Discussion of "Consumer Search and Productivity Heterogeneity: Theory and Estimation"

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October 17, 2026

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What this paper is about

Research question

- How do productivity differences change markups and pass-through under search?

Model

- Burdett and Judd (1983) consumer search with productivity heterogeneity
- Free entry and a fixed cost determine which stores operate

Estimation

- Revenue, costs and profits from tax records, 11 Canadian retail industries, 2001–13
- Search and productivity estimated jointly from the spread of revenue/fixed cost

Exercises

- Compare prices and markups with those of a model with homogeneous stores
- Compute pass-through of cost and demand shocks, holding the set of stores fixed

Main findings

Estimates

- Receiving two price quotes is most common; some buyers get only one
- Productivity dispersion in line with estimates for manufacturing

Markups

- U-shaped in store size in most industries, in the model and in the data
- Heterogeneity raises price dispersion and the average markup

Pass-through

- Heterogeneity weakens cost pass-through and strengthens demand pass-through

My discussion

Great paper: learned a lot, and clearly written

- Main contribution: search and productivity estimated jointly from firm accounts
- My discussion: a little exercise with their model + a few suggestions

What I do with their model

- I replicate their estimated model for clothing; it closely reproduces their tables
- Then I lower the one-quote share and, unlike CHL, let stores enter and exit
- And compare with homogeneous stores at CHL's average cost, with entry and exit
- I find that high-cost stores exit: productivity rises, the average markup is flat

My main point:

CHL focus on markups, but with entry and exit,
more search lowers prices through productivity, not markups

Plus some smaller points

Intuition: how search matters for which stores survive

Homogeneous stores (Burdett and Judd)

- Identical stores randomize over prices, so all price differences are markups

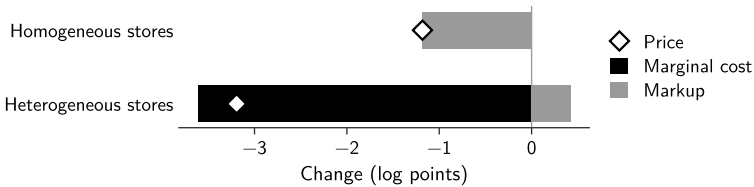
Heterogeneous stores (CHL)

- The highest-cost store sets the highest price, so only one-quote buyers buy there
- Costs differ, so price differences are partly due to costs

One-quote buyers keep high-cost stores alive, raising average cost

My exercise: what if fewer buyers get only one quote?

- One-quote share 18.4% $\rightarrow$ 17.4%; stores can enter and exit All industries
- $\Delta \ln(\text{avg. price}) = \Delta \ln(\text{avg. markup}) + \Delta \ln(\text{avg. marginal cost})$ Definitions



- Homogeneous stores: 14% fewer stores, all with the same cost; cost unchanged
- Heterogeneous stores: 14% fewer, the high-cost ones exit; average cost falls

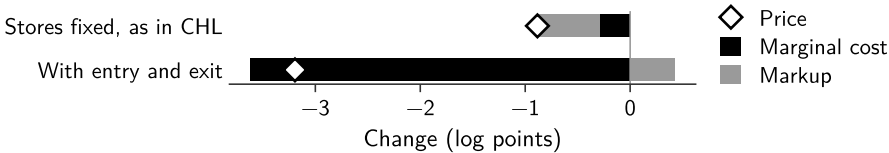
With entry and exit: average productivity +3.7%, average markup +0.4%

Lower prices, nearly the same markup

Why does the average markup barely move with entry and exit?

- With free entry: price = marginal cost + fixed and entry costs per buyer
- So markup = 1 + fixed and entry costs per buyer / marginal cost
- High-cost stores exit: marginal cost falls, which raises the ratio
- Fewer firms enter: entry costs per buyer fall, which lowers it

With entry and exit, the markup rises instead of falling



- **Suggestion 1: report pass-through with entry and exit as well**
- **Suggestion 2: report the effect on productivity and store counts as well**

How big is the productivity gain?

- The productivity gain in my exercise, +3.7%, looks large. What drives it?
- CHL assume the fixed cost per store rises with buyers per store (market tightness)
- That assumption decides how many stores exit, so how big the productivity gain is

Clothing, % change, with entry and exit	**Stores**	**Productivity**	**Avg. markup**
Fixed cost rises with buyers per store, as in CHL	−14.1	+3.7	+0.4
Fixed cost constant per store	−4.0	+1.1	−0.3

- **Suggestion 3: show that fixed costs rise with buyers per store, as assumed**

Smaller points

Search parameters are held constant over 2001–2013

- Online shopping spread in those years, so how much buyers search likely changed
- **Suggestion 4: estimate the search parameters on sub-periods**

Each sub-sector is one national market

- Retail is local: a buyer compares stores in one city, not across Canada
- **Suggestion 5: estimate by region**

Markups are estimated as revenue over cost of goods sold

- Under cost minimization, this is the markup over the output elasticity of COGS
- In their model the elasticity is one; in the data it likely varies across stores
- **Suggestion 6: estimate that elasticity**

My take

CHL's point: when stores differ in costs, search works differently

- Homogeneous stores (Burdett and Judd): all price differences are due to markups
- CHL: costs differ, so price differences are partly due to costs

My point: heterogeneity also changes what entry and exit do

- Homogeneous stores: exit leaves identical stores, so more search lowers markups
- Heterogeneous stores: the high-cost stores exit, so more search raises productivity
- **Suggestions 1–2: report pass-through, productivity and store counts**
- **Suggestion 3: show that fixed costs rise with buyers per store, as assumed**
- **Suggestions 4–6: estimate on subsamples; check the markup measure**

Appendix: measuring markups and productivity

Average markup

- $M = \left(\sum_i s_i/m_i\right)^{-1} = \bar{p}/\bar{c}$, with store markups $m_i = p_i/c_i$ and revenue shares s_i

Average productivity

- $\bar{z} = \left(\sum_i t_i/z_i\right)^{-1} = \phi/\bar{c}$, with $c_i = \phi/z_i$ and quantity shares t_i
- ϕ: the common price of variable inputs
- Output over variable inputs; it leaves out fixed and entry costs

Both

- $\bar{p}$ and $\bar{c}$: average price and marginal cost over all units sold

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Appendix: productivity and markups, all 11 industries

One-point fall in the one-quote share, with entry and selection (changes in %).

	Price	Productivity	Avg. markup
Electronics	-5.1	5.5	+0.13
Health	-4.2	4.6	+0.22
Miscellaneous	-3.6	4.1	+0.37
Clothing	-3.1	3.7	+0.42
Furniture	-2.8	3.1	+0.21
Sporting goods	-2.6	2.9	+0.18
General merchandise	-2.0	2.1	+0.05
Building materials	-1.3	1.4	+0.04
Gasoline	-0.4	0.4	+0.00
Food	-0.4	0.4	+0.00
Motor vehicles	-0.2	0.2	+0.00

Definitions

Productivity rises where prices fall; the average markup moves by under 0.5%

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References

Burdett, Kenneth, and Kenneth L. Judd. 1983. "Equilibrium Price Dispersion." *Econometrica* 51 (4): 955–969.