Market Polarization and the Phillips Curve

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Banco de España

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Gita Gopinah (Feb 2021, IMF):

"... Another structural trend over recent decades is the dominance of market share by firms with high profit margins. This has allowed these firms to absorb higher costs without raising prices...

This crisis could likely increase the market share of such firms, as smaller firms have been harder hit than large businesses by the pandemic-related downturn. . . ."

Introduction

AIM OF THE PAPER:

- The Phillips Curve has flattened out over the last decades, while there has been an increase in industrial polarization.
- We develop a model that rationalizes the flattening of the PC as the result of the observed increase in polarization in many industries.

Structure of the presentation:

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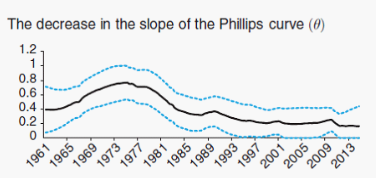
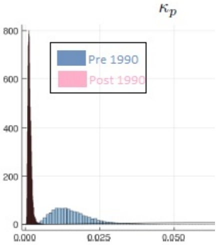
Stylized facts I:

Weaker inflation-activity link due to a flatter Phillips Curve

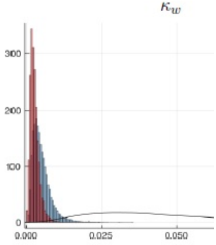
The relationship between inflation and activity has weakened since 1980s.



Blanchard (2016)



slope price PC



slope wage PC

due to a **flatter price PC, not** to flatter wage PC (Del Negro et al (2020)).

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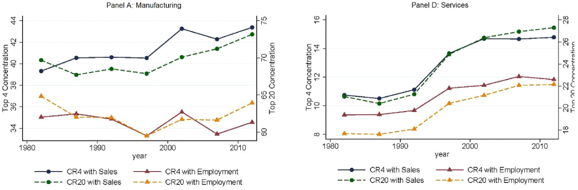
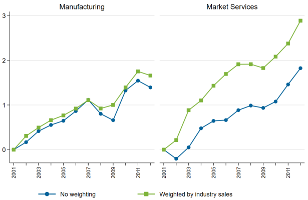
Stylized facts II:

Increase in concentration

Increase in concentration, stronger in output than employment.





US, Autor et al (2020) EU, Bajgar et al (2019)

Covarrubias et al (2019) show this is due to:

"good" factors: technological innovation, higher competition,

"bad" factors: higher entry barriers.

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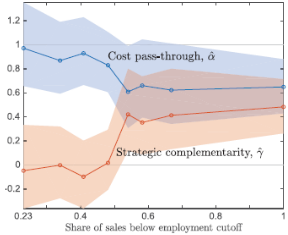
Passthrough of shocks to prices is weaker in larger firms

Amiti et al (2019, RES) find significant strategic complementarities & substantial heterogeneity:

- **Small firms exhibit NO strategic compl. & 100% pass-through**.

- **Large firms exhibit strong strategic compl., with 50% pass-through**.



Preview of results

- The model is consistent with the stylized facts.
- TFP heterogeneity plus Bertrand pricing means that most efficient firms get a larger market share, face a lower price elasticity of demand and are more able to absorb shocks through their mark-ups.
- This mechanism flattens the Phillips Curve.
- A rise in polarization (TFP/competition) flattens the PC further.

Structure of the presentation:

1. Stylized facts
2. **DSGE model**
3. Results - IO Stylized facts
4. Results - Phillips curve
5. Conclusions

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Model - Highlights

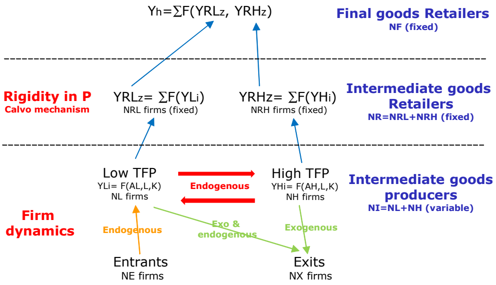
Standard New Keynesian model (Calvo sticky P & W, K, adj. cost I), modified for:

1. Endogenous firm entry/exit & technology choice→TFP heterogeneity.
2. Bertrand competition in prices → firms set prices taking into account their effect on the aggregate price (strategic interactions).

Calibrated for the euro area (mean of the 4 largest countries).

