

# **Markups and Low-Productivity Firms: Evidence from the Great Recession in Spain**

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Market Dynamics, Competition and the Role of Industrial Policy in the Context  
of the COVID-19 Crisis

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# Motivation

## ■ Debate about:

- [De Loecker & Eeckhout \(2017\)](#): Increasing trend of markups since 1980.
- [Autor et al. \(2017\)](#): *Profit share* and *concentration* increase; *labour share* decrease.
- Consensus that big firms with high markups in the US increased further.
- [Philippon \(2017\)](#): No similar trends in Europe.
- [Díez, Fan Villegas-Sánchez \(2019\)](#): U-shape relationship markups and size.

## ■ This presentation:

(based on [García Perea, Lacuesta, Roldan-Blanco \(Bank of Spain WD2020\)](#))

- Evolution of **markups**, **costs** and **concentration** in Spain 2004-2017.
- **Higher markups** in small and unproductive firms.
- **Countercyclical markups**, mainly in **small** and unproductive firms.

# Data and definitions

## ■ Spain: Central de Balances (CBI).

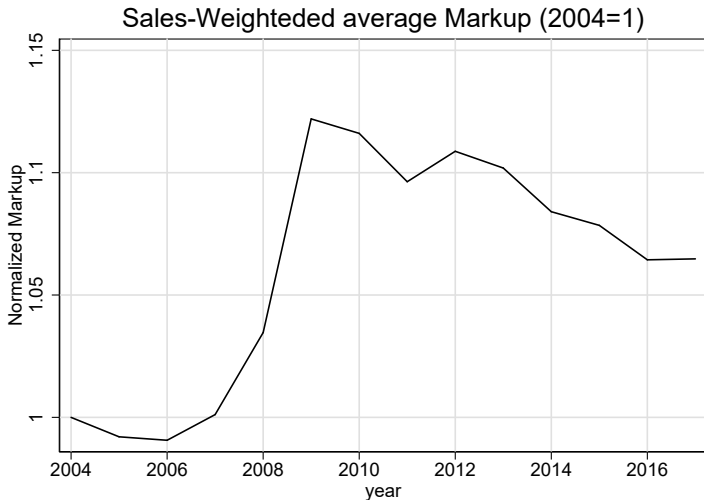
- Good coverage since 2004 (see [Almunia, López-Rodríguez, Moral-Benito \(2018\)](#)).
- Covering expansion, crisis, recovery (2004-2016).
- Final dataset →  $\approx$  3.8M obs; 300k firms per year; 4-dig. NACE.
- Information → Sales, intermediate goods (materials, other operating expenses), capital, labour (open ended/fixed term).

## ■ Markups definition: Price/Mg Cost

- Following [De Loecker Warsynsky \(2012\)](#). [Methodology](#).
- We compute it with respect to **materials**, the variable part of intermediate goods.

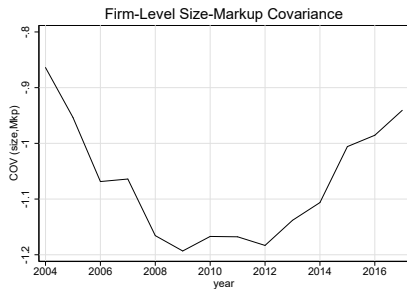
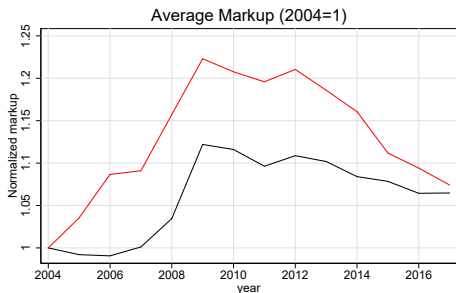
# Average Markup

- Average Markup:  $M_t = \sum_i \omega_i \mu_i$ , where  $\omega_i \equiv \frac{P_i Q_i}{\sum_i P_i Q_i}$



