

Who gains from better market access?

Miklós Koren
CEU, MTA KRTK and CEPR
respect.eui.eu

World Trade Forum
European University Institute
September 29, 2018

Large aggregate gains from trade

Large aggregate gains from trade

In absence of randomized control trials for trade policy, we can rely on natural experiments, in which trading opportunities changed suddenly, while tastes and technologies remained the same.

1. Jeffersonian self embargo of U.S. trade (1808-09)
2. Meiji restoration in Japan (1859-75)
3. Closure of the Suez Canal (1967-75)
4. The age of aviation (1960-95)

Aggregate loss from halving trade

Period	Geography	Percentage GDP loss from halving trade
1808–09	USA	2–3%
1854–75	Japan	3–5%
1967–75	Europe–Asia	10–16%
1960–95	World	25–35%

Based on Irwin (2005), Bernhofen and Brown (2004, 2005), Feyrer (2009a, b).

Note: Reduced-form estimates are much bigger than model-based estimates (Alvarez and Lucas, 2007; Arkolakis, Costinot, Rodriguez-Clare, 2010: 0.5–1%).

Is it exports or imports?

$$Y = C + I + G + X - M$$

Is it exports or imports?

$$Y = C + I + G + X - M$$

but

$$Y = F(K, L, M)$$

Three effects of imports

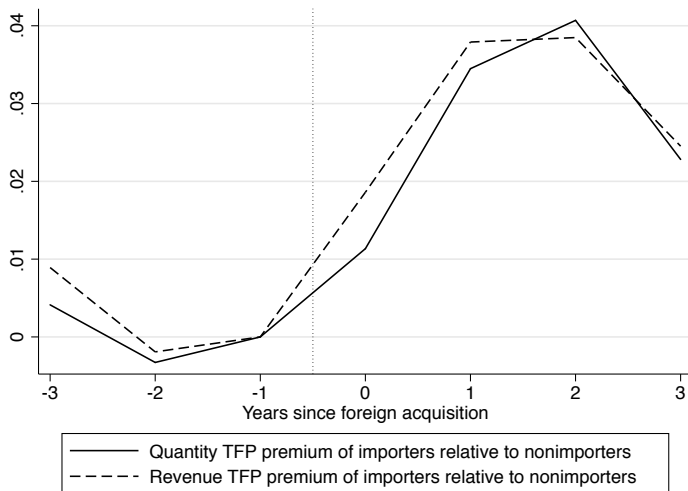
1. Imported intermediate inputs (Halpern, Koren and Szeidl, 2015)
2. Technology embodied in imported machines (Halpern, Hornok, Koren and Szeidl, 2018; Koren, Csillag and Köllő, 2018)
3. Diversification of suppliers (Koren and Tenreyro, 2013; Caselli, Koren, Lisicky and Tenreyro, 2018)

Imported intermediate inputs

How do imported inputs affect productivity?

- ▶ Different (price-adjusted) quality.
- ▶ Imperfect substitution with domestic inputs.
- ▶ Estimate in Hungarian manufacturing data 1992–2003.
- ▶ Conduct counterfactual simulations.

After foreign acquisition, importers become even more productive



Trade liberalization increases aggregate TFP by 0.8–2.9 percent

Panel A

Tariff reduction (percent)	No firms foreign (percent)	Baseline (percent)	All firms foreign (percent)
40 to 30	0.8	1.3	1.6
10 to 0	1.6	2.5	2.9

Panel B

Tariff reduction (percent)	High fixed cost (percent)	Baseline (percent)	Low fixed cost (percent)
40 to 30	1.2	1.3	1.5
10 to 0	2.2	2.5	2.7

Notes: Table reports changes in aggregate TFP in our simulated economy in response to a 10 percentage point tariff reduction under various scenarios. High fixed costs are 3 times the baseline and low fixed costs are 1/3 of the baseline for each firm in the simulated economy.

Technology embodied in capital

Questions

1. Are firms importing capital more productive?
2. Is foreign R&D embodied in capital imports?

Patterns of imported capital (Hungary, 1992–2003)

1. Between 40-50% of firms have any imported capital. This has increased over time.
2. Among those that do, import accounts for around 25% of their fixed assets. Stable over time.
3. The mean R&D content of imported capital is around 3%. Stable over time.

Imported R&D improves productivity

	(1)	(2)	(3)
Dependent variable: log value added			
R&D content of capital		0.100*** (0.011)	0.086*** (0.011)
Capital stock	0.172*** (0.005)	0.176*** (0.005)	0.170*** (0.005)
Employment	0.667*** (0.010)	0.664*** (0.010)	0.648*** (0.010)
Firm has foreign owner	0.027 (0.021)	0.022 (0.021)	0.014 (0.021)
Firm imports materials			0.120*** (0.010)
Firm is an exporter			0.123*** (0.011)
Observations	99.816	99.816	99.816
Number of firms	24.316	24.316	24.316
Within R-squared	0.283	0.285	0.289

Standard errors (in parentheses) are clustered by firm. All specifications include firm fixed effects and common time dummies. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Complementarity with other inputs

- ▶ But imported capital may be complementary with other inputs of production.
 - ▶ intermediate inputs
 - ▶ workers
- ▶ Complementarity may magnify inequality (Jones 2011).

