

Employment Adjustments to Increased Imports: Evidence from a Developing Country

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Motivation

- ▶ International trade is one of the most commonly cited reasons for domestic job loss in both developed and developing countries. It has been argued that globalization was responsible for jobless growth.
- ▶ In U.S. exposure to Chinese import competition was associated with higher unemployment and lower wages (Autor et al., 2011), and manufacturing workers who experienced higher growth in imports experienced earnings losses (Autor et al., 2013).
- ▶ There is little conclusive empirical evidence on the effects of trade on employment and wages in low-wage countries (Goldberg and Pavcnik, 2007; Hoekman and Winters, 2005).
- ▶ Impact of recent expansion of trade volumes rather than trade liberalization episodes.

Motivation

- ▶ How labor market outcomes adjust to changes in international trade in India?
 - ▶ The changes in industry-specific employment across Indian regions are compared to changes in import exposure between the years of 1983 and 2010.
 - ▶ The share of manufacturing sector employment varied between 15 and 54 percent across regions in 1994.
 - ▶ The impact on traded sectors as well as nontradable service sectors.
- ▶ Import exposure from high income OECD countries. Annual imports were \$21B in 2000, \$53B in 2005, and \$114B in 2010.

Employment Composition in India

- ▶ Employment and Unemployment Surveys of the Indian National Sample Survey Organization. 1983, 1988, 1994, 2000, 2005, and 2010 rounds.
 - ▶ Tradable categories: agriculture, mining, and manufacturing sectors.
 - ▶ Nontradable services: Local services (utilities, construction, retail trade, wholesale trade, transportation and communication); business services (banking, insurance, real estate, legal services and other business services); and social services (education, health, and other social services).
- ▶ Working age individuals; self employed, either as 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.

Employment Shares by Industry

	1983	1988	1994	2000	2005	2010	$\Delta_{1994-1983}$	$\Delta_{2010-1994}$
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	0.120	-0.007	0.008
Local Services	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)	-	331.2	370.4	407.9	464.5	468.1	-	97.7

Import Exposure

- ▶ 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 (Autor et al., 2013).

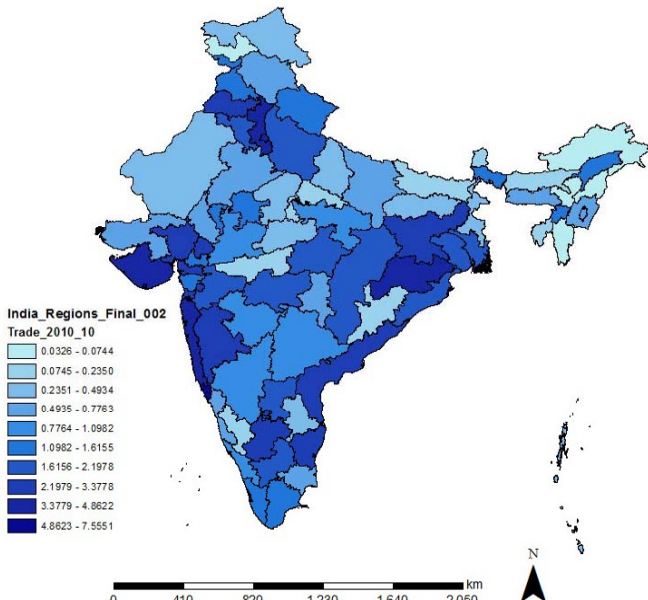
$$\Delta IE_{rt} = \frac{1}{N_{rt}} \sum_j \eta_{rjt} \Delta M_{jt} \quad (1)$$

$$\eta_{rjt} = N_{rjt} / N_{jt} \quad (2)$$

- ▶ 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).

Changes in Import Exposure per Worker

	1994-2000	2000-2005	2005-2010
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			
100 th	0.176	3.033	5.528
90 th	0.055	1.746	3.150
80 th	0.036	1.238	2.145
70 th	0.016	0.789	1.776
60 th	0.010	0.662	1.325
50 th	0.006	0.432	0.890
40 th	0.003	0.300	0.628
30 th	-0.002	0.206	0.425
20 th	-0.017	0.102	0.218
10 th	-0.117	0.024	0.084
All	0.015	0.807	1.143



Empirical Approach

The estimation strategy compares the changes in import exposure per worker to the changes in employment shares within regions over time.

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

where X'_{rt} includes the set of control variables.

The imports from high income OECD countries may be correlated to industry specific import demand shocks.

Instrument

The following non-India exposure variable is computed:

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

where $N_{r,t-5}$ is 5-year lagged employment and ΔM_{jt}^d is the changes in exports of high-income OECD countries to other middle-income developing countries. The top ten importers among these countries are consistent across the years of 2000-2010.

Changes in Employment and Import Exposure per Worker

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
<i>Dependent Variable: Change in Employment</i>						
<u>Post-liberalization</u>						
Δ Imports per Worker (1994 – 2000)	-0.203** (2.65)	-0.008 (0.74)	0.119* (2.09)	-0.030 (0.80)	0.063** (4.13)	0.059** (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

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).