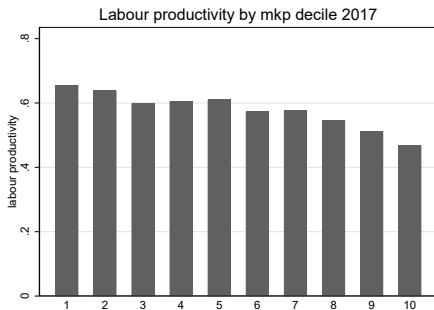
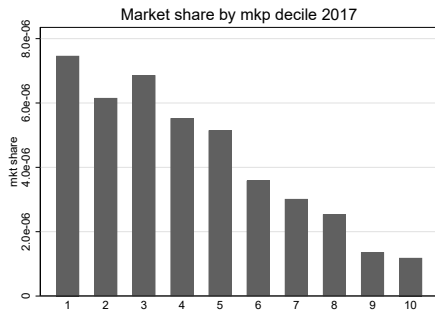
# Markups and size of the firm

- Markups and size of the firm: 
$$M_t = \sum_i \omega_i \mu_i = \bar{\mu}_t + \underbrace{\sum_i (\omega_{it} - \bar{\omega}_t)(\mu_{it} - \bar{\mu}_t)}_{\text{Covariance size vs. markup}}$$



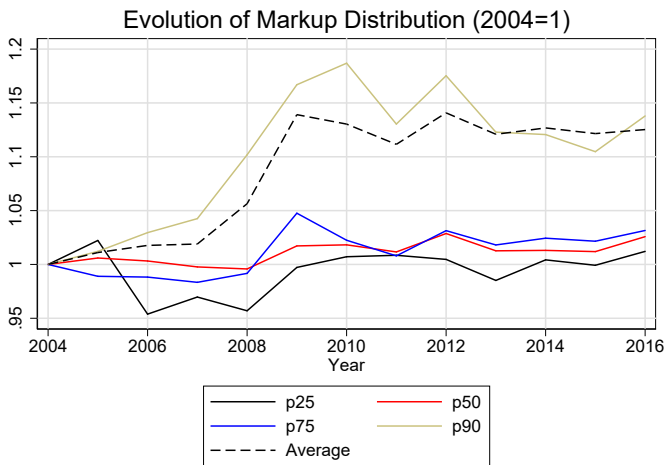
Legend: [Red] *Unweighted markup* ( $\bar{\mu}_t$ ) ; [Black] *Sales-weighted markup* ( $M_t$ )

# Markups levels and size of the firm

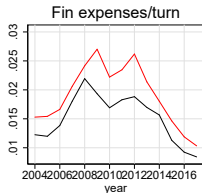
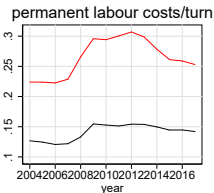
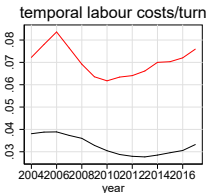
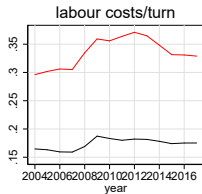
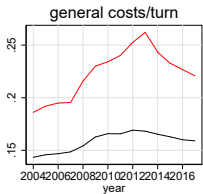
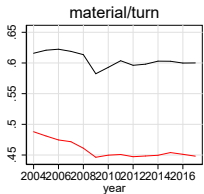


*Figure: Market share (left) and average productivity [right], average by decile of the markup distribution.*

# Markups evolution and size of the firm



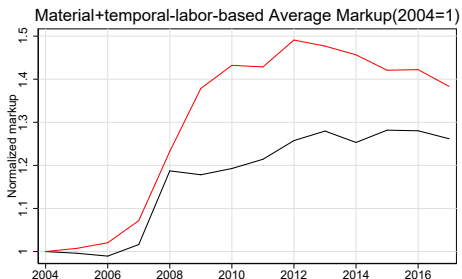
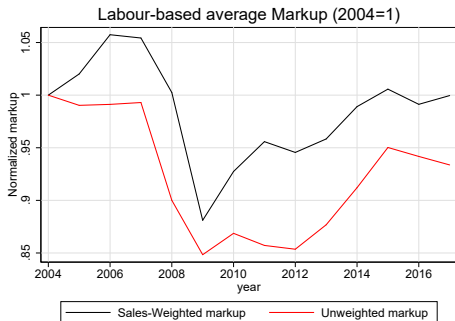
# Structure of costs