Model - Market structure

- 3 levels: intermediate producer (IP) & retailer (IR), final retailer (FR)
- Firm dynamics at IP level, Price stickiness at IR level



Model - 1. Firm dynamics:

ENTRY & TECHNOLOGICAL CHOICE:

- **Endogenous entry** (like in Bilbiie et al. (2012 JPE)):

- Firms enter until expected gains (v_t^L) equal the cost ($mc_t * C^E$).
- It takes one period & firms are born with lowest technology (A^L).

- **Endogenous technological upgrade/downgrade**:

- firm's TFP = general (A_t^s) + idiosyncratic (a_{it})

$$y_{it}^s = a_{it}^\gamma A_t^s \left(k_{it-1}^s\right)^\alpha \left(l_{it}^{ds}\right)^{1-\alpha}$$

$\boldsymbol{a_{it}}$ drawn from $F(i)$ distribution every period (iid).

$\boldsymbol{A_t^s}$ fixed cost per period (F_t^s) + initial cost (f_t^s) (persistent)

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Model - 1. Firm dynamics:
TECHNOLOGICAL CHOICE

The conditions determining technology decisions:

$$\textbf{Upgrade if } v_{it}^{H} > v_{it}^{L} + f_t^H \implies a_{it} > \boldsymbol{a}_t^U = \left[\frac{\left[\left(F_t^H + f_t^H\right) - F_t^L\right] - \left(e_t^H - e_t^L\right)}{d_t^H - d_t^L} \right]^{\frac{1}{\varepsilon - 1}}$$

$$\textbf{Downgrade if } v_{it}^{H} < v_{it}^{L} + f_t^L \implies a_{it} < \boldsymbol{a}_t^D = \left[\frac{\left[F_t^H - \left(F_t^L + f_t^L\right)\right] - \left(e_t^H - e_t^L\right)}{d_t^H - d_t^L} \right]^{\frac{1}{\varepsilon - 1}}$$

$$\textbf{Exit if } v_{it}^{L} < f_t^X \implies a_{it} < \boldsymbol{a}_t^X = \left[\frac{F_t^L - f_t^X - e_t^L}{d_t^L} \right]^{\frac{1}{\varepsilon - 1}}$$

and we only need to follow the thresholds $\boldsymbol{a}_t^U$, $\boldsymbol{a}_t^D$, $\boldsymbol{a}_t^X$

Model - 1. Firm dynamics:
NUMBER OF FIRMS

Given these thresholds, the dynamics of firms by technology are:

$$N_{t+1}^{H} = \overbrace{\left(1-\delta^{H}\right) N_{t}^{H} \int_{a_{t+1}^{D}}^{1} di}^{\text{remain}} + \overbrace{\left(1-\delta^{L}\right) N_{t}^{L} \int_{a_{t+1}^{U}}^{1} di}^{\text{upgrade}}$$

$$N_{t+1}^{L} = \overbrace{\left(1-\delta^{L}\right) N_{t}^{L} \int_{a_{t+1}^{X}}^{a_{t+1}^{U}} di}^{\text{remain}} + \overbrace{\left(1-\delta^{H}\right) N_{t}^{H} \int_{0}^{a_{t+1}^{D}} di}^{\text{downgrade}} + \overbrace{N_{t}^{E}}^{\text{enter}}$$

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Model - 2. Pricing:
BERTRAND COMPETITION IN PRICES

Under Calvo pricing, optimal relative price for IR of type s is:

$$\Pi_t^{s*} = \frac{\eta_{pt}^s}{\eta_{pt}^s+1} \frac{\mathbb{E}_t \sum_{\tau=0}^{\infty} \left(\beta\theta_p^s\right)^\tau \frac{\lambda_{t+\tau}}{\lambda_t} mc_{t+\tau}^s y_{t+\tau}^{dH}}{\mathbb{E}_t \sum_{\tau=0}^{\infty} \left(\beta\theta_p^s\right)^\tau \frac{\lambda_{t+\tau}}{\lambda_t} y_{t+\tau}^{dH}}$$

where η_{pt}^s is the **price elasticity of demand**

$$\eta_{pt}^s = \frac{\partial y_{t+\tau}^s}{\partial p_t^s} \frac{p_t^s}{y_{t+\tau}^s} = -\varepsilon \left(1 - \frac{\partial p_t}{\partial p_t^s} \frac{p_t^s}{p_t}\right)$$

