Anatomy of Corporate Borrowing Constraints

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Motivation

What determines firms' borrowing constraints?

Approaches in models:

- Early work: cash flows from operations and investment
  - Townsend; Holmstrom-Tirole
- **Common focus: liquidation value of physical assets**
  - Hart-Moore; Kiyotaki-Moore; Bernanke-Gertler-Gilchrist
  - key to financial amplification through asset price feedback

This Paper: collect comprehensive data on corporate debt

- A close look at corporate borrowing **in practice**
- Study macro-finance implications

Key Findings

Non-financial corporate borrowing in US:

- Fact 1: Prevalence of **"cash flow-based lending"** (**80%** by value)
- Fact 2: Prevalence of **"earnings-based borrowing constr."** (EBCs)
  - operating earnings as a contractible measure of cash flows

Contract features ⇒ impact of financial variables *on the margin*

- **Cash flows** (operating earnings) directly relax borrowing constraints
- **Collateral value** impact limited, fire sale amplification dampened

Heterogeneity:

- Legal bases ⇒ borrowing practices ⇒ macro-finance mechanisms

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Part 1. Corporate Borrowing in the US

1.1 Prevalence of "Cash Flow-Based Lending"

1.2 Prevalence of Earnings-Based Borrowing Constraints

1.3 Economic Foundations and Heterogeneity

Fact 1: Prevalence of "Cash Flow-Based Lending"

20%: "Asset-Based Lending" (ABL)

- Collateralized by specific physical assets
- Creditor payoffs (in bankruptcy) & debt capacity tied to
  - **liquidation value of physical assets** ("land" in KM)

80%: "Cash Flow-Based Lending" (CFL)

- Not collateralized by specific physical assets
  - unsecured or secured by entity
- Creditor payoffs (in bankruptcy) & debt capacity tied to
  - **cash flow value from continuing operations** ("fruit" in KM)
  - "going-concern" value in **Chapter 11**

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Fact 1: Prevalence of "Cash Flow-Based Lending"

Integrate data from many sources: aggregate & debt level

- FoF, FISD; DealScan, ABL Advisor, SNC, SDC; SBA; Compustat; CapitalIQ

Aggregate share by type (entire corp sector):

Category	Debt Type	Share
Asset-based lending (**20%**)	Mortgages	6.5%
	Asset-based loans	13.5%
Cash flow-based lending (**80%**)	Corporate bonds	48.0%
	Cash flow-based loans	32.0%

Firm-level median share by group (public firms):

	Large Firms	Rated Firms	Small Firms
Asset-based lending	**12.4%**	**8.0%**	**61.0%**
Cash flow-based lending	**83.0%**	**89.0%**	**7.2%**

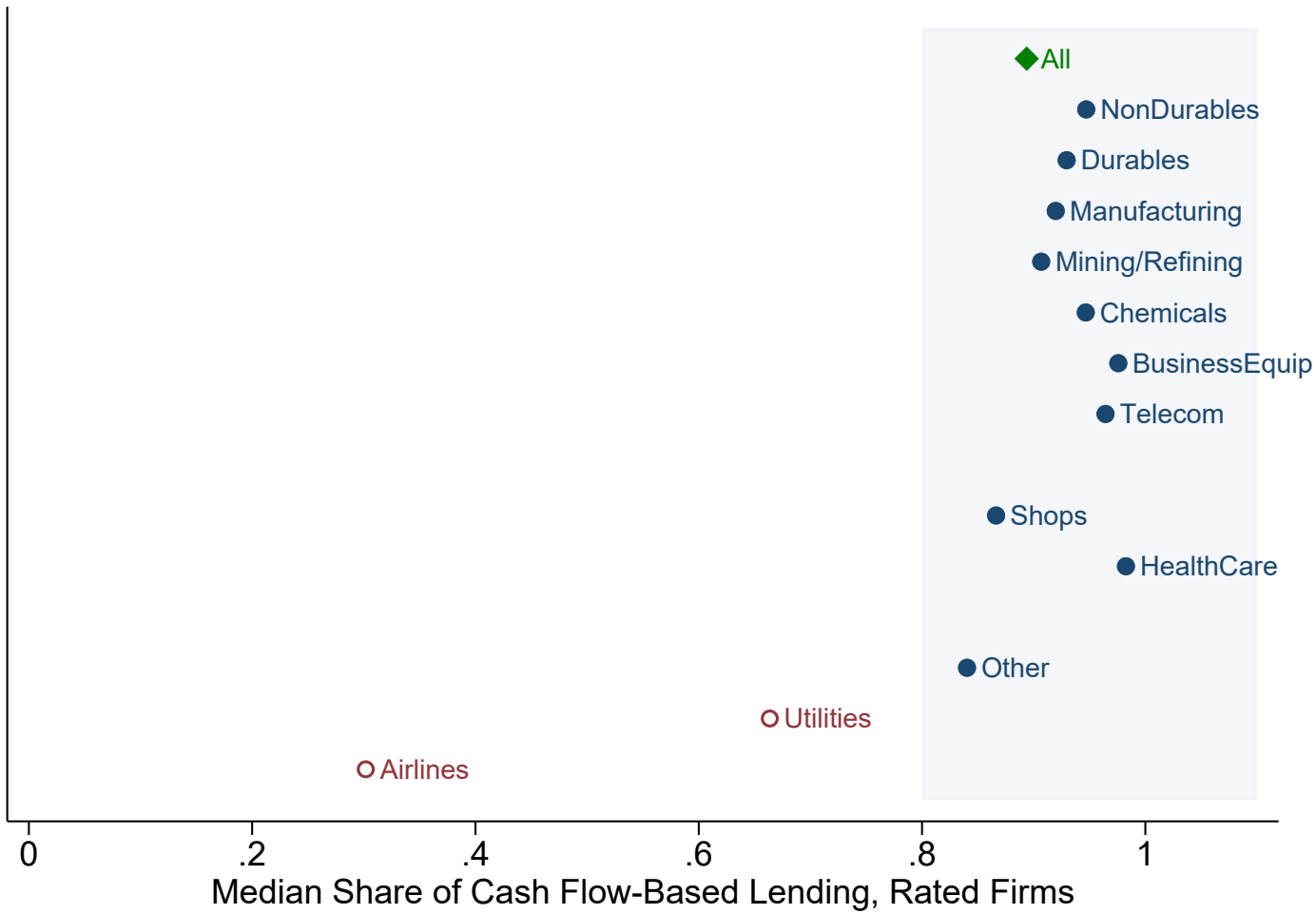
large (assets>median): 96%+ debt, sales, capx, emp in all public firms

relationship

Fact 1: Prevalence of "Cash Flow-Based Lending"

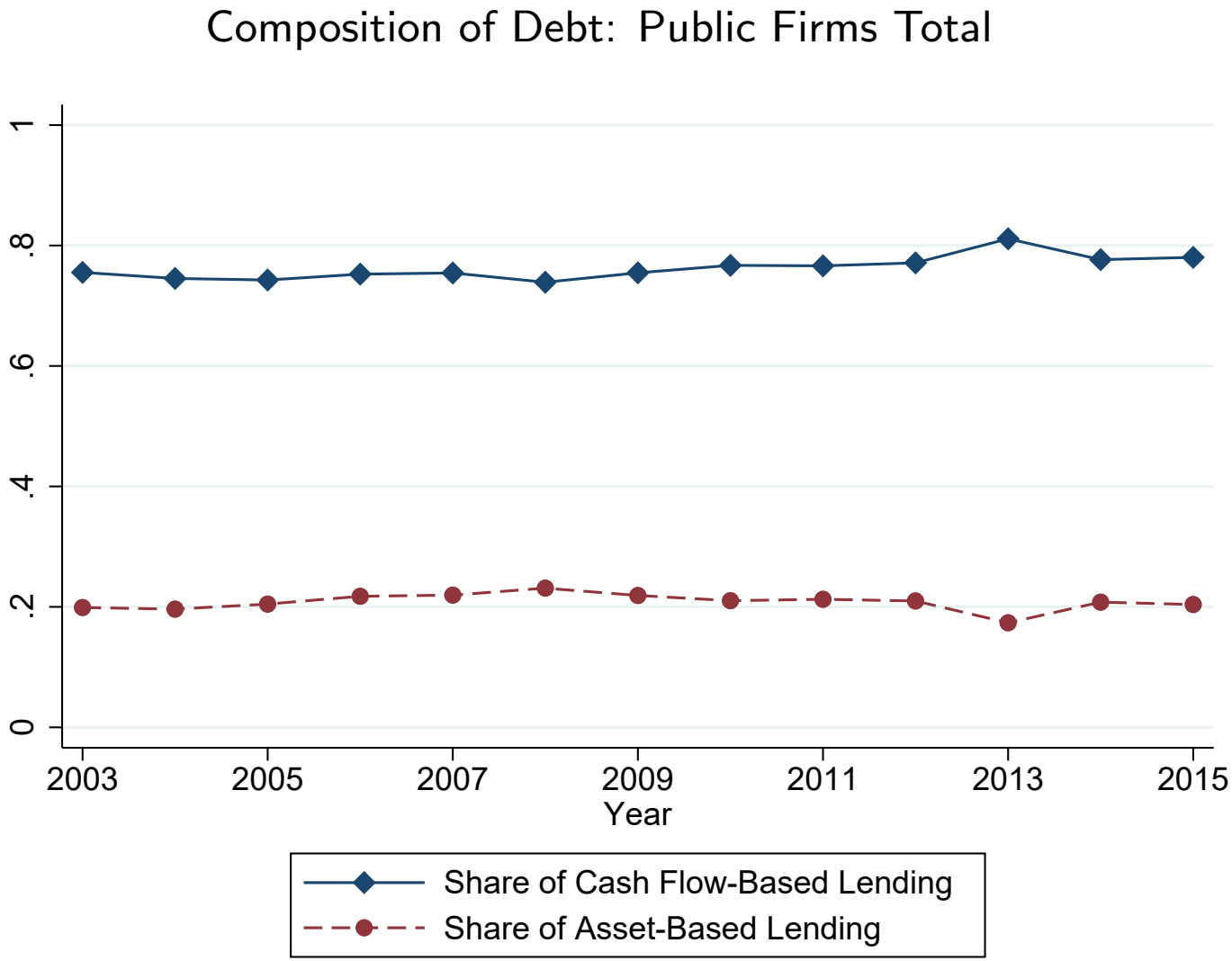
Similar in most industries

Median Share of Cash Flow-Based Lending: Rated Firms by Industry



Fact 1: Prevalence of "Cash Flow-Based Lending"

