Regulatory Costs of Being Public: Evidence from Bunching Estimation

Michael Ewens
Caltech & NBER

Kairong Xiao
Columbia

Ting Xu
UVA Darden

UVA FEBB
Feb 24, 2021

Motivation

- Regulation a key part of the costs of being public
- Central to the debate on public vs. private markets
- However, quantifying these regulatory costs is difficult

Motivation

- Regulation a key part of the costs of being public
- Central to the debate on public vs. private markets
- However, quantifying these regulatory costs is difficult
  - Survey: self-report bias (Coates & Srinivasan 2014, Parker 2018)
  - Text- or labor-based measures: doesn't quantify $ value
  - Event studies: most regulations are either anticipated or can be avoided through manipulation of firm size

Motivation

- Regulation a key part of the costs of being public
- Central to the debate on public vs. private markets
- However, quantifying these regulatory costs is difficult
  - Survey: self-report bias (Coates & Srinivasan 2014, Parker 2018)
  - Text- or labor-based measures: doesn't quantify $ value
  - Event studies: most regulations are either anticipated or can be avoided through manipulation of firm size

This paper

- Focus on disclosure and internal governance regulations
  - Major components of SEC regulations
  - Often activate when firms' public float exceeds a threshold
- Use bunching estimators to quantify the costs of these regulations

Why disclosure and internal governance regulations?

- Two fundamental goals of the Securities Act of 1933:
  1. Ensure investors receive financial and other significant information $\rightarrow$ **disclosure**
  2. Prohibit fraud and misrepresentations by firms $\rightarrow$ **internal governance**

Why disclosure and internal governance regulations?

- Two fundamental goals of the Securities Act of 1933:
  1. Ensure investors receive financial and other significant information $\rightarrow$ **disclosure**
  2. Prohibit fraud and misrepresentations by firms $\rightarrow$ **internal governance**

- Regulations that we don't study in this paper:
  - Regulations on trading and securities exchange (Securities Exchange Act of 1934)
  - Industry-specific regulations: financial, mining, etc.

Overview of this paper

- Exploit three regulatory thresholds based on public float
  - \$25m: scaled disclosure
  - \$75m: SOX 404 (internal control) exemption
  - \$700m: Emerging Growth Companies (a combination of disclosure and internal control reliefs)

Overview of this paper

- Exploit three regulatory thresholds based on public float
  - \$25m: scaled disclosure
  - \$75m: SOX 404 (internal control) exemption
  - \$700m: Emerging Growth Companies (a combination of disclosure and internal control reliefs)
- Document significant bunching below each of these thresholds
  - Firms manipulate float mainly by substituting debt for equity

Overview of this paper

- Exploit three regulatory thresholds based on public float
  - \$25m: scaled disclosure
  - \$75m: SOX 404 (internal control) exemption
  - \$700m: Emerging Growth Companies (a combination of disclosure and internal control reliefs)
- Document significant bunching below each of these thresholds
  - Firms manipulate float mainly by substituting debt for equity
- Develop a model to translate float distortion to firm value loss
  - Map leverage distortion to value loss based on Binsbergen et al. (2011)

Overview of this paper

- Exploit three regulatory thresholds based on public float
  - \$25m: scaled disclosure
  - \$75m: SOX 404 (internal control) exemption
  - \$700m: Emerging Growth Companies (a combination of disclosure and internal control reliefs)
- Document significant bunching below each of these thresholds
  - Firms manipulate float mainly by substituting debt for equity
- Develop a model to translate float distortion to firm value loss
  - Map leverage distortion to value loss based on Binsbergen et al. (2011)
- Use our estimated regulatory costs to study IPO and going private decisions
  - Regulatory costs significantly impact going public. No effect going private.
  - Counterfactual IPO volumes under different regulatory scenarios

Institutional Background

Float-based regulations

Many SEC regulations trigger when firms cross certain public float threshold

Float-based regulations

Many SEC regulations trigger when firms cross certain public float threshold

1. Scaled disclosure:
   - 1992-2007 for firms <$25m (SBI), 2008- for firms <$75m (SRC)
   - Pared down disclosure for 13+ disclosure items scaled diclosure items

Float-based regulations

Many SEC regulations trigger when firms cross certain public float threshold

1. Scaled disclosure:
   - 1992-2007 for firms <$25m (SBI), 2008- for firms <$75m (SRC)
   - Pared down disclosure for 13+ disclosure items scaled diclosure items
2. Non-accelerated filing
   - 2003- for firms <$75m
   - 15-day (10-day) delay in filing 10-K (10-Q)

Float-based regulations

Many SEC regulations trigger when firms cross certain public float threshold

1. Scaled disclosure:
   - 1992-2007 for firms <\$25m (SBI), 2008- for firms <\$75m (SRC)
   - Pared down disclosure for 13+ disclosure items scaled diclosure items
2. Non-accelerated filing
   - 2003- for firms <\$75m
   - 15-day (10-day) delay in filing 10-K (10-Q)
3. SOX 404 exemption
   - 2002- for firms <\$75m
   - Exempt from SOX internal control and auditor attestation (costliest part of SOX)

Float-based regulations

Many SEC regulations trigger when firms cross certain public float threshold

1. Scaled disclosure:
   - 1992-2007 for firms <$25m (SBI), 2008- for firms <$75m (SRC)
   - Pared down disclosure for 13+ disclosure items scaled diclosure items
2. Non-accelerated filing
   - 2003- for firms <$75m
   - 15-day (10-day) delay in filing 10-K (10-Q)
3. SOX 404 exemption
   - 2002- for firms <$75m
   - Exempt from SOX internal control and auditor attestation (costliest part of SOX)
4. Emerging Growth Companies
   - 2012- for firms <$700m (and public age<5 & revenue<$1b)
   - Part of JOBS Act. Benefits include: scaled disclosure, 404(b) exemption, delayed compliance with new accounting rules, shorter registration statements.

Summary of thresholds and identified regulations

Time period	Scaled Disclosure	Non-accelerated filing	SOX 404 exempt	Emerging Growth Company (EGC)
1992–2002	$<$ \$25 mil			
2003–2007	$<$ \$25 mil	$<$ \$75 mil	$<$ \$75 mil	
2008–2011	$<$ \$75 mil	$<$ \$75 mil	$<$ \$75 mil	
2012–2018	$<$ \$75 mil	$<$ \$75 mil	$<$ \$75 mil	$<$ \$700 mil

Summary of thresholds and identified regulations

Time period	Scaled Disclosure	Non-accelerated filing	SOX 404 exempt	Emerging Growth Company (EGC)
1992–2002	$< \$25$ mil			
2003–2007	$< \$25$ mil	$< \$75$ mil	$< \$75$ mil	
2008–2011	$< \$75$ mil	$< \$75$ mil	$< \$75$ mil	
2012–2018	$< \$75$ mil	$< \$75$ mil	$< \$75$ mil	$< \$700$ mil

Thresholds	**$25 mil**	**$75 mil**	**$700 mil**
Bunching period	1994-2007	2003-2007	2012-2018
Non-bunching period	2009-2018	1994-2002	1997-2011
Regulatory benefits	Scaled disclosure	SOX 404 exempt + filing delay	EGC benefits

Public float data

- All these regulations share a common criterion—**public float**
  - SEC's definition: aggregate worldwide market value of a firm's voting and non-voting common equity held by non-affiliates (i.e., excluding large shareholders or top management)
  - Calculated within 60-day of fiscal year end before 2002, and at the end of 2nd fiscal quarter after 2002
  - Precisely disclosed in firm's 10-K filing

Public float data

- All these regulations share a common criterion—**public float**
  - SEC's definition: aggregate worldwide market value of a firm's voting and non-voting common equity held by non-affiliates (i.e., excluding large shareholders or top management)
  - Calculated within 60-day of fiscal year end before 2002, and at the end of 2nd fiscal quarter after 2002
  - Precisely disclosed in firm's 10-K filing

Example: Apple's 2018 10-K

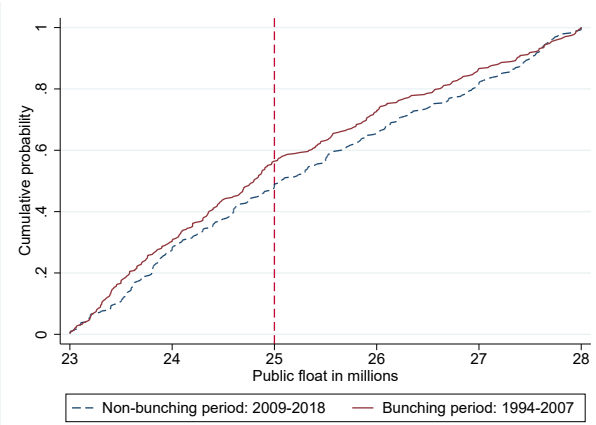
The aggregate market value of the voting and non-voting stock held by non-affiliates of the Registrant, as of March 30, 2018, the last business day of the Registrant's most recently completed second fiscal quarter, was approximately $828,880,000,000. Solely for purposes of this disclosure, shares of common stock held by executive officers and directors of the Registrant as of such date have been excluded because such persons may be deemed to be affiliates. This determination of executive officers and directors as affiliates is not necessarily a conclusive determination for any other purposes.