- Standard model $\frac{\partial p_t}{\partial p_{zt}^s} \frac{p_{zt}^s}{p_t} = 0 \rightarrow \eta_{pt}^s = -\varepsilon$
- Bertrand pricing $\frac{\partial p_t}{\partial p_{zt}^s} \frac{p_{zt}^s}{p_t} = s_t^s$ (market share) $\rightarrow \eta_{pt}^s = -\varepsilon\left(1 - s_t^s\right)$

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Model - 2. Pricing:

WHY ASSUME PRICE SETTERS IGNORE THEIR IMPACT ON OTHER FIRMS' P?

$$\eta_{pt}^{s,i} = \frac{\partial y_{t+\tau}^{s,i}}{\partial p_t^{s,i}} \frac{p_t^{s,i}}{y_{t+\tau}^{s,i}} = -\varepsilon(1 - \underbrace{\frac{\partial p_t}{\partial p_t^s}\frac{p_t^s}{p_t}}_{\text{agg. P reaction}} - \underbrace{\sum_{s=1}^{N}\sum_{j=1}^{N^s} \overbrace{\frac{\partial p_t^{s,j\neq i}}{\partial p_t^{s,i}}}^{\text{assumed}=0} \frac{p_t^{s,i}}{p_t^{j\neq i}}}_{\text{competitors' P reaction}})$$

- Only solvable in a GE dynamic duopoly (Wang & Werning (2020) & Mongey (2021)),

- Used in macro/trade lit. (Faia (JEDC 2012), Etro & Rossi (JEDC 2015), Bernard et al (JEL 2018)),

- It is sufficient for relation between strategic compl. & firm het.,

- Evidence on Mixed Structures suggests a large number of small firms coexist with a few large ones in many markets (Bernard et al (JEL 2018)).

Structure of the presentation:

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Results - IO facts:

THE MODEL IS CONSISTENT WITH STYLIZED FACTS

1. **Increase in concentration**, **stronger in Y than L**.
2. **Passthrough of shocks to prices is weaker in larger firms**

Other:

a. Polarization in productivity between firms.
b. Increase in mark-ups.
c. Decline in firm entry, investment rate & K share.
d. Decline in the response of output to TFP shocks.

Results - IO facts:

THE MODEL IS CONSISTENT WITH STYLIZED FACT 2

2. Passthrough of shocks to prices is weaker in larger firms

High A^s $\Rightarrow$ high s^s $\Rightarrow$ low $\left|\eta_p^s\right| = \varepsilon\left(1 - s^s\right)$ $\Rightarrow$ large $\mu^H = \frac{\varepsilon(1-s^s)}{\varepsilon(1-s^s)-1}$

$A^H = 1.8$ $(\Pi_t^{H*} = 0.95) \Rightarrow$ high $s^H = 0.8$ $\Rightarrow$ low $\left|\eta_p^H\right| = 2$ $\Rightarrow$ large μ^H

$A^L = 0.9$ $(\Pi_t^{L*} = 1.11) \Rightarrow$ low $s^L = 0.2$ $\Rightarrow$ high $\left|\eta_p^L\right| = 8$ $\Rightarrow$ small μ^L

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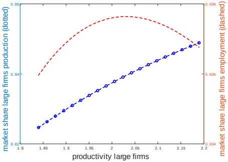
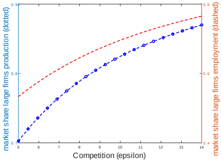
Results - IO facts:

THE MODEL IS CONSISTENT WITH STYLIZED FACT 1

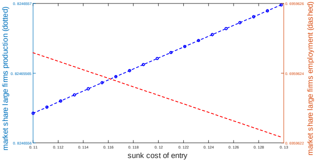
1. Increase in concentration, stronger in Y than L.



(a) Productivity large firms



(b) Competition (ε)



(c) Cost of entry

Regardless of the underlying cause ("good" or "bad"):

$\uparrow$ **TFP polarization** $\Rightarrow \downarrow$ price & $\uparrow$ market share of high TFP firms

$\uparrow$ **Competition** $\Rightarrow$ hurts less the most efficient $\Rightarrow \uparrow$ high TFP share

$\uparrow$ **Entry barriers** $\Rightarrow \downarrow$ number of new low TFP $\Rightarrow \uparrow$ share of high TFP

Structure of the presentation:

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Results - Phillips Curve:

THE NKPC OF EACH GROUP s BECOMES

$$\widehat{\Pi}_t^s = \underbrace{\beta \mathbb{E}_t \widehat{\Pi}_{t+1}^s + \frac{\left(1-\theta_p^s\right)\left(1-\beta\theta_p^s\right)}{\theta_p^s}\widehat{mc}_t^s}_{\text{Standard NKPC}}$$

$$+ \underbrace{\frac{s^s\left(1-\theta_p^s\right)}{\left(1-s^s\right)\left(\varepsilon\left(1-s^s\right)-1\right)\theta_p^s}\left(\widehat{s}_t^s - \beta\theta_p^s \mathbb{E}_t \widehat{s}_{t+1}^s\right)}_{\text{Heterogeneity effect}}$$

$$- \underbrace{\frac{\left(1-\theta_p^s\right)\left(1-\beta\theta_p^s\right)}{\theta_p^s}\widehat{\overline{a}}_t^s}_{\text{firm dynamics effect}}$$

Substituting for $\widehat{s}_t^s = -\frac{(\varepsilon-1)\theta_p^s}{1-\theta_p^s}\widehat{\Pi}_t^s$

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Results - Phillips Curve:

THE NKPC OF EACH GROUP s BECOMES

$$\widehat{\Pi}_{st} = \underbrace{\left(\frac{1+\theta_p^s \xi_N^s}{1+\xi_N^s}\right)}_{\text{Heterogeneity ef.}} \beta \mathbb{E}_t \widehat{\Pi}_{st+1} + \underbrace{\left(\frac{1}{1+\xi_N^s}\right)}_{\text{Heterogeneity ef.}} \frac{\left(1-\theta_p^s\right)\left(1-\beta\theta_p^s\right)}{\theta_p^s} \widehat{mc}_t^s$$

$$-\underbrace{\left(\frac{1}{1+\xi_N^s}\right) \frac{\left(1-\theta_p^s\right)\left(1-\beta\theta_p^s\right)}{\theta_p^s} \widehat{a}_t^s}_{\text{firm dynamics effect}}$$

where $\xi_N^s = \frac{(\varepsilon-1)s^s}{(1\text{-}s^s)(\varepsilon(1\text{-}s^s)-1)} > 0;\ \frac{\partial \xi_N^s}{\partial \varepsilon}, \frac{\partial \xi_N^s}{\partial s^s} > 0.$

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Results - Phillips Curve:

THE NKPC OF EACH GROUP s BECOMES

$$\widehat{\Pi}_t^H = \underbrace{\mathbf{0.76}}_{\textbf{Het.ef.}} * 0.99\mathbb{E}_t\widehat{\Pi}_{t+1}^H + \underbrace{\mathbf{0.03}}_{\textbf{Het.ef.}} * 0.09\widehat{mc}_t^H - \underbrace{0.002\widehat{a}_t^H}_{\text{firm dyn. ef.}}$$

$$\widehat{\Pi}_t^L = \underbrace{\mathbf{0.94}}_{\textbf{Het.ef.}} * 0.99\mathbb{E}_t\widehat{\Pi}_{t+1}^L + \underbrace{\mathbf{0.76}}_{\textbf{Het.ef.}} * 0.09\widehat{mc}_t^L - \underbrace{0.07\widehat{a}_t^L}_{\text{firm dyn. ef.}}$$

Heterogeneity effect reduces most coefficients of more productive firms.
Firm dynamics have a very limited effect.

Results - Flatter Phillips Curve:

DUE TO BERTRAND PRICING + HETEROGENEITY

Flatenning of PC$_s$**=**$\frac{\text{PC coef } \widehat{mc}_t^s}{\text{PC coef } \widehat{mc}_t^s \text{ AAB}}$ **=** $1 + \xi_N^s$

$\Rightarrow$ High TFP=37 >> Low TFP=0.3 flattening

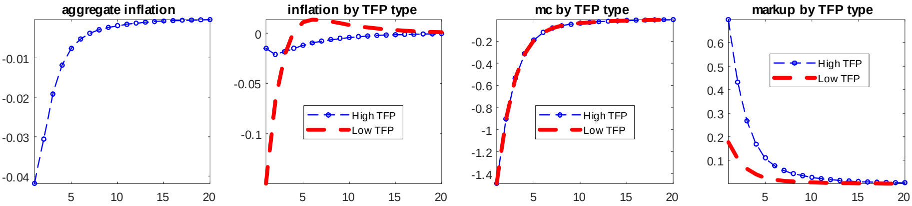
Requires both Bertrand pricing & TFP heterogeneity:

1) No Bertrand Pricing: $\frac{\partial p_t}{\partial p_{zt}^s} \frac{p_{zt}^s}{p_t}$=0 =$\xi_N^s \Rightarrow$ **Flat.PC =** 1

2) No Heterogeneity: N large, ξ_N^s small $\Rightarrow$ **Flat. PC** $\rightarrow$ 1

Impulse response 1% neutral TFP shock:

BASELINE CALIBRATION



High-TFP firms reduce their prices by much less than low-TFP. They use their competitive advantage to absorb TFP shocks through mark-ups and smooth inflation.

