Trade Liberalisation and Productivity: the Role of Foreign Ownership

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  - by inducing firms to adopt more advanced technologies (Lileeva and Trefler, 2010; Bustos, 2011)
  - and providing access to cheaper and/or better inputs (Amiti and Konings, 2007; Goldberg et al, 2010)
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Cross-border investment impacts on aggregate productivity

- Anecdotal and theoretical evidence: trade liberalisation and market integration often coincide with heightened cross-border M&A activity (Neary, 2007).
- FDI may affect aggregate productivity through within-firm productivity gains; selection of target firms; and reallocation of market shares to foreign and more productive firms.
- These effects do not assume greater market access.
- Important to understand the complementarity between liberalisation and MP: gains from trade can be twice as high in models with MP than in models without it (Ramondo and Rodriguez-Clare, 2013).

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- Import tariff liberalisation leads to increased multinational activity.
  - Input or export tariff reductions do not lead to cross-border investment.
  - Relatively productive firms that may be credit constrained are targeted.
- Increased import competition induces firms to upgrade efficiency.
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Related literature

- Trade liberalisation and productivity upgrading:
  - Lower output tariffs increase productivity at import-competing firms (Pavcnik, 2002, Trefler, 2004).
  - Lower input tariffs increase efficiency as a result of access to cheaper and better inputs, especially at importers (Amiti and Konings, 2007, Khandelwal and Topalova, 2010).
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- Trade liberalisation and M&A's:
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Outline

Trade liberalisation in Turkey

The timeline

- September 1963: Association Agreement between the EEC and Turkey.
- November 1970: Additional Protocol sets out the timetable for the elimination of tariffs and quotas.
- 1980s: Export-oriented reforms and capital account liberalisation. Import tariffs reduced to around 20 percent for most products.
- December 1995: All customs duties and quantitative restrictions on *manufactured products* between Turkey and the EU are eliminated; Turkey adopts EU's common external tariff (CET) for third countries.

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Trade liberalisation in Turkey

The impact of the customs union

- The nominal protection rate in trade with the EU in 1994 was 10.2 percent (weighted by sectoral import values), which eventually dropped to 1.3 percent in 2001 (Togan, 2011).
- In trade with third countries, to which the CET applied, the weighted average m.f.n. tariff rate dropped from 22.1 percent in 1994 to 6.9 percent in 2001.

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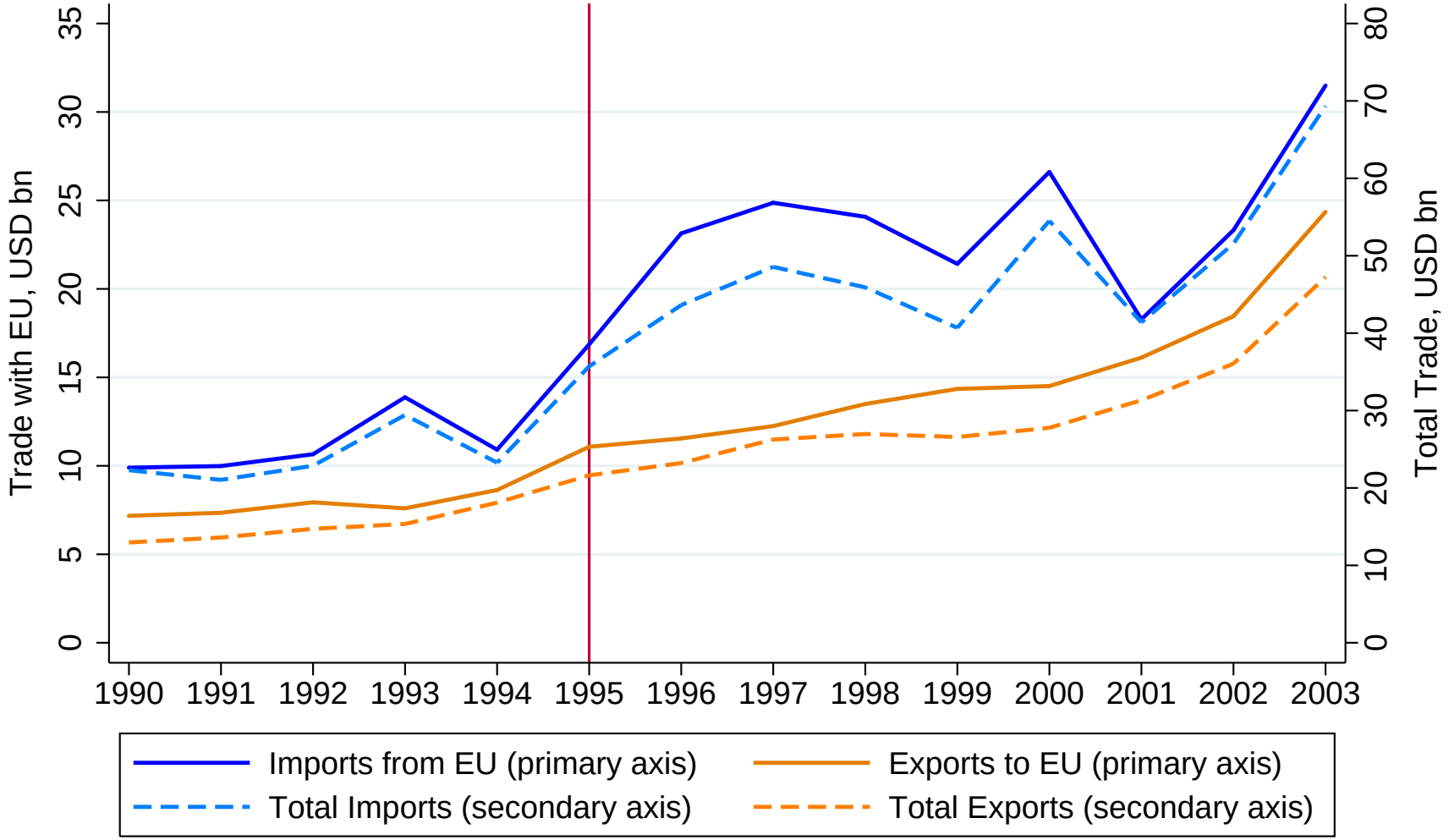
Imports responded more than exports



