2)	(3)	(4)	(5)	(6)

Dependent Variable: Change in Employment

Post-liberalization
Δ Imports per Worker

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
$(1994 - 2000)$	-0.203**	-0.008	0.119*	-0.030	0.063**	0.059**
	(2.65)	(0.74)	(2.09)	(0.80)	(4.13)	(3.15)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.13	0.23	0.15	0.22	0.33	0.15
N	230	230	230	230	230	230

Pre-liberalization
Δ Imports per Worker

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
$(1983 - 1994)$	0.284	0.005	-0.178	-0.301	0.054	0.136
	(0.51)	(0.12)	(0.61)	(0.56)	(0.82)	(1.26)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.40	0.06	0.28	0.27	0.11	0.25
N	153	153	153	153	153	153

Pre-liberalization
Δ Imports per Worker

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
$(1983 - 1994)_{t+15}$	0.013	-0.007	-0.045	0.029	0.010	0.001
	(0.17)	(0.59)	(1.46)	(0.70)	(1.06)	(0.05)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.08	0.32	0.32	0.11	0.18
N	148	148	148	148	148	148

Notes: The changes in import exposure and industry employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects. The t-statistics are in parentheses. The post-liberalization results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 periods, while the pre-liberalization results are based stacked first differences of the 1983-1988 and 1988-1994 periods. Standard errors are clustered within states. All regressions are weighted by the population of the region at the start of the period. Industries are classified with respect to the 2-digit NIC 1987 classification. Concordance tables are used to make the classifications consistent across rounds. Local services include utilities, construction, retail trade, wholesale trade, transportation and communication (NIC 40-79). Business services include banking, insurance, real estate, legal services and other business services (NIC 80-89). Social services include public administration, sanitary services, education, health, and other social services (NIC 90-99).

cause higher levels of imports in a future period. If that is the case, the current methodology would be incorrectly identifying the impact of imports by comparing concurrent changes. To check for this, the effect of past changes in employment levels on future changes in import levels is estimated. That is, stacked changes in employment between 1983 and 1994 is regressed on the stacked changes in import exposure between 2000 and 2010. The evidence does not show that past employment changes were significantly correlated with future changes in import exposure.

This model is then augmented with a set of demographic and labor force controls in Table 4 for merchandise imports. Column (1) adds the start of period employment in agriculture and column (2) adds the percentage of the labor force with a high school degree, percentage of females, and the average age at the start of the period. The inclusion of demographic controls increased the effect to a 0.281 percentage point reduction in the agricultural sector, and the impact is still significant. State and year fixed effects are then interacted to account for state-specific factors that change over time. State-specific policy changes that may affect the size of the industry, such as subsidies and differential taxes, may also affect the growth in industry-specific employment. Column (3) shows that controlling for state-year fixed effects increases the effect to a 0.326 percentage point reduction. These results imply that a region within a state that was exposed to one thousand dollars higher imports per working age population experienced a 0.326 percentage points greater reduction in agricultural employment compared to a region that experienced average growth in import exposure. The initial industry employment in column (3) is positive and significant, indicating that regions that already had lower employment in the agricultural sector experienced a smaller increase in agricultural employment.

The impact on manufacturing employment is positive, but smaller than the impact on the agricultural sector and less significant. Autor et al. (2013a) found that the differential impact of Chinese imports on U.S. manufacturing employment is negative. Given that Indian manufacturing imports are largely intermediate products, the higher availability of inputs would help this industry thrive. On the other hand, U.S. manufacturing imports from China are largely final good products that compete with local producers. Using the same argument, it is intuitive that

15

Table 4: Changes in Employment and Changes in Import Exposure per Worker in NSS regions in the Post-Liberalization Period - Traded Merchandise Sectors

