Entry and Employment Dynamics in the Presence of Market Power

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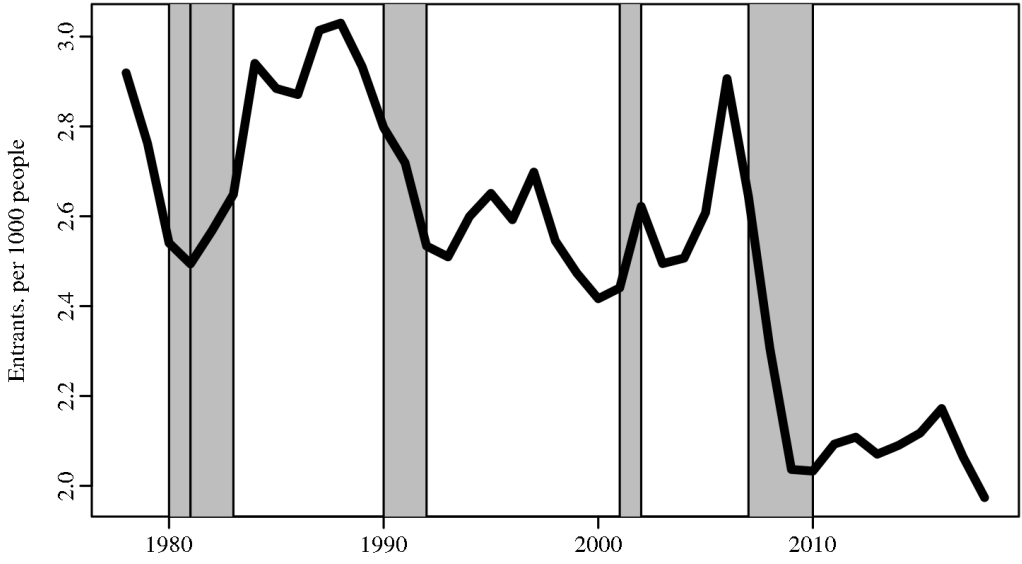
September 1, 2022

[1]The views expressed in this paper are solely those of the author and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or any other person associated with the Federal Reserve System.

Introduction



Introduction

The decline in business formation during the Great Recession accompanied a large and persistent contraction in employment.

Existing work shows empirically and theoretically that declines in business formation can generate persistent falls in employment.

This paper shows that the link between business formation and employment depends crucially on market structure.

Effects are **significantly larger** if firms' market power varies with size.

Method: GE firm dynamics model with two ingredients:

- Variable markups
- Labor adjustment frictions

Introduction

Main Findings:

1. Falling entry leads to a large employment contraction
   - Incumbent market shares rise
   - Their markups vary with market share
   - Generates a large employment contraction

2. Variable markups + labor adjustment costs are both key
   - Because entrants are small, need variable markup response of incumbents.
   - Variable markups have 2 offsetting effects
     - generate incumbent response ($\mu \uparrow$)
     - imply reallocation to low-markup producers ($\mu \downarrow$)
     - Adjustment costs slow growth of small producers ($\mu \uparrow$)

Literature

So far: large effects with homogeneous firms, but not with heterogeneity

1. **No pro-competitive effects**:
   e.g., Clementi and Palazzo (2016), Lee and Mukoyama (2018)
   - Entrants are small relative to incumbents, $\downarrow$ entry lengthens recessions

2. **Potential pro-competitive effects**
   e.g., Jaimovich and Floetotto (2008) and Bilbiie, Ghironi and Melitz (2012), Edmond, Midrigan and Xu (2018)
   - Large effects in homogeneous firms models, tiny effect with heterogeneity

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This paper: a model with heterogeneity **and** significant aggregate effects.

Model: Overview

Heterogeneous producers

- Face demand curve with variable elasticity
- Labor adjustment costs

Entry & Exit

- Exogenous exit (endogenize, for robustness)
- Free entry

Household

- Supplies labor, consumes final good, owns all firms
- Final goods production function gives rise to demand curve

Quantifying the model: How variable are markups?

