Customer Capital and the Aggregate Effects of Short-Termism

Marco Errico
Bank of Italy

Alessandro Dario Lavia
Boston College

Luigi Pollio
Boston College

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Introduction

- Short-termism is a tendency to prioritize immediate gains over long-term development.
  - Typical feature of so called *Anglo-Saxon* model of corporate governance.

- Around 90% of recently surveyed US managers report pressure to meet short-term profit targets Graham et al. (2005).
  - Shareholders put pressure on managers to meet profits' forecasts.
  - Manager opportunistically manipulate operational and accounting margins.

- We want to study the aggregate effects of short-termism in a customer capital setting.
  - Manager changes markups to meet forecasters' expectations.
  - Endogenous accumulation of customer capital via markup choice.

This Paper

1. Evidence of markup change consistent with short-termism:

- Abnormal bunching of firms that just beat forecasters' earnings expectations.
- Firms just meeting earnings' forecasts have higher markup growth.
- Manipulation arising mainly from revenues rather than costs.

2. The aggregate effects of short-termism:

- Quantitative, heterogeneus firm model with short-term frictions and customer capital.
  - Trade off between higher markup today and lower customer base tomorrow.
  - Short-term as corrective mechanism to manager's agency conflict, Terry (2022).
- Relevant quantitative impact due to short-termism.
  - Average markup increase of $\approx 8\%$.
  - Average shareholders profit gain (yearly) of $\approx \$38$ mln per firm.
  - Market capitalization loss of $\approx \$3$ tln.

Contribution to the Literature

- Short-termism on micro level decisions (accounting and operational decisions): Fundemberg and Tirole (1995), Zhang and Gimeno (2016, 2010), Graham (2005), Roychowdhury (2006), Corredoira et al (2021), Marinovic, et al. (2013).
  - Novel evidence on markup change using U.S. public companies.

- Implications of short-termism and agency conflicts at the aggregate level: Terry (2022), Celik and Tian (2022), Bertomeu et al. (2022), German and Philippon (2017,2018).
  - Short-termism increases average markup, costing 4% loss in consumption eq. welfare.

- Firm heterogeneity and customer capital: Foster et al. (2014), Moreira (2017), Gilchrist et al. (2017), Gourio and Redunko (2014), Ravn et al. (2008).
  - Develop a quantitative framework with short-term friction and customer capital.

Empirics

Datasets

- **Compustat (Quarterly)**: public firm accounting and balance sheet information, sales, cost goods sold (cogs), assets, etc.
- **I/B/E/S**: contains 12 million analysts' quarterly forecasts and realized earning for public US companies.
- Sample: panel of 86,122 quarterly observations, 2,205 U.S. firms, from 1990Q1 to 2018Q4.

Key Variables - Markup & Forecast Errors

- **Markup (Compustat)**:
  - Estimate PF and markup at firm i, in sector s at quarter t, De Loecker et al. (2020):

$$\mu_{ist} = \widehat{\theta}_s \frac{\text{Sales}_{it}}{\text{Costs of Goods Sold}_{it}} = \widehat{\theta}_s \frac{\text{salesq}_{it}}{\text{cogsq}_{it}}$$

  - θ_s is the output elasticity (by sector) of the variable inputs, Sales_{it} is firm's gross revenues (saleq_{it}) and Costs_{it} is firm's costs of goods sold.
  - Alternative measures of markup as robustness.

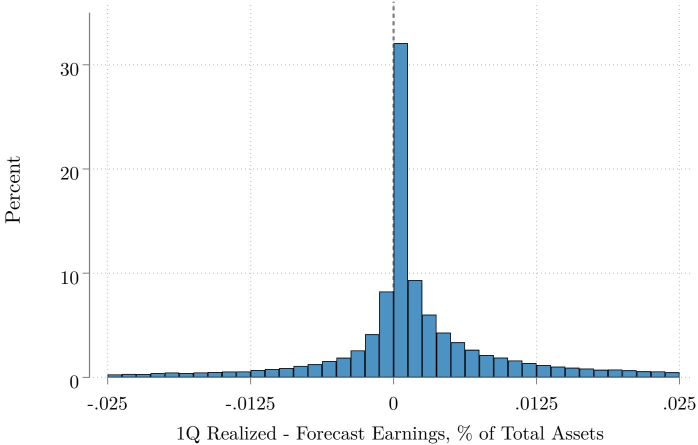
- **Forecast error (I/B/E/S)**:
  - Consensus is the median forecast across analysts, Drechsler (2021).

$$\text{Forecast Errors}_{it} \equiv fe_{it} = \frac{\text{Realized Earnings}_{it} - \text{Consensus}_{it}}{\text{Total Assets}_{it}}$$

  - Alternative normalization on the denominator: lagged sales, market value.

Alternative Measures Markup

Firm Earnings Bunch Above Short-Term Targets



- Abnormal bunching at or just above zero:
  - 11% (18%) of observations exhibit $fe_{it} \in [0, 0.001\%]$ ($\in [0, 0.005\%]$);
- Bunching suggests firms *actively* try avoiding small negative forecast errors.

Alternatives

Discontinuity at the Zero Forecast Error Threshold

- Local linear regression to detect opportunistic change in markup:

$$\underbrace{\Delta \log \mu_{i,t}}_{\text{Markup Growth}} = \alpha_{1i} + \alpha_{2t} + \beta fe_{i,t} + \gamma fe_{it} \mathbb{1}(fe_{i,t} \geqslant 0) + \delta \mathbb{1}(fe_{i,t} \geqslant 0) + \varepsilon,$$

where *fe* is *forecast error* and α_{1i}, α_{2t} firm and time fixed effects, respectively.