Composition stable over time



Fact 2: Prevalence of Earnings-Based Constraints (EBCs)

Borrowing constraints $\Rightarrow$ a specific measure of cash flows

Earnings-based borrowing constraints

- Form 1: maximum debt to earnings: $b_t \leq \phi \pi_t$
- Form 2: maximum debt payments to earnings: $r_t b_t \leq \theta \pi_t \Rightarrow b_t \leq \frac{\theta \pi_t}{r_t}$

- Apply at **firm level**
- π_t : EBITDA (earnings before interests, taxes, depreciation, and amortization) in past 12 months
  - excludes non-operating income, windfalls; not literal cash receipts
- Important source: financial covenants of loans & bonds
  - + credit market norms

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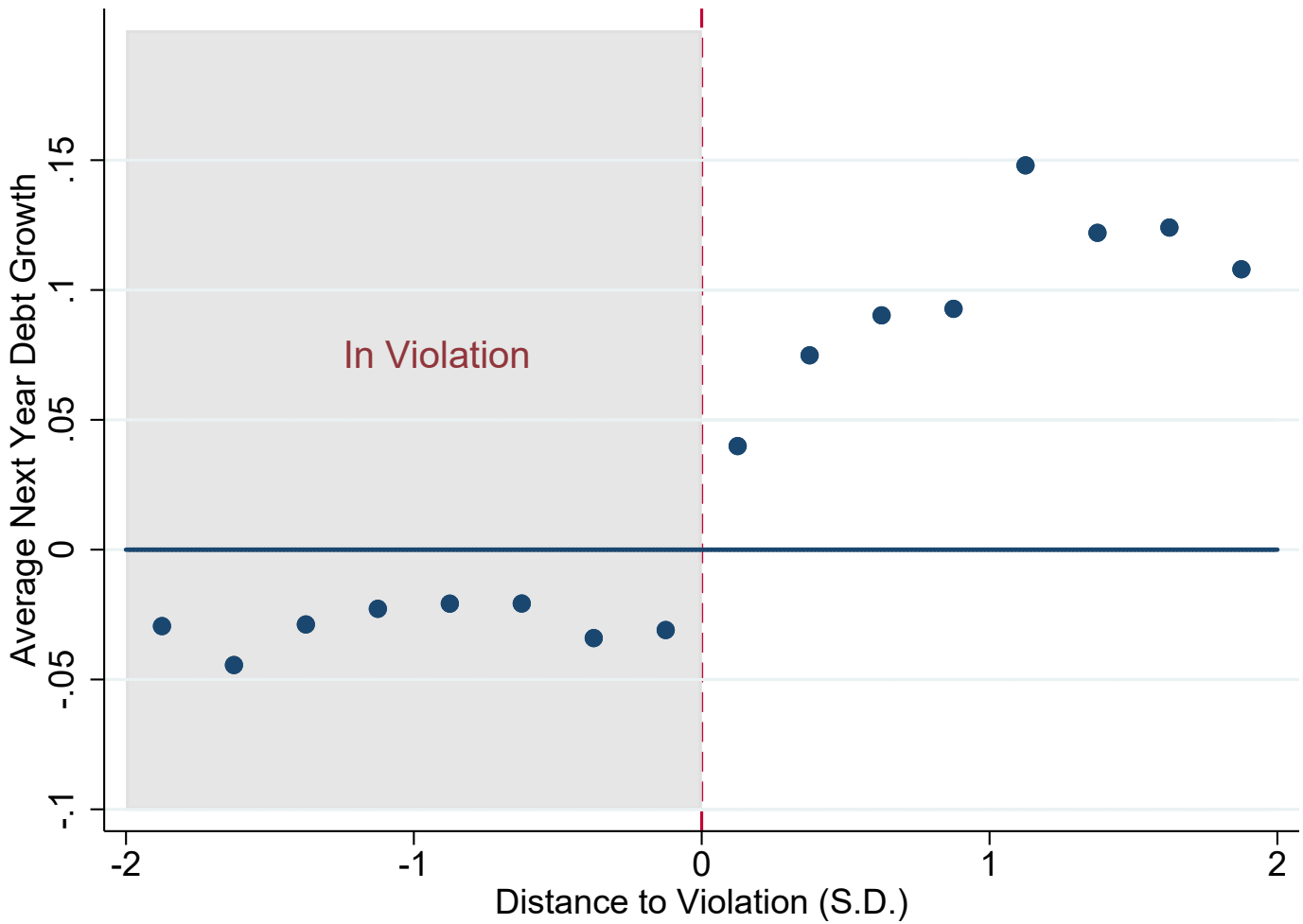
Earnings-Based Covenants

- Financial covenants: legally binding provisions
  - loans: assessed **quarterly** based on financial statements
  - matter for both **issuance** and **maintenance** of debt
- Most financial covenants are **earnings-based covenants**
- Covenant violation: technical default
  - creditors can accelerate payments
  - use it as threat $\rightarrow$ raise borrowing cost, charge fees, more restrictions
- **Effective debt limits:** after violation of earnings-based covenants
  - debt growth becomes negative on average

bunching

Earnings-Based Covenants as Debt Limits

Negative debt growth post violation (DealScan)



Pervasiveness & Tightness

Pervasiveness: Fraction of firms with earnings-based covenants

- **50% to 60%** of large public firms each year
  - accounts for ∼60% of sales, capx, emp
- Some large firms no written constraint because little debt
  - likely to have the constraint if debt level higher

Tightness : Fraction of firms violating earnings-based covenants per year

- **10%** large public firms w/ DealScan loans
- **20%** large public firms w/ DealScan loans within 0.5 s.d. of violation

plot other

Earnings-Based Borrowing Constraints

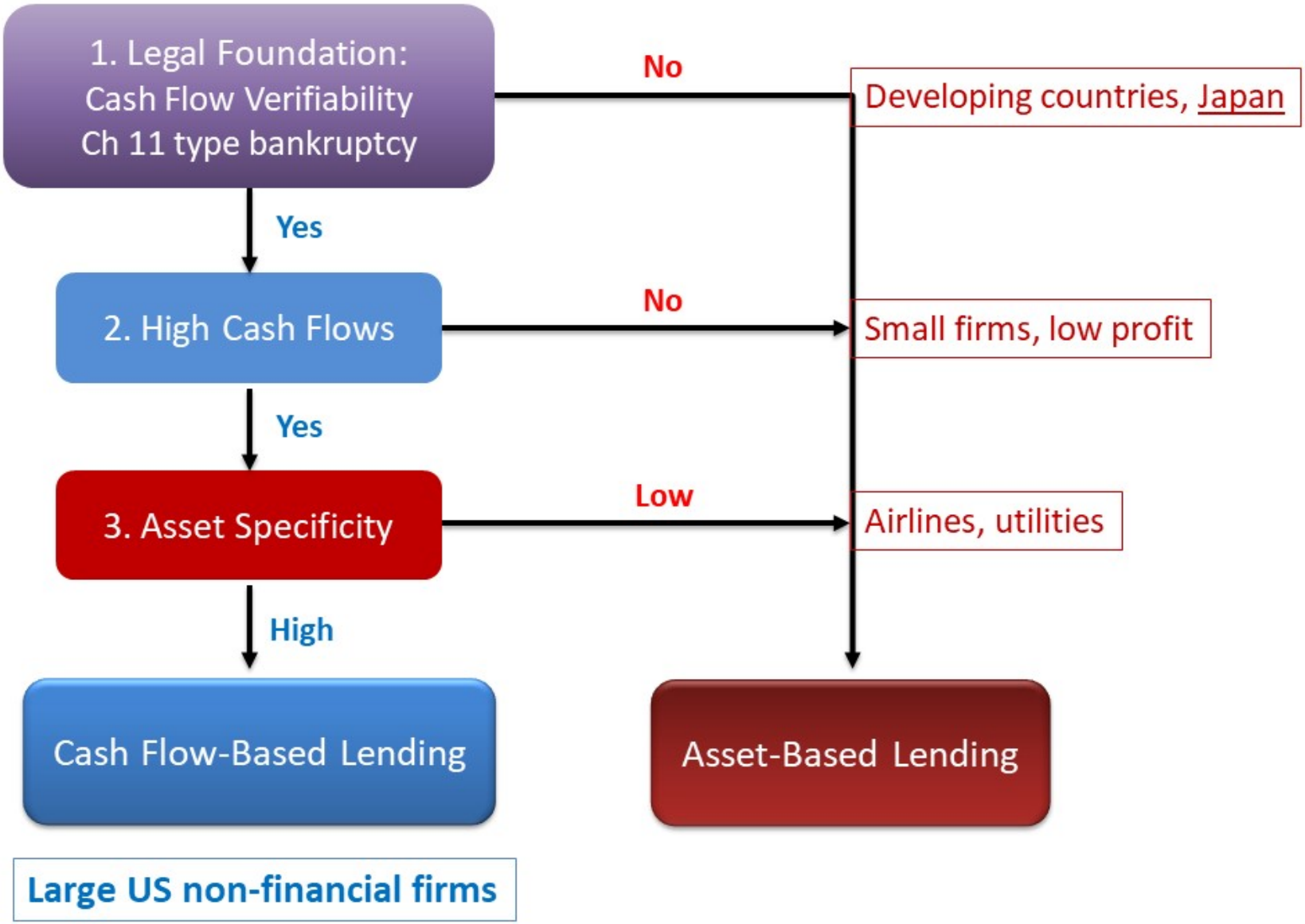
"I think collateral is there mostly for some regulatory reasons. What banks really care is your EBITDA and coverage ratio."