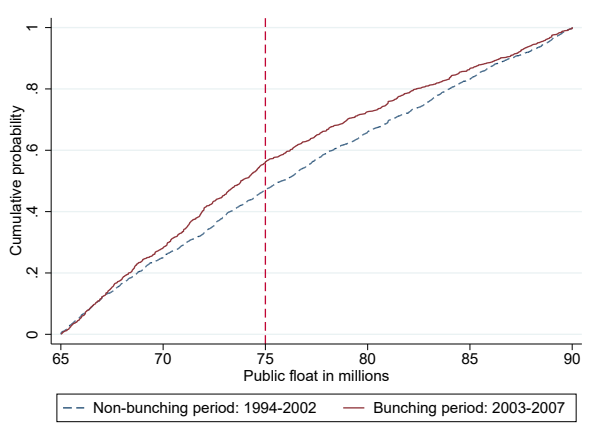
- We use a proprietary script to scrape public float from 10-Ks (including 10-KSB, 10-KT, and 10-K405) for the period of 1994-2018

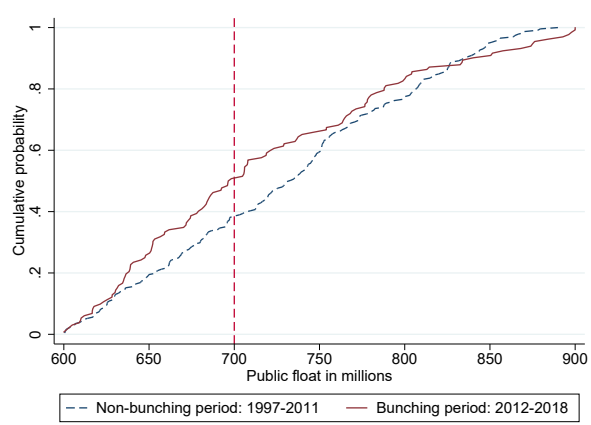
Empirical Facts

Fact 1: Bunching at three regulatory thresholds

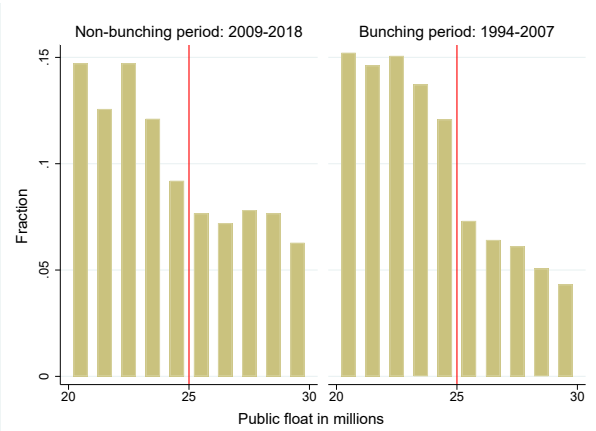
CDF

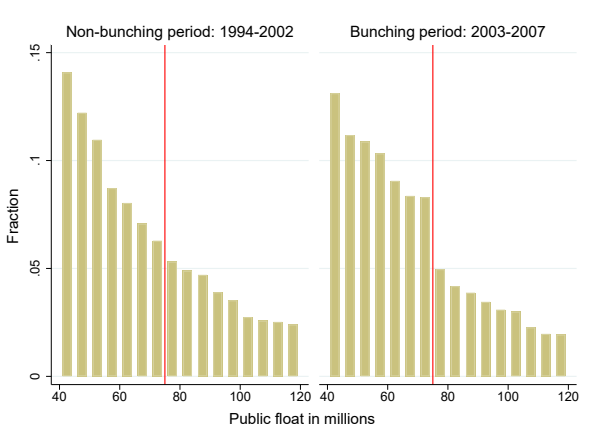


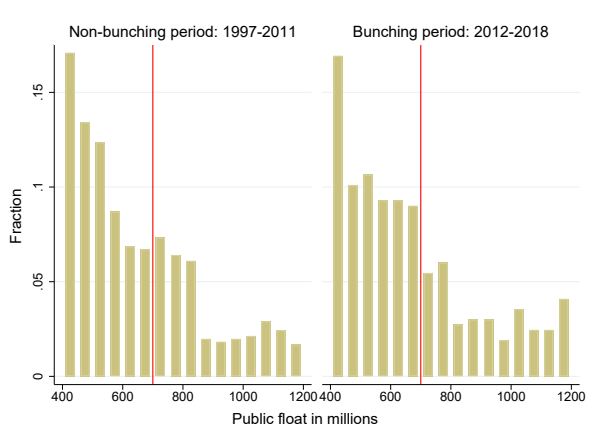




Histogram







Fact 1: Bunching at three regulatory thresholds

- Bunching below \$75M and \$700M thresholds were also documented in prior studies (Gao et al 2009, Dharmapala 2016, Khaled and Moon 2020)
- Bunching itself provides strong evidence that regulations triggered by these thresholds impose significant costs that outweigh the benefits of compliance
- The extent of bunching identifies the magnitude of regulatory costs
- Bunching means regulations are **privately costly** for the regulated firms. Does not necessarily mean that regulations are **socially costly** $\rightarrow$ regulators objective function

Fact 2: Margins of manipulation — mainly through leverage

Dep. var.	Δ *Book leverage* (1)	Δ *Investment1* (2)	Δ *Investment2* (3)	Δ *Investment3* (4)	Δ *Non-aff. own.* (5)
			Panel A: $25m threshold		
Below $25m × Bunching years	0.113*	0.021	0.008	-0.033	-0.149
	[0.060]	[0.023]	[0.024]	[0.038]	[0.189]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes
N	1,484	1,368	1,362	1,296	772
Adj. R-sq	-0.003	0.026	0.019	0.026	0.046
Mean of dep. var. in level	0.248	0.059	0.132	0.197	0.933
			Panel B: $75m threshold		
Below $75m × Bunching years	0.024***	-0.004	-0.011	-0.013	-0.009
	[0.006]	[0.010]	[0.012]	[0.014]	[0.034]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes
N	3,633	3,531	3,508	3,331	2,717
Adj. R-sq	-0.005	0.002	0.001	-0.001	0.002
Mean of dep. var. in level	0.169	0.051	0.096	0.140	0.753
			Panel C: $700m threshold		
Below $700m × Bunching years	0.075**	-0.004	0.003	-0.006	0.053
	[0.028]	[0.022]	[0.043]	[0.048]	[0.048]
Year FE and SIC2 FE	Yes	Yes	Yes	Yes	Yes
N	230	228	222	222	197
Adj. R-sq	0.065	0.11	0.09	0.091	0.002
Mean of dep. var. in level	0.189	0.073	0.142	0.203	0.765

Bunching Estimation Model

Bunching estimation

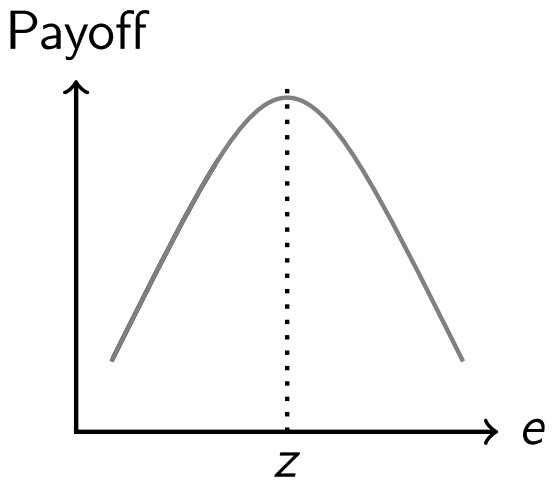
- Bunching estimation exploits policy-induced discontinuity in the payoff function

$$\max_{e} -\Phi(e - z) - k\mathbf{1}_{\{e \geq \underline{e}\}}$$

  - Φ is the cost of capital structure distortion (from Van Binsbergen et al. 2011)
  - e is actual equity; z is optimal undistorted equity
  - $\underline{e}$ is regulatory threshold for equity
  - k is regulatory costs

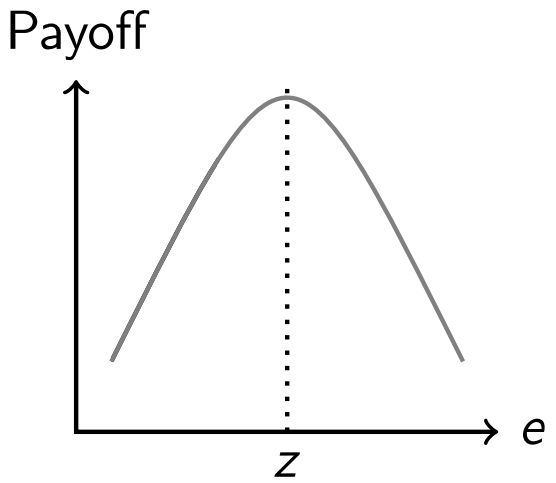
- Firms trade off Φ and k, choosing whether to bunch.
- Bunching estimation infers k from firms' choice.