- δ – local effect in $\Delta \log \mu_{i,t}$ between firms just meeting and just missing forecasts.
  - $\delta \neq 0$ suggests opportunistic increase in markup for firms just meeting the forecast.

- Caveats:
  - Evidence of local effect, not mean effect.
  - No causal interpretation *short-termism* $\leftrightarrow \Delta \log \mu_{i,t}$.
  - $\rightarrow$ Need a model to quantify effect of short-termism.

Discontinuity at the Zero Forecast Error Threshold

	(1) Δ% Markup	(2) Δ% Sales	(3) Δ% Costs
Mean Change at Cutoff (p.p.)	0.793***	1.065***	0.270*
	(0.116)	(0.177)	(0.155)
Standardized (p.p.)	4.822	5.098	1.303
Firm, Quarter FEs	Yes	Yes	Yes
Mean $\lvert\Delta \log \mu\rvert$ (p.p.)	8.351	13.560	13.616
Median $\lvert\Delta \log \mu\rvert$ (p.p.)	3.276	7.907	8.027
Observations	76087	76255	76069

- Markup growth 0.8 p.p. higher for firms just meeting profit target.
  - Quantitatively relevant when compared to mean ($\approx$ 10 %) and median ($\approx$ 25 %).
  - Suggestive of opportunistic changes in markup to avoid small missing.
- Firms just meeting expectations increase prices rather than cutting costs.

Robustness Checks

1. Pricing vs accruals manipulation: inventory growth. Markup Residual
2. Pricing vs accruals manipulation: persistence in markup growth. Markup Persistence
3. Pricing vs accruals manipulation: sectoral correlations. Sectoral Correlations
4. Pricing vs accruals manipulation: markup growth and firm diversification. Diversification
5. Endogeneity issues: lagged markup. Lagged Markup
6. Robustness to different markup measures. Markup Measures
7. Robustness to different forecast error measures. Forecast Measures
8. Local linear regression with different bandwidth. Optimal Bandwidth
9. Manipulation in boom vs. recession. Boom Recession
10. Estimated discontinuity over time. Time Discontinuity

Simple Model

A Simple Two-Period Model

- **Goal**: understand how short-termism affect firms' pricing decisions.
- Partial equilibrium two-period model with short-termism and endogenous markup.
- Endogenous markup: **customer base** in the spirit of Foster et al. (2014)
  - Trade off: higher profits today vs higher profits in the future in pricing decisions;
- Short-termism: board discipline managerial behavior, Terry (2022).
  - Manager and shareholders have different objectives (agency conflict).
  - Short term costs counteract managers' **empire building motive**.

Customers and Demand

- Firm produces a product y_t using a linear technology with marginal cost, c.
- Firm sells y_t today to $\bar{b}$ customers at a price p_t according to an isoelastic demand

$$y_t = \bar{b}^{\theta} p_t^{-\eta}, \quad \eta > 1.$$

- Firm sells y_{t+1} tomorrow to b_{t+1} customers that depends on today revenues

$$b_{t+1} = \delta p_t y_t.$$

- Price on the output sold tomorrow y_{t+1} is

$$\bar{p} = \frac{\eta}{\eta - 1} c.$$

Firm Profit and Value

- Firms' profits are revenues minus cost, plus a random noise ν_t

$$\Pi_t = p_t y_t - c y_t + \nu_t, \qquad \nu_t \sim N(0, \sigma_v^2).$$

- Analysts' forecasts do not observe ν_t, a transitory profitability shock.

$$\Pi_t^f(\theta_\pi) = \mathbb{E}\left[\Pi_t(p_t^*)\right].$$

- Firm's value given the customer base from previous period $\bar{b}$

$$V(p_t) = (p_t - c)\,\bar{b}^\theta p_t^{-\eta} + \frac{1}{R}(\bar{p} - c)\frac{(\delta \bar{b}^\theta)^\theta}{\bar{p}^\eta} p_t^{(1-\eta)\theta}.$$

  - Price p_t leverage trade-off: (i) more customers tomorrow; (ii) higher profits today.

Manager Sets Prices under Agency Conflict

- Risk-neutral manager sets the prices today to maximize his utility.

$$V^M\left(p_t \mid \Pi_t^f, \theta_\pi\right) = (p_t - c)\,\bar{b}^\theta p_t^{-\eta} + \frac{1}{R}(\bar{p} - c)\frac{(\delta\bar{b}^\theta)^\theta}{\bar{p}^\eta}p_t^{(1-\eta)\theta} + \phi_e y_t - \theta_\pi y_t \mathbb{P}\left(\Pi_t < \Pi_t^f\right)$$

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- **Private Benefit**: Manager receives a benefit from expanding the company size y_t.

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- **Private Benefit**: Manager receives a benefit from expanding the company size y_t.

- **Cost of Missing**: Board of directors introduces a cost to control manager's behavior.
  - Cost of missing depends on θ_π and proportional to the company size y_t.

- Parameter costs of missing targets θ_π chosen optimally to correct agency conflict.