Estimate model using simulated method of moments:

- Choose super-elasticity jointly with adjustment cost + 4 other parameters
- Estimation strategy motivated by production function approach.
  See: Hall (1986, 1988), De Loecker and Warzynski (2012), De Loecker et al (2018)

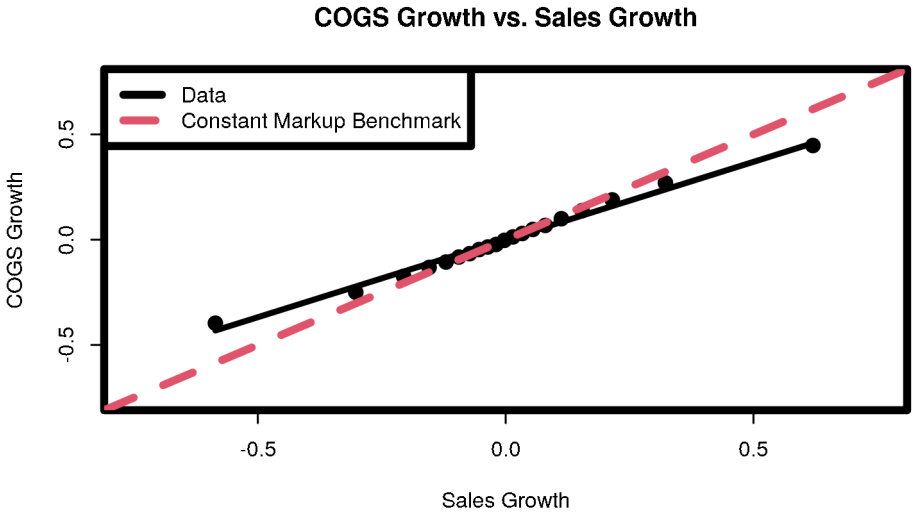
$$\Delta \log COGS_{ift} = \alpha_{it} + \underset{(0.002)}{0.654} \times \Delta \log PY_{ift} + \epsilon_{ift}$$

- Adj. cost pinned down by employment growth autocorrelation

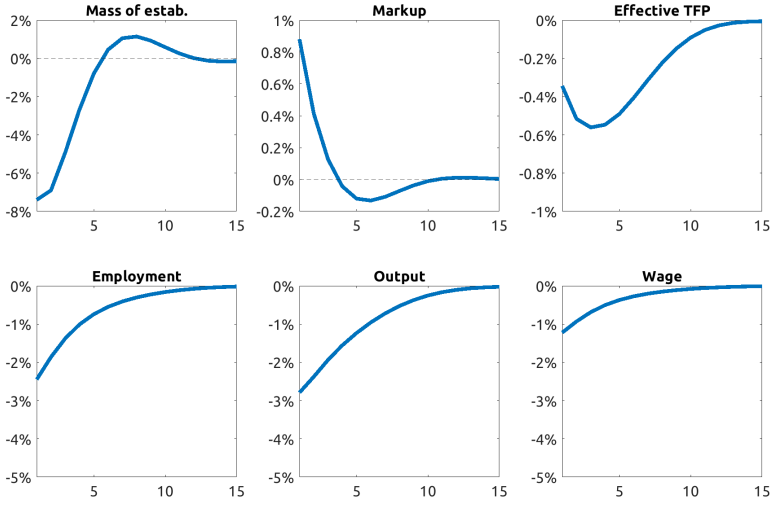
My approach addresses shortcomings of production function method.
See: Bond et al (2020)

- Allows me to estimate variable markups in the presence of adjustment costs
- Avoids (mis-)measurement of output elasticities