—Byron Pollitt, former CFO of Gap, Visa, Disney Parks & Resorts

Examples of firms w/ earnings-based covenants:

AAR Corp, AT&T, Barnes & Noble, Best Buy, Caterpillar, CBS Corp, Comcast, Costco, Disney, FedEx, GE, General Mills, Hershey's, HP, IBM, Kohl's, Lear Corp, Macy's, Marriott, Merck, Northrop Grumman, Pfizer, Qualcomm, Rite Aid, Safeway, Sears, Sprint, Staples, Starbucks, Starwood Hotels, Target, Time Warner, US Steel, Verizon, Whole Foods, Yum Brands...

Economic Foundations and Heterogeneity



Part 2. Contract Features $\Rightarrow$ Impact on the Margin

2.1 Role of Cash Flows

2.2 Role of Physical Collateral Value

Firms are constrained, but a different type

Part 2. Contract Features ⇒ Impact on the Margin

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Relevance of Cash Flows for Firm Borrowing

Coty Inc
[owner of fragrance brands Calvin Klein, Chloe, Davidoff, Marc Jacobs]

We remain dependent upon others for our financing needs, and our debt agreements contain **restrictive covenants**.

[F]inancial covenants restrict our operations and limit our flexibility and ability to respond to changes or take certain actions.

Financial covenants...require us to maintain...a consolidated leverage ratio of **total debt to EBITDA** based on the previous 12-month period.

Role of Cash Flows

- Mechanism: cash flows in the form of operating earnings
  - **relax** earnings-based **borrowing constraints**
  - crowd in borrowing & investment
- Concentrated in firms borrowing CFL & have EBCs
  - not in ABL firms
- Empirical tests: traditional approach + natural experiment
- Old literature: main role of cash flows ↑ internal funds
  - pecking order; Fazzari-Hubbard-Petersen, Kaplan-Zingales
  - substitute out costly external financing

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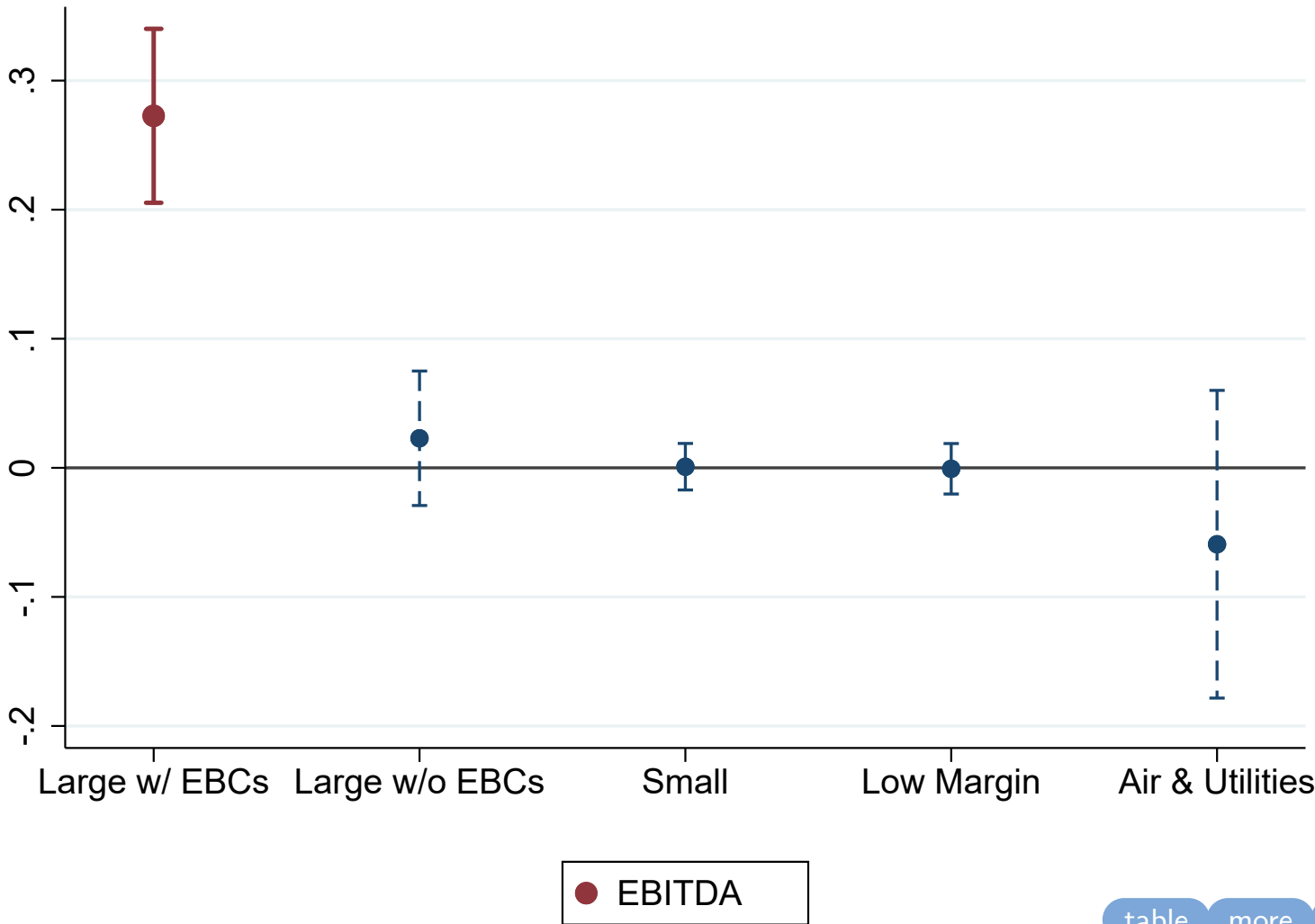
Traditional Approach: Sensitivity to EBITDA

Debt Issuance: $Y_{it} = \alpha_i + \eta_t + \beta \text{EBITDA}_{it} + X'_{it}\gamma + \epsilon_{it}$



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Additional Checks

Mismeasured Q: EBITDA proxies for investment opportunities?

- Hard to account for firm heterogeneity across samples
  - need Q less mismeasured/EBITDA less informative among all comps
  - no evidence in the data; if anything **the reverse**
- No response for net equity issuance
  - not higher demand for external financing in general

Collateral value: EBITDA correlated with collateral value?

- Unsecured debt
- Directly control for firm real estate value

Hard to square with accounting natural experiment (next)

predict re

Accounting Natural Experiment: SFAS 123(r)

- Pre: option compensation not included in operating expenses
  Post: counts towards operating expenses (EBITDA)
  - issued in Dec 2004; implemented starting fiscal year 2006

- $Y_i^{2006} = \alpha + \beta \widehat{\text{EBITDA}}_i^{2006} + X_i'\gamma + \epsilon_i$

- Instrument EBITDA_i^{2006} using prior option comp expenses
  - controls: lags of EBITDA & dependent variable; firm characteristics

First Stage

	EBITDA_i^{06}		
	Large w/ EBCs	Large w/o EBCs	Small
Avg. option comp expense 02-04	**-0.857*****	**-0.721*****	**-0.520****
	(0.212)	(0.134)	(0.208)
Obs	686	435	727

s.e. in parentheses

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Accounting Natural Experiment

Second Stage

	Large **w/ EBCs**	Large w/o EBCs	Small
	Net LT Debt Iss		
$\widehat{\text{EBITDA}}_i^{06}$	**0.869****	**-0.327**	**0.225**
	(0.451)	(0.344)	(0.366)
1st stage F	16.39	23.42	9.08
Obs	686	435	727

s.e. in parentheses

- Significant impact for firms **w/ EBCs**
- Coefficients larger than baseline
  - permanent shock to accounting earnings
  - LATE: firms with significant option comp more sensitive

US vs. Japan

- Japan: borrowing traditionally based on physical assets (real estate)
  - lack of legal infrastructure for cash flow-based lending
- Run same specification as before
  - large firms in US vs. large firms in Japan
- Japan: debt issuance/investment does not respond to EBITDA

cf table

Role of Cash Flows: Taking Stock

- Attest to impact of EBCs for firm outcomes **on the margin**
  - for large US non-financial firms
- New perspectives on the role of cash flows for firm outcomes
- How it can be shaped by corporate borrowing practices
  - asset-based lending vs. cash flow-based lending

Part 2. Contract Features $\Rightarrow$ Impact on the Margin

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2.2 Role of Physical Collateral Value