Equilibrium in the model

1. Manager determines a p_t to maximize his utility conditional to the Π_t^f and θ_π

$$p_t^* := \arg\max V^M\left(p_t \mid \Pi_t^f, \theta_\pi\right).$$

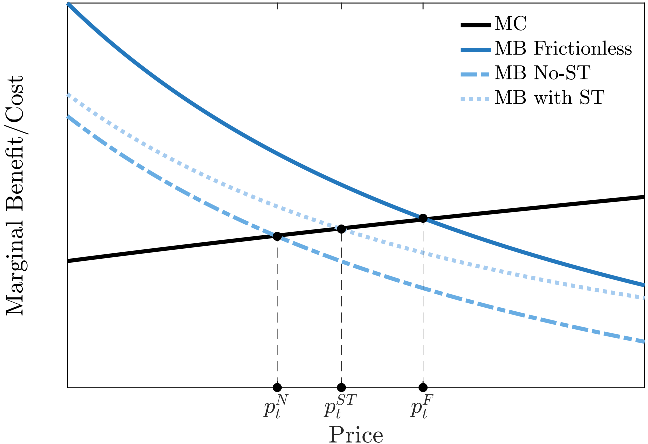
2. Analysts' forecasts are rational conditional to θ_π and information set

$$\Pi_t^f(\theta_\pi) = \mathbb{E}\left[\Pi_t(p_t^*)\right].$$

3. Board of directors sets the short-term cost

$$\theta_\pi^* := \arg\max V(p_t).$$

Short-termism and pricing decisions



$$\left(1-\eta\frac{p_t-c}{p_t}\right)-\frac{\eta}{p_t}\phi_e+\left[\theta_\pi\mathbb{P}\left(\Pi_t<\Pi_t^f\right)+\theta_\pi f_\nu\frac{\partial\Pi_t}{\partial p_t}\right]=\frac{1}{R}(\bar{p}-c)\frac{(\bar{b}\delta)^\theta}{\bar{p}^\eta}(\eta-1)\theta p_t^{(1-\eta)(\theta-1)}$$

Full Model

Heterogeneous firms

- In each period, there is unit mass of firms producing a differentiated product $y_{j,t}$.
- Firms face an isoelastic demand curve with parameter η:

$$y_{j,t} = e^{z_{j,t}} b_{j,t}^{\theta} p_{j,t}^{-\eta}, \quad 0 < \theta < 1 \text{ and } \eta > 1$$

- $z_{j,t} = \varepsilon_{j,t} + \nu_{j,t}$ is the sum of two i.i.d. exogenous demand shocks $z_{j,t} \sim_{\text{iid}} N(0, \sigma_z)$.
  - $\varepsilon_{j,t} \sim_{\text{iid}} N(0, \sigma_\varepsilon)$ is observed by the firms' manager when decisions are taken.
  - $\nu_{j,t} \sim_{\text{iid}} N(0, \sigma_\nu)$ is unobserved by the firms' manager when decisions are taken.
- $b_{j,t}$ is size of costumers according costumer capital accumulation, Gilchrist (2017):

$$b_{j,t+1} = (1-\delta) b_{j,t} + \delta p_{j,t} y_{j,t}, \quad 0 < \delta < 1$$

Heterogeneous firms

- Firm produces $y_{j,t}$ using a linear technology in labor $l_{j,t}$:

$$y_{jt} = a_{j,t} l_{j,t}$$

- $a_{j,t}$ is exogenous idiosyncratic productivity (observed only by manager).

$$a_{j,t} = \rho_a a_{j,t-1} + \sigma_a \varepsilon_{j,t}, \qquad \varepsilon_{j,t} \sim N(0,1)$$

- Firms' reported profits are revenues minus costs plus accruals manipulation $m_{j,t}$:

$$\Pi_{j,t} = p_{j,t} y_{j,t} - \frac{w_t}{a_{j,t}} y_{j,t} + m_{j,t}$$

Agency conflict and short-term incentives

- Risk-neutral manager determines $p_{j,t}$ and $m_{j,t}$ to maximize utility V^M.
- Manager receive a private benefit from expanding company size:

$$\text{Private Benefit } = \phi_e \frac{y_{j,t}}{a_{j,t}}$$

- Managers incur costs for failing to surpass analysts' earnings forecasts:

$$\text{Short-Term Costs } = \theta_\pi \frac{y_{j,t}}{a_{j,t}} \mathbb{P}\left(\Pi_{j,t} < \Pi^f_{j,t}\right)$$

- $\Pi^f_{j,t}$ are firms' expected profits of the analysts (observed by the manager prior decisions).

Manager problem and analysts' forecasts

- Risk-neutral manager determines $p_{j,t}$ and $m_{j,t}$ to maximize utility V^M:

$$V^M\left(a_{j,t}, \varepsilon_{j,t}, b_{j,t} \mid \theta_\pi, \Pi^f_{j,t}\right) = \max_{\{p_{j,t}, m_{j,t}\}} \left\{\theta_d \left(p_{j,t} y_{j,t} - \frac{w_t}{a_{j,t}} y_{j,t}\right) + \phi_e \frac{y_{j,t}}{a_{j,t}} - \phi_m m^2_{j,t} \right.$$
$$\left. - \theta_\pi \frac{y_{j,t}}{a_{j,t}} \mathbb{P}\left(\Pi_{j,t} < \Pi^f_{j,t}\right) + \frac{1}{R_t} \mathbb{E}_t V^M\left(a_{j,t+1}, \varepsilon_{j,t+1}, b_{j,t+1} \mid \theta_\pi, \Pi^f_{j,t}\right)\right\},$$

