

# Market Structure and Competition, Redux

Steven Berry

FTC Micro Conference November, 2017

## How Should Empirical IO Respond to the Exploding Interest in Competition and Market Structure?

These ought to be heady times for empirical IO economists. One of our signature issues, the level and nature of markups, is at the heart of much policy debate, in the press, in policy papers and in academic research.

One can see the CEA report on competition, many popular press pieces, claims by Stiglitz, the debate over “hipster anti-trust,” etc.

## So Far, the Empirical Response is Largely from Non-IO Researchers

Many empirical IO papers have little to say about “aggregate” or average economy-wide levels of competition.

As a result, much research is being done by non-IO economists (Macro, Trade, etc.)

To varying degrees, these papers by non-IO economists recreate various aspects of the old, supposedly discredited, [Structure-Conduct-Performance](#) “paradigm,” which was intended to answer exactly these kinds of questions.

Example: Autor, et al, on technology, labor share and concentration cites Demsetz (1973), “Industry Structure, Market Rivalry and Public Policy,” but (I think) cites empirical work by current members of the NBER IO program only in reference to the modern literature on productivity estimation.

# The New S-C-P and Empirical IO

How are we to think about the New S-C-P? Do we

- ▶ ignore,
- ▶ critique,
- ▶ improve,
- ▶ or propose alternatives?

## S-C-P, original generation

- ▶ **Broad question:** the causal effect of “market structure” (mostly, “concentration”) on outcomes (markups or prices or profits).
- ▶ **Method:** cross-industry OLS regression of (say) Herfindahl index,  $H$ , on accounting measures of markups (Lerner Index) and/or profits, and/or other market outcomes with controls for cross-industry differences.

# Own-Time Critiques of S-C-P

Schmalensee (1989), Bresnahan (1989)

- ▶ “Chicago:” **theoretical endogeneity** of market shares, concentration and markups. Low cost → high share and high concentration with high markup even with a not-high price.
- ▶ Everyone: accounting data are terrible and there can be no cross-industry measure of price.
- ▶ Many: there is **no single cross-industry theory of markets** to guide us in cross-industry study.
- ▶ L. Weiss (and others): **econometric endogeneity** of shares and Herfindahls: what are possible IVs / what is **excluded**?

# DEIO

One solution: Bresnahan's "NEIO" single-industry studies, with carefully measured data, theory tied to the market and (eventually) clear analysis of endogeneity, identification and instruments.

This is now the **Dominant Empirical IO** paradigm. It says nothing (can say nothing?) about economy-wide trends, etc.

**Common Criticism:** While Macro/Trade studies THE ECONOMY, IO studies the price of Yogurt.

Truthfully, IO has added markets for Health, Education, Environment, in addition to Anti-Trust, etc.

But still little aggregate.

## SCP Redux

Macro, Trade & Finance economists are often still happy to regress outcomes on  $H$ .

The first two (alphabetical) references in the 2016 CEA report on competition are a regression of “innovation” on  $H$  and  $H^2$  and a regression of price on modified (for cross-ownership)  $H$ . Autor, et al, and many other examples.

Studies with some features of SCP are driving much of the debate. They use [cross-industry data](#) and/or [accounting data](#) and/or [concentration](#) and/or [markups](#) (without price) and often treat market structure as [exogenous](#), or use *ad hoc* instruments for market structure.



# Straight-Up SCP is Still Pretty Hopeless

There isn't a shortcut around demand/cost/equilibrium

Think of a well-measured regression of price (or markup) on  $H$ . What is this? It's not demand and it's not supply. It must be a FOC from an oligopoly model, which therefore includes both demand and cost shifters.

What could possibly be **excluded** and yet correlated with  $H$ ?

Maybe changes in pure fixed costs? Exogenous merger policy? Is there any cross-sectional variation in these IVs?

More fundamentally, there isn't any model with an "effect of  $H$ ," it is always a joint outcome. (In a symmetric firm model, there is sometimes an "effect of  $N$ ").

The Macro/Trade folks do not seem to be solving this.