Why study this liberalisation episode?

- Political economy concerns limited: Turkey has been unable to influence the level of tariffs that would prevail under the CET.
  - Pre-1995 levels of tariffs can still be non-random.
- Reforms went beyond simply lowering tariffs: Turkey was required to adopt the EU competition rules and to modernise its customs procedures.
  - Makes it hard to isolate the impact of tariff reductions; but other reforms affect all companies equally.
- CU mostly affected Turkey's import tariffs: the episode is more appropriate to study product market competition and access to imported inputs.
  - Turkish exports of industrial goods to the EU have been mostly duty-free since the 1970s.

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Customs union and multinationals: the anecdotes

- World Bank (2014):
  - CU helped to integrate Turkish companies closely into European production networks (three-quarters of Turkey's FDI come from the EU).
  - Intra-industry trade between Turkey and the EU as a share of Turkish exports to the EU rose from 30% in 1995 to around 50% by 2001.
- Dutz et al (2005) on the automotive industry:
  - The prospect of CU attracted investors from third countries (e.g. Honda, Hyundai, Isuzu, and Toyota) to begin investing in joint ventures with Turkish industrialists.
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Firm-level information from the manufacturing census

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- Detailed information on plant-level characteristics such as employment, sales, investments, and breakdown of ownership.
  - Calculate TFP following Wooldridge (2009) and Levinsohn and Petrin (2012).
- Define plants with positive levels of foreign equity as *foreign-owned*.
- Balanced panel of 4,591 firms operational in both 1995 and 2001.

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Increasing presence of multinationals in Turkish manufacturing

	1993	1994	1995	1996	1997	1998	1999	2000	2001
New Acquisitions	28	15	22	19	28	39	38	30	40
Continuing Affiliates	194	233	235	235	234	264	290	292	292
Decreases in Equity	8	15	16	11	14	14	10	10	10
No Changes in Equity	174	195	203	206	207	233	266	260	263
Increases in Equity	12	23	16	18	13	17	14	22	19
Divestments	11	8	17	30	27	27	24	38	35
Share of Foreign Affiliates in:									
Employment	0.13	0.13	0.12	0.13	0.13	0.13	0.13	0.14	0.15
Output	0.25	0.23	0.23	0.24	0.25	0.23	0.24	0.28	0.27
Value Added	0.27	0.25	0.26	0.27	0.29	0.25	0.28	0.30	0.30

Product-level information matched to firms

- Annual Industrial Products database: same firm and time coverage as AMIS.
- Detailed information on values and quantities of each firm's domestic and imported inputs, outputs, and exports at the product level.
- Follows a national classification of ~2,700 products.