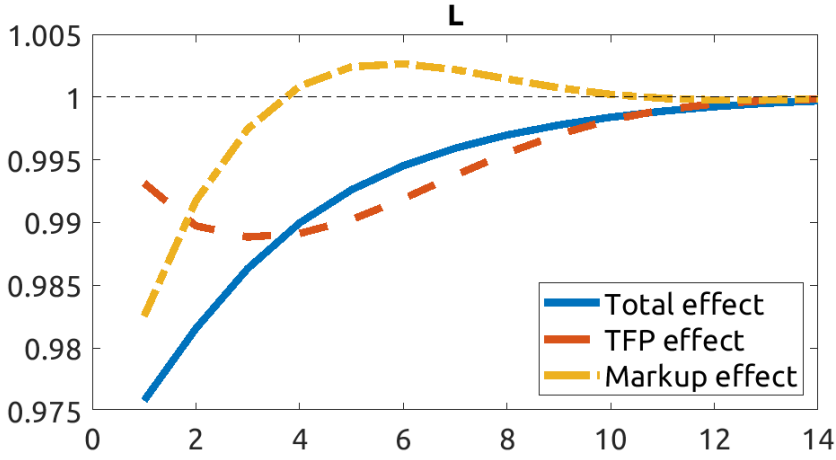
How variable are markups?



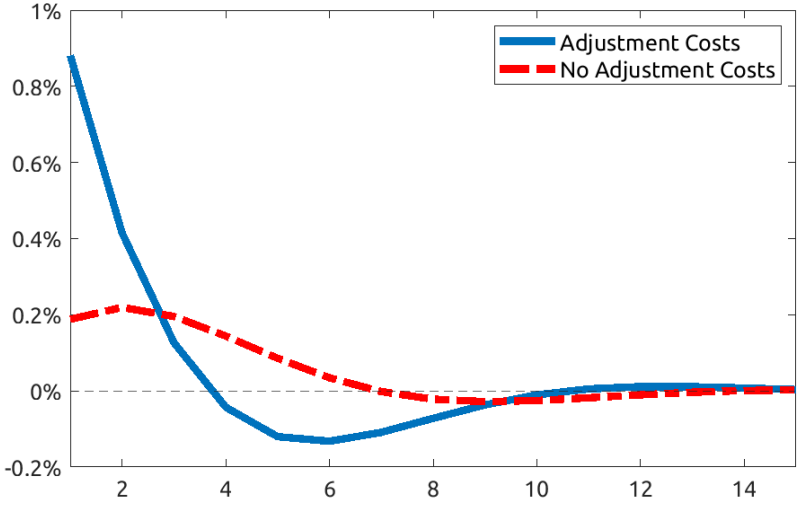
Entry shock response



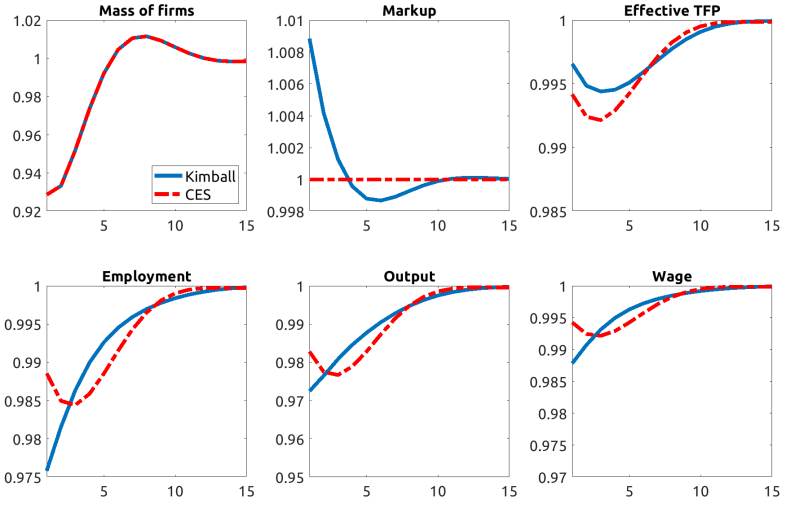
Entry shock response



The role of adjustment frictions



CES + No Adjustment costs



Conclusion

Entry matters in a model with variable markups + adjustment costs

- Mechanism: incumbents increase markups
- Leads to a rise in the aggregate markup and a fall in TFP
- Doubles employment effects of a shock to entry relative to constant elasticity benchmark
- Interaction between adjustment cost and variable markups is key

