

Increasing Markups and the Concentration of Market Shares

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Motivation

- Increasing markup ($\frac{Price}{Marginal-cost}$) in the US economy over the 4 last decades. (debate on the magnitude : micro vs macro estimation).
- Increasing in market shares concentration by the largest firms (superstars) across industries.
- Causes :
 - ▶ Change in the market structure (fall of entry, merges and acquisitions).
 - ▶ Technological change \implies Reallocation of market share from low to high markup firms.
- This paper, I analyse the causes of the rise of markup in US economy and the role of the superstars firms.
 - ▶ Estimate US markup based on aggregation and quantify the role of superstars firms.
 - ▶ Propose a model that explains the role of fixed cost share as driving cause of US markup.

Previews of Findings

- Link macro and micro estimation of markup based on aggregation :
 - ▶ Aggregate markup is sales weighted harmonic of firm's level markup.
 - ▶ US markup raises 13 pp over the 4 last decades and is not associated with the recent increase in sales concentration.
- Empirical facts :
 - ▶ The largest sales (superstars) firms are distributed at average markup and have low markup relative to the non stars firms \implies Sales concentration has slowed markup growth by 2 pp.
 - ▶ Reallocation of sales share explains 70% of the increase in markup driving by a joint increase in the correlation between markup and sales and an increase in the firm's level markup.
- Rise of fixed cost share :
 - ▶ Model of customer base formation explain the joint distribution between markup and sales share.
 - ▶ Increasing in fixed cost share explains half of the overall growth in markup.

Estimation strategy

- De Loecker and Eeckhout (2017) framework :

$$\min_{c_i, k_i} p^c c_i + r k_i \quad s/c \quad y_i(a_i, k_i, c_i) = a_i k_i^{\alpha_j} c_i^{\beta_j} \leq y_i \quad (1)$$

$$\mu_i = \beta_j \left(\frac{p^c c_i}{p_i y_i} \right)^{-1} \quad (2)$$

- Aggregate industry markup is defined as the degree of monopoly power that will have a representative firm by industry.
- CES aggregation of output imply : $Y_j = A_j K_j^{\alpha_j} C_j^{\beta_j}$

$$\min_{C_j, K_j} p^c C_j + r K_j \quad s/c \quad A_j K_j^{\alpha_j} C_j^{\beta_j} \leq Y_j \quad (3)$$

$$\mu_j^{-1} = \int_{i \in j} \omega_i \mu_i^{-1} di \quad (4)$$

Markup and Sale Concentration Trends

- Dataset : Computstat from 1980-2014.
- Superstars : 4 largest firms by industry (sic 3 digits).

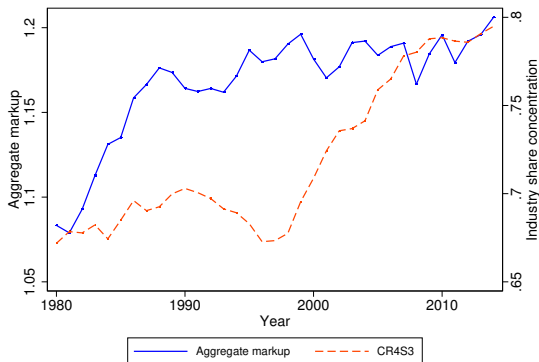


Figure: Aggregate markup and markup concentration trends

Joint distribution of sales and markup

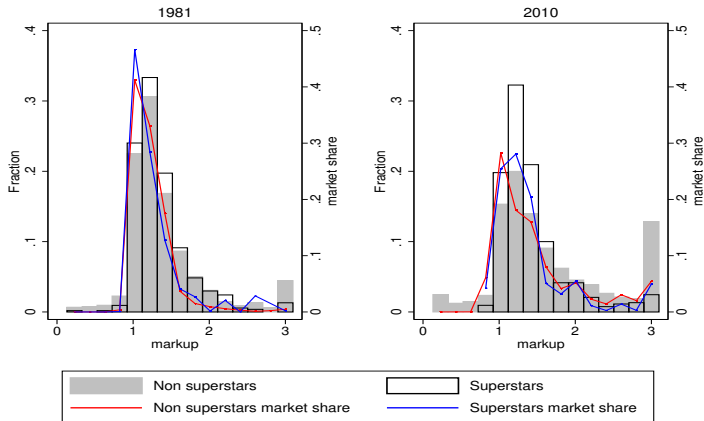


Figure: Joint distribution between sales and markup

Effect from sales concentration : Back of the envelop

- Back of the envelop : Increasing in sales concentration has slowed the markup growth by 2 pp \implies A simple shift of sales share (especially the sales concentration in 2000) cannot explain the increase in US markup.

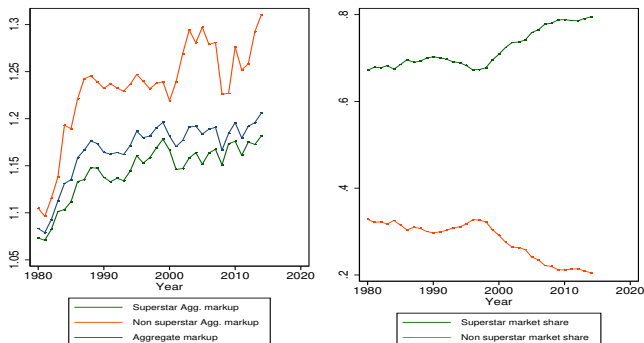


Figure: Markup and market share trend for superstars and non superstars

Accounting Growth Decomposition

$$\Delta\mu_t^{-1} = \underbrace{\sum_{i \in S} \omega_{it-1} \Delta\mu_{it}^{-1}}_{\text{Within}} + \underbrace{\sum_{i \in S} \mu_{it-1}^{-1} \Delta\omega_{it}}_{\text{Between}} + \underbrace{\sum_{i \in S} \Delta\omega_{it} \Delta\mu_{it}^{-1}}_{\text{Cross}} + \underbrace{\sum_{i \in E} \omega_{it} \mu_{it}^{-1} - \sum_{i \in X} \omega_{it-1} \mu_{it-1}^{-1}}_{\text{Netentry}}$$