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Creating firm-level tariff measures

- Import tariffs applied by Turkey on trading partners provided at HS-6 level.
- Create a manual concordance between Turkey's national classification and HS-6, and use import weights to calculate the tariff rate applied for each product.
- For each plant, we match the product-level tariff information to the products it produces and take the simple average. Call this: τ_t^{prd}. Similarly we calculate τ_t^{inp} and τ_t^{exp}.
- Tariff reductions: $\Delta\tau_i^{prd} = \tau_{i,2001}^{prd} - \tau_{i,1995}^{prd}$ for each firm i.

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Baseline identification

Follow Bustos (2011)

$$FEP_{ijt} = \beta_{prd}\tau_{ijt}^{prd} + \beta_{inp}\tau_{ijt}^{inp} + \beta_{exp}\tau_{ijt}^{exp} + \alpha_{jt} + \mu_i + \varepsilon_{ijt}$$

- τ_{ijt} = tariff faced by firm i in industry j in year t
- α_{jt} = two-digit ISIC industry time trends
- μ_i = plant fixed effects
- $FEP_{ijt} \in [0, 100]$ = share of equity held by foreign investors
  Alternative definitions: $FEP \in \{0, \mathbf{1}[10, 100]\}$,
  $FEP \in \{0, \mathbf{1}[1, 49], \mathbf{1}[50, 100]\}$

Baseline identification

Follow Bustos (2011)

$$FEP_{ijt} = \beta_{prd}\tau_{ijt}^{prd} + \beta_{inp}\tau_{ijt}^{inp} + \beta_{exp}\tau_{ijt}^{exp} + \alpha_{jt} + \mu_i + \varepsilon_{ijt}$$

- τ_{ijt} = tariff faced by firm i in industry j in year t
- α_{jt} = two-digit ISIC industry time trends
- μ_i = plant fixed effects
- $FEP_{ijt} \in [0, 100]$ = share of equity held by foreign investors
  Alternative definitions: $FEP \in \{0, \mathbf{1}[10, 100]\}$,
  $FEP \in \{0, \mathbf{1}[1, 49], \mathbf{1}[50, 100]\}$

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Taking first-differences (1995-2001) to eliminate time-invariant plant and sector heterogeneity

$$\Delta FEP_{ij} = \beta_{prd}\Delta\tau_{ij}^{prd} + \beta_{inp}\tau_{ij}^{inp} + \beta_{exp}\Delta\tau_{ij}^{exp} + \mathbf{X}'_{ij,1995}\Gamma + \Delta\alpha_j + \Delta\varepsilon_{ij}$$

- β's capture the impact of a percentage change in firm-level output tariffs on foreign equity flows
- Standard errors clustered at two-digit ISIC industry level
- $\mathbf{X}_{ij,1995}$: employment, capital intensity, skill intensity, exporting status, importing status

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Alternative estimation procedure

Lagged dependent variable estimation to account for sunk investment costs

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- Estimation in first-differences and lagged dependent variables provides a bracketing property.
- Re-estimate baseline after excluding foreign-owned plants in 1995.
- Falsification tests and robustness checks in the paper.

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Tariff reductions induce foreign equity investment

Baseline identification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Dependent variable: Change in Foreign Equity Share 1995-2001							
Δ Output Tariff	-1.8194**	-1.9168**		-1.7446**		-1.8341**	-1.7585**
	(0.7572)	(0.7887)		(0.7090)		(0.7705)	(0.7193)
Δ Input Tariff			-0.8445	-0.4585			-0.4496
			(0.7078)	(0.8473)			(0.8598)
Δ Input Tariff * Importer 1995			0.8779	0.6877			0.6735
			(2.4422)	(2.5266)			(2.3887)
Δ Export Tariff					-0.1741	-0.2575	-0.2520
					(0.3228)	(0.3987)	(0.4450)
Δ Export Tariff * Exporter 1995					0.1044	0.1403	0.3278
					(2.4276)	(2.9667)	(3.0113)
Firm controls, 1995	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ Firm controls, 1993-1995		Yes					
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,110	4,012	3,989	3,755	4,170	4,080	3,729
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.01

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Impact of the tariff cuts is relatively stable

Alternative estimation procedure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel B: Dependent variable: Foreign Equity Share in 2001							
Δ Output Tariff	-2.0059**	-2.1290**		-1.9619**		-2.0031**	-1.9495**
	(0.8346)	(0.8708)		(0.7817)		(0.8469)	(0.7923)
Δ Input Tariff			-0.8473	-0.1231			-0.1145
			(1.0191)	(1.2617)			(1.2764)
Δ Input Tariff * Importer 1995			0.6867	0.4544			0.3851
			(1.7268)	(1.8165)			(1.6799)
Δ Export Tariff					0.0485	-0.0616	-0.0073
					(0.2603)	(0.2999)	(0.3193)
Δ Export Tariff * Exporter 1995					0.4413	0.7906	1.0816
					(2.5788)	(3.0495)	(2.9577)
Foreign Equity Share, 1995	0.8281***	0.8243***	0.8211***	0.8074***	0.8321***	0.8279***	0.8072***
	(0.0582)	(0.0588)	(0.0577)	(0.0603)	(0.0568)	(0.0583)	(0.0603)
Firm controls, 1995	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ Firm controls, 1993-1995		Yes					
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,110	4,012	3,989	3,755	4,170	4,080	3,729
R^2	0.56	0.56	0.55	0.54	0.56	0.56	0.54

