Griliches Lecture 1: Firm Heterogeneity

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  - exporters are bigger than non-exporters;
  - exporters are more productive than nonexporters.

Table 2

Exporting By U.S. Manufacturing Firms, 2002

NAICS industry	*Percent of firms*	*Percent of firms that export*	*Mean exports as a percent of total shipments*
311 Food Manufacturing	6.8	12	15
312 Beverage and Tobacco Product	0.7	23	7
313 Textile Mills	1.0	25	13
314 Textile Product Mills	1.9	12	12
315 Apparel Manufacturing	3.2	8	14
316 Leather and Allied Product	0.4	24	13
321 Wood Product Manufacturing	5.5	8	19
322 Paper Manufacturing	1.4	24	9
323 Printing and Related Support	11.9	5	14
324 Petroleum and Coal Products	0.4	18	12
325 Chemical Manufacturing	3.1	36	14
326 Plastics and Rubber Products	4.4	28	10
327 Nonmetallic Mineral Product	4.0	9	12
331 Primary Metal Manufacturing	1.5	30	10
332 Fabricated Metal Product	19.9	14	12
333 Machinery Manufacturing	9.0	33	16
334 Computer and Electronic Product	4.5	38	21
335 Electrical Equipment, Appliance	1.7	38	13
336 Transportation Equipment	3.4	28	13
337 Furniture and Related Product	6.4	7	10
339 Miscellaneous Manufacturing	9.1	2	15
Aggregate manufacturing	**100**	**18**	**14**

Sources: Data are from the 2002 U.S. Census of Manufactures.
Notes: The first column of numbers summarizes the distribution of manufacturing firms across three-digit NAICS manufacturing industries. The second reports the share of firms in each industry that export. The final column reports mean exports as a percent of total shipments across all firms that export in the noted industry.

Table 3

Exporter Premia in U.S. Manufacturing, 2002

	Exporter premia		
	(1)	*(2)*	*(3)*
Log employment	1.19	0.97	
Log shipments	1.48	1.08	0.08
Log value-added per worker	0.26	0.11	0.10
Log TFP	0.02	0.03	0.05
Log wage	0.17	0.06	0.06
Log capital per worker	0.32	0.12	0.04
Log skill per worker	0.19	0.11	0.19
Additional covariates	None	Industry fixed effects	Industry fixed effects, log employment

Sources: Data are for 2002 and are from the U.S. Census of Manufactures.
Notes: All results are from bivariate ordinary least squares regressions of the firm characteristic in the first column on a dummy variable indicating firm's export status. Regressions in column 2 include industry fixed effects. Regressions in column 3 include industry fixed effects and log firm employment as controls. Total factor productivity (TFP) is computed as in Caves, Christensen, and Diewert (1982). "Capital per worker" refers to capital stock per worker. "Skill per worker" is nonproduction workers per total employment. All results are significant at the 1 percent level.

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     - Different market structures (e.g., BEJK 2003).

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  - The fixed cost is identical across all firms; denote it by f.

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$$\begin{aligned} p(\varphi) &= \frac{1}{\rho\varphi}; \quad q(\varphi) = RP^{\sigma-1}(\rho\varphi)^{\sigma}; \\ r(\varphi) &= p(\varphi)\, q(\varphi) = R(P\rho\varphi)^{\sigma-1}; \qquad (3) \\ \pi(\varphi) &= \frac{1}{\sigma} r(\varphi) - f. \qquad (4) \end{aligned}$$

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3. Every firm faces a probability δ of death per unit time.