Firms are constrained, but a different type

Role of Physical Collateral

For large firms which predominantly borrow CFL

- Borrowing/investment sens. to **collateral value (real estate)** limited
  - asset-based debt only
- Great Recession: property price declines
  - collateral damage to major US non-financial firms not significant
- Financial acceleration among non-financial firms
  - asset price feedback may dampen

Measure Firm Real Estate Value

- Method 1: traditional estimate (Chaney-Thesmar-Sraer)
  - book value + HQ property price
  - assumes owned real estate near HQ
- Method 2: hand collect property-level data from 10K filings
  - ownership, location, size, usage. example: Starbucks (2006)

Location	Size	Purpose
King, WA	200,000	Office
Kent, WA	332,000	Roasting and distribution
York, PA	365,000	Roasting and distribution
York, PA	297,000	Warehouse
Douglas, NV	360,000	Roasting and distribution

- Estimated value based on two methods very similar
  - 0.7 correlated; levels match

Borrowing Sensitivity to Property Value

$$Y_{it} = \alpha_i + \eta_t + \beta \text{RE}_{it} + X'_{it}\gamma + \epsilon_{it}$$

	Net LT Debt Iss		Δ Asset-Based		Δ CF-Based	
	(1)	(2)	(3)	(4)	(5)	(6)
RE (Method 1)	**0.030****		0.042**		-0.007	
	(0.014)		(0.021)		(0.022)	
RE (Method 2)		**0.029****		0.030**		-0.002
		(0.014)		(0.016)		(0.026)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y

s.e. in parentheses, clustered by firm and time

- Real estate value reasonably exogenous to demand
  - can also restrict to tradables only
- Property price ↓ 20% ⇒ RE ↓ 0.04 of assets ⇒ debt issuance ↓ 0.001

tradable

Great Recession: Property Price Effects

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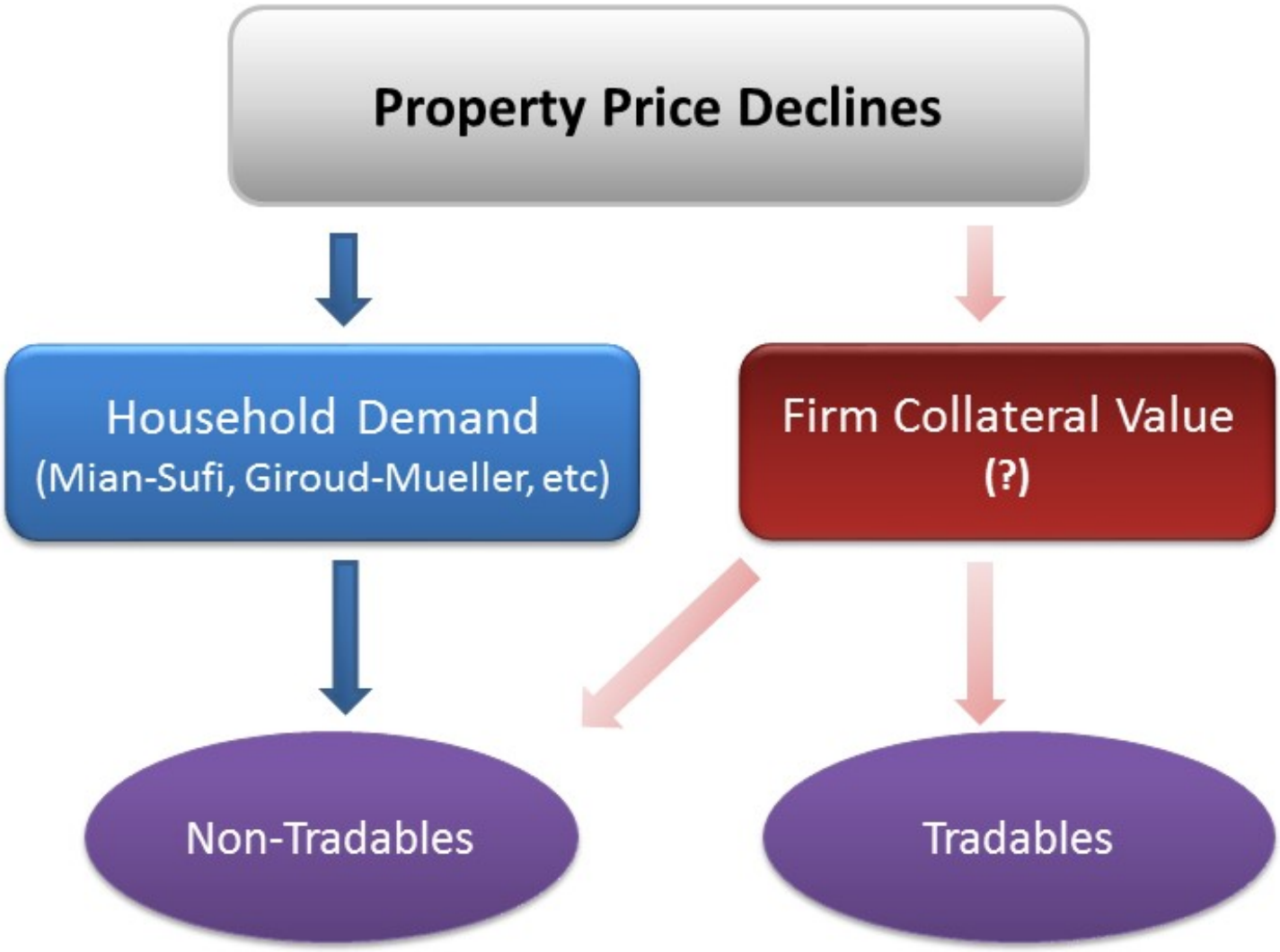

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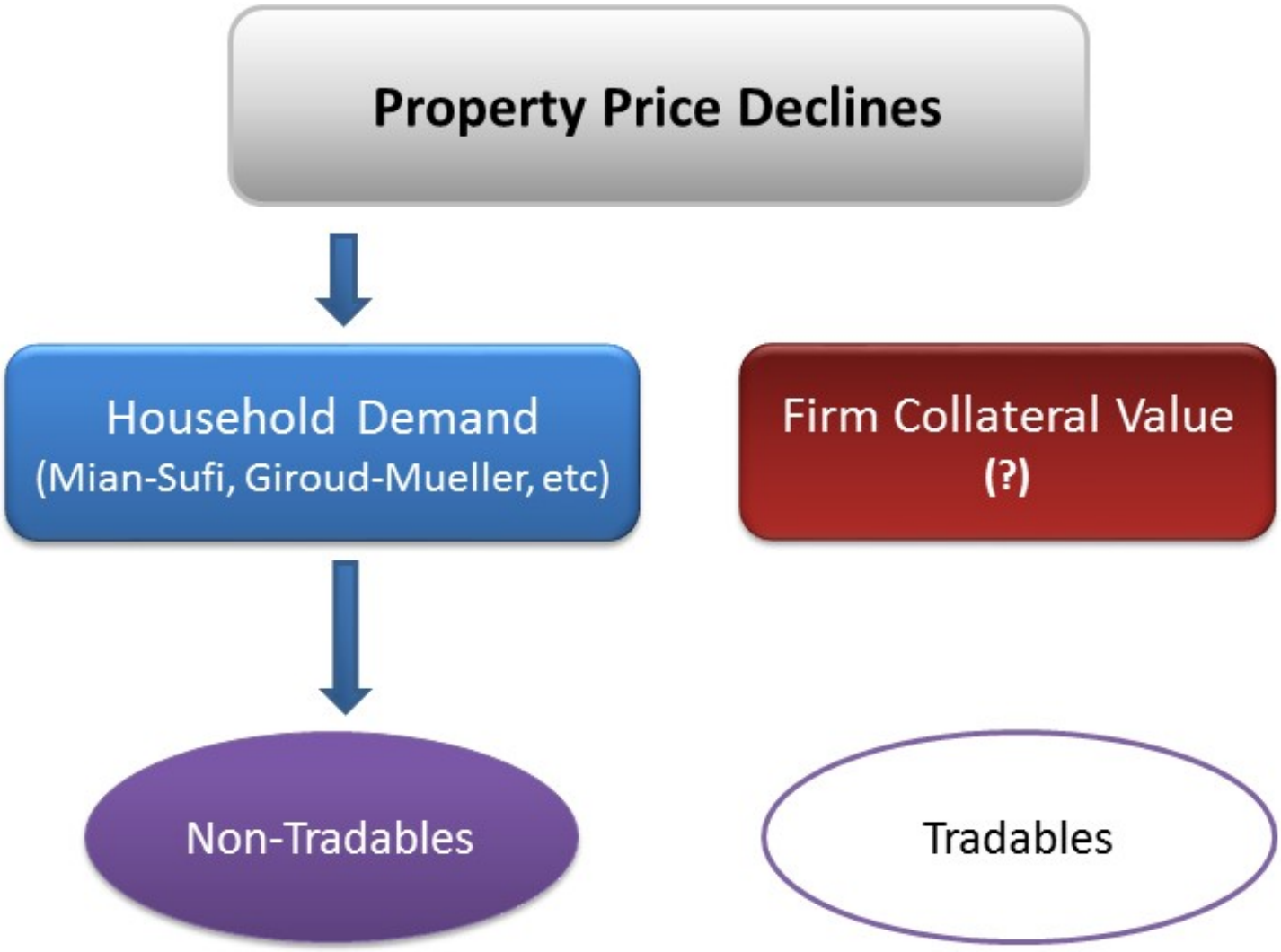