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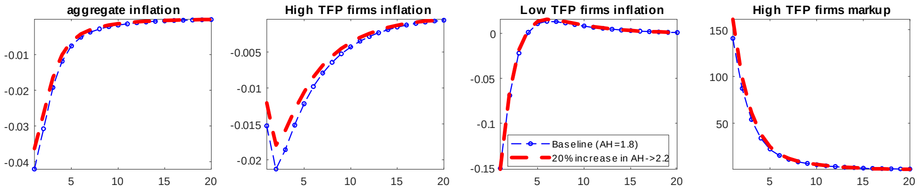
Rise in concentration via technology:

1% NEUTRAL TFP SHOCK: 20% INCREASE IN PRODUCTIVITY OF HIGH-TFP FIRMS (AH 1.8->2.2)



A rise in TFP polarization rises high TFP firms' market share & markup, **reducing by** 20% **the response of** (sectoral) **inflation to mg cost**.

Aggregate inflation volatility falls by 26%

Flattens PC of High (Low) TFP firms by 60% (20% steeper).

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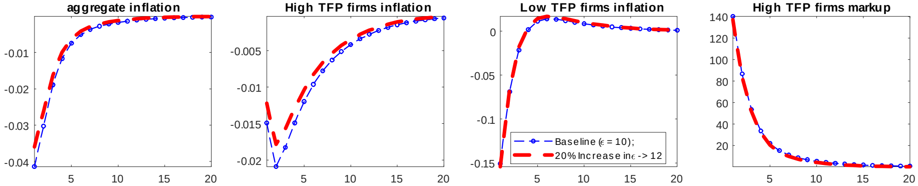
Rise in concentration via competition:

1% NEUTRAL TFP SHOCK: 20% INCREASE IN ELASTICITY OF DEMAND (10->12)



A rise in competition reduces more high TFP markups, increases market share & reduces 20% the response of (sectoral) inflation to mg cost.

Aggregate inflation volatility falls by 25%.

Flattens PC of High (Low) TFP firms by 40% (20% steeper).

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Conclusions:

- We show that a model combining firm dynamics and Bertrand pricing is consistent with the industrial stylized facts and explains the flattening of the Phillips Curve.
- In the model an increase in polarization rises the market share of a few very productive firms, who face a lower price elasticity of demand and are more able to absorb shocks through their mark-ups.
- This gives rise to a (modified) Phillips Curve whose slope falls by a factor depending on the market share of firms.
- Thus, in line with empirical evidence, an increase in concentration in a few productive firms mutes the response of inflation to changes in marginal costs.

THANK YOU FOR YOUR ATTENTION

Literature review

- The response of inflation to exogenous shocks has been studied extensively (theory & empirics) using DSGEs with sticky P & W.
- Beyond entry, little attention dedicated to the industrial structure, which may affect aggregate responses to exogenous shoks.
- Until recently:

- Andrés & Burriel (2018) show the impact of Bertrand Pricing and firm heterogeneity on inflation dynamics.

- Wang & Werning (2020), Mongey (2021) show the impact of strategic complementarities with low N.

- Baqaee, Farhi & Sangani (2021) show the impact of TFP missallocation.

- In this paper we add firm & TFP dynamics to AB (2018).

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Stylized facts OTHER:

Empirical IO literature has recently uncovered other relevant structural changes

a. **Polarization in productivity** between firms (Andrews et al 2015).

b. **Mark-ups have grown** 60% since 90s in EU/US (De Loecker et al 2020).

c. **Decline in firm entry** (OECD 2019), **investment** rates (Gutiérrez et al 2019) and the **capital share** (De Loecker et al 2020).

e. Decline in the **response of Y to TFP** shocks (De Loecker et al 2020).

