Lecture 9: Trade with Heterogenous Firms (Empirics)

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Today's lecture

Test on Melitz (2003)

- Pavcnik (2002, RES)
- Bernard, Jensen and Schott (JME, 2006)

Empirical evidence

Papers: Pavcnik (2002, RES) and Bernard, Jensen and Schott (JME, 2006)

General questions:

- Trade-induced reallocation: are some plants growing, some exiting?
- If there are productivity gains, where do they come from?
- Short-run pains, long-run gains

Empirical evidence: Pavcnik (2002)

Pavcnik (2002)

- looks at the effect of trade liberalization on plants exit and productivity improvements in Chile
- Why is Chile a good case study? Massive trade liberlization during the late 70s and early 80s
- How has sectoral productivity evolved during this period? Through which channels?

Empirical evidence: Pavcnik (2002)

- Plant-level data, 1979-1986
- Tariffs have fallen in the same way in every sector
- Characterizes sectors as
  - **export-oriented** (more than 15 % of its total output is exported)
  - **import-competing** (ratio import over total output larger than 15 %)
  - non-traded goods (others)

Empirical evidence: Pavcnik (2002)

For each industry we want to know:

1. How has evolved aggregate productivity over the liberalization period?
2. Do variations in productivity come from resources reallocations from the least to the most efficient firms?

Empirical evidence: Pavcnik (2002)

$$W_t = \sum_i s_{it} pr_{it} = \widetilde{pr}_t + \sum_i (s_{it} - \widetilde{s}_t)(pr_{it} - \widetilde{pr}_t)$$

Where W_t is aggregate weighted productivity

- $\widetilde{pr}_t$ is unweighted aggregate productivity (within firm gains?)
- $\sum_i (s_{it} - \widetilde{s}_t)(pr_{it} - \widetilde{pr}_t)$: total covariance between a plant's share of the industry output and its productivity (positive values of the covariance means that more output produced by more efficient plants)

$\rightarrow$ Melitz (2003) predicts that this covariance should be positive and increasing over time

Pavcnik (2002)

All industries

Year	Aggregate productivity	Unweighted productivity	Covariance
79	0.000	0.000	0.000
80	-0.010	0.018	-0.027
81	0.051	0.054	-0.003
82	0.329	0.048	0.281
83	0.174	0.010	0.160
84	0.117	0.025	0.092
85	0.120	-0.003	0.123
86	0.193	0.066	0.127
The reported growth figures are relative to 1979			

Pavcnik (2002)

Import competing industries (Pavcnik, 2002)

Year	Aggregate productivity	Unweighted productivity	Covariance
79	0.000	0.000	0.000
80	-0.063	0.027	-0.090
81	0.032	0.092	-0.061
82	0.088	0.066	0.022
83	0.077	0.034	0.043
84	0.089	0.059	0.030
85	0.095	0.061	0.034
86	0.319	0.107	0.213
The reported growth figures are relative to 1979			

Pavcnik (2002)

Export oriented industries (Pavcnik, 2002)

Year	Aggregate productivity	Unweighted productivity	Covariance
79	0.000	0.000	0.000
80	-0.059	-0.038	-0.021
81	-0.048	-0.054	0.006
82	0.591	0.040	0.551
83	0.326	0.015	0.311
84	0.178	0.049	0.129
85	0.203	-0.011	0.214
86	0.254	0.087	0.166
The reported growth figures are relative to 1979			

Empirical evidence: Pavcnik (2002)

- Important reallocation effects following trade liberalization
- Those firms which exit are not only less productive, but also have other characteristics: less capital intensive, skill intensive, etc. Useful to understand the short run effects of trade liberalization among groups

Bernard, Jensen and Schott (2006)

- Link plant-level U.S. manufacturing data with industry measures of tariffs and transportation costs.

- As trade costs fall:

1. industry productivity increases
2. higher probability of plant death
3. higher probability of successful exports
4. existing exporters increase their export shipments

Bernard, Jensen and Schott (2006)

Regressor	Change in TFP	Change in TFP
Change in Trade Cost	-0.152 *	-0.190 *
	(0.079)	(0.104)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	No	Yes
Observations	1,153	1,153
R^2	0.00	0.02

Notes: Industry-level OLS regression results. Robust standard errors adjusted for clustering at the four-digit SIC level are in parentheses. Industry fixed effects are for two-digit SICs. Dependent variable is the average annualized change in Bartelsman, Becker and Gray (2000) five-factor total factor productivity from years t+1 to t+5.. Regressor is the change in total trade costs between years t-5 and t. Regressions cover 1972 to 1996. ***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Coefficients for the regression constant and dummy variables are suppressed.

Table 2: Industry Productivity Growth, 1982-97

Bernard, Jensen and Schott (2006)

Regressor	Logit Plant Death	Logit Plant Death	Logit Plant Death
Change in Trade Cost	-5.664 *	-6.388 **	-6.669 **
	(3.148)	(2.782)	(2.937)
Relative Productivity		-0.221 ***	-0.202 ***
		(0.059)	(0.053)
x Change in Trade Cost			12.178 **
			(6.012)
Industry Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	210,664	210,665	210,666
Log likelihood	-115,329	-109,734	-109,713

Notes: Plant-level logistic regression results. Robust standard errors adjusted for clustering at the four-digit SIC level are in parentheses. Industry fixed effects are for two-digit SICs. Dependent variable indicates plant death between years t and t+5. First regressor is the change in total trade costs between years t-5 and t. Regressions cover two panels: 1982 to 1987 and 1987 to 1992. ***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Coefficients for the regression constant and dummy variables are suppressed.

Bernard, Jensen and Schott (2006)

Regressor	OLS TFP Growth	OLS TFP Growth	OLS TFP Growth	OLS TFP Growth	OLS TFP Growth
Change in Trade Cost	-1.027	-1.494 *	-1.902 *	-1.924 *	-2.321 *
	(0.733)	(0.854)	(1.008)	(1.025)	(1.228)
Relative Productivity			-0.545 ***	-0.545 ***	-0.545 ***
			(0.016)	(0.016)	(0.016)
x Change in Trade Cost				0.559	0.545
				(1.389)	(1.360)
Exporter		-0.143 ***	0.007	0.007	0.008
		(0.005)	(0.007)	(0.007)	(0.007)
x Change in Trade Cost					1.182
					(0.913)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	119,918	119,918	119,918	119,918	119,918
R^2	0.01	0.11	0.26	0.26	0.26

Notes: Plant-level OLS regression results. Robust standard errors adjusted for clustering at the four-digit SIC level are in parentheses. Industry fixed effects are for two-digit SICs. Dependent variable indicates change in plant TFP between years t and t+5. First regressor is the change in total trade costs between years t-5 and t. Regressions cover two panels: 1982 to 1987 and 1987 to 1992. ***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. Coefficients for the regression constant and dummy variables are suppressed.

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