Table: FHK markup's growth decomposition

	Growth	Within	Reallocation	Reallocation		
				Between	Cross	Netentry
1980-1989	9.84	4.43	5.41	-11.58	28.76	-11.77
1990-1999	2.14	-0.26	2.40	-9.73	26.68	-14.55
2000-2010	0.11	-0.45	0.56	-25.00	23.58	1.99
2010-2014	2.41	0.91	1.50	-8.93	11.33	-0.90
Total	3.56	1.06	2.50	-15.07	24.42	-6.86
Contribution	100.00	29.79	70.21			

Cause : Rise of fixed cost share

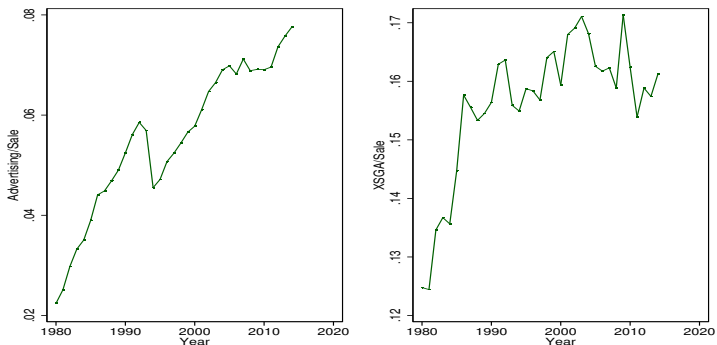


Figure: Trend in advertising and SG&A to sales share

Model : Set-up

- GE model of industry dynamic (Hopenhayn (1992)).
 - ▶ Heterogeneous firms (i) in productivity.
 - ▶ Firms pays a fixed cost to build customer base (b_t).
 - ▶ Customer base is formed through deep habit \Rightarrow Endogeneous markups.
 - ▶ Selection : Endogeneous entry and exogeneous exit.
- Representative consumer :

$$\begin{aligned} \max_{(C_{it})_i} C_t &= \left[\int_i (c_{it} b_{it-1}^{-\theta})^{(1-1/\eta)} di \right]^{1/(1-1/\eta)} \\ s/c \quad \int_i p_{it} c_{it} di &= \omega_t + D_t \end{aligned} \tag{5}$$

Model

- Firm problem :

$$\begin{aligned}v(a, b) &= \max_{d, p, y, s'} \{ \pi + (1 - \bar{s})\beta \int v(a', b') dG(a'|a) \} \\ \pi &= py - \omega n - \varphi py \\ y &= an^\alpha \\ y &= p^{-\eta} b^{\theta(1-\eta)} R \\ b' &= (1 - u\delta)b + u\delta(\varphi py) \\ \ln(a') &= (1 - \rho) \ln(a) + \sigma \varepsilon'\end{aligned} \tag{6}$$

- New entrant firm :

- ▶ Draws productivity a_0 and customer base b_0 next acts like an incumbent.
- ▶ Free entry condition : $V_{out} = \int v(a, s) dM(b_0) d\tau(a_0)$.

Model

- Firm trade-off : with $(\hat{\mu} = \bar{\mu} \frac{1}{1-\varphi})$

$$(\mu^{-1} - \hat{\mu}^{-1}) = (1 - \bar{s})\beta E \left((1 - \delta)(\mu'^{-1} - \hat{\mu}^{-1}) - u\delta\varphi\theta \frac{p'y'}{b'} \bar{\mu}^{-1} \mu'^{-1} \right)$$

- The largest firms (most productive with a large customer) are not the highest markup firms because conditional on customer capital, they exploit their low marginal cost to invest more in customer capital, leading to a low markup.
- Increasing in fixed cost share reduces the marginal revenue that raises the firm-level markup but also increases the expected long-run gain from customer base accumulation which reduces the firm-level markup.
- The average effect depend on the distribution of firm over the states variables.
- Define a stationary equilibrium and calibrate the model for 1980 US economy.

Simulation

Table: Increasing in fixed cost share (in % change)

Moment	Data	Benchmark	Increase in φ (0.04 pp)
Output		1	0.867
wage		1	0.6571
TFP		1	0.867
Entry rate	0.0727	0.0727	0.0727
Aggregate markup	1.0807	1.0901	1.1499
Markup by top sale (1%)	1.0218	1.0453	1.1062
Sales share by top sale (1%)	0.3955	0.3061	0.4011
Correlation(markup,sales)	0.0285	0.1287	0.1502

Conclusion

This paper :

- Reconcile micro and macro estimation of US markup by showing that aggregation matter.
- Shows that the largest firms (superstars) don't have the highest markup and the recent rise in sales concentration does not necessarily result from the rise markup but has slowed markup growth.
- Shows that reallocation explains 70% of the overall increase of markup but result from the joint growth in the correlation between markup and sales and firm's level markup.
- Quantify the contribution from the rise of fixed cost share to the increase of markup. That change in fixed cost share explains half of the overall increase in aggregate markup.