	Agriculture			Mining			Manufacturing		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable: Change in Employment									
Δ Imports per Worker	-0.220**	-0.281**	-0.326**	-0.009	-0.001	-0.003	0.125*	0.140*	0.120*
	(2.61)	(3.75)	(3.99)	(0.76)	(0.10)	(0.17)	(2.18)	(2.51)	(2.40)
% Employment$_{t-5}$	0.320	0.452	0.618*	0.001	-0.022	-0.024	-0.098	-0.126	-0.117
	(0.81)	(1.18)	(2.13)	(0.02)	(0.37)	(0.44)	(0.52)	(0.72)	(0.70)
% High School Degree$_{t-5}$		0.146	0.108		-0.017	-0.020		-0.036	-0.041
		(1.42)	(1.06)		(1.71)	(1.86)		(0.85)	(0.99)
% Female$_{t-5}$		0.416	0.421		-0.056*	-0.066		-0.095	-0.147
		(1.95)	(1.86)		(1.96)	(1.88)		(0.81)	(1.65)
Average Age$_{t-5}$		-0.001	0.000		0.001	0.002		-0.000	-0.001
		(0.24)	(0.03)		(1.56)	(1.74)		(0.03)	(0.36)
First Stage:									
Δ Exports to ROW	0.158***	0.155***	0.153***	0.158***	0.155***	0.153***	0.158***	0.155***	0.153***
	(13.55)	(10.08)	(9.76)	(13.55)	(10.08)	(9.76)	(13.55)	(10.08)	(9.76)
F-Statistic	183.66	101.53	95.24	183.66	101.53	95.24	183.66	101.53	95.24
Anderson-Rubin Wald-Statistic	6.75**	14.03***	18.87***	11.23***	4.01**	4.63**	4.13*	4.93**	4.63**
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Year Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
R^2	0.13	0.14	0.33	0.23	0.27	0.46	0.15	0.16	0.46
N	230	230	230	230	230	230	230	230	230

<u>Notes</u>: The changes in import exposure and industry employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 periods. Standard errors are clustered within states. All regressions are weighted by the population of the region at the start of the period. Industries are classified with respect to the 2-digit NIC 1987 classification. Concordance tables are used to make the classifications consistent across rounds.

16

OECD imports have a negative effect on agricultural employment, as some of the local demand would be met by imports from developed countries, inducing the economy to release some labor from the agricultural sector and reallocate it towards the other sectors.

Table 5 presents the results for the service sectors. Import exposure in a region has significant effects on business services and social services, but not on local services. An increase in economic activity due to higher imports would increase demand for business services, such as finance, banking, and insurance. An increase in import exposure differentially increases employment in this sector by 0.081 percentage points. The social services sector, composed of public administration, education, health, and other community services, is also impacted positively from an increase in import exposure.[7] These impacts on the service sector have not been previously documented in the literature.

The inference about the actual changes in employment between 1995 and 2010 can be made based on the changes in import exposure that took place during this period. Table shows that import exposure per worker increased by $1.5 between 1995 and 2000, $80.7 between 2000 and 2005, and an additional $114.8 between 2005 and 2010. According to the results under the preferred specification including all controls and state-year fixed effects, agricultural employment decreased by less than 0.01 percentage points in the first period, 0.26 percentage points in the second period, and 0.37 percentage points in the third period, a total of 0.64 percentage points between the years of 1994 and 2010.[8] The reduction in agricultural employment was 3.8 percentage points during the first period, 4.4 percentage points during the second period, and 9.1 percentage points during the third period (Table 1). These results indicate that 0.26 percent of the reduction in the first period, 5.91 percent of the reduction in the second period, 4.06 percent of the reduction in the third period, and 3.7 percent of the total reduction during the entire 1995-2010 period can be explained by the increase import exposure from developed economies. In other words, only 0.64 percentage point of 17.3 percentage point reduction can

---

[7]This sector also includes a category for "international and other extraterritorial bodies". It is reasonable to think that this is where the effect lies. However, the data only consists of a few individuals affiliated with this particular industry.

[8]These results are obtained by multiplying the increase in import exposure per worker to the coefficient on Table 4, column (3).

be explained by increased import exposure from high-income OECD countries in the post-liberalization period.

The share of manufacturing employment increased by 0.5 percentage points during the first period and another 0.5 percentage points during the second period, but it was reduced by 0.2 percentage points in the third period. Over the entire post-liberalization period of 1994-2010, manufacturing employment increased by 0.8 percentage points. The results in Table 4, column (9) indicate that the increase in imports was responsible for 30 percent of the change in employment in this sector between 1994 and 2010, where 0.24 percentage points of a total 0.80 percentage points increase can be explained by the increase in import exposure from high-income OECD countries.