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Results are not driven by existing affiliates

Sample of domestic companies in 1995

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel C: Sample excludes foreign-owned firms during 1995-2001							
Dependent variable: Change in Foreign Equity Share 1995-2001							
Δ Output Tariff	-1.7726**	-1.8534**		-1.6307**		-1.7875**	-1.6467**
	(0.7432)	(0.7733)		(0.6961)		(0.7551)	(0.7070)
Δ Input Tariff			-0.9294	-0.6153			-0.6132
			(0.8449)	(1.0599)			(1.0710)
Δ Input Tariff * Importer 1995			-0.0922	-0.2949			-0.2421
			(2.7119)	(2.8238)			(2.6913)
Δ Export Tariff					-0.1666	-0.2209	-0.2371
					(0.1937)	(0.2255)	(0.2754)
Δ Export Tariff * Exporter 1995					-0.6992	-0.8869	-0.8099
					(2.4685)	(3.0974)	(3.0757)
Firm controls, 1995	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ Firm controls, 1993-1995		Yes					
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,951	3,855	3,835	3,608	4,008	3,921	3,582
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.01

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

MNEs target relatively productive firms...

	(1)	(2)	(3)	(4)
Dependent variable: Change in Foreign Equity Share 1995-2001				
Δ Output Tariff				
$\times 1^{st}$ TFP quartile	-0.7443*	-0.4796*	-0.7500*	-0.4793*
	(0.3763)	(0.2230)	(0.3935)	(0.2110)
$\times 2^{nd}$ TFP quartile	-2.5431	-2.3244	-2.5725	-2.3505
	(1.6422)	(1.4758)	(1.6523)	(1.4878)
$\times 3^{rd}$ TFP quartile	-2.7746**	-2.9623**	-2.7755**	-2.9609**
	(0.8539)	(1.0187)	(0.8735)	(1.0426)
$\times 4^{th}$ TFP quartile	0.5596	0.4803	0.5498	0.4708
	(3.5797)	(3.8068)	(3.5745)	(3.8018)
Δ Input Tariffs		Yes		Yes
Δ Tariffs on Exports			Yes	Yes
Firm controls, 1995	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Observations	4,079	3,727	4,049	3,701
R^2	0.01	0.01	0.01	0.01

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

...that are not burdened by debt

Baseline estimation

	(1)	(2)	(3)	(4)
Dependent variable: Change in Foreign Equity Share 1995-2001				
Δ Output Tariff				
×Credit Access, 1995	-2.4638	-2.4600	-2.2937	-2.2354
	(2.1067)	(1.7920)	(2.0931)	(1.7589)
×No Credit Access, 1995	-3.4536*	-3.3965**	-3.4096**	-3.3234**
	(1.4978)	(1.4120)	(1.4752)	(1.3866)
Δ Input Tariffs		Yes		Yes
Δ Tariffs on Exports			Yes	Yes
Firm controls, 1995	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Observations	4,110	3,755	4,080	3,729
R^2	0.09	0.08	0.09	0.08

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Tariff reductions lead to productivity improvements

Input tariff cuts benefited firms that were already importers in 1995

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable: Change in Total Factor Productivity 1995-2001							
Δ Output Tariff	-0.2712**	-0.2558***		-0.2401***		-0.2680***	-0.2259***
	(0.0814)	(0.0757)		(0.0570)		(0.0781)	(0.0506)
Δ Input Tariff			-0.0567	-0.0021			-0.0313
			(0.1083)	(0.1519)			(0.1686)
Δ Input Tariff * Importer 1995			-0.9849***	-0.9473***			-0.9229***
			(0.1644)	(0.1453)			(0.1287)
Δ Export Tariff					0.0280	0.0540	0.1531
					(0.1490)	(0.0960)	(0.1011)
Δ Export Tariff * Exporter 1995					0.2113	0.2354	0.2249
					(0.1594)	(0.2411)	(0.2338)
Firm controls, 1995	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Δ Firm controls, 1993-1995		Yes					
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,986	3,889	3,874	3,647	4,045	3,957	3,622
R^2	0.02	0.02	0.03	0.02	0.02	0.02	0.02

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Some firms increase R&D spending...