Bunching estimation

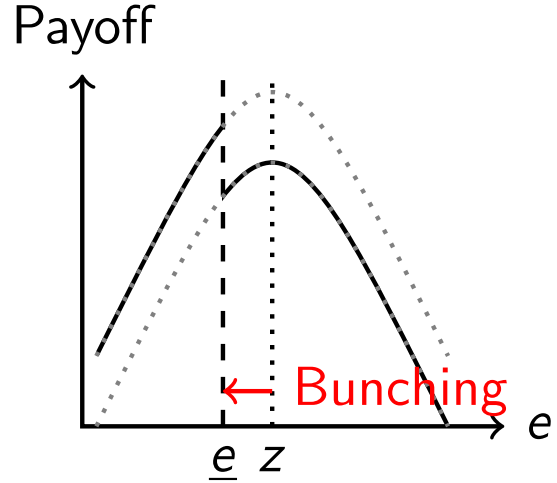


(a) No regulatory threshold

Bunching estimation

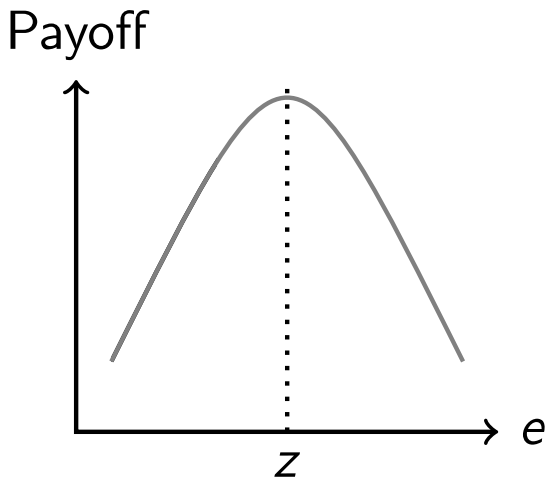


(a) No regulatory threshold

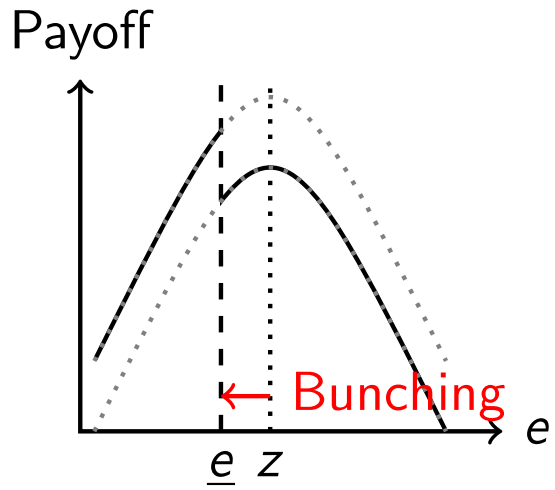


(b) Bunching at regulatory threshold

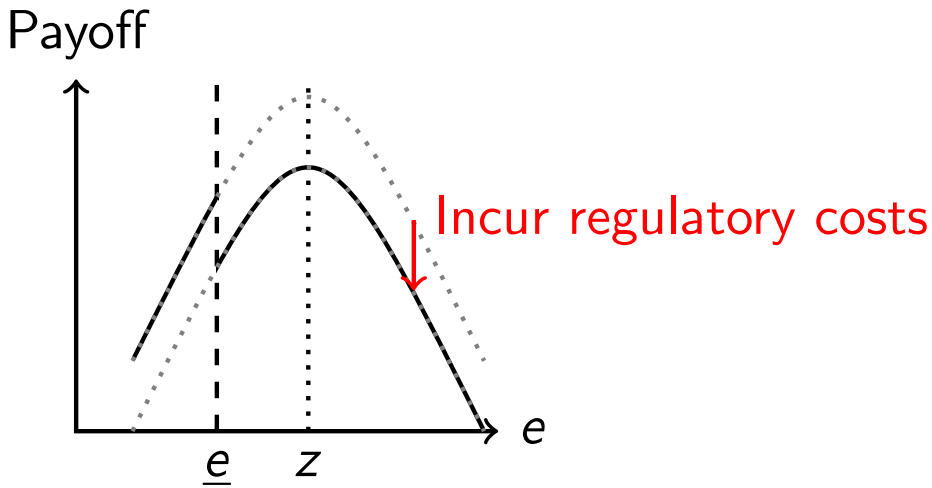
Bunching estimation



(a) No regulatory threshold

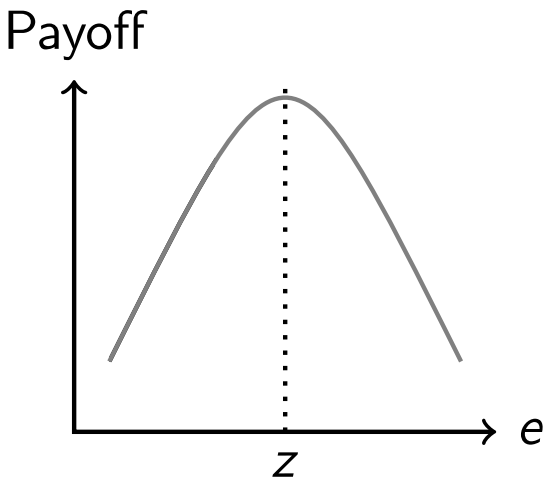


(b) Bunching at regulatory threshold

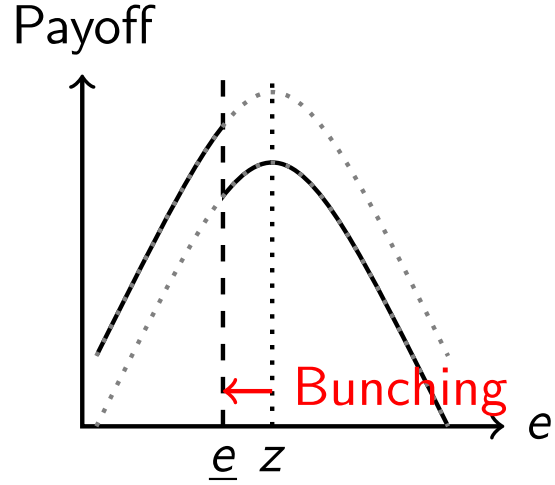


(c) No bunching

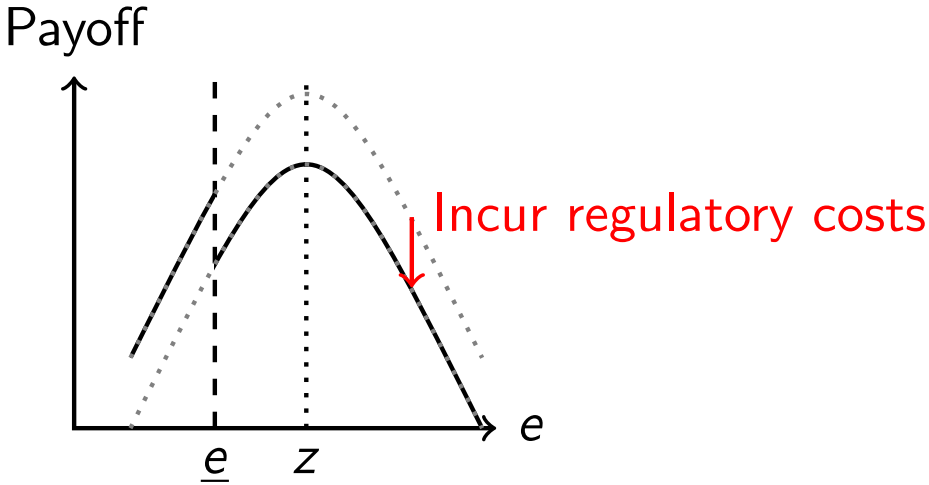
Bunching estimation



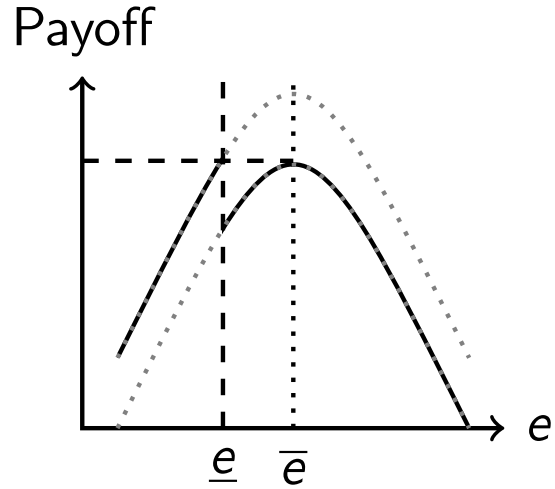
(a) No regulatory threshold



(b) Bunching at regulatory threshold

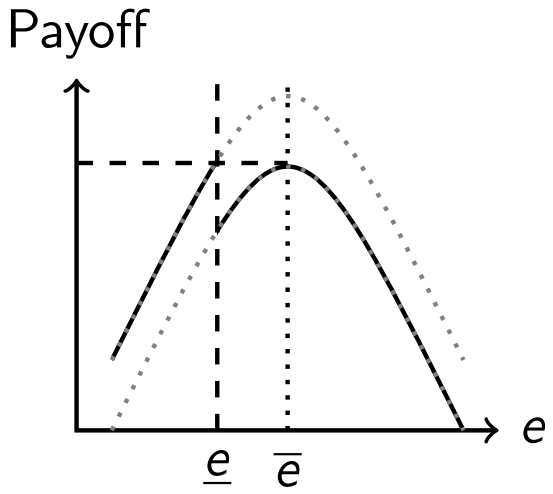


(c) No bunching



(d) Indifferent: marginal buncher

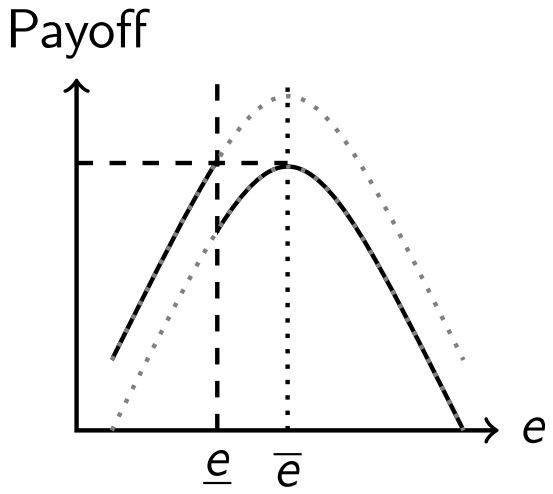
The marginal firm: indifferent between bunching or not



- Indifference condition of the marginal bunching firm

$$k = \Phi\left(\underline{e} - \overline{e}\right)$$

The marginal firm: indifferent between bunching or not



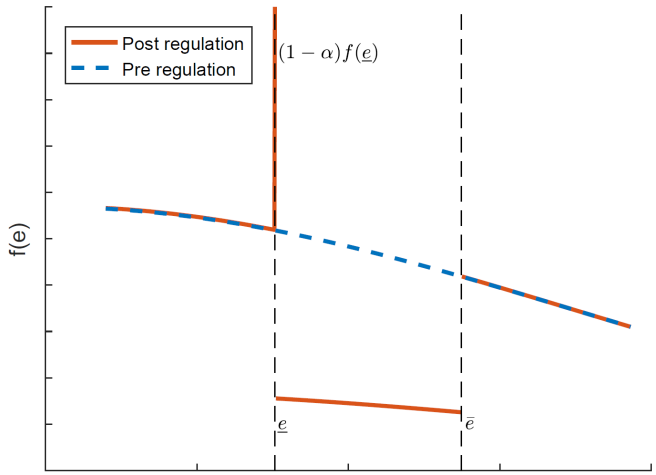
- Indifference condition of the marginal bunching firm