The results of the augmented model for nontraded services are presented in Table 5. As before, the increase in import exposure per worker has a significant positive effect on business services and social services, but not on local services. Table 1 shows that employment in business services and social services have increased by 1.1 and 0.9 percentage points, respectively, between 1994 and 2010. The results suggest that 15 percent and 16 percent of this increase can be explained by the increase in import exposure.

Besley and Burgess (2004) argue that labor regulations in India is a source of imperfect labor mobility and argue that the flexibility of labor markets varies across Indian states. As the main mechanisms through which trade affects domestic markets works through labor allocation, the states with flexible labor markets should show a greater magnitude of adjustment as a response to trade. The results in Table 7 show that employment effects are in fact more pronounced in states with flexible labor markets that allow more efficient allocation of labor force and a better adjustment to trade-induced changes. In states with inflexible markets, not only magnitudes are smaller, but also the positive impact on the manufacturing employment is insignificant. These findings confirm that rigid labor regulations are an important factor that hinders the labor market adjustments.[9]

International trade has also played a significant role in the shift from informal employment towards formal employment, as documented in the seminal paper of

---

[9]States with flexible labor markets are defined as Andhra Pradesh, Gujarat, Maharashtra, Karnataka, Rajasthan, and Tamil Nadu

McCaig and Pavcnik (2015). In order to check for this, Equation is re-estimated to understand the impact of imports on informal employment. The results are presented in Table under two definitions of informal work. The first definition considers self-employment and unpaid family work as informal employment, and the second definition also adds casual work. The results show that the increase in imports has reduced the amount of informal employment (column 2), and these effects were not present prior to trade liberalization (column 3) under both definitions.

Table splits the effect by industries. According to the first definition, imports have significantly reduced informal employment in the manufacturing sector and local services, which includes wholesale and retail trade, while the impact on other factors are insignificant. When casual work is also included in the definition of informal employment, the results suggest a negative impact on the agricultural sector and slightly higher effects in manufacturing and local services. These results adds to the previous literature that find structural transformation across sectors by documenting that trade also induces more formal within broadly defined industries.

The OECD is composed of a set of countries with a wide range of countries, and the factor content of imports is expected to differ within the OECD. Therefore, the model is estimated separately for the United States (U.S.) and European Union (E.U.) imports. The instrument is constructed according to equation 4 in order to represent the growth in imports from the U.S. and the E.U. to other developing countries in each of the periods. The results of the preferred specification with the demographic controls, labor force controls, and state-year fixed effects are presented in Table 6. Only the coefficient of interest is presented for brevity. These results are consistent with the results presented in Tables 4 and 5 for the entire group of OECD countries. The coefficient on the growth in U.S. imports per worker is -1.922, which indicates that a thousand dollar exogenous increase in U.S. imports within a 5-year period reduces agricultural employment per working age population by 1.922 percentage points. The impact on manufacturing employment is larger in magnitude compared to the larger group of OECD countries, with an estimated coefficient of 0.708. Similarly, the effects on business and social services are also found to be significant, with larger magnitudes as compared to the impact across all OECD countries.

19

Table 5: Changes in Employment and Changes in Import Exposure per Worker in NSS regions in the Post-Liberalization Period - Nontraded Service Sectors

	Local Services			Business Services			Social Services		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable: Change in Employment									
Δ Imports per Worker	-0.018	0.012	0.057	0.066**	0.064**	0.081**	0.056**	0.066**	0.071**
	(0.44)	(0.25)	(1.02)	(4.06)	(3.71)	(4.69)	(2.71)	(3.61)	(4.33)
% Employment$_{t-5}$	-0.223	-0.260	-0.395**	-0.052	-0.053	-0.088	0.052	0.009	0.006
	(1.11)	(1.20)	(2.62)	(0.95)	(0.88)	(1.26)	(0.98)	(0.13)	(0.13)
% High School Degree$_{t-5}$		-0.074	-0.010		0.006	0.006		-0.024	-0.043
		(1.15)	(0.17)		(0.69)	(0.70)		(0.77)	(1.40)
% Female$_{t-5}$		-0.138	-0.123		0.004	-0.007		-0.131**	-0.077*
		(1.49)	(1.00)		(0.19)	(0.29)		(3.27)	(2.34)
Average Age$_{t-5}$		0.000	-0.001		0.000	0.000		0.000	0.000
		(0.05)	(0.22)		(0.54)	(0.49)		(0.27)	(0.06)
First Stage:									
Δ Exports to ROW	0.158***	0.155***	0.153***	0.158***	0.155***	0.153***	0.158***	0.155***	0.153***
	(13.55)	(10.08)	(9.76)	(13.55)	(10.08)	(9.76)	(13.55)	(10.08)	(9.76)
F-Statistics	183.66	101.53	95.24	183.66	101.53	95.24	183.66	101.53	95.24
Anderson-Rubin Wald-Statistics	4.32**	5.62**	12.14***	18.69***	16.09***	32.17***	6.77**	10.40***	15.63***
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Year Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
R^2	0.21	0.21	0.36	0.32	0.33	0.53	0.15	0.17	0.47
N	230	230	230	230	230	230	230	230	230

