

Learning About Demand

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Organization of Presentation

1. Motivation

Selection=>Evolution=>Learning

2. Model

3. Data and Measurement

4. Exercises

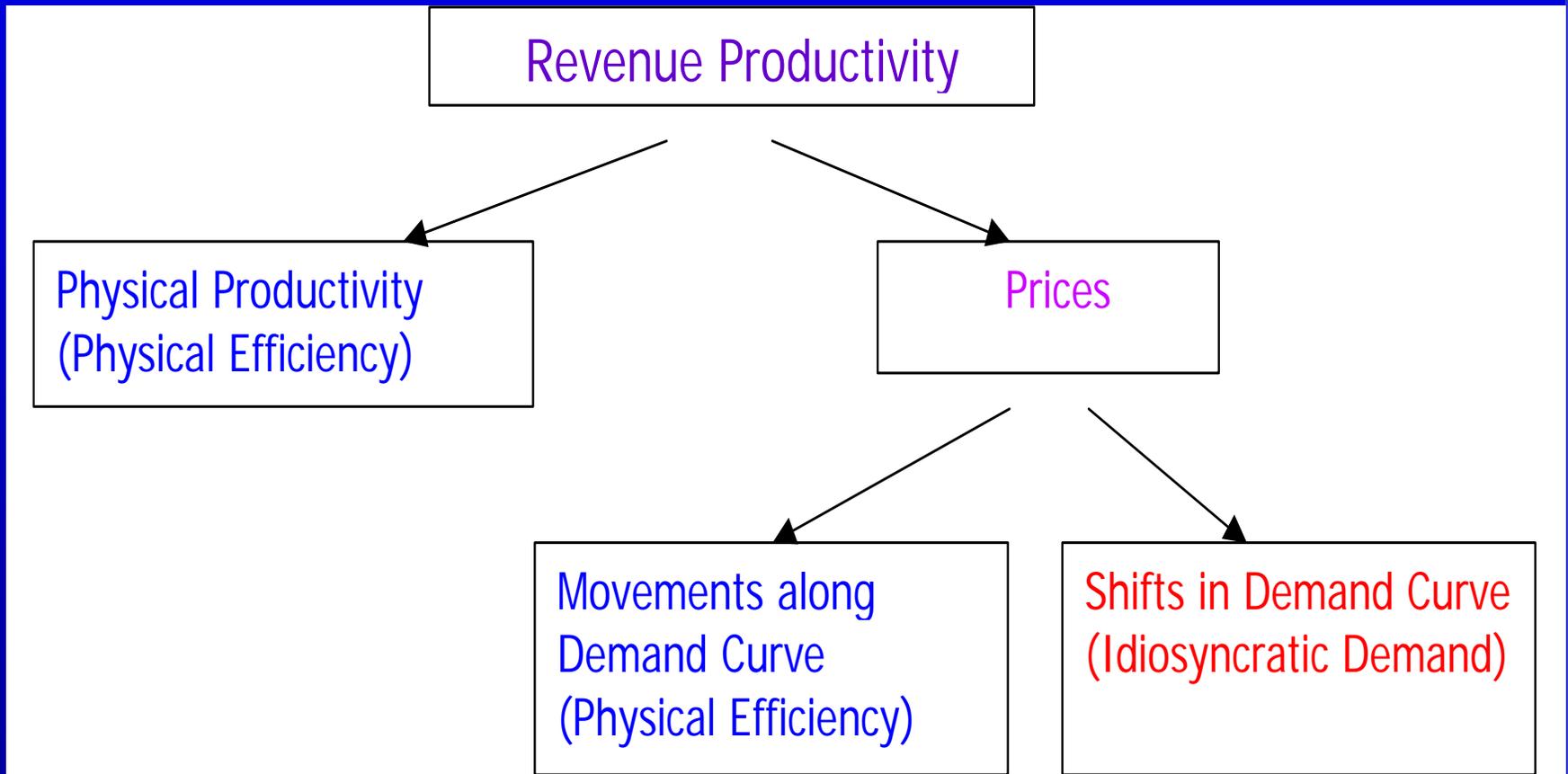
5. Future Work

Motivation: Selection

Existing literature:

- Selection on productivity: Survival of high productivity, exit of low productivity.
- Entrants have lower productivity than incumbents.
- Takes time to learn (technology).

Motivation: Selection



Motivation: Evolution

Evolution of TFP, price, demand after entry.

- Regression of variables of interest with exit, entry, plant age dummies and product-year dummies.

Find that:

- Entering plants have a productivity advantage but young and medium do not.
- Low prices for entrants, prices rise with plant age.
- Demand shocks are lowest for entrants and increase only slowly as plants age.

Motivation: Learning

Results suggest that firms take time to “learn about their market” which raises the following types of questions:

What influences the learning?

- Time alone?
- Experience operating plants?
- Experience producing in the same industry?
- Experience in the same market?