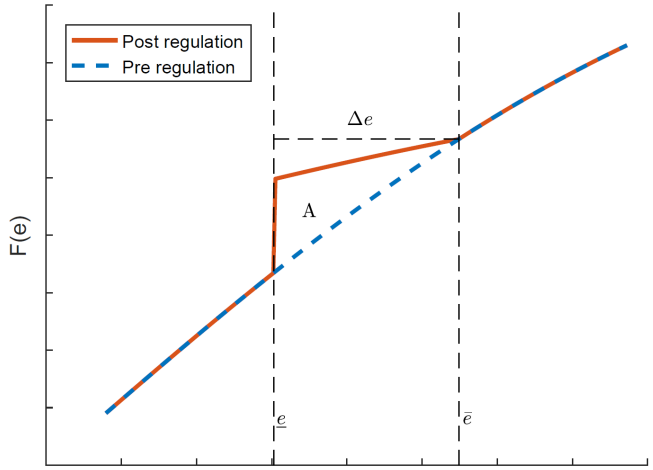
$$k = \Phi\left(\underline{e} - \overline{e}\right)$$

  - In public finance: know policy cost k (e.g. tax schedule), identify parameter in Φ (e.g. labor supply elasticity)
  - This paper: know Φ, identify the policy cost k (e.g. regulatory costs)

Step 1: Find the marginal bunching firm

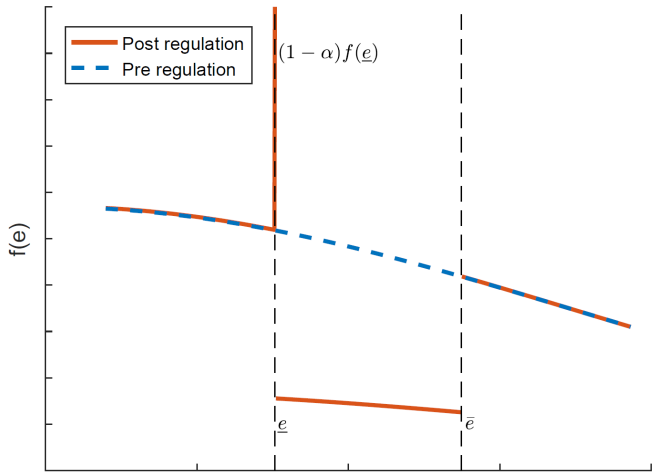
PDF and CDF in theory:

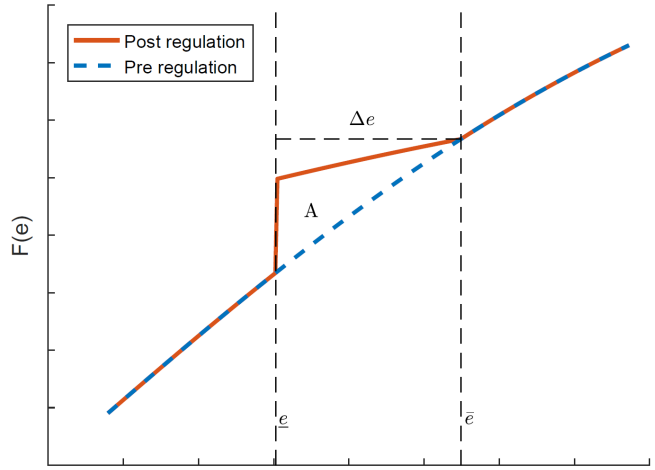




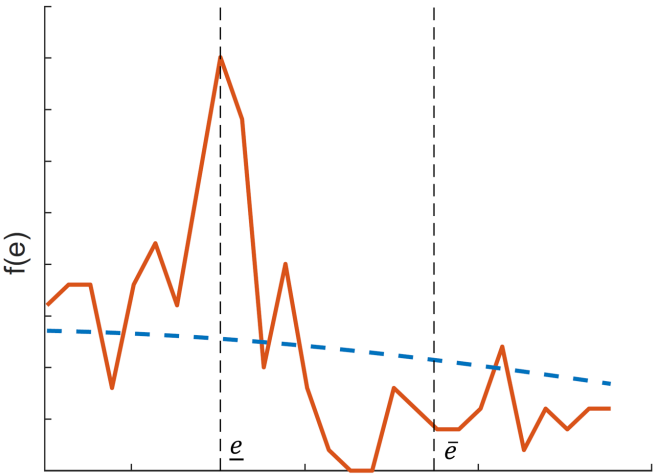
Step 1: Find the marginal bunching firm

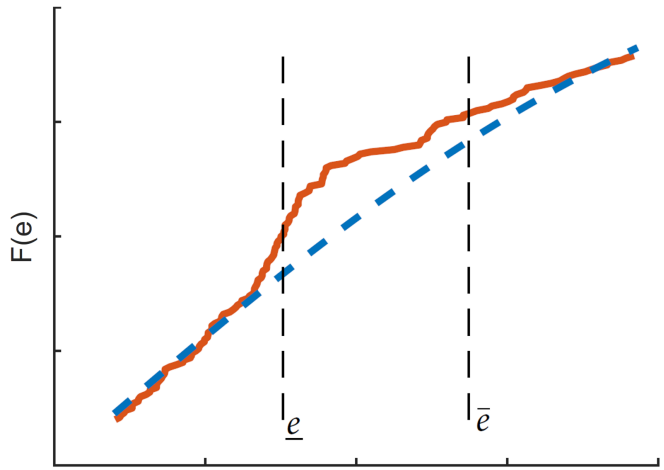
PDF and CDF in theory:





PDF and CDF with noisy data:

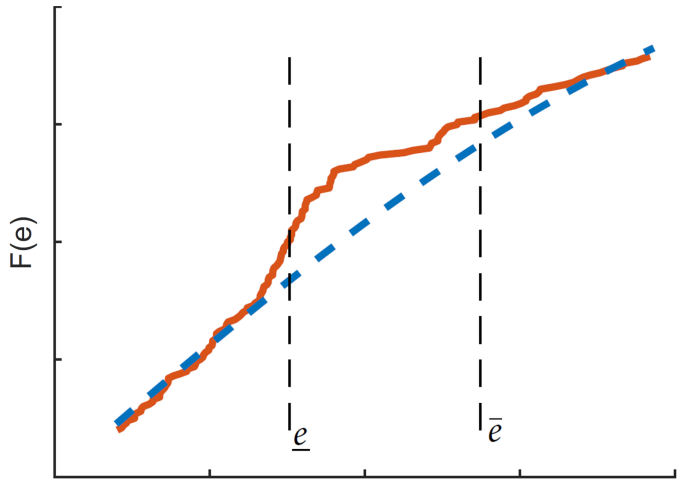




Step 1: Find the marginal bunching firm

- Validity of bunching estimator relies on the **"smoothness assumption"**: counterfactual distribution is smooth in the absence of regulation

- Advantages of **fuzzy bunching estimator**: when sample size is small, CDF much smoother and more robust than PDF (not sensitive to bin size)



- Use a fuzzy bunching estimator (Alvero and Xiao 2020) to find $\overline{e}$

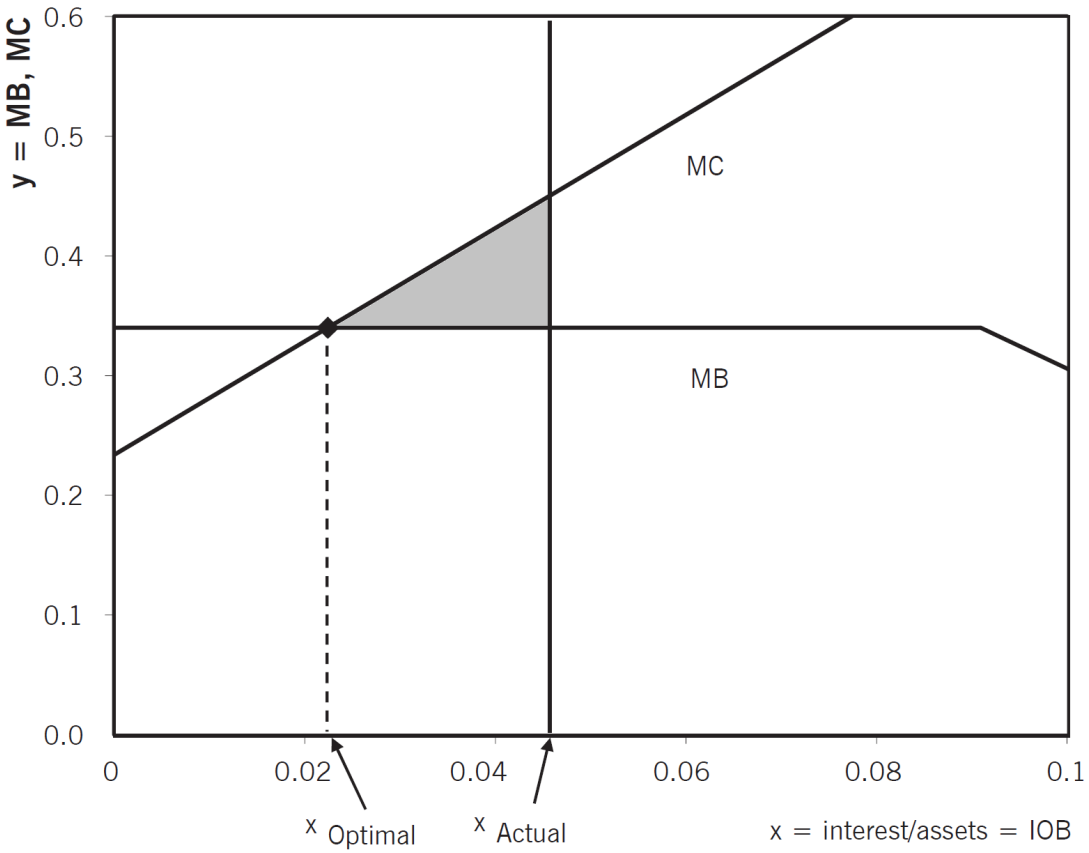
$$\overline{e} = \underline{e} + \sqrt{\frac{2\int (F(e) - F_0(e))\, de}{(1-\alpha) f_0(\underline{e})}}$$

where α is the fraction of non-optimizing firms: $\hat{\alpha} = \frac{2(F(\overline{e})-F(\underline{e}))}{f_0(\underline{e})(\overline{e}-\underline{e})} - 1$