# The “Causal Effect” of Competition on Price

What IV is excluded?

Chicago meets Bresnahan via Cournot à la Cowling and Waterson.

$$p_m - mc_m = \beta_m s_{jm}$$

with  $mc_{jm} = w_{jm}\gamma_1 + \gamma_2 q_{jm} + \nu_{jm}$  and  $\beta_m$  the inverse semi-elas, so

$$p_m = \beta_m s_{jm} + w_{jm}\gamma_1 + \gamma_2 q_{jm} + \nu_{jm}$$

The “Chicago” issue is that (conditional on  $N$ ) high share comes from low cost, so what is the “effect of share”, does that even make sense. The Bresnahan issue is that quantity/share enters the FOC through both terms associated with demand and supply.

## Aggregating to “Concentration”

A simple market average gives

$$p_m = \beta_m \frac{1}{N_m} + \bar{w}_m \gamma_1 + \gamma_2 \frac{Q_m}{N_m} + \bar{v}_m$$

S-C-P folks noted that true  $N$  is hard to see (many small firms),  $\bar{w}_m$ , average cost shifter is hard for the same reason. But  $N$  may be “less correlated” with cost unobservable?

A share weighted average gives

$$p_m = \beta_m H_m + \tilde{w}_m \gamma_1 + \gamma_2 Q_m H_m + \tilde{v}_m$$

This a classic motivation for  $H$ , but all the problems are here:  $H$  shows up in two places and everything is a share-weighted average while shares are endogenous. The share-weight cost shock  $\tilde{v}_m$  is moving almost mechanically with  $H$ . “Chicago” is still here, so clear “effect of  $H$ .”

Doesn't get easier with product differentiation, etc. Together with measurement and theory, this is why the field gave up on this approach.

## Descriptive Regressions with Concentration

- ▶ Descriptive regressions involving market structure avoid the need for IV, and seem more straightforward, although it is often hard to avoid a causal interpretation.
- ▶ Some authors are more careful to say that they are measuring pure correlation, with price and concentration responding to some third variable. Maybe, though, we should be studying that variable directly.

## Possible Non S-C-P Approach: Production Markups

Nice Example: De Loecker and Eeckhout (2017)

Here,

- ▶ accounting data, so can do cross-industry studies
- ▶ Aim for the Macro markup,  $p_m/c_{jm}$ , without using demand data and without imposing an equilibrium assumption

Still,

- ▶ Accounting data is ... not very good.
- ▶ “Chicago” calls from 1975 to say that high markups might just be low cost.

# The Hall-De Loecker Markup

Pure cost-minimization on a variable input

$$w_{jmt} = \lambda \frac{\partial F_{jmt}}{\partial L_{jmt}} = mc_{jmt} \frac{\partial F_{jmt}}{\partial L_{jmt}}$$
$$\frac{w_{jmt} L_{jmt}}{p_{jmt} q_{jmt}} = \frac{mc_{jmt} L_{jmt}}{p_{jmt} q_{jmt}} \frac{\partial F_{jmt}}{\partial L_{jmt}}$$

$$\frac{[\text{input elasticity}]}{[\text{input revenue share}]} = \frac{p_{jmt}}{mc_{jmt}}$$

Markup is a technology-adjusted cost share. Key question for looking at markups over time/firm is whether we have captured all production-elasticity heterogeneity. De Loecker and Eeckhout use a translog, allowing for some heterogeneity. Enough?

## Production Methods, cont

The markup is revealed via accounting data + an estimate of the input elasticity. There are no good IVs, so use a “control variable” (materials?) + dynamic panel data assumptions to learn  $\beta_{jmt}$ .

Markup is a residual (a quasi-dual to  $mc$  in DEIO), so as usual there is a problem if  $\beta_{jmt}$  has un-modeled or mis-measured heterogeneity.

On the other hand are the advantages of cross-industry data, no reliance on oligopoly behavior, etc.

This seems like a good complement to DEIO, though without ever addressing the “Chicago” question. No reason the approaches have to be separate, could be combined (De Loecker and Scott).