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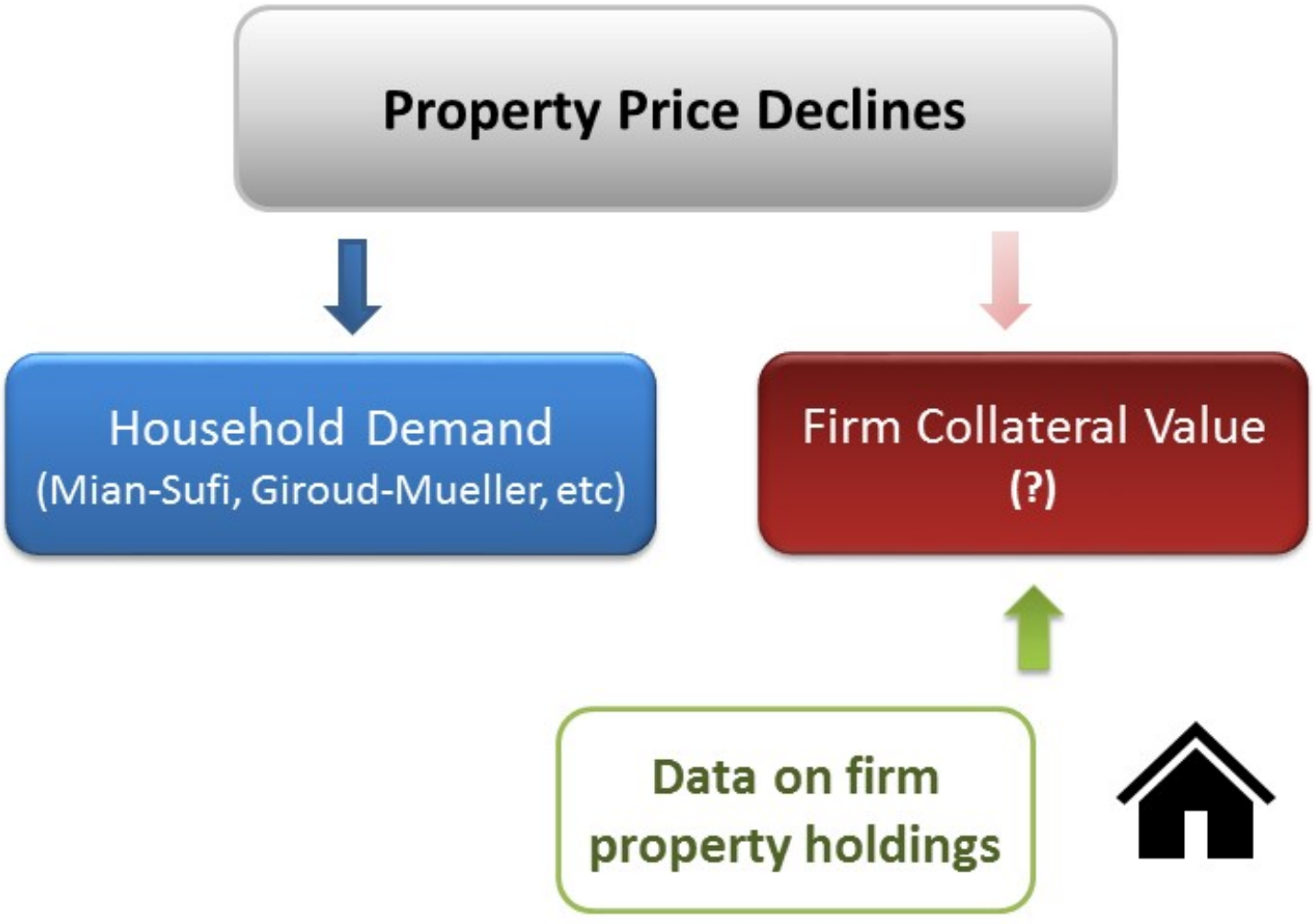
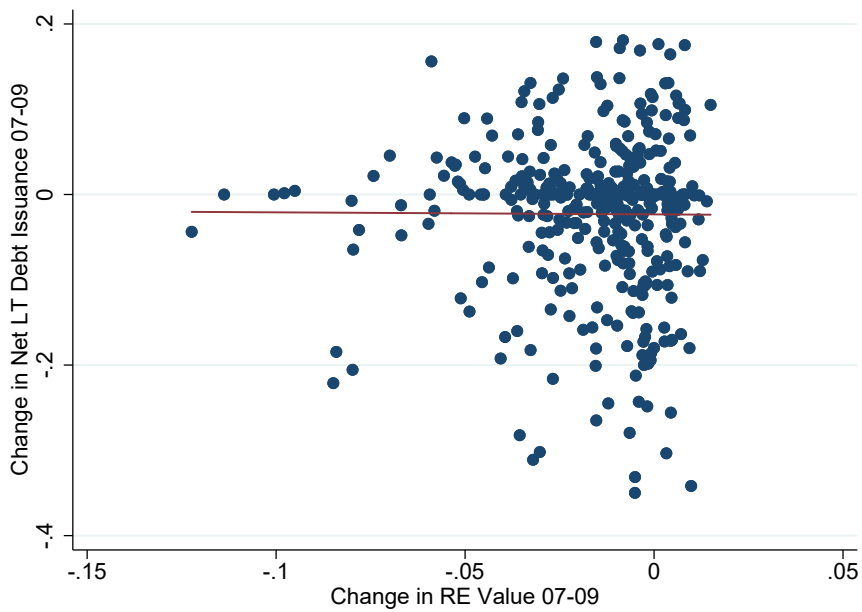


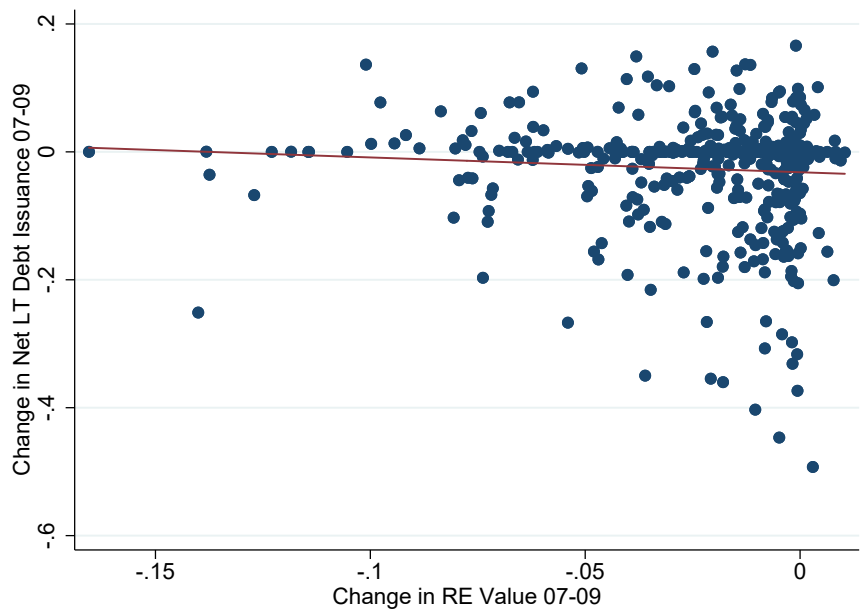
Great Recession: Property Price Effects

- $\Delta Y_i^{07-09} = \alpha + \lambda \Delta \text{RE}_{i,06}^{07-09} + \eta \text{RE}_{i,06} + \phi \Delta P_i^{07-09} + X_i' \gamma + u_i$
  - $\Delta \text{RE}_{i,06}^{07-09}$: change in market value of firm i's real estate 2007—2009
  - based on properties owned by the end of 2006

Net LT Debt Issuance and Real Estate Value: 2007—2009



Method 1



Method 2

Great Recession: Property Price Effects

- **Firm collateral damage** ΔRE_i^{07-09}: no significant effects
- Endogeneity concern:
  - ΔRE_i^{07-09} bias down if firms w/ more RE less sensitive to local demand similar
- Look at tradables only (70% of sample) $\Rightarrow$ results

Earnings Drop and Debt Capacity in the Great Recession

- **Earnings drop and EBCs** in the Great Recession
  - back-of-envelope PE effect
  - **10%∼15%** of decline in net LT debt iss & CAPX, all public firms

- Meaningful but not catastrophic
  - key to the Great Recession: households & financial institutions
  - non-financial firms not the epicenter for a good reason

Contrast with Japan

- Corporate borrowing historically emphasizes physical assets
  - especially real estate

- **EBITDA**: No positive impact on debt issuance/investment

- **Firm collateral damage**: Central in Japanese property price decline
  - Gan (2007): 1 yen increase in 1989 pre-collapse land holdings
    $\Rightarrow$ average CAPX lower by 0.16 yen in 1994—1998
  - US: run same regression as Gan (2007), get zero coefficient

table

Financial Acceleration

Under cash flow-based lending and EBCs:

- Firms' borrowing capacity **not directly** tied to the liquidation value
- Asset price feedback may **dissipate**

Financial acceleration dynamics with different borrowing constraints:

- Based on Kiyotaki & Moore (1997)
- Collateral-based constraints vs EBCs
- Same steady states leverage ratio & shock
- Impact on eq. output **10 times smaller** with EBCs

plot

Further Implications

Economic recovery:

- Prices of physical assets often slow to recover
- Prolonged recovery in Japan: corp. investment below peak till 2005

Monetary policy transmission:

- One form of EBC is the "coverage ratio" constraint:

$$r_t b_t \leq \theta \pi_t$$

Credit access and allocation:

- Firms have more **intangibles** $\Rightarrow$ harder access to credit?
- Form of corporate borrowing matters
  - share of intangible less relevant under **cash flow-based lending**

Summary

Corporate borrowing in the US

- **Cash flow-based lending** vs. Asset-based lending
- Earnings-based borrowing constraints (EBCs)

Major US non-financial firms

- Constrained, but of a different type
- Cash flows; not necessarily physical collateral value
- Asset price feedback-based financial amplification may dampen

Legal bases $\Rightarrow$ corporate borrowing $\Rightarrow$ macro-finance mechanisms

Thank You

Debt and Physical Assets

	Total Debt			
Book PPE	0.043***		0.096***	
	(0.012)		(0.020)	
Market value real estate		0.034		-0.022
		(0.023)		(0.023)
Book inventory	-0.197***	-0.264***	-0.028	-0.162***
	(0.020)	(0.050)	(0.030)	(0.058)
	Asset-Based Lending			
Book PPE	0.126***		0.116***	
	(0.010)		(0.014)	
Market value real estate		0.036**		-0.006
		(0.018)		(0.021)
Book inventory	0.050***	-0.071**	0.085***	-0.037
	(0.018)	(0.036)	(0.031)	(0.070)
	Cash Flow-Based Lending			
Book PPE	-0.100***		-0.057**	
	(0.013)		(0.024)	
Market value real estate		-0.019		-0.071**
		(0.020)		(0.028)
Book inventory	-0.240***	-0.203***	-0.135***	-0.135*
	(0.019)	(0.044)	(0.036)	(0.071)

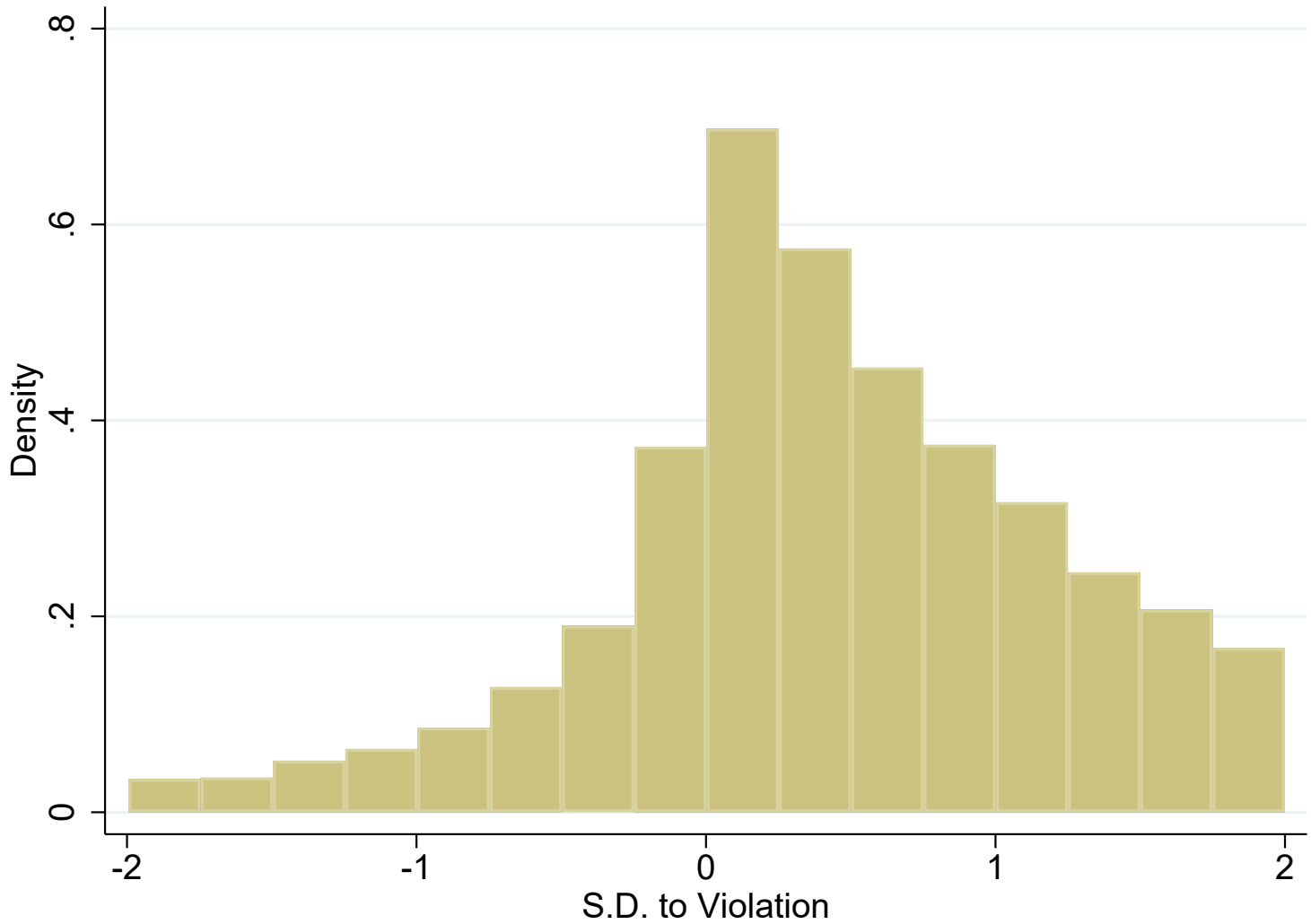
s.e. in parentheses, clustered by firm and time.

Debt and Physical Assets (more)

		Mortgage		
Book PPE	0.038***		0.022***	
	(0.003)		(0.003)	
Market value real estate		0.017***		0.019***
		(0.004)		(0.006)
Book inventory	0.003	0.009	0.003	-0.020
	(0.003)	(0.008)	(0.004)	(0.017)
		Non-Mortgage ABL		
Book PPE	0.066***		0.081***	
	(0.009)		(0.013)	
Market value real estate		0.007		-0.026
		(0.017)		(0.021)
Book inventory	0.055***	-0.056*	0.082***	-0.011
	(0.016)	(0.032)	(0.029)	(0.070)
		Cash Flow-Based Loans		
Book PPE	-0.055***		-0.026**	
	(0.009)		(0.010)	
Market value real estate		-0.021**		-0.002
		(0.010)		(0.019)
Book inventory	-0.089***	-0.096***	-0.051***	0.004
	(0.011)	(0.023)	(0.014)	(0.041)

s.e. in parentheses, s.e. clustered by firm and time.

Bunching around Earnings-Based Covenant Threshold



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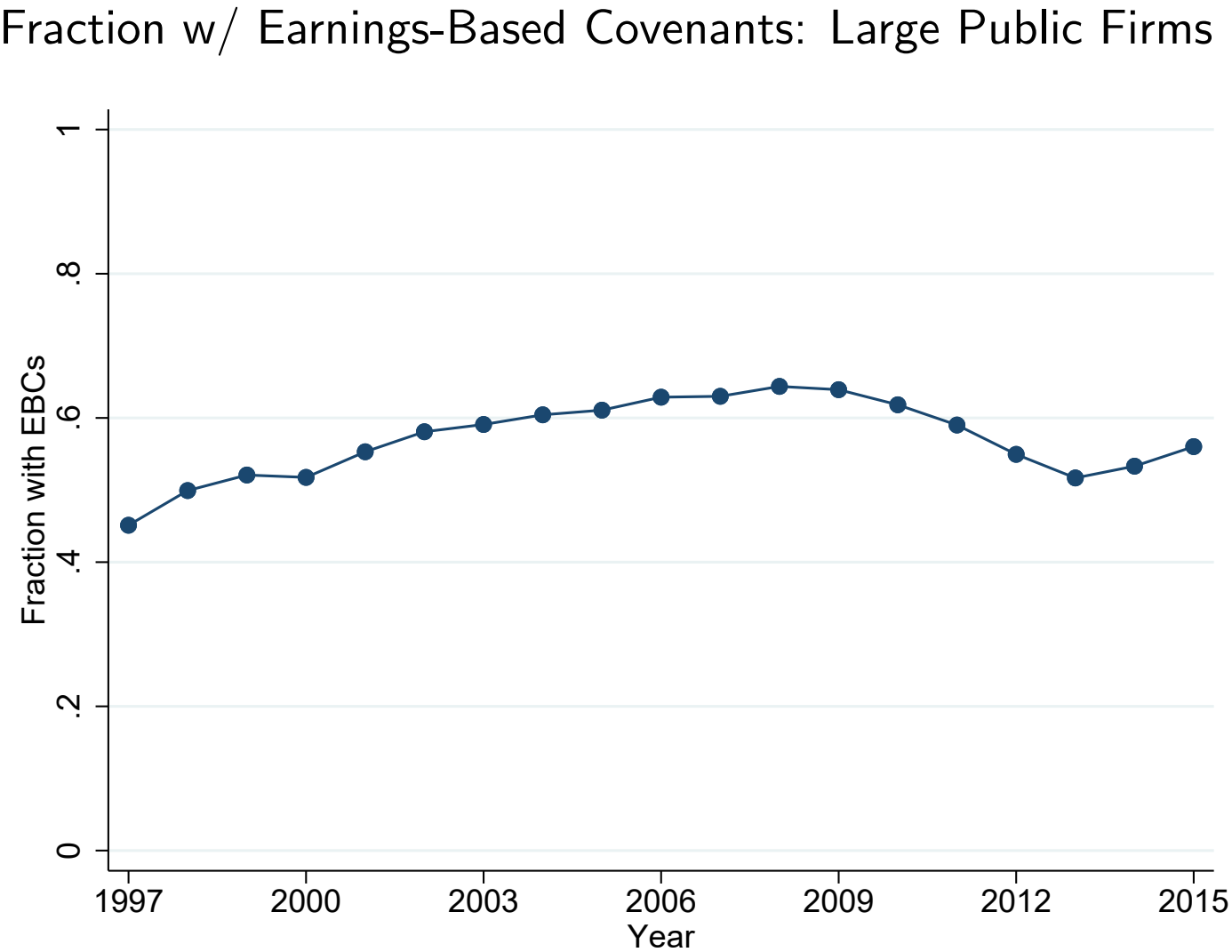
Prevalence of EBCs: Large US Firms