- Analysts determine expected profits Π^f_t to maximize:

$$\Pi^f_{j,t} = \arg\min_{\Pi^f_{j,t}} \mathbb{E}\left[\left(\Pi_{j,t} - \Pi^f_{j,t}\right)^2 \mid b_{j,t}\right] = \mathbb{E}\left[\Pi_{j,t} \mid b_{j,t}\right].$$

Firm value and optimal board control

- Value of a firm given manager policy $p^*_{j,t}$ and $m^*_{j,t}$ is:

$$V^F\left(a_{j,t},\varepsilon_{j,t},b_{j,t}\right)=\left[p^*_{j,t}y^*_{j,t}-\frac{w_t}{a_{j,t}}y^*_{j,t}+\frac{1}{R_t}\mathbb{E}_tV^F\left(a_{j,t+1},\varepsilon_{j,t+1},b^*_{j,t+1}\right)\right]$$

- Board of directors of each firm sets the short-term cost to maximize expected value:

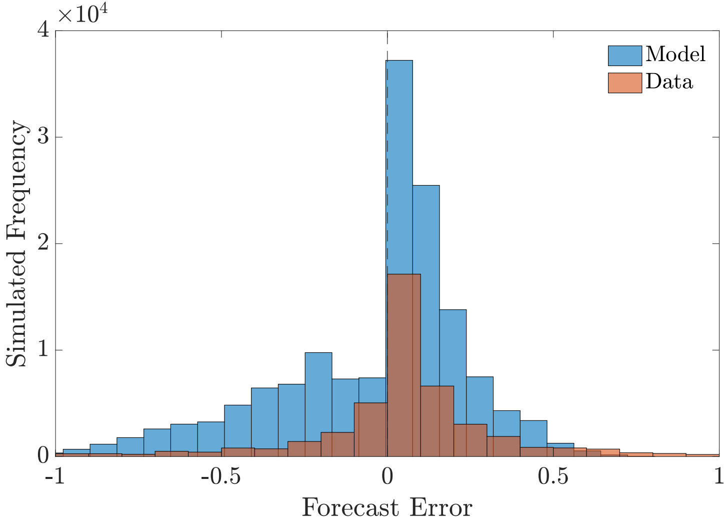
$$\theta^*_\pi:=\arg\max\int V^F\left(a_{j,t},\varepsilon_{j,t},b_{j,t}\right)d\Gamma^F\left(a_{j,t},\varepsilon_{j,t},b_{j,t}\right)$$

- $\Gamma^F\left(a_{j,t},\varepsilon_{j,t},b_{j,t}\right)$ is the firms' distribution that prevail in a frictionless world $(\phi_e=0)$.

Estimation and Identification

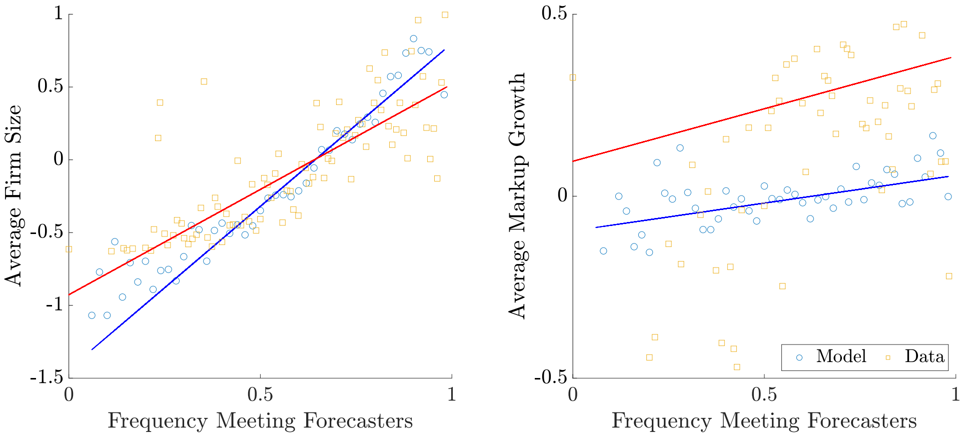
1. Calibrate a set of parameters following previous works in the literature.
    - Set the parameter $\delta = 0.08$, Glichrist et al. (2017).
    - Normaize eqm wage, proportional to demand elasticity, $\frac{\eta - 1}{\eta}$.
    - Discount factor $\beta = 0.96$, Moreira (2016).
2. Estimate the remaining 7 parameters using the Simulated Method of Moments (SMM).
3. Compute targeted moments, to be matched in the estimation. Moments and Parameters
    - Period spanning from 2003 to 2018, post Sarbanes-Oxley (SOX) Act in 2002.
    - Target a set of 12 empirical moments computed from quarterly Compustat/IBES.

Data vs Model: Forecast Error Distribution



- Forecast errors generated by the model closely aligns with the data estimates.

Data vs Model: Size and Markup Growth



- Model qualitatively replicates positive relationship between probability of beating forecasts' and size (left panel) and markup growth (right panel) at the firm level.