<u>Notes</u>: The changes in import exposure and industry employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 periods. Standard errors are clustered within states. All regressions are weighted by the population of the region at the start of the period. Industries are classified with respect to the 2-digit NIC 1987 classification. Concordance tables are used to make the classifications consistent across rounds. Local services include trade, construction, transportation and infrastructure services (40-79). Business services includes banking activities, insurance services, real estate, and other business (80-89). Social services includes education, health, public administration, and other community services (90-99). Local services include utilities, construction, retail trade, wholesale trade, transportation and communication (NIC 40-79). Business services include banking, insurance, real estate, legal services and other business services (NIC 80-89). Social services include public administration, sanitary services, education, health, and other social services (NIC 90-99).

The effect of E.U. imports is again similar in sign and significance, while the magnitudes are smaller than that of U.S. A thousand-dollar increase in E.U. imports reduces agricultural employment in India by 0.980 percentage points, while increasing manufacturing employment by 0.361 percentage points. Business services employment increases by 0.243 percentage points and social services employment increases by 0.212 percentage points.

Table 6: Changes in Employment and Changes in Import Exposure per Worker in NSS regions from the United States and European Union

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: Change in Employment						
United States						
Δ Imports per Worker	-1.922**	-0.015	0.708*	0.336	0.477**	0.416**
	(3.91)	(0.17)	(2.11)	(1.06)	(5.09)	(3.90)
R^2	0.34	0.46	0.44	0.36	0.64	0.48
European Union						
Δ Imports per Worker	-0.980**	-0.008	0.361*	0.171	0.243**	0.212**
	(3.62)	(0.17)	(2.07)	(1.02)	(4.80)	(4.36)
R^2	0.34	0.46	0.45	0.36	0.63	0.48
State*Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	230	230	230	230	230	230

Notes: The changes in import exposure and industry employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 periods. Standard errors are clustered within states. All regressions are weighted by the population of the region at the start of the period. Industries are classified with respect to the 2-digit NIC 1987 classification. Concordance tables are used to make the classifications consistent across rounds. Local services include trade, construction, transportation and infrastructure services (40-79). Business services includes banking activities, insurance services, real estate, and other business (80-89). Social services includes education, health, public administration, and other community services (90-99). Local services include utilities, construction, retail trade, wholesale trade, transportation and communication (NIC 40-79). Business services include banking, insurance, real estate, legal services and other business services (NIC 80-89). Social services include public administration, sanitary services, education, health, and other social services (NIC 90-99).

22

Table 7: Labor Market Institutions and the Effect of Imports

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
Dependent Variable: Change in Employment						
Flexible Labor Markets						
Δ Imports per Worker	-0.375*	-0.025	0.233**	0.055	0.078**	0.034
	(2.55)	(1.51)	(4.22)	(0.53)	(2.60)	(0.67)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.15	0.09	0.23	0.11	0.33	0.14
N	56	56	56	56	56	56
Inflexible Labor Markets						
Δ Imports per Worker	-0.258**	-0.003	0.119	0.021	0.057**	0.065*
	(2.66)	(0.25)	(1.71)	(0.33)	(2.79)	(2.47)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.09	0.08	0.16	0.15	0.36	0.14
N	104	104	104	104	104	104

Notes: Each regression includes a constant, state fixed effects, and year fixed effects, lag employment, lagged education, lagged share of female workers, state fixed effects and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 period. Standard errors are clustered within states.