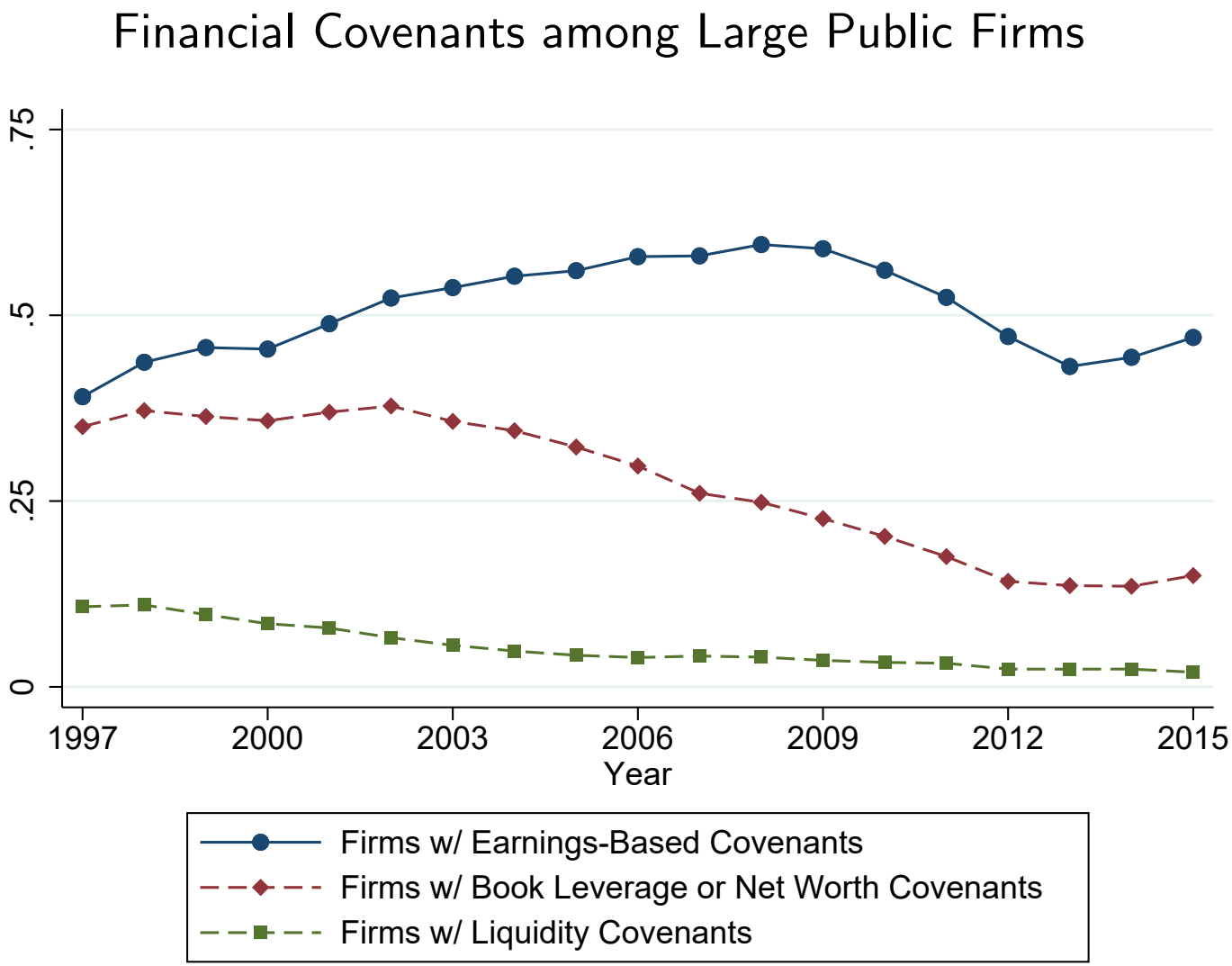
back

Other Forms of Financial Covenants

- Main alternative: covenants on book leverage/book net worth
  - not market net worth
  - book net worth (i.e. book equity) $\approx$ accumulation of past earnings
  - cousin of earnings-based covenants
- Prevalence:
  - $\sim$20% large public firms
  - declining substantially over time
- Tightness:
  - less constraining
  - less than 2% of large public firms w/ bank loans violate in a given year