Legend: [Red] *Unweighted*; [Black] *Sales-weighted*

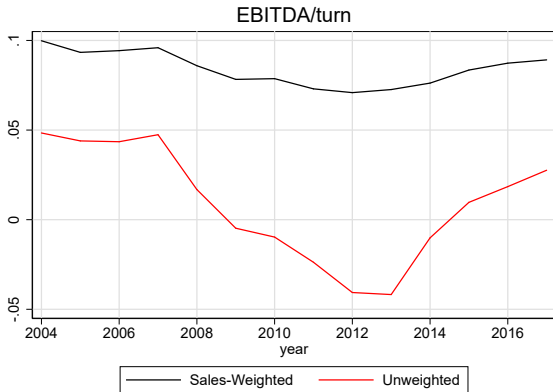


# Markups estimated with other inputs



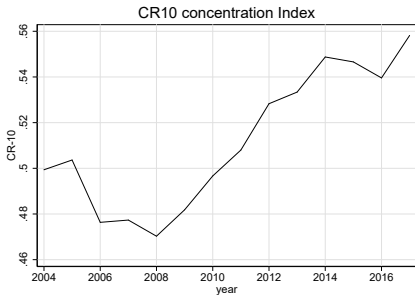
# EBITDA share

$$\frac{\pi_i}{P_i^Q Q_i} = 1 - \frac{1}{\mu_i} \frac{AC_i}{MC_i}$$



Legend: [Red] *Unweighted*; [Black] *Sales-weighted*

# Concentration and firm dynamics



# Conclusions

- We analyze the evolution of estimated markups alla [De Loecker Eechout \(2017\)](#), costs and concentration in Spain 2004-2017.
- We find higher markups in small and unproductive firms.
- We find countercyclical markups, mainly in small and unproductive firms.
- **Tale:** More than changes in market power, the estimated markups show a switch from variable to fixed costs.
- **Tale:** Small inefficient firms, as a reaction of a sharp drop in sales leading to higher average costs, reduced their variable costs to maintain profit rates as much as possible. This was not the case for bigger firms.

# Lessons for the post-COVID-19

- Despite economic policies (short time working arrangements and supplies and rents transfers or renegotiation), a raise in average costs and estimated markups according to previous definition is expected and a fall in profit rates.
- [Lacuesta, Roldan-Blanco, Serrano \(Analytical Article BoS 2020\)](#) relate the increase in e-commerce at the sector level in Spain with a fall in markups and average costs (supplies not labour).

# APPENDIX

# Appendix: Methodology (I)

- Estimation of markups following [De Loecker & Warsynski \(2012\)](#)

▶ Back

- Minimization production costs:

$$\min_{V_i, K_i} \sum_{j=1}^J P_i^{V_j} V_{ij} + r_i K_i \quad \text{s.t. } Q_i \geq Q(\Omega_i, \mathbf{V}_i, K_i)$$

- FOC( $V_{ij}$ ):

$$\frac{\partial Q_i}{\partial V_{ij}} \frac{V_{ij}}{Q_i} = \frac{1}{\Lambda_i} \frac{P_i^{V_j} V_{ij}}{Q_i}; \quad \Lambda_i \equiv \frac{\partial \mathcal{L}_i}{\partial Q_i} \geq 0 \Rightarrow \text{Multiplier} \approx \text{Marginal Cost}$$

- Firm level markup  $i$ :

$$\boxed{\mu_i \equiv \frac{P_i^Q}{\Lambda_i} = \frac{\varepsilon_{ij}}{\alpha_{ij}}}, \quad \text{where } \begin{cases} \alpha_{ij} \equiv \frac{P_i^{V_j} V_{ij}}{P_i^Q Q_i} & \leftarrow \text{Data} \\ \varepsilon_{ij} \equiv \frac{\partial Q_i}{\partial V_{ij}} \frac{V_{ij}}{Q_i} & \leftarrow \text{To estimate} \end{cases}$$

- **Pros:** Model-free; allowing different competition frameworks, and inputs with adjustment costs (e.g.  $K$ ).

## Appendix: Methodology (II) $\varepsilon_i$

### ■ Production Function:

$$Q(\Omega_i, \mathbf{V}_i, K_i) = \Omega_i F(\mathbf{V}_i, K_i; \beta)$$

- 1 Observed productivity  $\Omega_i$  is Hicks-neutral.
- 2 Same technology parameters ( $\beta$ ) for all producers.