Table 8: Informality and the Effect of Imports

	No Controls	Controls	Pre-liberalization

Dependent Variable: Change in the Share of Informal Labor

Self Employed & Unpaid Workers

Δ Imports per Worker

	No Controls	Controls	Pre-liberalization
	-0.150*	-0.454**	-0.177
	(2.24)	(5.51)	(1.72)
State Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
R^2	0.29	0.52	0.47
N	230	230	230

Self Employed & Unpaid & Casual

r

Δ Imports per Worker	-0.189**	-0.498**	-1.502
	(2.56)	(4.60)	(1.21)
State Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes s
R^2	0.29	0.52	0.25
N	230	230	230

Notes: The changes in informal employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects, lag employment, lagged education, lagged share of female workers, state fixed effects and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 period. Standard errors are clustered within states.

Table 9: Change in Informality within Industries

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
Dependent Variable: Change in the Share of Informal Labor						
Self Employed & Unpaid Workers						
Δ Imports per Worker	-0.480	-0.542	-0.409**	-0.636**	-0.569	-0.091
	(1.95)	(1.54)	(2.03)	(4.78)	(1.82)	(0.78)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.29	0.36	0.31	0.42	0.26	0.28
N	90	90	90	90	90	90
Self Employed & Unpaid & Casual						
Δ Imports per Worker	-0.108*	-0.263	-0.611**	-0.732**	-0.566	-0.014
	(2.60)	(0.43)	(3.18)	(0.26)	(1.86)	(0.12)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.09	0.08	0.16	0.15	0.36	0.14
N	174	174	174	174	174	174

<u>Notes</u>: The changes in informal employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects, lag employment, lagged education, lagged share of female workers, state fixed effects and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 period. Standard errors are clustered within states. Local services include utilities, construction, retail trade, wholesale trade, transportation and communication (NIC 40-79). Business services include banking, insurance, real estate, legal services and other business services (NIC 80-89). Social services include public administration, sanitary services, education, health, and other social services (NIC 90-99).

Table 10: Informality and Labor Market Institutions

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
Dependent Variable: Change in the Share of Informal Labor						
Self Employed & Unpaid Workers						
Inflexible Labor Markets	-0.665	-0.348	-0.112	-0.522**	-0.755	-0.006
	(1.19)	(0.21)	(0.25)	(2.23)	(0.99)	(0.03)
Flexible Labor Markets	-0.405*	-0.776**	0.539**	-0.701**	-0.506*	-0.116
	(0.32)	(0.34)	(0.11)	(0.40)	(0.18)	(0.18)
Self Employed & Unpaid & Casual						
Inflexible Labor Markets	0.062	0.332	-0.629*	-0.603**	-0.505	-0.114
	(0.45)	(0.31)	(1.99)	(4.56)	(0.94)	(1.11)
Flexible Labor Markets	-0.671*	-0.298	-0.654*	-1.289**	-0.815	0.113
	(2.51)	(0.90)	(2.43)	(3.30)	(1.83)	(0.36)

Notes: Each entry is the coefficient of corresponding regression. The changes in informal employment are computed for each region. Each regression includes a constant, state fixed effects, and year fixed effects, lag employment, lagged education, lagged share of female workers, state fixed effects and year fixed effects. The t-statistics are in parentheses. The results are based on stacked first differences of the 1994-2000, 2000-2005, and 2005-2010 period. Standard errors are clustered within states. Local services include utilities, construction, retail trade, wholesale trade, transportation and communication (NIC 40-79). Business services include banking, insurance, real estate, legal services and other business services (NIC 80-89). Social services include public administration, sanitary services, education, health, and other social services (NIC 90-99).

26

5 Conclusion

There is an extensive literature focusing on how increase in imports affected the manufacturing employment in developed countries. This paper contributes to the literature by analyzing the employment adjustments in a developing country across the entire economic activity, encompassing agriculture and manufacturing industries as well as non-tradable service sectors. According to the standard theory of international trade, the labor force is expected shift away from import competing sectors towards export oriented sectors as a result of trade. In addition, trade is expected have spillover effects in service industries such as retail trade and banking that tend to expand and contract with the economic activity, but are often excluded as non-tradable industry. The results in this paper in fact reveal a trade-induced reduction in agricultural employment, but a sizable increase in manufacturing employment as well as employment in business and social services.