Kimball demand details

The final goods production function is

$$\int_0^{N_t} \Upsilon(y/Y) = 1$$

I use the Klenow Willis (2016) specification:

$$\Upsilon(q) = 1 + (\sigma - 1)\exp\left(\frac{1}{\epsilon}\right)\epsilon^{\frac{\sigma}{\epsilon}-1}\left[\Gamma\left(\frac{\sigma}{\epsilon}, \frac{1}{\epsilon}\right) - \Gamma\left(\frac{\sigma}{\epsilon}, \frac{q^{\epsilon/\sigma}}{\epsilon}\right)\right]$$

where $\sigma > 1$ and $\epsilon \geq 0$ and where $\Gamma(s, x)$ denotes the upper incomplete Gamma function:

$$\Gamma(s, x) = \int_x^{\infty} t^{s-1}\epsilon^{-t}dt$$

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Model fit

Moment	Target	Source	Model moment
$\text{Var}(\Delta \log L))$	6.17%	Compustat	5.82%
$\text{Var}(\Delta \log PY))$	14.15%	Compustat	13.4%
$\rho(\Delta \log L_t, \Delta \log L_{t-1})$	0.13	Compustat	0.14
$\rho(\Delta \log P_t Y_t, \Delta \log P_{t-1} Y_{t-1})$	0.12	Compustat	0.12
Labor–sales regression	0.654	Compustat	0.628
Average size of entering estab	50%	CP	0.526%
Top 10% share of sales	75%	Compustat	69%
Frac. rel. sales. below 1	79%	Compustat	80%
Cost–weighted average markup	1.25	DLE	1.2645
Share of employment at young producers	30%	BDS	32.9%

DLEU: De Loecker et al (2019), CP: Clementi and Palazzo (2016)
Untargeted moments below line

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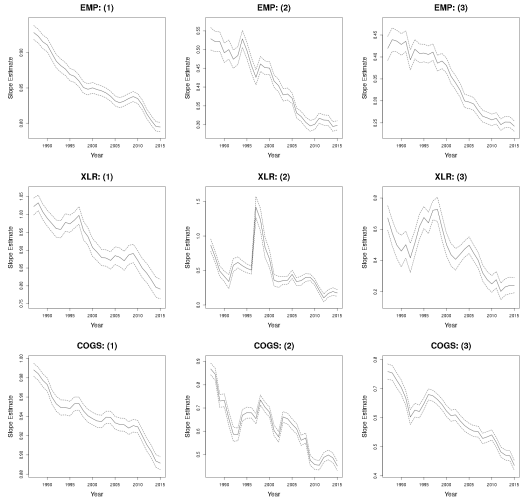
Fact 2 table

Dependent variable	log PY		
	(1)	(2)	(3)
log EMP			
1986–1990	0.888	0.585	0.483
	(0.002***)	(0.005***)	(0.005***)
2010–2014	0.802	0.312	0.250
	(0.002***)	(0.0.005***)	(0.005***)
log XLR			
1986–1990	0.926	0.57166	0.468
	(0.005***)	(0.015***)	(0.016***)
2010–2014	0.812	0.222	0.261
	(0.001***)	(0.025***)	(0.021***)
log $COGS$			
1986–1990	0.970	0.810	0.786
	(0.001***)	(0.005***)	(0.004***)
2010–2014	0.900	0.466	0.486
	(0.003***)	(0.008***)	(0.007***)
Specification	Log levels	Log levels	Log difference
Fixed Effects	Industry × Year	Firm + Industry × Year	Industry × Year

Fact 2 figures



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Full table 1

Dependent variable	log *PY*		
	(1)	(2)	(3)
log *EMP*	0.8384	0.6275	0.356
	(0.0009***)	(0.0016***)	(0.0137***)
log *XLR*	0.8983	0.6716	0.4266
	(0.003***)	(0.007***)	(0.007***)
log *COGS*	0.9263	0.783	0.654
	(0.0007***)	(0.002***)	(0.002***)
Specification	Log levels	Log levels	Log difference
Fixed Effects	Industry $\times$ Year	Firm + Industry $\times$ Year	Industry $\times$ Year

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How does rising market power affect business cycles?