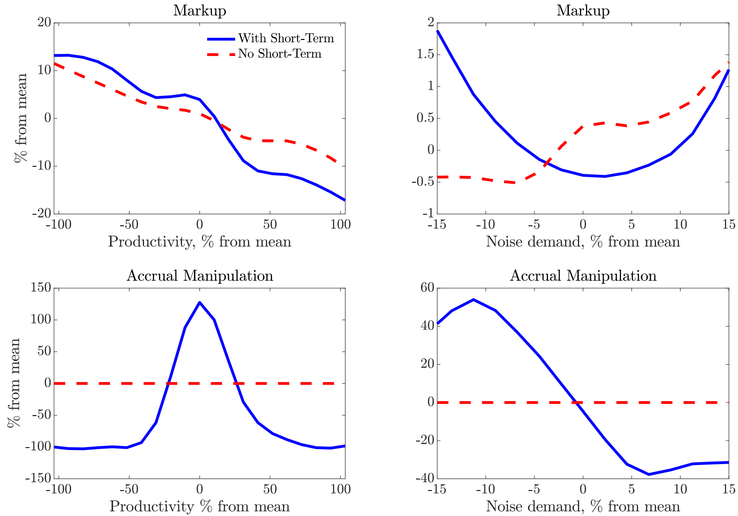
Data vs Model: Discontinuity at the Zero Forecast Error Threshold

	Model (1)	Model (2)	Data (3)	Data (4)
Mean Change at Cutoff (p.p.)	1.036**	1.062**	0.841***	0.790***
	(0.463)	(0.461)	(0.139)	(0.114)
Standardized (p.p.)	5.284	5.485	5.061	4.813
Firm, Quarter FEs	No	Yes	No	Yes
Mean $\lvert\Delta \log \mu\rvert$ (p.p.)	12.236	12.236	8.300	8.300
Median $\lvert\Delta \log \mu\rvert$ (p.p.)	8.402	8.402	3.179	3.179
Observations	139650	139650	79014	79014

$$\Delta \log \mu_{i,t} = \alpha_{1i} + \alpha_{2t} + \beta fe_{i,t} + \gamma fe_{it} \mathbb{1}(fe_{i,t} \geqslant 0) + \delta \mathbb{1}(fe_{i,t} \geqslant 0) + \varepsilon$$

- Model qualitatively replicates the discontinuity at the zero forecast error as in the data.
  - Results obtained from simulated data on 3000 firms for 50 quarters.

Manager Policy Functions



- Firms opportunistically raise markup and accruals to beat forecasts (i.e., *local effect*).
  - Effect of short-termism on markup can be negative at aggregate level (i.e., *mean effect*)

A. Micro Level (Firm)

Quantitative Impact	p.p.
A. Micro variable	
Mean markup increase from short-term pressure	8.043
Mean shareholders profit gain from short-term pressure	5.768
B. Macro variable	
Welfare loss from short term pressure	[3.474,5.959]
Market capitalization loss from short-term pressure	9.178
Average effect	-0.770
Distribution effect	9.948

- Sizeable increase in markup due to short-termism ($\approx$ 8%).
- Increase in average firms' profits of $\approx$ 38 mln $.

B. Macro Level (Aggregate)

Quantitative Impact	p.p.
A. Micro variable	
Mean markup increase from short-term pressure	8.043
Mean shareholders profit gain from short-term pressure	5.768
B. Macro variable	
Welfare loss from short term pressure	[3.474,5.959]
Market capitalization loss from short-term pressure	9.178
Average effect	-0.770
Distribution effect	9.948

- Loss of welfare in a range of $\approx 3.5 - 6\%$, due to short-termism.
- Loss in market cap of ≈ 3.1 tln of \$, due to short-termism.

Ergodic Distribution

Extensions of the Model

1. Decreasing Accruals Costs.
   - Cost of accruals is decreasing in firms' size as follow:

$$\Psi_{j,t} = \phi_m \left(\frac{m_{j,t}}{b_{j,t}} \right)^2 b_{j,t},$$

   - Larger firms prefer accrual manipulation rather than markup to meet earnings forecasts.
   - Lower impact of short-termism on macro aggregates.

2. Sales Benefit.
   - Private benefit and short-term cost are increasing with total sales.
   - Private benefit higher than in the benchmark model (higher short-term cost).
   - Higher impact of short-termism on macro aggregates.

3. CES demand, no customer base.
   - Same qualitative effect on pricing, but conceptually different.

Customer Accumulation vs CES

Conclusion

Conclusion

- Evidence of markup increase due to short-termism pressure:
  - Firms just meeting earnings' forecasts have higher markup growth than firms just miss.
  - Manipulation arising mainly from revenues rather than costs.

- Develop model with short-term frictions and endogenous markups:
  - Customer base, manager's private benefits and optimal board control.
  - Short-termism leads to higher level of markup, and lower sensitivity to interest rates.

- Quantitative dynamic model to study macro and micro implications.
  - Firm heterogeneity in idiosyncratic productivity.
  - Short-term frictions and endogenous markup.
  - The effects of short-termism on macro aggregates.

Appendix

A.1. Empirical Part

Other Measures of Firm-level Markup

- Our main measure of markups at the firm-quarter level is constructed as follow:

$$\mu_{it} = \widehat{\theta_{it}} \frac{\text{Sales}_{it}}{\text{Cost of goods sold}_{it}} = \widehat{\theta_{it}} \frac{\text{saleq}}{\text{cogsq}},$$

  where $\widehat{\theta_{it}}$ is downloaded directly from De Loecker et al.(2020).