Under Calvo pricing, optimal relative price for IR of type s is:

$$\Pi_t^{s*} = \frac{\eta_{pt}^s}{\eta_{pt}^s+1} \frac{\mathbb{E}_t \sum_{\tau=0}^{\infty} \left(\beta\theta_p^s\right)^{\tau} \frac{\lambda_{t+\tau}}{\lambda_t} mc_{t+\tau}^s y_{t+\tau}^{dH}}{\mathbb{E}_t \sum_{\tau=0}^{\infty} \left(\beta\theta_p^s\right)^{\tau} \frac{\lambda_{t+\tau}}{\lambda_t} y_{t+\tau}^{dH}}$$

where η_{pt}^s is the **price elasticity of demand**

$$\eta_{pt}^{s,i} = \frac{\partial y_{t+\tau}^{s,i}}{\partial p_t^{s,i}} \frac{p_t^{s,i}}{y_{t+\tau}^{s,i}} = -\varepsilon(1 - \underbrace{\frac{\partial p_t}{\partial p_t^s} \frac{p_t^s}{p_t}}_{\text{agg. P reaction}} - \underbrace{\sum_{s=1}^{N} \sum_{j=1}^{N^s} \frac{\overbrace{\partial p_t^{s,j\neq i}}^{\text{assumed}=0}}{\partial p_t^{s,i}} \frac{p_t^{s,i}}{p_t^{j\neq i}}}_{\text{competitors' P reaction}})$$

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Model - 2. Pricing:
BERTRAND COMPETITION IN PRICES

Under Calvo pricing, optimal relative price for IR of type s is:

$$\Pi_t^{s*} = \frac{\eta_{pt}^s}{\eta_{pt}^s + 1} \frac{\mathbb{E}_t \sum_{\tau=0}^{\infty} \left(\beta\theta_p^s\right)^{\tau} \frac{\lambda_{t+\tau}}{\lambda_t} mc_{t+\tau}^s y_{t+\tau}^{dH}}{\mathbb{E}_t \sum_{\tau=0}^{\infty} \left(\beta\theta_p^s\right)^{\tau} \frac{\lambda_{t+\tau}}{\lambda_t} y_{t+\tau}^{dH}}$$

where η_{pt}^s is the **price elasticity of demand**

$$\eta_{pt}^{s,i} = \frac{\partial y_{t+\tau}^{s,i}}{\partial p_t^{s,i}} \frac{p_t^{s,i}}{y_{t+\tau}^{s,i}} = -\varepsilon(1 - \underbrace{\frac{\partial p_t}{\partial p_t^s} \frac{p_t^s}{p_t}}_{\text{agg. P reaction}} - \underbrace{\sum_{s=1}^{N} \sum_{j=1}^{N^s} \overbrace{\frac{\partial p_t^{s,j\neq i}}{\partial p_t^{s,i}}}^{\text{assumed}=0} \frac{p_t^{s,i}}{p_t^{j\neq i}}}_{\text{competitors' P reaction}})$$

- Standard model $\frac{\partial p_t}{\partial p_{zt}^s} \frac{p_{zt}^s}{p_t} = 0 \rightarrow \eta_{pt}^s = -\varepsilon$
- Bertrand pricing $\frac{\partial p_t}{\partial p_{zt}^s} \frac{p_{zt}^s}{p_t} = s_t^s$ (market share) $\rightarrow \eta_{pt}^s = -\varepsilon\left(1 - s_t^s\right)$

Model - 2. Pricing:

(LIMITED) STRATEGIC COMPLEMENTARITIES

Why assume price setters ignore their impact on other firms' P? ($\frac{\partial p_t^{s,j\neq i}}{\partial p_t^{s,i}}$=0):

- Technical limitations: currently only possible to solve in a dynamic duopoly model (Wang & Werning (2021) and Mongey (2021)),

- Previously used in macro & trade literature: Etro & Colciago (EJ 2010), Faia (JEDC 2012), Etro & Rossi (JEDC 2015), Bernard et al (JEL 2018),

- It is sufficient to show the interaction between strategic complementarities and firm heterogeneity,

- Recent empirical evidence on Mixed Structures: in which a large number of smallish firms coexist with a few large ones in many markets.

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Calibration:

Standard values for parameters, provide reasonable fit for steady state.