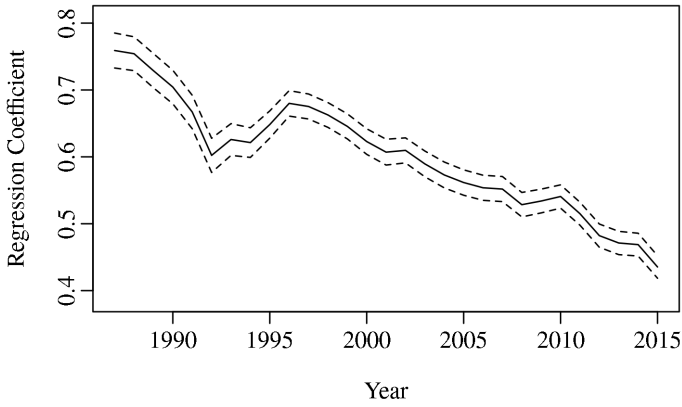
Lots of recent research into rising markups and market concentration

- How has firm behavior changed over time?
- Recall the regression I ran earlier:

$$\log WL = \tilde{\alpha} + \beta \log(PY) + \epsilon$$

- Estimate using 5-year rolling windows

How does rising market power affect business cycles?



More specifications

Implication for labor dynamics

Cross-sectional variance in growth rates is a measure of *reallocation*

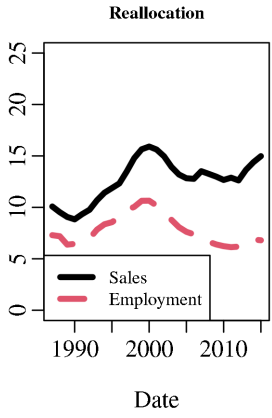
$$Var(\Delta \log X_{ift})$$

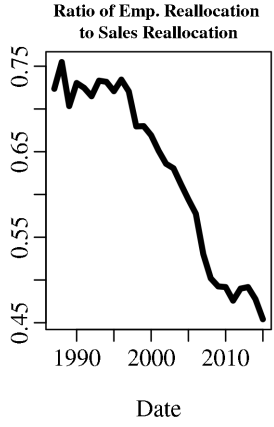
Returning to the estimating equation:

$$\underbrace{\text{Var}(\Delta \log PY)}_{\text{Sales reallocation}} = \underbrace{\text{Var}(\Delta \log WL)}_{\text{Labor reallocation}} + \underbrace{\text{Var}(\Delta \log \mu) + 2\text{Cov}(\Delta \log \mu, \Delta \log L)}_{\text{Markup variation}}$$

Rising markup-size relationship drives a wedge between sales and labor reallocation

Implication for firm dynamics





The rise in markup-revenue elasticity

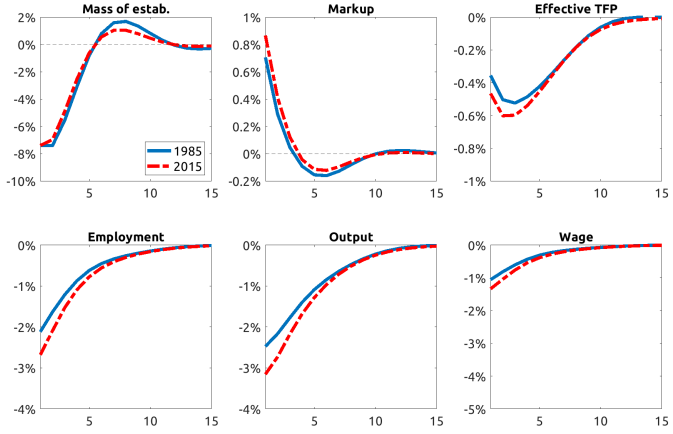
Superelasticity directly affects this regression.

Calibration	ϵ/σ	β_L	$\sigma(\Delta L)/\sigma(\Delta PY)$	Cost-weighted markup
1985	0.45	0.77	61%	1.24
2015	0.72	0.46	28%	1.26

Procedure:

- Choose ϵ/σ to match regression coefficients in 1985 and 2015.
- Generates a fall in β_L and in labor reallocation relative to sales reallocation
- Cost weighted markup rises by 2 percentage points

How does rising market power affect business cycles?



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