Indian import exposure per worker grew substantially between 1994 and 2000, from 1.5 percent in 1994-2000 period to 144 percent in 2005-2010 period. As is typical for a developing country, the share of employment in the agricultural sector has been decreasing in India, while the shares of the manufacturing and service sectors has been increasing. The results show that this increase in imports from developed nations was responsible for 3.7 percent percent of the reduction in agricultural employment. On the other hand, imports are found to have increased employment in the manufacturing sectors, which accounted for 30 percent percent of the overall increase during this period. In addition, imports were associated with higher employment in the business services and social services sectors, where the increase in imports accounted for 15 percent and 16 percent of the overall increase in these sectors, respectively. Therefore, imports from the developed nations are responsible for a relatively small percentage of the employment reduction in agriculture, which employs most poor individuals in India, while it is more effective in creating employment in other sectors. This paper documents that increased imports from developed nations increase employment in manufacturing sector, and this expansion is accompanied by an increase in economic activity in service sectors.

References

[1] Autor, David H., David Dorn and Gordon Hanson. 2013a. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States," *American Economic Review*, forthcoming.

[2] Autor, David H., David Dorn and Gordon Hanson. 2013b. "Untangling Trade and Technology: Evidence from Local Labor Markets," *NBER Working Paper*, No: 18938.

[3] Besley, Timothy, and Robin Burgess. 2004. "Can Labor Regulation Hinder Economic Performance? Evidence from India." *The Quarterly Journal of Economics*.

[4] Brulhart, Marius, Celine Carrere and Federico Trionfetti. 2012."How Wages and Employment Adjust to Trade Liberalization: Quasi-Experimental Evidence from Austria", *Journal of International Economics*, 86: 68-81.

[5] Goldberg, Pinelopi and Nina Pavcnik. 2007. "Distributional Effects of Trade in Developing Countries," *Journal of Economic Literature*, 45(1): 39-82.

[6] Government of India. 1985. 7th 5-Year Plan, Planning Commission of India.

[7] Hasan, Rana, Devashish Mitra and Beyza P. Ural. 2007. "Trade Liberalization, Labor-Market Institutions, and Poverty Reduction: Evidence from Indian States," *India Policy Forum*, 3(1): 71-122.

[8] Hoekman, Bernard and Alan Winters. 2005. "Trade and Employment: Stylized Facts and Research Findings," *UN/DESAWorking Paper Series*, No: 7.

[9] Kovak, Brian K. 2013. "Regional Effects of Trade Reform: What Is the Correct Measure of Liberalization?," *American Economic Review*, 103(5): 1960-76.

[10] McCaig, Brian. 2011. "Exporting out of poverty: Provincial Poverty in Vietnam and U.S. Market Access," *Journal of International Economics*, 85(1): 102-113.

[11] McCaig, Brian, and Nina Pavcnik. 2015. "Informal Employment in a Growing and Globalizing Low-Income Country." *American Economic Review*, 105 (5): 545-50.

[12] World Bank. 2014. World Development Indicators.

A   Appendix Tables

Table A.1: Rankings of Regions with Low and High Growth in Import Exposure Between 2005 and 2010

State	Region	Growth in Import Exposure * 10
High Growth in Import Exposure		
Goa	Goa	6.264
Orissa	Northern	4.862
Haryana	Eastern	4.724
Maharashtra	Coastal	4.681
Gujarat	Saurashtra	4.198
West Bengal	Plains Western	3.919
Delhi	Delhi	3.721
Andhra Pradesh	Coastal	3.377
Tamil Nadu	Coastal Northern	2.899
Gujarat	Plains Northern	2.745
Maharashtra	Inland Western	2.734
Karnataka	Inland Southern	2.424
Maharashtra	Inland Northern	2.059
High Growth in Import Exposure		
Tripura	Tripura	0.199
Sikkim	Sikkim	0.180
Bihar	Northern	0.172
Assam	Plains Western	0.148
Orissa	Southern	0.141
Karnataka	Inland Eastern	0.133
Uttar Pradesh	Southern	0.131
Mizoram	Mizoram	0.074
Jammu & Kashmir	Outer Hills	0.066
Aruinachal Pradesh	Aruinachal Pradesh	0.057
Assam	Hills	0.040
Nagaland	Nagaland	0.033

Table A.2: National Industry Classification - Traded Sectors

NIC Code	Description

1A. Agriculture

0	Agricultural production
1	Plantations
2	Raising of livestock
3	Agricultural services
4	Hunting, trapping and game propagation
5	Forestry and logging
6	Fishing (including collection of sea products)

1B. Mining

10	Mining of coal and lignite; extraction of peat
11	Extraction of crude petroleum
12	Mining of iron ore
13	Mining of metal ores other than iron ore
14	Mining of uranium and thorium ores
15	Mining of non-metallic minerals n. e. c.
19	Mining services n. e. c.