- Alternatively, we define variable input to include also selling and general expenses as follow:

$$\mu_{it} = \theta_{it} \frac{\text{Sales}_{it}}{\text{Costs of goods sold + Overhead costs}_{it}} = \theta_{it} \frac{\text{saleq}}{\text{cogsq + xsgaq}},$$

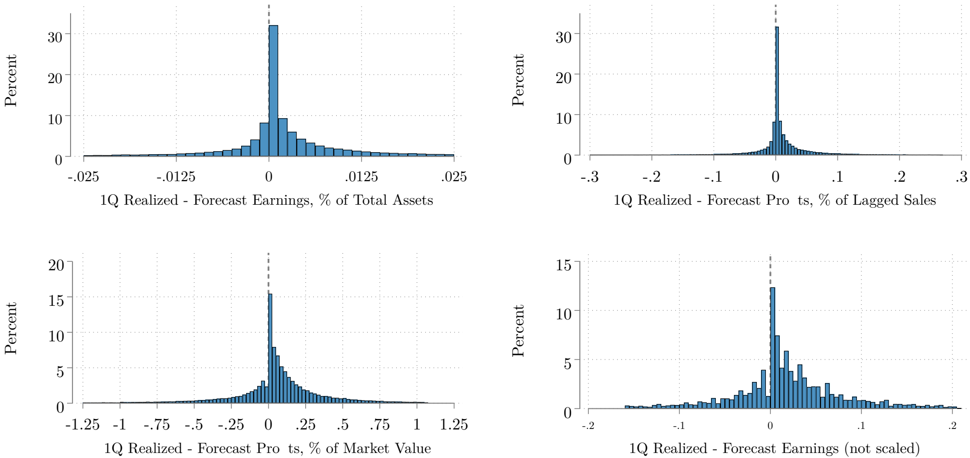
  where $\widehat{\theta_{it}}$ estimated including xsgaq in the definition of variable input.

- We also consider the gross-margin defined as follow:

$$\mu_{it} = 1 - \frac{\text{Costs of goods sold}_{it}}{\text{Sales}_{it}} = 1 - \frac{\text{cogsq}}{\text{saleq}}.$$

Return

Alternative Scales for Forecast Errors



- Bunching not affected by scaling measure (Burgstahler and Eames, 2006).

Return

Markup Residual (Inventory Growth)

We estimate the residual of markup growth not explained by inventory and we use it to compute the usual local linear regression.

	DEU (1)	DEU - Demean (2)	DEU - (Cogs+Xsga) (3)	Gross Margin (4)
Mean Change at Cutoff (p.p.)	0.826***	0.793***	0.911***	1.796***
	(0.110)	(0.116)	(0.100)	(0.161)
Firm, Quarter FEs	Yes	Yes	Yes	Yes
Observations	62237	62258	58882	59870

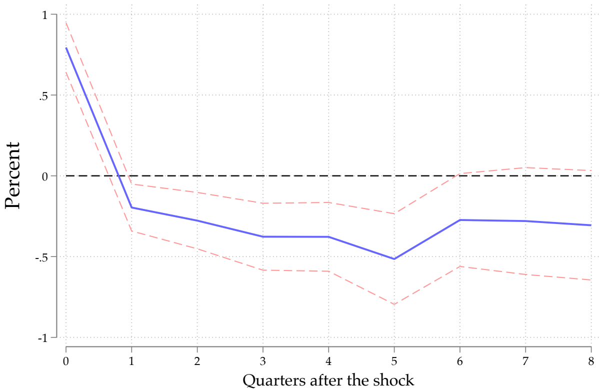
- Discontinuity robust when controlling markup change for inventory.

Return

Markup change over time

We run a local projection using the following specification for the entire time horizon.

$$\Delta \log \mu_{i,t+h-t} = \alpha_{1i} + \alpha_{2t} + \beta fe_{i,t} + \gamma fe_{it}\mathbb{1}(fe_{i,t} \geqslant 0) + \delta\mathbb{1}(fe_{i,t} \geqslant 0) + \varepsilon.$$



Return

Sectoral Correlations

We study how the sectoral (NAICS 5) heterogeneity of the markup discontinuity correlates with sector characteristics (standard deviation).

	HHI (1)	Elasticity (2)	Calvo (3)	Inventory (4)	Markup (5)
δ	0.153***	-0.218**	0.121*	-0.226***	0.469**
	(0.054)	(0.093)	(0.068)	(0.053)	(0.208)

- Correlations are statistically significant at standard level and qualitatively in line with economic intuition.

Return

Diversification on Markup Growth

We study how the sectoral (NAICS 5) heterogeneity of the markup discontinuity correlates with diversification.

- Column (1) - (2) $\Longrightarrow$ within industry, geographical area,
- Column (3) - (4) $\Longrightarrow$ within industry,geography, finance and accounting, regulation and legal compliance, business operations and miscellaneous.
- High HHI $\Longrightarrow$ lower degree of diversification on products.

	Below Median (1)	Above Median (2)	Below Median Ind (3)	Above Median Ind (4)
Mean Change at Cutoff (p.p.)	0.585***	1.109***	0.630***	0.948***
	(0.140)	(0.224)	(0.147)	(0.213)

- Smaller discontinuity for firms with lower degree of diversification.
- Consistent with literature saying that more diversified firms face lower short-term pressure (Hoberg and Phillips (2016); Hong et al. (2008); Morck et al. (1990)).