Capital importers buy more intermediate inputs from the same country

Dependent variable: Firm imports material dummy			
	(1)	(2)	(3)
After capital imports	0.051*** (0.002)	0.047*** (0.002)	0.037*** (0.003)
After x Top 10 R&D		0.010*** (0.004)	
After x Top 20 R&D			0.022*** (0.003)
Observations	363,371	363,371	363,371
Number of groups	39,424	39,424	39,424
Within R-squared	0.088	0.088	0.088

Notes: Firm-country fixed effects and common time dummies included. Additional regressors: employment (log), foreign dummy, exporter dummy. Sample includes firms that became capital importers between 1992-2003. Robust standard errors (in parentheses) are clustered by firm-country groups.

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

Operators exposed to imported machines earn more

	(1) Baseline	(2) Skill controls	(3) Firm controls	(4) IV
Worker exposed to imported machine (dummy)	0.055*** (0.016)	0.035*** (0.010)	0.021** (0.011)	0.321*** (0.066)
Firm is an importer (dummy)	0.019 (0.017)	0.011 (0.011)		-0.056 (0.144)
Firm is foreign owned (dummy)	0.127*** (0.017)	0.075*** (0.011)		0.095** (0.024)
Book value of machinery (log)	0.086*** (0.006)	0.049*** (0.005)		0.072*** (0.012)
R^2	0.517	0.715	0.863	0.496
Number of observations	61,173	61,173	61,173	61,173

Summary

- ▶ Imported R&D has *large* effect on productivity.
- ▶ Buying all machines from Sweden (R&D content 8%) rather than Hungary (R&D content 0.5%) raises productivity by 30%.
- ▶ Preliminary evidence for complementarities.
- ▶ Needed: a model of imported machines with machine-material, machine-worker complementarities.

Technological diversification

Questions

1. Why are some firms more volatile than others?
2. Can technology choices affect volatility?
3. Does openness affect volatility?
 - ▶ sources of new shocks (Rodrik, 1998; di Giovanni and Levchenko, 2009)
 - ▶ specialization across sectors (Newbery and Stiglitz, 1984)
 - ▶ diversification across buyers (Kramarz, Martin and Mejean, 2018) and suppliers (Caselli, Koren, Lisicky and Tenreyro, 2018)

Diversification through trade

- ▶ Remember that imported inputs are *substitutes*.
- ▶ As firms diversify across supplier countries, volatility (may) go down.
- ▶ No closed-form solutions, simulate the world economy.
- ▶ On average, trade has reduced volatility between 1972 and 2007 by 33 percent.
(But: small increases for Colombia, Greece, Italy, Japan.)

Conclusions

Open questions

1. Complementarity between trade and technology
2. New research designs based on new data

Complementarity between trade and technology

- ▶ Most studies focus on the competitive effect of trade: prices adjust, firms expand/shrink, worker income adjusts.
- ▶ In these explanations, trade liberalization and technical progress are alternative competitive forces.
- ▶ New approaches suggest complementarities between the two:
 - ▶ trading as an activity, quality needed to export (Hallak and Sivadasan, 2013, Boler, Moxnes and Ulltveit-Moe, 2015)
 - ▶ using imported technology (Koren, Csillag and Köllő, 2018, Halpern, Hornok, Koren and Szeidl, 2018)
- ▶ We need models to capture the precise nature of complementarities.

New research designs based on new data

- ▶ To study the heterogeneous effects of policy, micro data is needed on firms and workers.
- ▶ These are often collected outside traditional statistical agencies:
 - ▶ administrative data (social security, VAT filings)
 - ▶ business data (financials, transactions data, location tracking)
- ▶ Useful to analyze
 - ▶ full impact of policy (earnings, job loss, transfers, job transitions)
 - ▶ international linkages
 - ▶ long-run effects
- ▶ Some great examples of cross-country harmonization, but more work needed.

Concluding remarks

1. Imports are great.
 - ▶ improve productivity
 - ▶ increase complementary operator wages
 - ▶ serve as technological insurance

Concluding remarks

1. Imports are great.
 - ▶ improve productivity
 - ▶ increase complementary operator wages
 - ▶ serve as technological insurance
2. But some gain more than others.
 - ▶ large, productive firms
 - ▶ foreign firms
 - ▶ skilled workers in complementary occupations