Step 2: Translate bunching to regulatory costs

- Use the marginal cost of debt function from Binsbergen, Graham & Yang (2011) to estimate the dollar cost of leverage distortion

$$MC\,(IOB) = \gamma + \beta \times IOB$$



Step 2: Translate bunching to regulatory costs

- Use the marginal cost of debt function from Binsbergen, Graham & Yang (2011) to estimate the dollar cost of leverage distortion
- A sufficient statistic formula for regulatory costs k:

$$k = \Phi\left(\underline{e} - \overline{e}\right) = \frac{1}{2}\beta\eta q r^2 \left(1 - \frac{\underline{e}}{\overline{e}}\right)^2 \overline{e}$$

  - $\overline{e}$: estimated float of the marginal bunching firm
  - $\beta = 4.733$ (slope of marginal cost of debt)
  - η: public float-to-book asset ratio
  - q: Tobin's Q
  - r: interest rate on debt

Step 2: Translate bunching to regulatory costs

- Use the marginal cost of debt function from Binsbergen, Graham & Yang (2011) to estimate the dollar cost of leverage distortion
- A sufficient statistic formula for regulatory costs k:

$$k = \Phi\left(\underline{e} - \overline{e}\right) = \frac{1}{2}\beta\eta q r^2 \left(1 - \frac{\underline{e}}{\overline{e}}\right)^2 \overline{e}$$

  - $\overline{e}$: estimated float of the marginal bunching firm
  - $\beta = 4.733$ (slope of marginal cost of debt)
  - η: public float-to-book asset ratio
  - q: Tobin's Q
  - r: interest rate on debt
- Parameters estimated from firms just above the marginal buncher's float.
  - Robust to using firms around the marignal buncher, or locally estimated β.

What does our estimated regulatory costs (k) capture?

- Captures:
  - Direct costs of regulation (e.g. lawyer fees etc.)
  - $+$ Indirect costs of regulation (e.g. productivity loss)
  - $-$ Private benefits of regulation accruable to firms (e.g. lower cost of capital, signaling)
- Does not capture:
  - Social benefits of regulation (e.g. investor welfare gain)
  - General equilibrium effects of regulation (e.g. effect on competition)
- Policy makers can compare our net cost estimate with a regulation's social benefit
  - Caveat: our methodology only applies to threshold-based regulations, not uniformly implemented regulations major non-threshold regulations

Bunching Estimates

Estimated results

Threshold	$ 25 mil	$ 75 mil	$ 700 mil
		Panel A: Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404 + filing delay	EGC benefits
		Panel B: Estimates	
Regulatory costs (k)	**0.026 [0.008]**	**0.122 [0.027]**	**0.743 [0.361]**
Marginal firm ($\bar{e}$)	27.041 [0.383]	94.566 [2.788]	841.468 [36.861]
Δ Leverage	0.056 [0.010]	0.108 [0.015]	0.074 [0.019]
PV(k)/Firm value	0.62%	0.73%	0.80%
k/Total assets	0.18%	0.10%	0.13%
k/EBITDA	7.78%	1.31%	2.39%

Compare with existing estimates

- Scaled disclosure: \$0.026m for firm of \$27m float
  - Structural estimate from Cheynel and Liu-Watts (2020): \$0.038m
- SOX 404: \$0.122m for firm of \$94.6m float
  - SEC (2011) survey SOX 404 audit fee: \$0.15m
  - Iliev (2010) RDD estimate of audit fee increase: \$0.132m
- No existing estimates of EGC benefits
- Our estimates are generally 10% - 40% smaller
  - Our estimates are *net* costs, i.e., incorporating the benefits of regulation available to firms (e.g. lower cost of capital)
  - Firms tend to inflate self-reported costs

Extrapolate Estimates from Marginal Firms to Other Firms

Extrapolate to firms of other sizes

- Estimate cost structure (fixed vs variable) from existing regulatory cost data:

$$\ln(\text{Compliance costs}_{i,t}) = \kappa \ln(\text{Public float}_{i,t}) + \delta_t + \epsilon_{i,t}$$

  - SEC (2011) survey: SOX 404 internal control costs (κ=0.456) κ estimate
  - Pre-SOX audit fees: disclosure cost (κ=0.412)
  - Post-SOX audit fees: internal control + disclosure costs (for EGC) (κ=0.423)

- Extrapolation:

$$\ln k = \ln \overline{k} + \kappa(\ln e - \ln \overline{e})$$

Extrapolate to firms of other sizes

- Estimate cost structure (fixed vs variable) from existing regulatory cost data:

$$\ln(\text{Compliance costs}_{i,t}) = \kappa \ln(\text{Public float}_{i,t}) + \delta_t + \epsilon_{i,t}$$

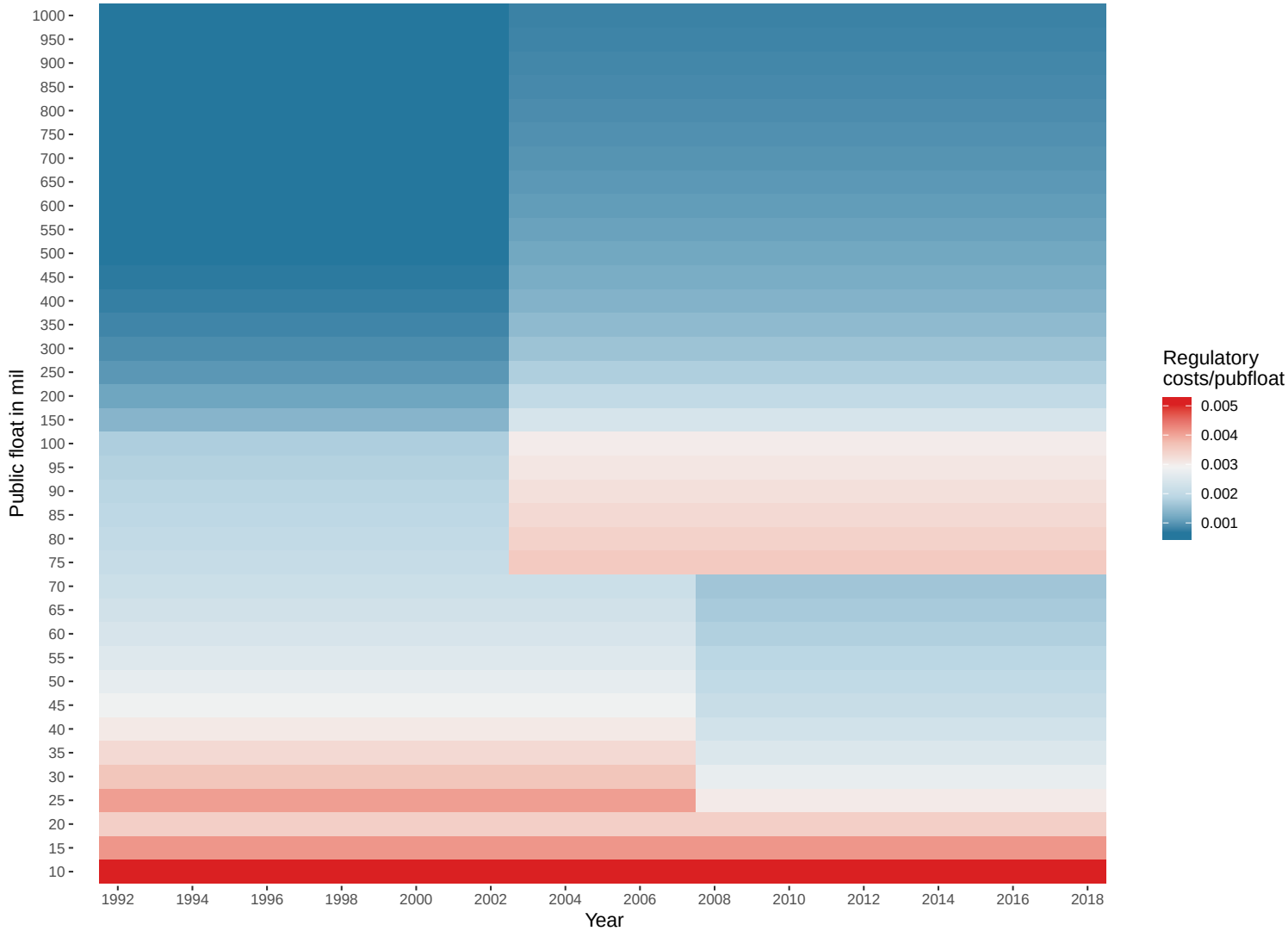
  - SEC (2011) survey: SOX 404 internal control costs (κ=0.456) κ estimate
  - Pre-SOX audit fees: disclosure cost (κ=0.412)
  - Post-SOX audit fees: internal control + disclosure costs (for EGC) (κ=0.423)