Return

Lagged Markup (Endogeneity Issues)

We estimate the residual of markup growth not explained by its lagged measure and we use it to compute the usual local linear regression.

	DEU (1)	DEU - Demean (2)	DEU - (Cogs+Xsga) (3)	Gross Margin (4)
Mean Change at Cutoff (p.p.)	0.760***	0.852***	0.846***	1.854***
	(0.114)	(0.123)	(0.098)	(0.150)
Firm, Quarter FEs	Yes	Yes	Yes	Yes
Observations	70405	70452	64330	66134

- Discontinuity robust to potential endogeneity issue, higher markup growth enabling to meet target.

Return

Measures of Markup

- Column (1) uses the preferred measure of markup (estimated using DEU and COGS as variable input) demeaned at the sector-quarter level.
- Column (2) uses markups estimated following DEU and using cost of good sold plus overhead costs as variable input.
- Column (3) proxies markups with the gross margin defined as $\mu_{it} = 1 - \frac{\text{Variable Costs}_{it}}{\text{Revenues}_{it}}$, where variable costs is the cost of of good sold (*cogs* in Compustat) and revenues is total sales (*saleq* in Compustat).

	DEU - Demean (1)	DEU - (Cogs+Xsga) (2)	Gross Margin (3)
Mean Change at Cutoff (p.p.)	0.839***	0.823***	1.776***
	(0.124)	(0.100)	(0.148)
Firm, Quarter FEs	Yes	Yes	Yes
Observations	76121	69533	71794

- Discontinuity robust to markup definitions.

Return

Measures of Forecast Errors

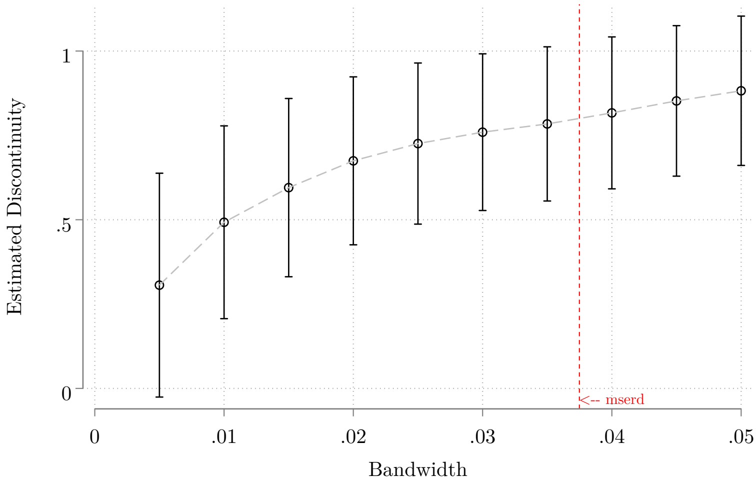
- Column (1): forecast errors as the differences between realized profits and the median analyst forecasts from IBES, scaled by firms' market value.
- Column (2): forecast errors as the differences between realized profits and the median analyst forecasts from IBES, scaled by firms' lagged sales.

	% Market Value (1)	% Lagged Sales (2)
Mean Change at Cutoff (p.p.)	0.756***	0.960***
	(0.122)	(0.087)
Firm, Quarter FEs	Yes	Yes
Observations	80174	80188

- Discontinuity robust to forecast error definitions.

Return

Local Linear Regression with Different Bandwidth



- Results are qualitatively the same if we select different bandwidths.

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Markup Growth - Boom vs Recession

	Boom	Recession	Difference
	(1)	(2)	(3)
Mean Change at Cutoff (p.p.)	0.718***	1.765***	
	(0.126)	(0.437)	
Difference in Mean Change at Cutoff (p.p.)			0.825***
			(0.145)
Firm, Quarter FEs	Yes	Yes	Yes
Observations	69306	6781	66083

- Discontinuity stronger in a period of recession, but nevertheless in line with main estimate.

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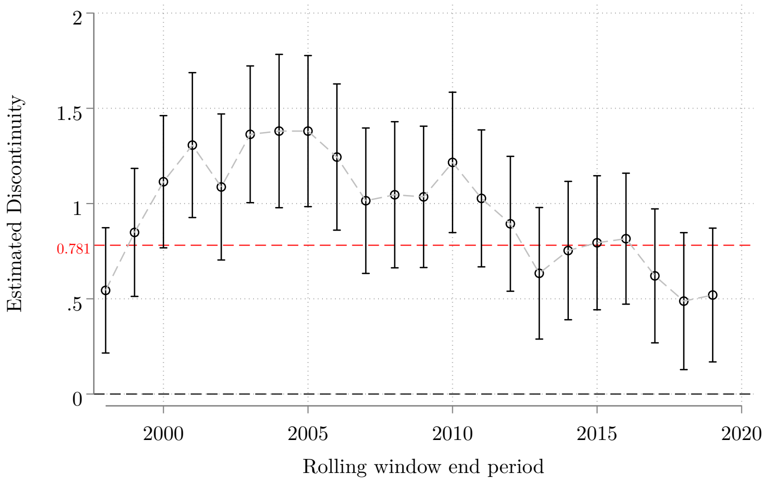
Estimated Discontinuity over Time



- Discontinuity stronger around 2005, but overall in line with average estimate.