# De Loecker and Eeckhout (2017) “The Rise of Market Power”

Findings: (summer 2017):

1. Sharp increase in Markup since 1980: 42%
2. High markup firms tend to be smaller
3. Only in the upper half of Markup distribution (espec. at top)
4. Mostly within industry (in all; no particular industries)

They say markup changes are correlated with accounting profits (net of intangibles) and so are “market power.”

Is it surprising that these are smaller firms? Maybe specialized? Or could this be production heterogeneity?



## Another non-S-C-P Idea: DEIO on Big Industries or Sectors

Another idea is moving toward more aggregate conclusions via a large but finite number of DEIO-like studies, which may themselves require some compromises.

What are some big sectors that would work? We have IO workhorses, health, supermarkets, cars, airlines, online markets, cement, *etc.*. Is there any way to summarize within and between markets? Better candidates?

Example: Ganapati (2017) on the US wholesale sector using Census of Wholesale data.

## Ganapati (2017) “Modern Wholesaling”

There is some feeling that large buyers (Walmart) are disintermediating the wholesale sector.

In fact, wholesale sector is

- ▶ growing,
- ▶ with fewer but larger firms,
- ▶ with many domestic locations,
- ▶ offering an increasing variety of products,
- ▶ that often source both domestically and internationally
- ▶ accounting markups are growing,
- ▶ as is IT spending.

## Ganapati (2017) continued

Methods are simple DEIO:

- ▶ Nested Logit demand from manufacturers for domestic and foreign-sourced wholesaling, outside option is direct purchase. Demand is shifted by geography, product variety, product source and manufacturer size.
- ▶ Price-setting Nash by wholesalers, uncovers marginal cost (also some accounting cost data).
- ▶ A rough free-entry model, with variety and foreign-sourcing as endogenous choices. Demand and marginal costs shocks not known at the time of entry, “solving” some endogeneity problems.

## Ganapati, continued

The model's parameters naturally yield an interpretation of the facts (close to a model-based decomposition):

Increasing demand for wholesaling, although not from the largest firms, and increasing demand for foreign sourcing and for wholesalers with national footprint. Decreasing marginal costs and increasing fixed costs. Together, demand up and cost down drives up markups and firm size, without markups being competed away.

Is this the result of IT and Trade?

Normative analysis is tough, not clear that “policy” or anti-trust is driving this.

## Some Very Tentative Conclusions

- ▶ If we ignore the New Macro S-C-P, it will generate “answers” for policy-makers, whether we think they make sense or not.
- ▶ Data issues (etc.) aside, Classic S-C-P still has the problem that without a cost-demand-equilibrium model, there is no way to motivate identification in the face of endogenous market structure.
- ▶ Production methods are a complementary approach to DEIO that can make use of (ahem) accounting data and think about aggregate trends, but will never get at the “Chicago” question of efficiency v. high prices.
- ▶ Maybe the dominant paradigm can raise its sights to closer-to-aggregate questions? May require some “ugly” compromises, but maybe not as ugly as some alternatives.

## “Modern” Markets

How common is the case of IT (and/or Trade and/or Big Data and/or ...) driven changes involving

- ▶ lower marginal costs,
- ▶ better products / better variety / better network
- ▶ better revenue management / marketing / regulatory arbitrage
- ▶ higher fixed costs (maybe endogenous fixed costs),
- ▶ leading to higher margins and variable profits
- ▶ fixed costs limit entry

Online markets, airlines, wholesaling, ...?

## Implications of “Modern Markets”

**Normative analysis** is tough. As an example, Berry (1993) suggested that airline networks increase demand (both via convenience and “marketing”), decrease *mc.* markups go up but net effect on consumers is not immediately clear. It seems that maybe DEIO could answer this one, with relevance for anti-trust.

**Distributional Effects** are almost never studied in IO, but this is a big part of the “policy demand” for concentration studies. Autor, et al, “superstar firms” comes close to this, albeit in the end regressing labor share on concentration.

Can we do better?