1C. Manufacturing

20-21	Manufacture of food products
22	Manufacture of beverages, tobacco and related products
23	Manufacture of cotton textiles
24	Manufacture of wool silk and man-made fiber textiles
25	Manufacture of jute and other vegetable fiber textiles (except cotton)
26	Manufacture of textile products (including wearing apparel)
27	Manufacture of wood and wood products; furniture and fixtures
28	Manufacture of paper and paper products and printing publishing & allied industries
29	Manufacture of leather and products of leather, fur & substitutes of leather
30	Manufacture of basic chemicals and chemical products (except products of petroleum and coal)
31	Manufacture of rubber, plastic, petroleum and coal products; processing of nuclear fuels
32	Manufacture of non-metallic mineral products
33	Basic metal and alloys industries
34	Manufacture of metal products and parts (except machinery and equipment)
35-36	Manufacture of machinery and equipment (except transport equipment)
37	Manufacture of transport equipment and parts
38	Other manufacturing industries
39	Repair of capital goods

Notes: The National Sample Survey changes industry classification over time. The 1983 and 1987-1988 surveys use the NIC 1970 classification; the 1993-1994 survey uses the NIC 1987 classification; the 1999-2000 and 2004-2005 surveys use the NIC 1998 classification; and the 2009-2010 survey uses the NIC 2004 classification. Concordance tables are used to convert all classifications to the 2-digit NIC 1987 classification listed in this table. The WITS Trade data are used in the ISIC Rev.3 classification, which is identical to the NIC 1998. The trade data are again converted to the 2-digit NIC 1987 using the concordance tables.

Table A.3: National Industry Classification - Services

NIC Code	Description

2A. Local Services

40	Electricity generation, transmission and distribution
41	Gas and steam generation and distribution through pipes
42	Works and water supply
43	Non-conventional energy generation and distribution
50	Construction
51	Activities allied to construction
60	Wholesale trade in agricultural raw materials, live animals, food, beverages, intoxicants and textiles.
61	Wholesale trade in wood, paper, skin, leather and fur, fuel, petroleum, and chemicals.
62	Wholesale trade in all types of machinery & equipment including transport equipment
63	Wholesale trade n.e.c.
64	Commission agents
65	Retail trade in food and food articles, beverages tobacco and intoxicants
66	Retail trade in textiles
67	Retail trade in fuels other than household utilities
68	Retail trade n.e.c.
69	Restaurants and hotels
70	Land transport
71	Water transport
72	Air transport
73	Services incidental to transportation n.e.c.
74	Storage and warehousing services
75	Communication services

2B. Business Services

80	Banking activities, including financial services
81	Provident and insurance services
82	Real estate activities
83	Legal services
84	Operation of lotteries
85	Renting and leasing n.e.c.
89	Business services n.e.c.

2C. Social and Community Services

90	Public administration and defense services
91	Sanitary services
92	Education, science and research services
93	Health and medical services
94	Community services
95	Recreational and cultural services
96	Personal services
97	Repair services
98	International and other extra territorial bodies
99	Services n.e.c.

Notes: The National Sample Survey changes industry classification over time. The 1983 and 1987-1988 surveys use the NIC 1970 classification; the 1993-1994 survey uses the NIC 1987 classification; the 1999-2000 and 2004-2005 surveys use the NIC 1998 classification; and the 2009-2010 survey uses the NIC 2004 classification. Concordance tables are used to convert all classifications to the 2-digit NIC 1987 classification listed in this table. The WITS Trade data are used in the ISIC Rev.3 classification, which is identical to the NIC 1998. The trade data are again converted to the 2-digit NIC 1987 using the concordance tables.