Heterogeneous outcomes

	(1)	(2)	(3)	(4)
Dependent variable: Change in (log) R&D and Intangibles Expenditure 1995-2001				
Δ Output Tariff				
×1^{st} TFP quartile	0.1035***	0.0340**	0.0974***	0.0260
	(0.0163)	(0.0144)	(0.0162)	(0.0170)
×2^{nd} TFP quartile	0.0667*	0.0570*	0.0658*	0.0549*
	(0.0308)	(0.0268)	(0.0318)	(0.0291)
×3^{rd} TFP quartile	0.0226	-0.0140	0.0193	-0.0201
	(0.0559)	(0.0509)	(0.0555)	(0.0505)
×4^{th} TFP quartile	-0.2998**	-0.2375*	-0.3026**	-0.2420*
	(0.1288)	(0.1190)	(0.1273)	(0.1179)
Δ Input Tariff		0.4167***		0.4251***
		(0.1184)		(0.1186)
Δ Input Tariff * Importer 1995		-0.5361***		-0.5363***
		(0.1218)		(0.1227)
Δ Export Tariff			-0.0393	-0.0651
			(0.0512)	(0.0481)
Δ Export Tariff * Exporter 1995			-0.1099	-0.0878
			(0.0872)	(0.0879)
Firm controls, 1995	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Observations	4,079	3,727	4,049	3,701
R^2	0.08	0.08	0.08	0.08

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...and invest in imported capital

Heterogeneous outcomes

	(1)	(2)	(3)	(4)
Dependent variable: Change in (log) Imported Capital Intensity 1995-2001				
Δ Output Tariff				
×1^{st} TFP quartile	-0.0122	-0.0171	-0.0129	-0.0179
	(0.0189)	(0.0202)	(0.0196)	(0.0206)
×2^{nd} TFP quartile	-0.0365**	-0.0428*	-0.0377**	-0.0448**
	(0.0146)	(0.0189)	(0.0149)	(0.0193)
×3^{rd} TFP quartile	-0.0615***	-0.0661***	-0.0605***	-0.0650***
	(0.0172)	(0.0161)	(0.0172)	(0.0161)
×4^{th} TFP quartile	-0.0186	-0.0203	-0.0165	-0.0184
	(0.0447)	(0.0451)	(0.0438)	(0.0444)
Δ Input Tariff		0.0207		0.0185
		(0.0148)		(0.0153)
Δ Input Tariff * Importer 1995		-0.0222		-0.0208
		(0.0310)		(0.0299)
Δ Export Tariff			0.0133	0.0067
			(0.0090)	(0.0076)
Δ Export Tariff * Exporter 1995			0.0233	0.0276
			(0.0969)	(0.0967)
Firm controls, 1995	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Observations	4,079	3,727	4,049	3,701
R^2	0.06	0.06	0.06	0.07

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Aggregate productivity driven by both the within effect and market reallocation

Balanced sample of firms

Year	Aggregate Productivity	Average Productivity	Market Reallocation
1995	0.00	0.00	0.00
1996	0.06	0.01	0.05
1997	0.08	0.10	-0.02
1998	0.07	0.10	-0.03
1999	0.16	0.14	0.02
2000	0.23	0.16	0.07
2001	0.35	0.12	0.23

As market resources are transferred to foreign plants

Balanced sample of firms

Year	Total Employment		Net Creation w.r.t. 1995		Share Accounted by Foreign
	Foreign	Total	Foreign	Total	
1995	89,474	664,445	-	-	-
1996	98,961	710,079	9,487	45,634	0.21
1997	104,586	751,584	15,112	87,139	0.17
1998	108,562	778,843	19,088	114,398	0.17
1999	106,399	744,919	16,925	80,474	0.21
2000	109,484	747,124	20,010	82,679	0.24
2001	111,764	714,140	22,290	49,695	0.45

Findings and implications

- Unilateral trade liberalisation induces cross-border investment and productivity-enhancing innovation.
- Product market competition is the key driver rather than greater market access or access to better inputs.
- Multinationals may arise as a source of both finance and technologies in the wake of trade liberalisation.
- Greater M&A activity may increase reallocation of factors and constitute a further source of increase in aggregate productivity.

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Next steps

- Did tariff reductions lead to reductions in markups?
  - Levinsohn (1993): yes.
  - If so, reductions in average prices provide sources of welfare gain.
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