### ■ (log-)sales deflated $\rightarrow y_{it} = \omega_{it} + f(\mathbf{v}_{it}, k_{it}; \beta) + \epsilon_{it}$ .

### ■ Estimation of $f$ using Olley-Pakes (1996):

1 **Stage 1:** Estimate  $\beta$  by OLS under  $\omega_i = h(\mathbf{v}_i, k_i; \mathbf{z}_i)$ .

2 **Stage 2:**

- 1 Get prediction and residual,  $(\hat{y}_i, \hat{\epsilon}_i)$ .
- 2 Compute  $\omega_i(\beta) = \hat{y}_i - f(\cdot, \beta)$ , y asume  $\omega_{it} = \rho\omega_{i,t-1} + u_{it}$ .
- 3 Estimate by GMM using  $\mathbb{E}[(\omega_{it}(\beta) - \hat{\rho}\omega_{i,t-1}(\beta))\mathbf{v}_{i,t-1}^\top] = \mathbf{0}$ .

### ■ Example:

1 Cobb-Douglas:  $y_i = \beta_v v_i + \beta_k k_i + \omega_i + \epsilon_i$

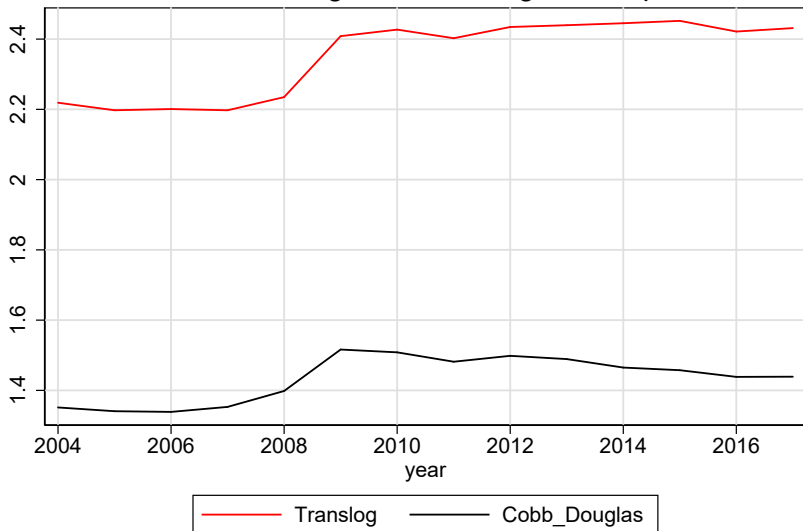
2 Translog:  $y_i = \beta_v v_i + \beta_k k_i + \beta_{vv} v_i^2 + \beta_{kk} k_i^2 + \beta_{vk} v_i k_i + \omega_i + \epsilon_i$



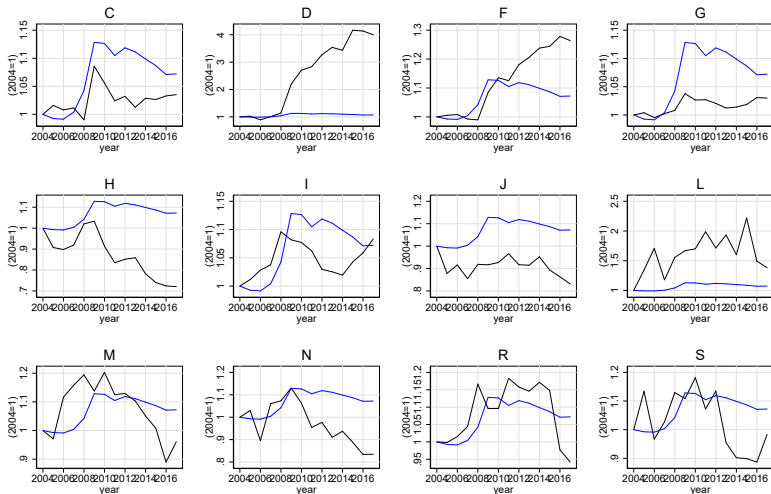
# Appendix: Production function specifications