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A.2. Model

Policy Function Algorithm I

- Guess short-term incentives θ_π;
  - Given analysts forecasts Π_t^f solve the managers' problem for a given θ_π:
    - i) Guess a value function for the manager the $V_0^M(a, \varepsilon, b)$;
    - ii) Find the policy function (b', m) that it solve the Bellman equation for each element in the grid;
    - iii) Calculate the new value function $V_1^M(a, \varepsilon, b)$;
    - iv) Update the value function and iterate until $\max ||V_1 - V_0||$ is arbitrary small;
- Update analysts forecasts Π_t^f given managers policies;
  - i) Calculate the implied firms' realized profits over the states;
  - ii) Calculate the expected profits $\Pi_{1,t}^f$ using the unconditional probabilities from the Transition matrix;
- Update the analysts forecasts and iterate until $\max ||\Pi_{1,t}^f - \Pi_{0,t}^f||$ is arbitrary small;
- Find the θ_π that maximizes the expected firm value using the frictionless ergodic distribution Γ^f;

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Policy Function Algorithm II

- Compute the implied mean firm value objective of boards given θ_π.
- If the board objective is optimized, realized short-term incentives θ_π^* are computed. If not, update the guess for θ_π and return to 1.a.
- Given a solution for b', m calculate the distribution Γ of firms over (a, ε, b) in the stationary equilibrium using Young et al. (2010).

A solution to this problem deliver the policy function for b', m and a policy functions over the space grid (a, ε, b). For the counter-factual experiments, we only solve the model without finding the short-term parameter θ_π in the algorithm.

Estimated parameters, targeted moments

A. Estimated parameters	Symbol	Estimate	(Std. Error)
Price elasticity of demand	η	1.7270	0.0024
Persistence of idiosyncratic productivity	ρ_a	0.8433	0.0009
Std of idiosyncratic productivity	σ_a	0.1852	0.0004
Std of observed demand shock	σ_e	0.0751	0.0005
Std of unobserved demand shock	σ_u	0.0338	0.0001
Quadratic manipulation cost	ϕ_m	1.6319	0.0894
Private benefit manager	ϕ_e	0.0293	0.0016
B. Targeted moments	**Data**	**(Std. Error)**	**Model**
Std. deviation of sales growth	0.1591	0.0029	0.2185
Correlation of sales growth, profits growth	0.4924	0.0148	0.0769
Correlation of sales growth, forecast error	0.0610	0.0066	0.1642
Std. deviation of profits growth	0.4921	0.0075	0.5584
Correlation of profits growth, markup growth	0.1784	0.0150	0.1884
Correlation of profits growth, forecast error	0.1082	0.0090	0.1771
Std. deviation of markup growth	0.0915	0.0028	0.1593
Correlation of markup growth, forecast error	0.0887	0.0074	0.2068
Std. deviation of forecast error	0.5707	0.0091	0.2485
Probability of meeting forecasts	0.7094	0.0028	0.7706
Probability of just meeting forecasts	0.7707	0.0046	0.8294
Mean of markup	1.5540	0.0189	1.6379

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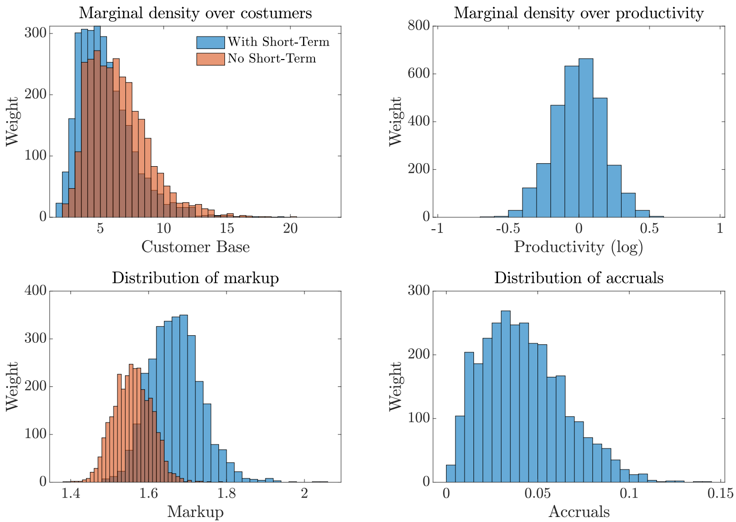
Ergodic Distribution



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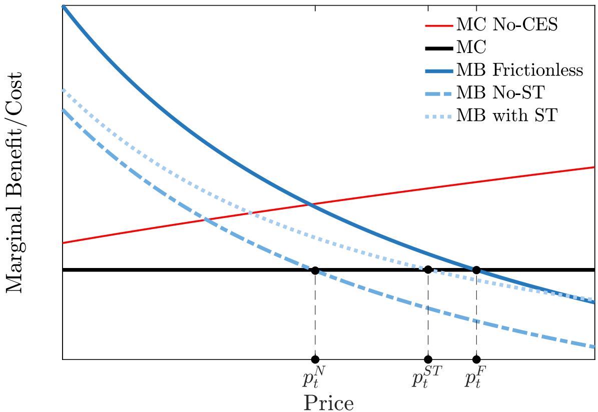
Customer Accumulation vs CES

We contrast our model specification with a standardstatic CES framework that does not incorporate customer capital, eliminating the investmentmotive within the framework.



- Marginal Cost of chaging price is now zero, no effect on customer base tomorrow.
- Same qualitative effects on pricing and markup.
- Absence ofany investing motifs clashes with the definition of short-termism itself.