- Extrapolation:

$$\ln k = \ln \overline{k} + \kappa(\ln e - \ln \overline{e})$$

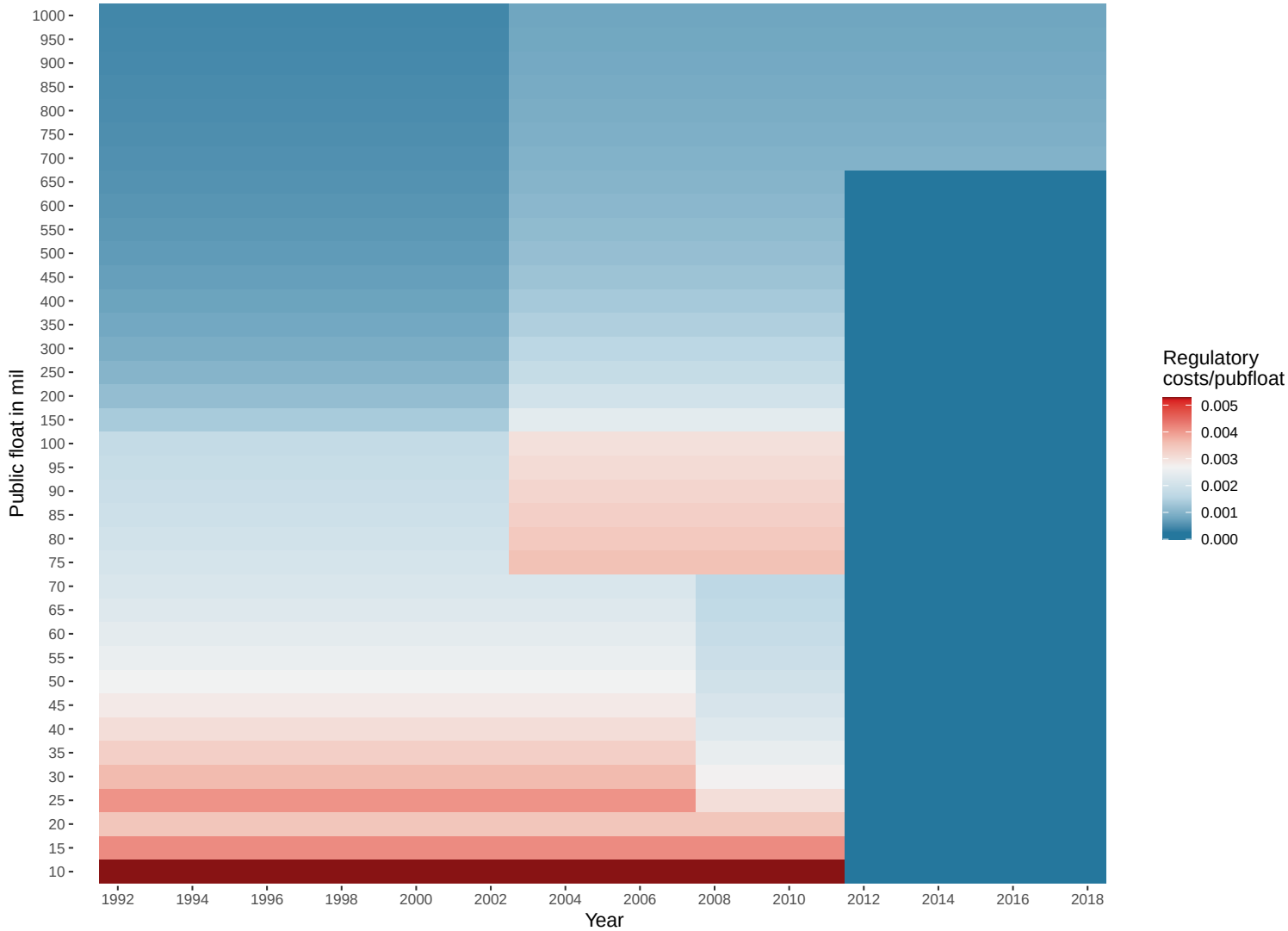
- Extrapolated costs:
  - $\ln(k_{404+\text{filing delay}}) = \ln(0.122 \times 10^6) + 0.456\left(\ln(e) - \ln(94.57 \times 10^6)\right)$
  - $\ln(k_{i\_\text{SD}}) = \ln(0.026 \times 10^6) + 0.412\left(\ln(e) - \ln(27.04 \times 10^6)\right)$
  - $\ln(k_{i\_\text{EGC}}) = \ln(0.743 \times 10^6) + 0.423\left(\ln(e) - \ln(841.5 \times 10^6)\right)$

Regulatory costs scaled by float: public age>5



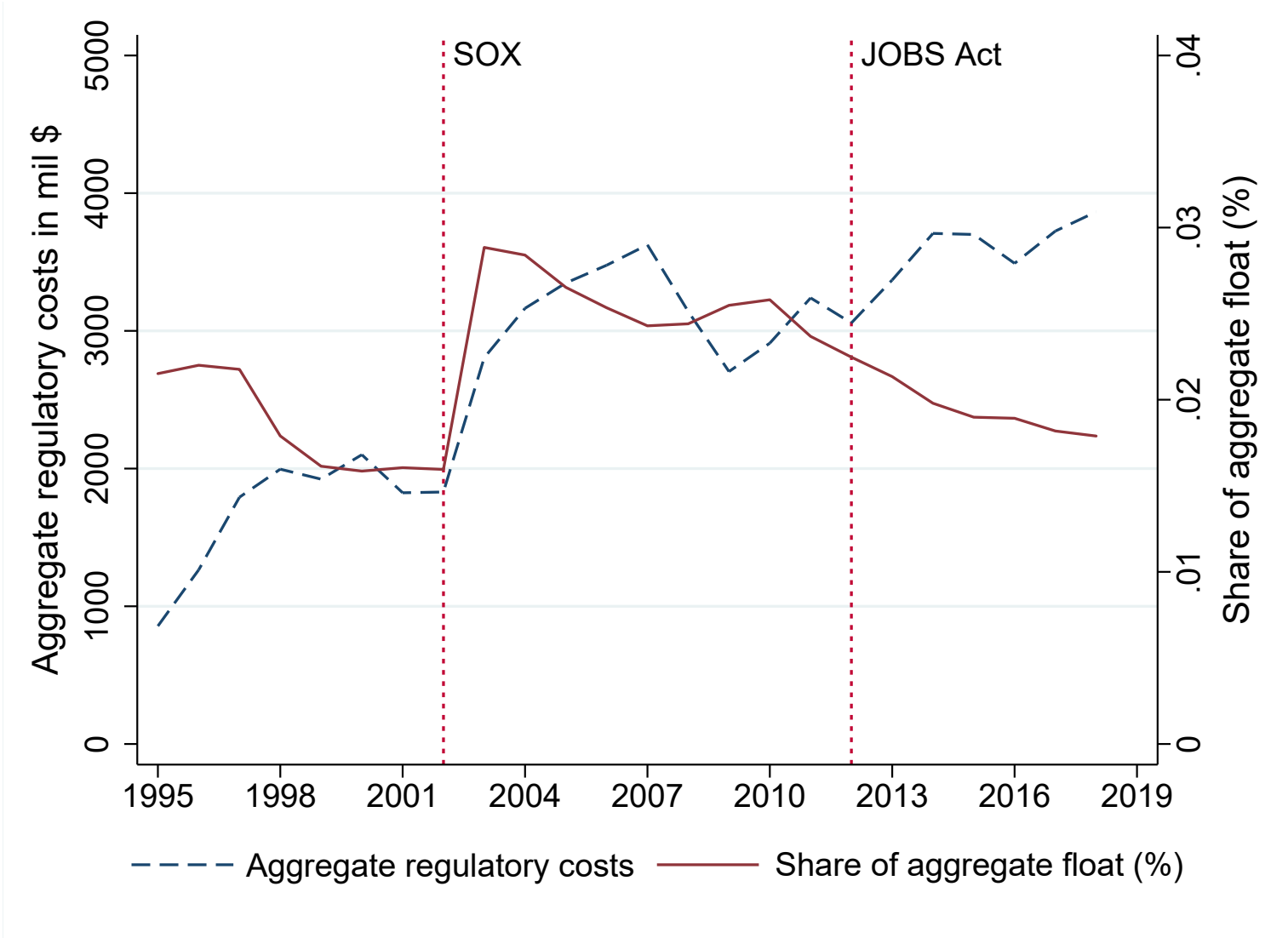
- The median US public firm spends 4.3% of its public float on our estimated regulations

Regulatory costs scaled by float: public age<=5



- The median US public firm spends 4.3% of its public float per year on our estimated regulations

Aggregate regulatory costs for all US public firms



Robustness

- Alternative bunching period for the \$75M threshold 75M robustness
  - 2008-2018 identifies the combined value of 404 exemption, filing delay, and scaled disclosure
  - \$0.162M for the marginal firm $\approx$ \$0.122M (404 exempt+filing delay) + \$0.044M (SD extrapolated from \$25M threshold)
- Dropping financial and utility firms drop fin. & utility
  - Estimates show these firms have similar disclosure costs, higher internal control costs
- Alternative counterfactual distributions drop 2 years
  - Drop 2 years before regulatory change to address potential anticipation
- Alternative parameter choices local β alt. parameters
  - Estimate local β (marginal cost of debt) by replicating Binsbergen et al. (2010) on firms around thresholds
  - Estimate η, q, and r from firms *around* the float of the marginal buncher