Changes in Employment and Import Exposure per Worker

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
<i>Dependent Variable: Change in Employment</i>						
<u>Pre-liberalization</u>						
Δ Imports per Worker (1983 – 1994)	0.284 (0.51)	0.005 (0.12)	-0.178 (0.61)	-0.301 (0.56)	0.054 (0.82)	0.136 (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
<u>Pre-liberalization</u>						
Δ Imports per Worker (1983 – 1994) _{$t+15$}	0.013 (0.17)	-0.007 (0.59)	-0.045 (1.46)	0.029 (0.70)	0.010 (1.06)	0.001 (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

Traded Merchandise Sectors

	Agriculture		Mining		Manufacturing	
Δ Imports per Worker	-0.281** (3.75)	-0.326** (3.99)	-0.001 (0.10)	-0.003 (0.17)	0.140* (2.51)	0.120* (2.40)
% Employment $_{t-5}$	0.452 (1.18)	0.618* (2.13)	-0.022 (0.37)	-0.024 (0.44)	-0.126 (0.72)	-0.117 (0.70)
% High School Degree $_{t-5}$	0.146 (1.42)	0.108 (1.06)	-0.017 (1.71)	-0.02 (1.86)	-0.036 (0.85)	-0.041 (0.99)
% Female $_{t-5}$	0.416 (1.95)	0.421 (1.86)	-0.056* (1.96)	-0.066 (1.88)	-0.095 (0.81)	-0.147 (1.65)
Age $_{t-5}$	-0.001 (0.24)	0.000 (0.03)	0.001 (1.56)	0.002 (1.74)	-0.000 (0.03)	-0.001 (0.36)
First Stage: Δ Exports to ROW	0.155*** (10.08)	0.153*** (9.76)	0.155*** (10.08)	0.153*** (9.76)	0.155*** (10.08)	0.153*** (9.76)
F-Statistics	101.53	95.24	101.53	95.24	101.53	95.24
Anderson-Rubin Wald	14.03***	18.87***	0.01	0.03	4.93**	4.63**
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Year FE	No	Yes	No	Yes	No	Yes
R^2	0.14	0.33	0.27	0.46	0.16	0.46
N	230	230	230	230	230	230

Non-traded Service Sectors

	Local Services		Business Services		Social Services	
Δ Imports per Worker	0.012 (0.25)	0.057 (1.02)	0.064** (3.71)	0.081** (4.69)	0.066** (3.61)	0.071** (4.33)
% Employment $_{t-5}$	-0.26 (1.20)	-0.395** (2.62)	-0.053 (0.88)	-0.088 (1.26)	0.009 (0.13)	0.006 (0.13)
% High School Degree $_{t-5}$	0.146 (1.15)	-0.01 (0.17)	0.006 (0.69)	0.006 (0.70)	-0.024 (0.77)	-0.043 (1.40)
% Female $_{t-5}$	-0.138 (1.49)	-0.123 (1.00)	0.004 (0.19)	-0.007 (0.29)	-0.131** (3.27)	-0.077* (2.34)
Age $_{t-5}$	0.000 (0.05)	-0.001 (0.22)	0.00 (0.54)	0.00 (0.49)	0.00 (0.27)	0.00 (0.06)
First Stage: Δ Exports to ROW	0.155*** (10.08)	0.153*** (9.76)	0.155*** (10.08)	0.153*** (9.76)	0.155*** (10.08)	0.153*** (9.76)
F-Statistics	101.53	95.24	101.53	95.24	101.53	95.24
Anderson-Rubin Wald	0.06	1.14	16.09***	32.17***	10.40***	15.63***
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Year FE	No	Yes	No	Yes	No	Yes
R^2	0.21	0.36	0.33	0.53	0.17	0.47
N	230	230	230	230	230	230

Inference

Evaluating these effects at the actual changes in import exposure between 1994 and 2010, the increase in imports from high-income OECD countries was responsible for:

- ▶ Agriculture: 0.64 pp reduction (about 4% of total).
- ▶ Manufacturing: 0.24 pp increase (about 30% of total).
- ▶ Business services: 1.10 pp increase (about 15% of total).
- ▶ Social services: 0.90 pp increase (about 16% of total).

Changes in Earnings and Wages

	Agriculture	Mining	Manufacturing	Local Services	Business Services	Social Services
Dependent variable: Change in Earnings per Worker						
Δ Imports per Worker	-2.589*	0.662	2.490**	0.900**	3.097**	-0.045
	(2.55)	(0.34)	(4.46)	(3.10)	(3.59)	(0.19)
R^2	0.78	0.53	0.52	0.63	0.58	0.78
Dependent variable: Change in Total Earnings						
Δ Imports per Worker	-0.114	2.006	3.956**	1.529*	5.382**	2.135**
	(0.12)	(0.85)	(3.88)	(1.96)	(3.20)	(5.41)
R^2	0.61	0.34	0.57	0.49	0.37	0.46
Dependent variable: Change in Daily Wages						
Δ Imports per Worker	-0.404	2.465	1.420**	0.685	0.079	0.231
	(0.61)	(1.38)	(3.42)	(1.17)	(0.12)	(0.90)
R^2	0.54	0.44	0.52	0.59	0.49	0.76
State*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	230	230	230	230	230	230

Conclusion

- ▶ The impacts of trade in developing countries are often analyzed based on episodes of trade liberalization, using tariffs as the main source of exogenous change.
- ▶ Estimate the effects for all traded industries and nontraded service industries. Impacts of trade may spillover to service industries such as retail trade and banking.
- ▶ 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. The employment impacts of trade do spillover into other nontraded local service sectors.