▶ Back

## Sales-Weighted average Markup



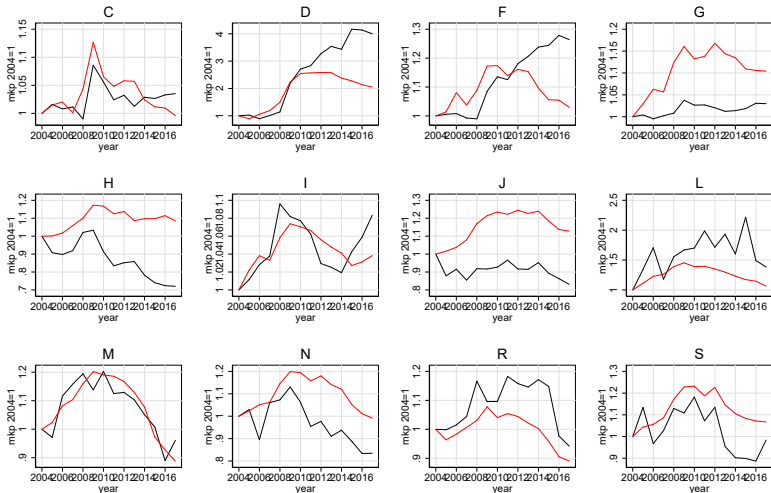
# Appendix: Markups – More sectors



— Sector\_C — Economy

1 "Manufacturing" 2 "Supplies" 3 "Construction" 4 "Retail Trade" 5 "Transportation" 6 "Accommodation"  
7 "IT" 8 "Real Estate" 9 "Tech. Act." 10 "Admin. Act." 11 "Recreational Act." 12 "Other Services"

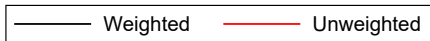
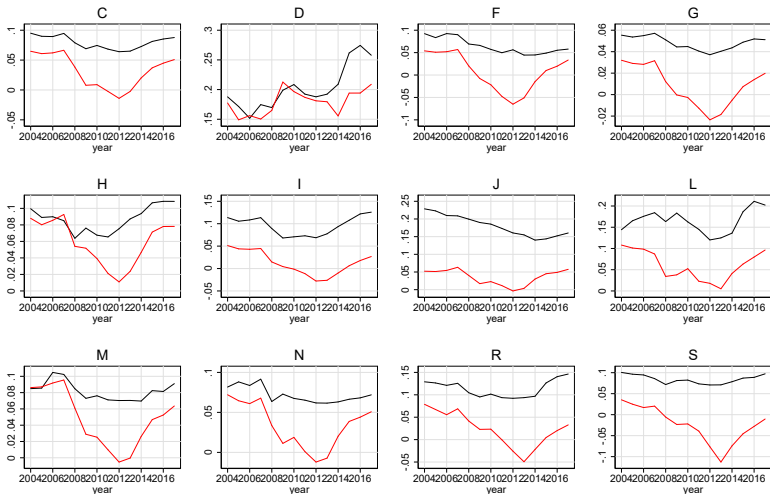
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— Weighted    — Unweighted

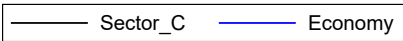
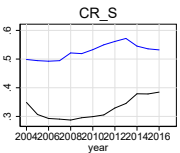
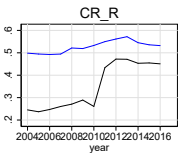
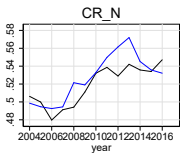
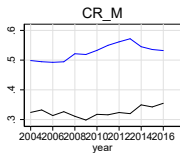
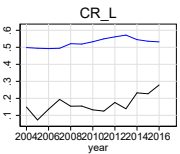
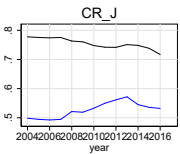
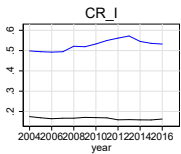
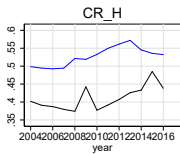
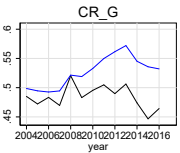
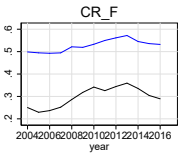
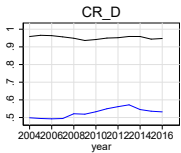
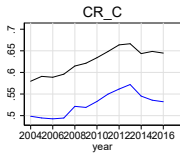
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# Appendix: EBITDA Share – More sectors



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