Firm Behavior

- Given stationarity, a firm with productivity φ earns profits $\pi(\varphi)$ in every period, until it is hit by a shock. The expected value of the firm is:

$$v(\varphi) = \max\left\{0, \sum_{t=s}^{\infty} (1-\delta)^{t-s} \pi(\varphi)\right\} = \max\left\{0, \frac{1}{\delta}\pi(\varphi)\right\}. \quad (5)$$

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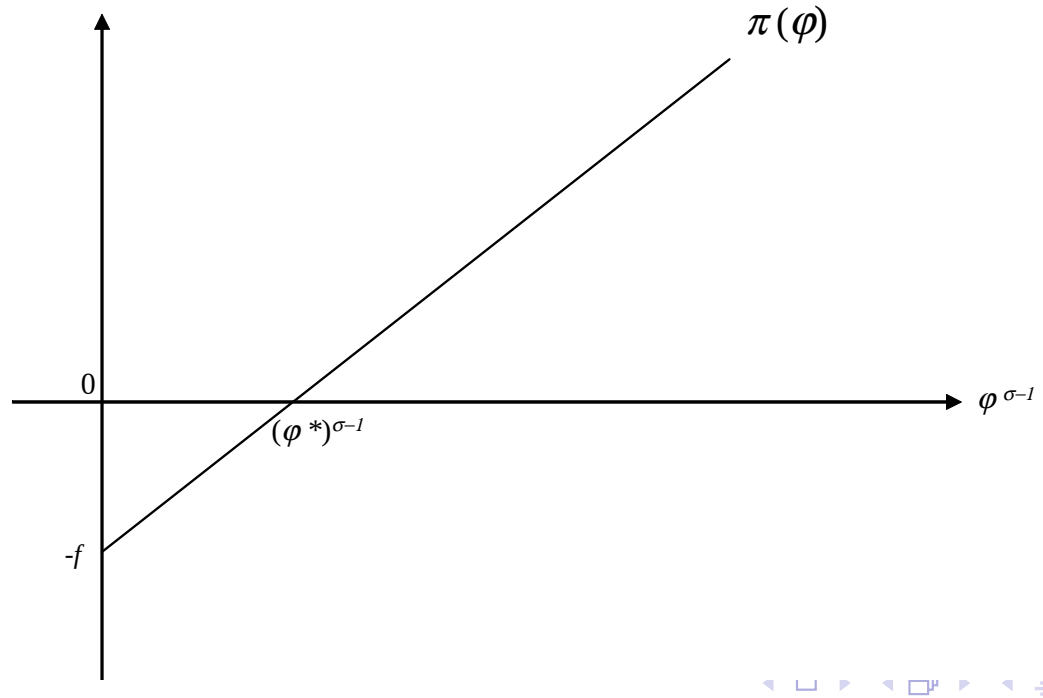
- It is clear from (4) and (5) that there is a unique threshold productivity φ^* such that $v(\varphi) > 0$ if and only if $\varphi > \varphi^*$.



Industry Equilibrium

- Free entry ensures that, in the industry equilibrium, the *expected* discounted value of profits for a potential entrant equal the fixed cost of entry, or

$$\int_0^\infty v(\varphi)\, g(\varphi)\, d\varphi = f_e \Leftrightarrow \overline{\pi} = \frac{\delta f_e}{1 - G(\varphi^*)}, \qquad \text{(FE)} \qquad (6)$$

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- Melitz shows that the equilibrium is unique.

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- It is also assumed that the domestic economy can trade with $n \geq 1$ other countries and that all countries are of equal size, which implies that factor price equalization will hold and the wage will equal 1 everywhere (this can be relaxed).

Firm Behavior Revisited

- Firms charge constant markups in both domestic and foreign markets. Domestic and foreign revenues are:

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$$r(\varphi) = \begin{cases} r_d(\varphi) & \text{if the firm does not export} \\ \left(1 + n\tau^{1-\sigma}\right) r_d(\varphi) & \text{if the firm exports to all countries.} \end{cases}$$

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- The corresponding profit levels are

$$\pi_d(\varphi) = \frac{r_d(\varphi)}{\sigma} - f, \tag{7}$$

$$\pi_x(\varphi) = \frac{r_x(\varphi)}{\sigma} - f_x = \frac{\tau^{1-\sigma} r_d(\varphi)}{\sigma} - f_x, \tag{8}$$

where f_x is amortized per-period portion of the initial fixed cost (i.e., δf_{ex}).