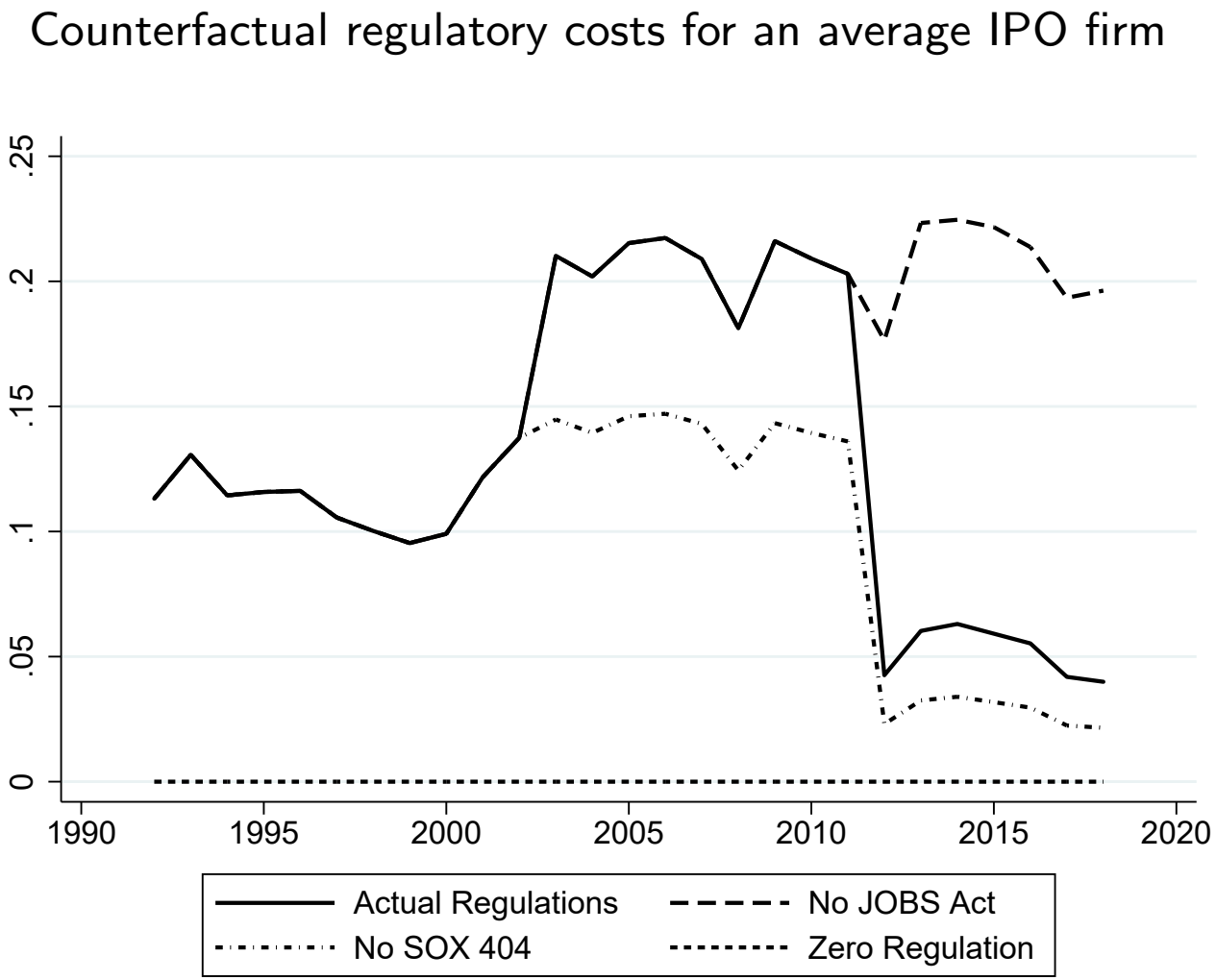
Regulatory Costs and the Public-vs-Private Choice

Regulatory costs and IPO decisions

	IPO	
	(1) Logit Coefficient	(2) Marginal Effect
Regulatory costs (ln)	-0.0541***	-0.0004***
	[0.0189]	[0.0002]
Imputed public float (ln)	0.2646***	0.0021***
	[0.0304]	[0.0003]
Total funding raised (ln)	0.8816***	0.0070***
	[0.0435]	[0.0004]
Years since first round	-0.0549***	-0.0004***
	[0.0127]	[0.0001]
Industry-Year FE	Yes	Yes
State FE	Yes	Yes
Observations	42,501	42,501

- Sample: 10,877 US VC-backed firms from 1992 to 2018; 9.7% went public
- Impute public float from last round valuation, adjusted for new issuance and secondary shares
- One std dev increase in regulatory costs decreases IPO likelihood by 10%

Counterfactual regulatory scenarios

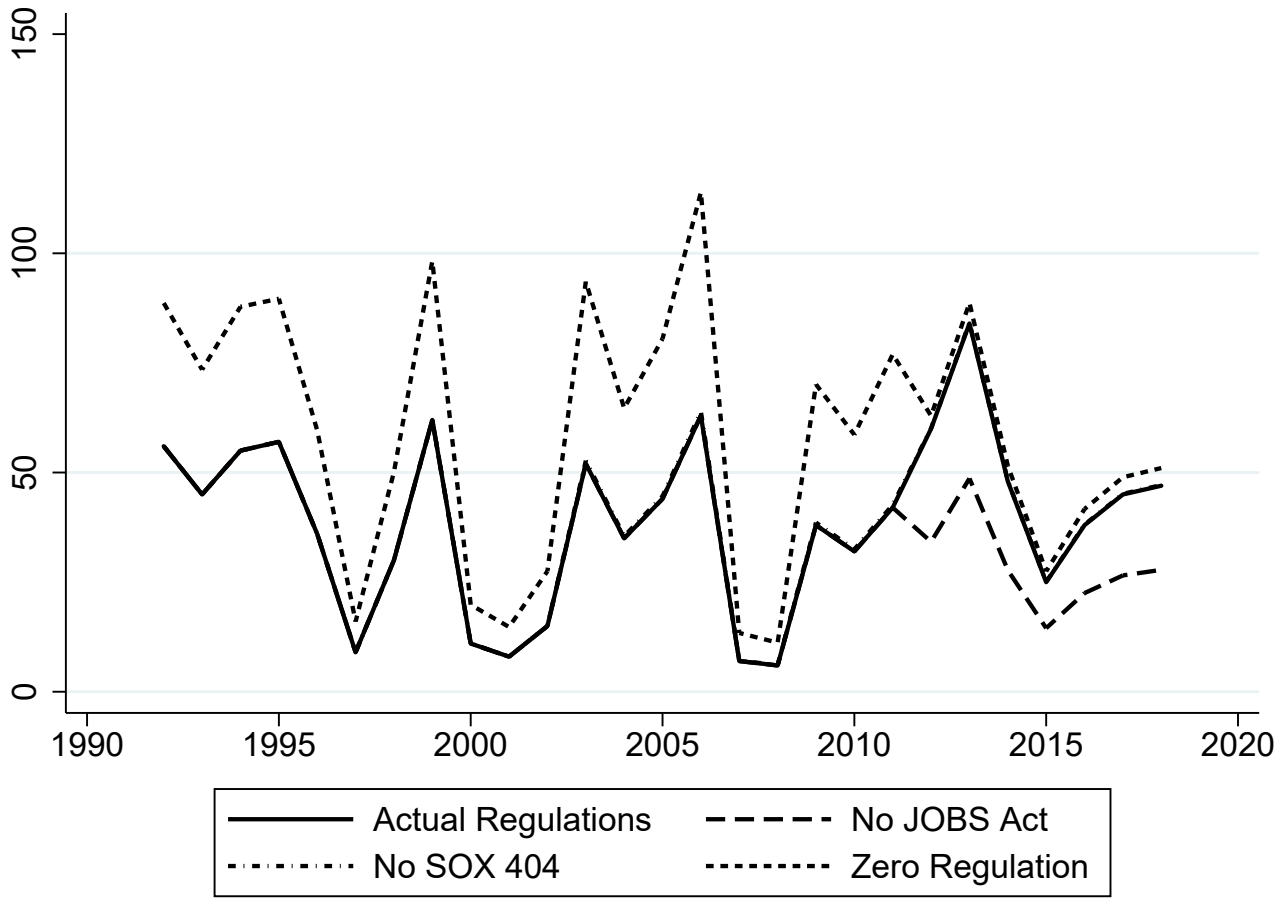


Counterfactual IPO volumes

	Actual regulation (1)	No JOBS Act (2)	No SOX 404 (3)	Zero regulation (4)
Regulatory costs ($m)	0.127	0.194	0.088	0.000
Regulatory costs / Public float (%)	0.213	0.370	0.200	0.000
IPO probability (%)	2.471	2.129	2.483	3.720
Total no. of IPOs	1050.0	905.0	1055.4	1581.0
Total IPO public float ($b)	395.3	374.6	402.5	644.4

- Removing JOBS Act: 20.7 fewer IPOs per year
- SOX 404 has minimal impact on IPOs (Gao et al. 2013)
- Removing all identified regulatory costs: IPO probability 2.47% $\rightarrow$ 3.72%

Counterfactual IPO volumes



- Removing JOBS Act: 20.7 fewer IPOs per year
- SOX 404 has minimal impact on IPOs (Gao et al. 2013)
- Removing all identified regulatory costs: IPO probability 2.47% $\rightarrow$ 3.72%

Regulatory costs and going private decisions

	Going Private	
	(1) Logit Coefficients	(2) Marginal Effects
Regulatory costs (ln)	-0.0406	-0.0003
	[0.0290]	[0.0002]
Public float (ln)	-0.1553***	-0.0010***
	[0.0194]	[0.0002]
Leverage	0.5918***	0.0038***
	[0.1276]	[0.0009]
Total assets (ln)	0.0114	0.0001
	[0.0287]	[0.0002]
ROA	0.6927***	0.0044***
	[0.1418]	[0.0009]
Investment-to-assets	-0.6522	-0.0042
	[0.4899]	[0.0031]
Sales growth	-0.3860***	-0.0025***
	[0.0990]	[0.0006]
M/B	-0.0141**	-0.0001**
	[0.0057]	[0.0000]
Stock return	-0.2915***	-0.0019***
	[0.0677]	[0.0004]
No. of analysts (ln)	-0.1637**	-0.0010*
	[0.0834]	[0.0005]
Institutional ownership	-1.1135***	-0.0071***
	[0.2512]	[0.0016]
Industry-Year FE	Yes	Yes
State FE	Yes	Yes
Observations	43,437	43,437

- Identify going private transactions from 13e-3 filings followed by a Form 15/25
- 949 firms went private from 1995 to 2017

Regulatory costs and going private decisions

- No significant impact on going private, consistent with mixed findings in the literature on regulations and going private (Engel et al. 2007, Leuz 2007, Leuz et al. 2008, Bartlett 2009)

- Likely explanations:
  - Many regulatory costs are upfront and irreversible (e.g. setting up internal control system) – affect IPO decisions but are sunk costs for going private.
  - Most PE deals are motivated by financial or operational engineering (Kaplan 1989; Bernstein & Sheen 2016), rather than to avoid regulatory costs.