PARAMETERS equal across countries

Utility			**Policy**		
discount rate	β	0.99	int rate TR	γr	0.80
labor coef	ψ	10	output TR	γy	0.125
C elast.	σ	1	inflation TR	$\gamma \pi$	1.70
labor elast	varθ	1.30			
int goods elast	ε	10	**Entry**		
Production			firms' death	δF	0.025
depreciation	δ	0.025	cost of entry	fE	0.50
I adjust cost	κ	0.10	**Pricing**		
			calvo param	θ	0.896
			degree index	χ	0.013

CALIBRATED for Spain

TFP	1.0
small	0.9
large	1.9
labor share	0.66
% of small firms	89%

OBJECTIVE OF CALIBRATION

firm's size (empl)	1.4
small	0.2
large	0.9
firm's size (prod)	0.7
small	0.1
large	1.0
labor productivity	1.3
small	1.0
large	1.5

2. Passthrough of shocks to prices is weaker in larger firms

Higher share ⇒ lower elast. of demand $\left|\eta_{pt}^{s}\right| = \varepsilon\left(1 - s_t^s\right)$ ⇒ larger markup

High TFP (Π_t^{H*}=0.95)⇒High share s^H=0.8 ⇒Low elast. $\left|\eta_p^H\right|$=2

Low TFP (Π_t^{H*}=1.11)⇒Low share s^L=0.2 ⇒High elast. $\left|\eta_p^L\right|$=8

⟹ High TFP firms charge larger markup.

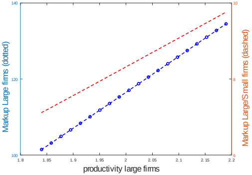
2. Passthrough of shocks to prices is weaker in larger firms

High $A^s \Rightarrow$ high $s^s \Rightarrow$ low $\left|\eta_p^s\right| = \varepsilon\left(1 - s^s\right) \Rightarrow$ large $\mu^H = \frac{\varepsilon(1-s^s)}{\varepsilon(1-s^s)-1}$

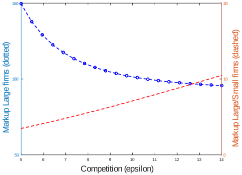
$A^H = 1.8$ $(\Pi_t^{H*} = 0.95) \Rightarrow$ high $s^H = 0.8 \Rightarrow$ low $\left|\eta_p^H\right| = 2 \Rightarrow$ large $\mu^H = 100$

$A^L = 0.9$ $(\Pi_t^{L*} = 1.11) \Rightarrow$ low $s^L = 0.2 \Rightarrow$ high $\left|\eta_p^L\right| = 8 \Rightarrow$ small $\mu^L = 14$

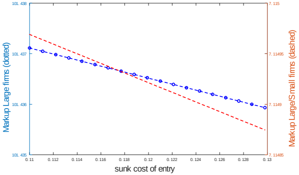
3. Increase in mark-ups, depending on cause of concentration.



(a) Productivity large firms



(b) Competition (ε)



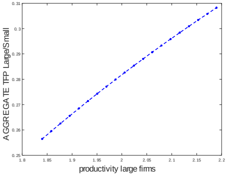
(c) Cost of entry

$\uparrow$ TFP polarization $\Rightarrow$ $\uparrow$ market share high TFP firms $\Rightarrow$ $\uparrow$ markup

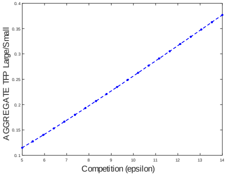
$\uparrow$ Competition $\Rightarrow$ hurts less most efficient $\Rightarrow$ $\downarrow$more high-TFP markups

$\uparrow$ Entry barriers $\Rightarrow$ $\downarrow$ number of low TFP $\Rightarrow$ $\downarrow$more low-TFP markups

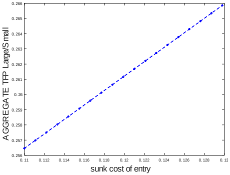
2. Polarization in productivity between firms.



(a) Productivity large firms



(b) Competition (ε)

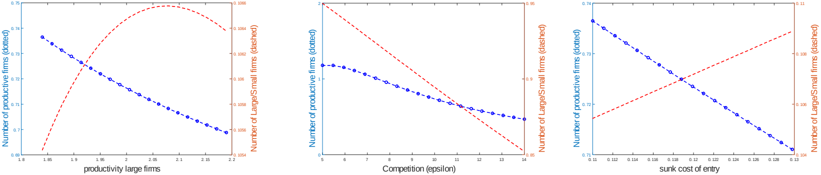


(c) Cost of entry

Regardless of the underlying cause behind this pattern.

Results (IO facts):
THE MODEL REPLICATES 8 STYLIZED FACTS

4a. Decline in firm entry.