Firm Behavior Revisited (continued)

- Defining per period profits as $\pi(\varphi) = \pi_d(\varphi) + \max\{0, n\pi_x(\varphi)\}$, the value of the firm is again

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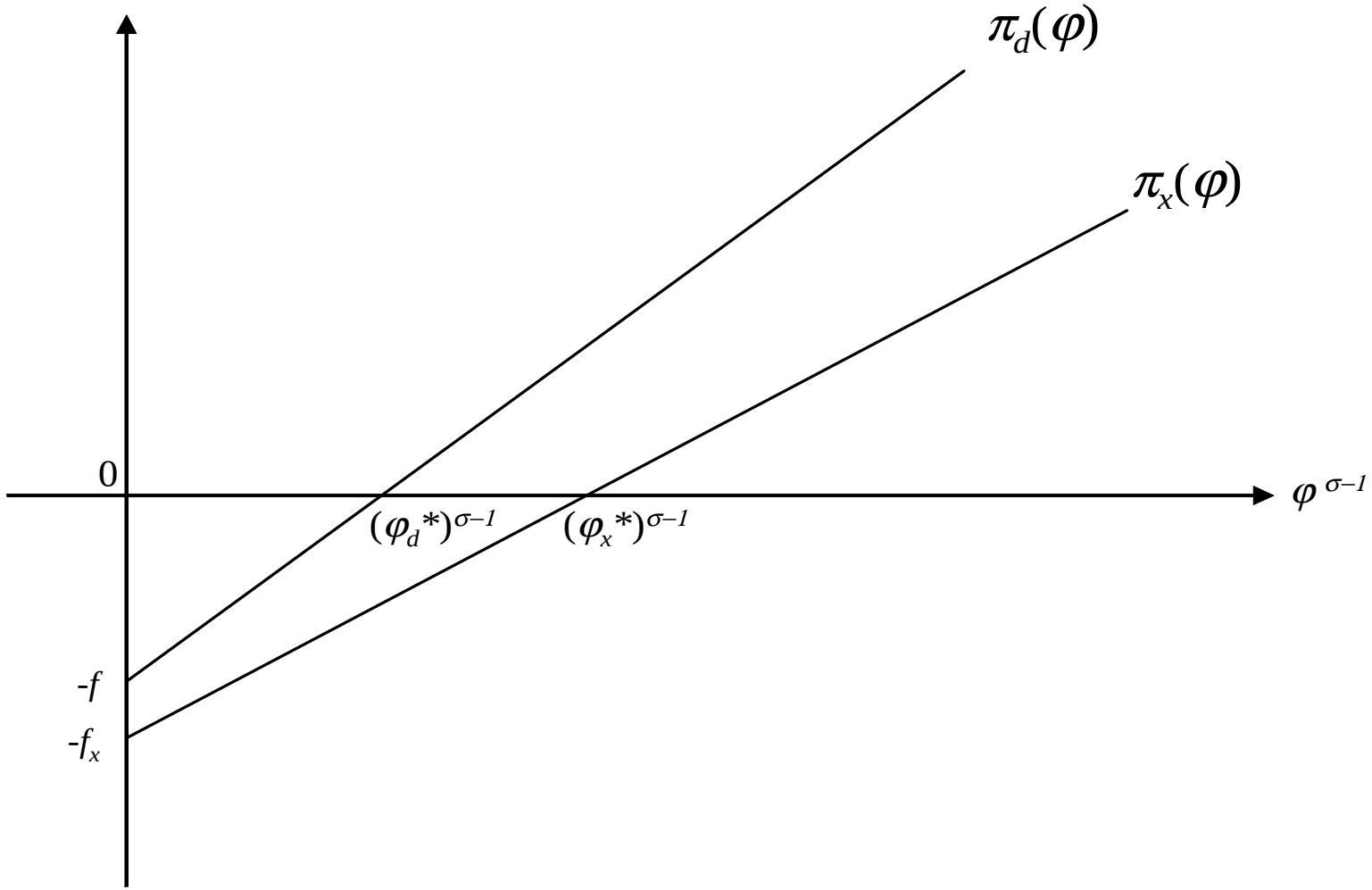
- The free entry condition is as before; expected discounted profits equal entry costs.


$\pi_d(\varphi)$
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$(\varphi_d^*)^{\sigma-1}$
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- Bernard, Redding and Schott (2007) integrate factor proportions into the Melitz framework.