Conclusion

- Bunching estimator to quantify the dollar cost of disclosure and internal control regulations
  - A median US public firm spends 4.3% of its market cap on these costs
- Our estimates that are generally smaller than existing estimates
- Use our estimates to examine IPO and going private decisions
  - These regulatory costs significantly impact IPO likelihood and IPO volume
  - No significant effect on going private decisions

Appendix

Sample Details

- All thresholds: U.S. incorporated firms with non-missing sales and non-missing public float
- \$25M threshold sample
  - <\$25M public float in previous fiscal year
  - <\$25M gross revenue in the previous and current fiscal year
- \$75M threshold sample
  - <\$75M public float in previous fiscal year
- \$700M threshold sample
  - <\$700M public float in previous fiscal year
  - <\$1B gross revenue in the previous and current fiscal year
  - First 3 years since IPO

Scaled disclosure items

regulations

Reg S-K Item	Content
Item 101	Description of business
Item 105	Risk factors
Item 201	Market price of and dividends on registrant's common equity and related stockholder matters
Item 301	Selected financial data
Item 302	Supplementary financial information
Item 303	Management's discussion and analysis of financial condition and results of operations
Item 305	Quantitative and qualitative disclosures about market risk
Item 402	Executive compensation
Item 404	Transactions with related persons, promoters and certain control persons
Item 407	Corporate governance
Item 503	Prospectus summary, risk factors, and ratio of earnings to fixed charges
Item 504	Use of proceeds
Item 601	Exhibits

- Conditioning on firm characteristics, SBIs (small business issuers)' 10-Ks are 27% shorter and their DEF14As 25% shorter than those by non-SBIs.

Cost structure estimation

Extrapolation

Panel A: SOX 404 Compliance Costs from SEC Survey

	404(b) audit (1)	Internal labor (2)	Non-labor (3)	Outside labor (4)	Total (5)
Public float (in $mil))	0.432***	0.519***	0.355***	0.337***	0.456***
	[0.014]	[0.032]	[0.018]	[0.023]	[0.028]
Intercept	10.476***	10.516***	9.467***	10.365***	11.554***
	[0.089]	[0.200]	[0.115]	[0.145]	[0.176]
Period FE	Yes	Yes	Yes	Yes	Yes
N	12	12	12	12	12
Adj. R-sq	0.813	0.85	0.946	0.833	0.852
Dep. var. mean	13.2	13.8	11.7	12.5	14.4

Panel B: Audit Fees from Audit Analytics

	Pre-SOX		Post-SOX	
	Audit fees (1)	Total fees (2)	Audit fees (3)	Total fees (4)
Public float (in $mil)	0.412***	0.524***	0.423***	0.434***
	[0.027]	[0.027]	[0.019]	[0.019]
Intercept	4.393***	2.964***	5.091***	5.058***
	[0.562]	[0.580]	[0.354]	[0.347]
Year FE	Yes	Yes	Yes	Yes
N	6836	6783	60889	60995
Adj. R-sq	0.426	0.469	0.616	0.624
Dep. var. mean	12.4	13.1	13.3	13.5

Major, non-threshold based regulations

interpretation

Regulation Name	Year
Regulations on public firms	
Rule 415 (Shelf Registration)	1982
Introduction of Edgar	1993
Ownership Reports and Trading by Officers, Directors and Principal Security Holders	1996
Amendments to Rules on Shareholder Proposals	1998
Amendments to Beneficial Ownership Disclosure	1998
Regulation of Takeovers and Security Holder Communications	1999
Amendments to Rule 9b-1 Relating to the Options Disclosure Document	2000
Selective Disclosure and Insider Trading	2000
Reg FD	2000
FASB ends pooling of interests accounting	2001
Option expensing	2004
Regulation National Market System	2005
Say on pay	2010
Regulations on private firms	
Regulation D	1982
Increased asset threshold for exempt from registration from \$5m to \$10m	1996
National Securities Markets Improvement Act (NSMIA)	1996

Robustness: alternative bunching period for $75M threshold

robustness

Threshold	$ 75 mil
	Panel A: Estimates
Marginal firm ($\bar{e}$)	97.918 [1.205]
Regulatory costs (k)	0.162 [0.015]
PV(regulatory costs)/Firm value	0.934 [0.084]
Δ Leverage	0.123 [0.006]
	Panel B: Samples
Bunching sample	2008-2018
Non-bunching sample	1994-2012
Identified regulation	15-day + SOX 404 + Scaled discl.

Robustness: dropping financial and utility firms

robustness

Threshold	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
		Panel A: Estimates	
Marginal firm ($\bar{e}$)	27.053 [0.426]	93.090 [3.663]	829.696 [31.912]
Regulatory costs (k)	0.027 [0.009]	0.106 [0.038]	0.633 [0.408]
PV(regulatory costs)/Firm value	0.627 [0.217]	0.644 [0.232]	0.693 [0.446]
Δ Leverage	0.056 [0.012]	0.102 [0.021]	0.069 [0.017]
		Panel B: Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ 15-day delay	EGC benefits

Robustness: drop the two years before regulatory change

robustness

Threshold	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
		Panel A: Estimates	
Marginal firm ($\bar{e}$)	26.869 [0.427]	95.424 [2.195]	840.169 [34.108]
Regulatory costs (k)	0.022 [0.009]	0.132 [0.023]	0.731 [0.366]
PV(regulatory costs)/Firm value	0.527 [0.204]	0.781 [0.137]	0.789 [0.395]
Δ Leverage	0.051 [0.012]	0.112 [0.012]	0.073 [0.018]
		Panel B: Samples	
Bunching sample	1994-2005	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2000	1997-2009
Identified regulation	Scaled disclosure	SOX 404 + 15-day delay	EGC benefits

Robustness: alternative parameters

robustness

Threshold	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
		Panel A: Estimates	
Regulatory costs (k)	0.026	0.121	0.896
		Panel B: Parameters	
Public float/Assets (η)	1.684	0.920	1.445
Tobin's Q (q)	2.7414	1.769	3.438
Interest rate (r)	0.133	0.088	0.057
		Panel C: Samples	
Bunching sample	1994-2007	2003-2007	2012-2018
Non-bunching sample	2009-2018	1994-2002	1997-2011
Identified regulation	Scaled disclosure	SOX 404+ 15-day delay	EGC benefits

Robustness: locally estimated β

robustness

	$ 25 mil (1)	$ 75 mil (2)	$ 700 mil (3)
IOB	4.637***	5.130***	6.192***
	[2.937]	[3.970]	[3.317]
COL	-0.022***	-0.021***	-0.002
	[-3.239]	[-2.773]	[-0.282]
LTA_adj	-0.074**	-0.058**	-0.061**
	[-2.616]	[-2.571]	[-2.090]
BTM	0.015**	0.009	0.007
	[2.219]	[1.244]	[0.447]
INTANG	-0.026***	-0.023***	-0.025***
	[-3.342]	[-3.381]	[-3.410]
CF	0.059***	0.053***	0.036***
	[12.739]	[8.595]	[5.777]
DDIV	0.104***	0.075***	0.067***
	[5.176]	[5.973]	[5.236]
Observations	2,492	3,313	2,594

Alternative margin of float manipulation — news release

	Bad news in Q2 (1)	*Bad news in Q3* (2)
	Panel A. $25m threshold	
Below $25m × Bunching years	0.019***	0.024
	[0.003]	[0.047]
Year FE and SIC2 FE	Yes	Yes
N	998	1,004
Adj. R-sq	0.012	0.008
Mean of dep. var.	0.206	0.195
	Panel B. $75m threshold	
Below $75m × Bunching years	0.037**	0.020
	[0.016]	[0.024]
Year FE and SIC2 FE	Yes	Yes
N	2,824	2,869
Adj. R-sq	0.024	0.053
Mean of dep. var.	0.192	0.184
	Panel C. $700m threshold	
Below $700m × Bunching years	0.122**	0.051
	[0.058]	[0.065]
Year FE and SIC2 FE	Yes	Yes
N	238	244
Adj. R-sq	0.021	0.029
Mean of dep. var.	0.157	0.167

Summary of regulatory reliefs

Time Period	$<$ 25 mil	25–75 mil	75–700 mil	$>$ 700 mil	Binding Thresholds
1992–2002	Scaled disclosure	N/A	N/A	N/A	25 for SD
2003–2007	Scaled disclosure + filing delay + 404 exempt	filing delay + 404 exempt	N/A	N/A	25 for SD 75 for 15d+404
2008–2011	Scaled disclosure + filing delay + 404 exempt		N/A	N/A	75 for SD+delay+404
2012–2018	Scaled disclosure + filing delay + 404 exempt + EGC benefits		EGC benefits	N/A	75 for SD+delay+404 700 for EGC

Total regulatory costs

Time Period	<25 mil	25–75 mil	75–700 mil	>700 mil
1992–2002	ER	ER+SD	ER+SD	ER+SD
2003–2007	ER	ER+SD	ER+SD+404+delay	ER+SD+404+delay
2008–2011	ER	ER	ER+SD+404+delay	ER+SD+404+delay
2012–2018 & public age>5	ER	ER	ER+SD+404+delay	ER+SD+404+delay
2012–2018 & public age<=5	0	0	0	ER+SD+404+delay

- ER is residual EGC benefits excluding scaled disclosure (SD), delayed filing (15d), and 404 exemption (404)