(a) Productivity large firms (b) Competition (ε) (c) Cost of entry

Regardless of the underlying cause behind this pattern.

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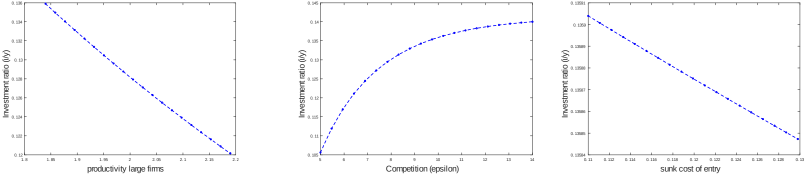
Eurosistema

4b. Decline in investment rate.



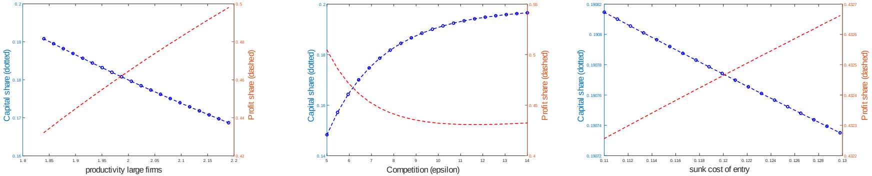
(a) Productivity large firms (b) Competition (ε) (c) Cost of entry

Regardless of the underlying cause behind this pattern.

Results (IO facts):

THE MODEL REPLICATES 8 STYLIZED FACTS

4c. Increase in profit share and decline in K share.



(a) Productivity large firms (b) Competition (ε) (c) Cost of entry

Regardless of the underlying cause behind this pattern.

Results - Phillips Curve:

THE NKPC OF EACH GROUP s BECOMES

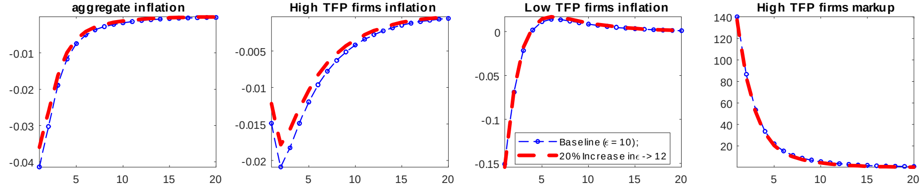
$$\widehat{\Pi}_t^H = \underbrace{\mathbf{0.76}}_{\textbf{Het.ef.}} * 0.99\mathbb{E}_t\widehat{\Pi}_{t+1}^H + \underbrace{\mathbf{0.03}}_{\textbf{Het.ef.}} * 0.09\widehat{mc}_t^H - \underbrace{0.002\widehat{a}_t^H}_{\text{firm dyn. ef.}}$$

$$\widehat{\Pi}_t^L = \underbrace{\mathbf{0.94}}_{\textbf{Het.ef.}} * 0.99\mathbb{E}_t\widehat{\Pi}_{t+1}^L + \underbrace{\mathbf{0.76}}_{\textbf{Het.ef.}} * 0.09\widehat{mc}_t^L - \underbrace{0.07\widehat{a}_t^L}_{\text{firm dyn. ef.}}$$

	$\widehat{\Pi}_{t+1}$	$\widehat{mc}_t$	ξ_N^s	η_p^s	s^s	Π^{s*}
High TFP	.75	.002	36	-2	0.8	0.95
Low TFP	.93	.07	0.3	-8	0.2	1.11

Rise in concentration via competition:

1% NEUTRAL TFP SHOCK: 20% INCREASE IN ELASTICITY OF DEMAND (10->12)



A rise in competition reduces more high TFP markups, increasing their market share and reducing by 20% the response of (sectoral) inflation to mg cost.

Aggregate inflation volatility falls by 25%.

Results IO fact 8:

THE MODEL SHOWS A FALL IN RESPONSE OF Y TO TFP SHOCKS

Percentage change in the volatility of output & inflation

	20% increase in High-TFP firms' productivity (AH: 1.8->2.2)				20% increase in the elasticity of demand (ε: 10->12)			
	TFP shock	monetary	preference	labour supply	TFP shock	monetary	preference	labour supply
Inflation	**-26**	-28	-25	-31	**-25**	-24	-32	-41
output	**-30**	-6	9	-40	**-26**	2	2	-52

Output volatility falls significantly after supply side shocks when concentration increases, either because of TFP polarization or more competition.