How does the entrant’s experience differ due to learning?

- Entrants of old firms vs entrants of new firms.
- Entrants old firms vs incumbent plants of old firms.

Model

Models that are relevant for us:

- Customer learning. Word of mouth and building customer bases.
- Real option of investment. When there is uncertainty it is wise to start out small and then to preserve the option to grow if things work out.
- Supply side/technological. Physical/managerial constraints make it so that can't grow too fast. The learning is about demand but it is the technology that is inflexible/inertial.

Data and Measurement

- Census of Manufactures (1982-1997)
- Physical quantity/price data available for selected products.
- Product data built up from the trailer files using non-AR, non-BC observations.
- Sample restricted to establishments that produce homogeneous products (11).
- Restrict using primary product rule.
- 17,669 observations.

Measures of TFP

TFPQ (physical) and TFPR (revenue)

- Measured using standard index number approach (output less cost-share weighted inputs):

$$tfp_i = y_i - \alpha_l l_i - \alpha_k k_i - \alpha_m m_i - \alpha_e e_i$$

- Input elasticities α_j are input cost shares computed at industry level.
- TFPQ and TFPR differ only by y .
 - TFPR: y =revenue deflated by establishment price
 - TFPQ: y =physical output

Measures of Demand Shocks

Estimate demand system by product:

$$\ln q_{it} = \alpha_o + \alpha_1 \ln p_{it} + \sum_t \alpha_t YEAR_t + \alpha_2 \ln(INCOME_{mt}) + \eta_{it}$$

Absolute values of elasticities are mostly greater than 1

DSHK= residual from demand eq + estimated income effect

Measures of Experience

- Prior experience (Estab age)
- Related experience (MU status)
- Prior related experience (Firm age)
- Product experience
- Market experience
- Product and market experience

Evolution and Experience (1)

- Expand on FHS specification to include related experience.
- Interact plant age (prior experience) with firm type (related experience):

$$\begin{aligned} \text{TFP}_{it} = & \beta_0 + \beta_1 \text{Exit} + \beta_2 \text{Entry} + \beta_3 \text{Young} + \beta_4 \text{Medium} \\ & + \beta_5 \text{ExMU}_t + \beta_6 \text{EnMU}_t + \beta_7 \text{YnMU}_t + \beta_7 \text{MdMU}_t \\ & + \beta_8 \text{Year}_t + \beta_9 \text{Product} + \beta_{10} \text{Year}_t * \text{Product} + \epsilon_{it} \end{aligned}$$

Results

	TFPQ	Price	Demand
Exit	-0.0197 <i>0.0073</i>	-0.0054 <i>0.0049</i>	-0.3052 <i>0.0321</i>
Entry	-0.0248 <i>0.0074</i>	0.0013 <i>0.0050</i>	-0.5764 <i>0.0323</i>
Young	-0.0273 <i>0.0078</i>	0.0119 <i>0.0052</i>	-0.4439 <i>0.0339</i>
Medium	-0.0317 <i>0.0085</i>	0.0142 <i>0.0057</i>	-0.4268 <i>0.0372</i>
ExMU	0.0053 <i>0.0097</i>	0.0034 <i>0.0065</i>	-0.0721 <i>0.0422</i>
EnMU	0.0655 <i>0.0090</i>	-0.0012 <i>0.0060</i>	0.0342 <i>0.0394</i>
YnMU	0.0572 <i>0.0097</i>	-0.0163 <i>0.0065</i>	0.0811 <i>0.0053</i>
MdMu	0.0489 <i>0.0107</i>	-0.0134 <i>0.0072</i>	0.1923 <i>0.0468</i>

Evolution and Experience (2)

- Adding experience of the firm over time. (interacting establishment age, MU status, and firm age).
- Current preferred: split each of the interacted establishment MU groups (including death) into categories based on firm age. Example: new estabs part of new firm, ..., new estabs part of old firm.
- Coarsened the firm age categories (due to thinness of categories).

Selected Results, Demand

	Deaths	New Estabs	Old Estabs
MU	-0.1831 <i>0.0323</i>	-0.3164 <i>0.0344</i>	
New Firm	-0.1817 <i>0.1129</i>	0.1632 <i>0.0676</i>	
Old Firm	-0.3485 <i>0.0459</i>	0.0914 <i>0.0432</i>	0.5481 <i>0.0270</i>

Selected Results, TFPQ

	Deaths	New Estabs	Old Estabs
MU	-0.0039 <i>0.0074</i>	0.0090 <i>0.0079</i>	
New Firm	-0.0082 <i>0.0260</i>	0.0569 <i>0.0156</i>	
Old Firm	-0.0298 <i>0.0106</i>	0.0851 <i>0.0100</i>	0.0716 <i>0.0062</i>

Future Work

- Experimenting with measures of experience.
- Constructing model consistent with learning about demand.