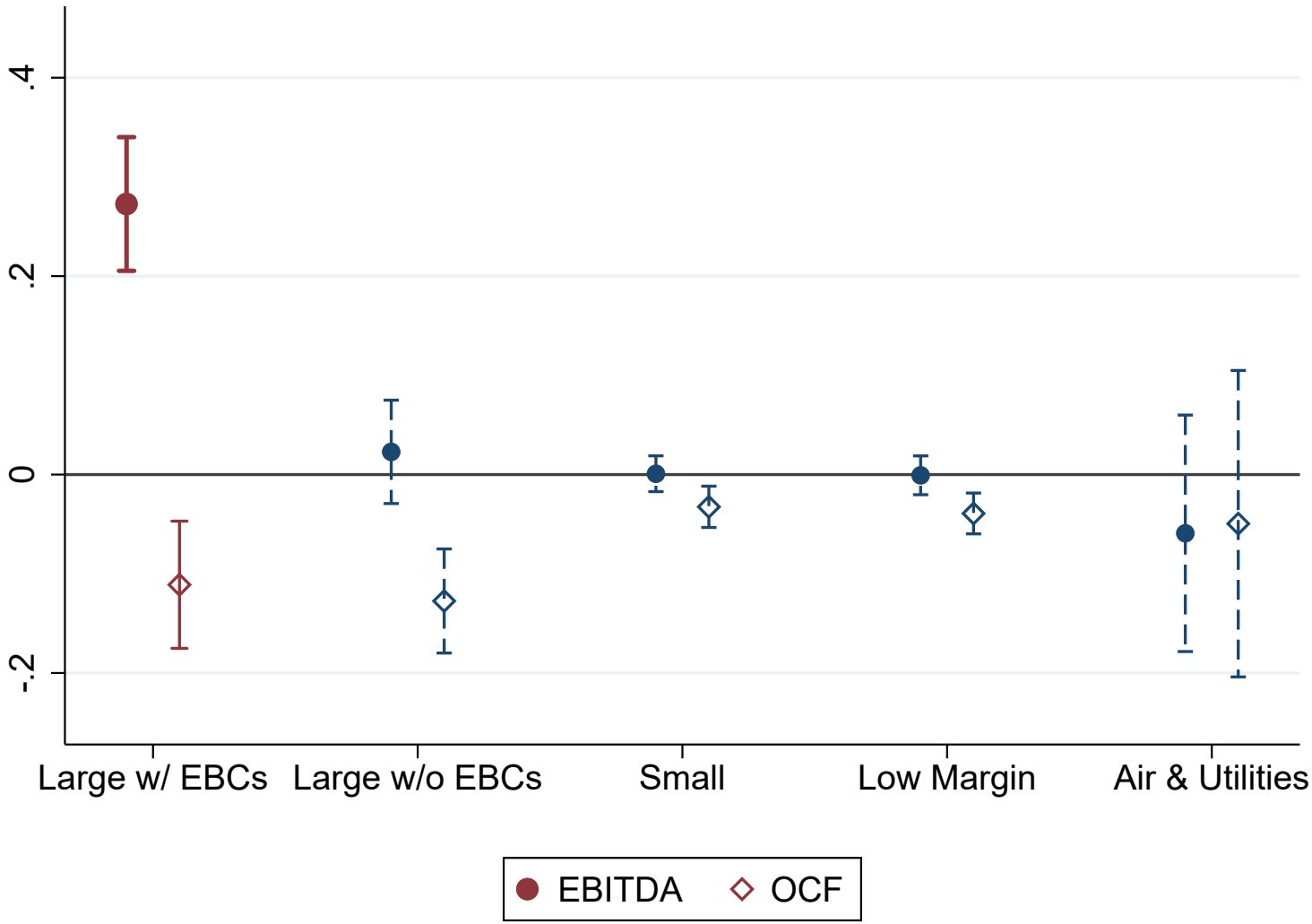
back

Other Forms of Financial Covenants



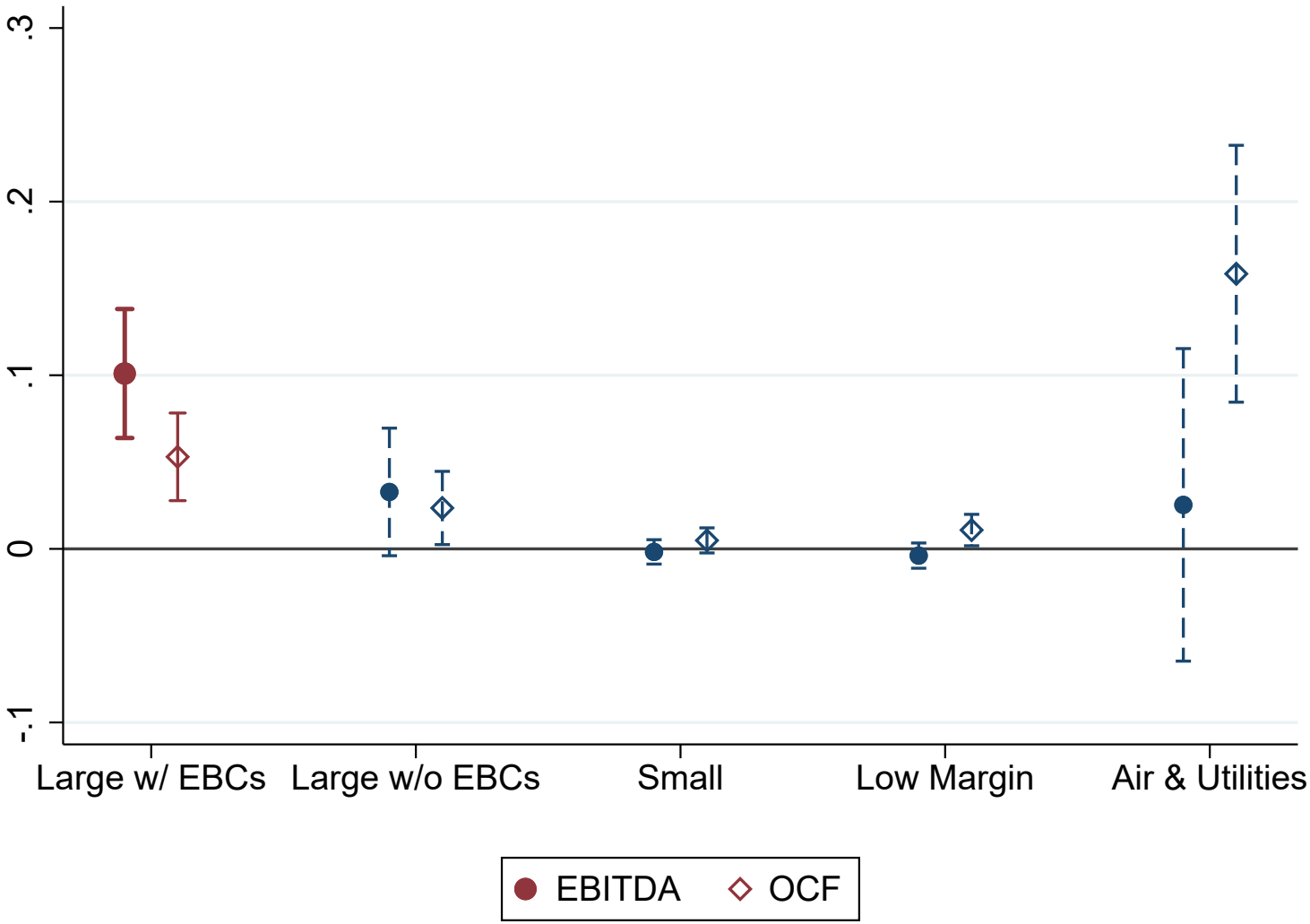
Traditional Approach: Sensitivity to EBITDA

Debt Issuance: $Y_{it} = \alpha_i + \eta_t + \beta \text{EBITDA}_{it} + \kappa \text{OCF}_{it} + X'_{it}\gamma + \epsilon_{it}$



Traditional Approach: Sensitivity to EBITDA

CAPX Investment: $Y_{it} = \alpha_i + \eta_t + \beta \text{EBITDA}_{it} + \kappa \text{OCF}_{it} + X'_{it}\gamma + \epsilon_{it}$



Large Firms with EBCs

	Net LT Debt Iss.		Δ Book Debt		Δ Unsec. Debt		CAPX	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EBITDA	**0.216*** **	**0.273*** **	**0.345*** **	**0.412*** **	**0.209*** **	**0.232*** **	**0.129*** **	**0.101*** **
	(0.030)	(0.034)	(0.039)	(0.042)	(0.037)	(0.041)	(0.017)	(0.019)
OCF		-0.111***		-0.135***		-0.048		0.053***
		(0.033)		(0.045)		(0.033)		(0.013)
Q	0.010**	0.011**	0.004	0.005	0.010**	0.011**	0.011***	0.011***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.002)	(0.002)
r_{-12m}	-0.003	-0.003	0.002	0.001	0.002	0.002	0.004*	0.004*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Cash Ho	-0.033	-0.033	0.039	0.039	-0.117***	-0.117***	0.015	0.015
	(0.043)	(0.044)	(0.051)	(0.052)	(0.044)	(0.043)	(0.013)	(0.013)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs	15,642	15,642	15,576	15,576	11,693	11,693	16,907	16,907
R^2	0.114	0.116	0.152	0.154	0.069	0.069	0.156	0.160

s.e. in parentheses, clustered by firm and time

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Firms with Low Prevalence of EBCs

Net LT Debt Issuance

	Large w/o EBCs		Small		Low Margin		Air & Utilities	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EBITDA	**-0.059*** **	**0.023**	**-0.019*** **	**0.001**	**-0.025*** **	**-0.001**	**-0.093** **	**-0.059**
	(0.021)	(0.027)	(0.007)	(0.009)	(0.008)	(0.010)	(0.045)	(0.061)
OCF		-0.127***		-0.033***		-0.039***		-0.050
		(0.027)		(0.011)		(0.010)		(0.079)
Q	0.007***	0.007***	0.004***	0.004***	0.007***	0.007***	0.042**	0.044**
	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.018)	(0.019)
r_{-12m}	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.002
	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.010)	(0.010)
Cash Ho	-0.048**	-0.042*	-0.055***	-0.059***	-0.071***	-0.076***	-0.109**	-0.130**
	(0.024)	(0.024)	(0.016)	(0.017)	(0.019)	(0.020)	(0.055)	(0.063)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs	10,137	10,136	20,153	20,129	22,557	22,534	2,475	2,474
R^2	0.073	0.078	0.029	0.030	0.036	0.038	0.087	0.088

s.e. in parentheses, clustered by firm and time

back

Firms with Low Prevalence of EBCs

CAPX Investment

	Large w/o EBCs		Small		Low Margin		Air & Utilities	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EBITDA	**0.053*** **	**0.033***	**0.001**	**-0.002**	**0.002**	**-0.004**	**0.079**	**0.025**
	(0.012)	(0.019)	(0.004)	(0.004)	(0.005)	(0.004)	(0.049)	(0.046)
OCF		0.024**		0.005		0.011**		0.158***
		(0.011)		(0.004)		(0.005)		(0.038)
Q	0.004***	0.004***	0.006***	0.006***	0.006***	0.006***	0.029***	0.026***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.010)	(0.010)
r_{-12m}	0.006***	0.006***	0.004***	0.004***	0.004***	0.004***	0.007	0.006
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)	(0.006)
Cash Ho	-0.019*	-0.019*	0.005	0.006	0.002	0.003	-0.018	-0.004
	(0.011)	(0.011)	(0.006)	(0.006)	(0.005)	(0.005)	(0.056)	(0.056)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs	10,683	10,681	21,249	21,222	24,045	24,020	2,535	2,534
R^2	0.107	0.108	0.043	0.043	0.046	0.047	0.122	0.144

s.e. in parentheses, clustered by firm and time

Summary Statistics

Median by Firm Group

	LG w/ EBCs	LG w/o EBCs	Small	Low Margin	Air & Util
Log assets	7.16	6.85	4.09	5.08	7.98
Log market cap	6.91	7.05	4.08	4.88	7.18
EBITDA/l.assets	0.13	0.12	0.06	0.06	0.10
EBITDA/sales	0.14	0.14	0.04	0.03	0.21
Debt/EBITDA	2.18	0.99	0.00	0.48	3.61
Debt/assets	0.29	0.18	0.07	0.18	0.36
EDF	0.00	0.00	0.01	0.02	0.00
Q	1.06	1.25	1.23	0.99	0.86
MTB	1.86	2.07	1.78	1.55	1.63
Cash/assets	0.05	0.13	0.19	0.12	0.02
PPE/assets	0.26	0.21	0.13	0.17	0.63
Inventory/assets	0.08	0.06	0.08	0.07	0.02
AR/assets	0.12	0.11	0.15	0.13	0.06
Intangible/assets	0.16	0.08	0.04	0.07	0.02
CAPX/l.assets	0.04	0.04	0.03	0.03	0.07
CFL share	0.88	0.88	0.00	0.47	0.66

Accounting Relationships

$$\text{EBITDA} = \text{SALE} - \text{COGS} - \text{XSGA}$$

$$\text{OCF} = \text{EBITDA} + \underbrace{(\text{NOPI} + \text{SPI}) + \text{SPPE}}_{\text{non-operating \& other income}} - \underbrace{(\text{TAX} - \text{DTAX} - \Delta\text{ATAX})}_{\text{cash taxes paid}}$$

$$\underbrace{+\Delta\text{AP} - \Delta\text{AR} - \Delta\text{INV} + \Delta\text{UR} - \Delta\text{PX} + \text{OCFO}}_{\text{difference between earnings \& cash receipts}}$$

- NOPI: non-operating income; SPI: special items; SPPE: sale of PPE; TAX: income taxes; DTAX: deferred taxes; ATAX: accrued taxes; UR: unearned revenue, PX: prepaid expenses.

Differences between EBITDA and OCF

- Timing of earnings recognition vs. cash payment
  - does not affect EBITDA; does affect OCF
- Non-operating & other income
  - does not affect EBITDA; does affect OCF

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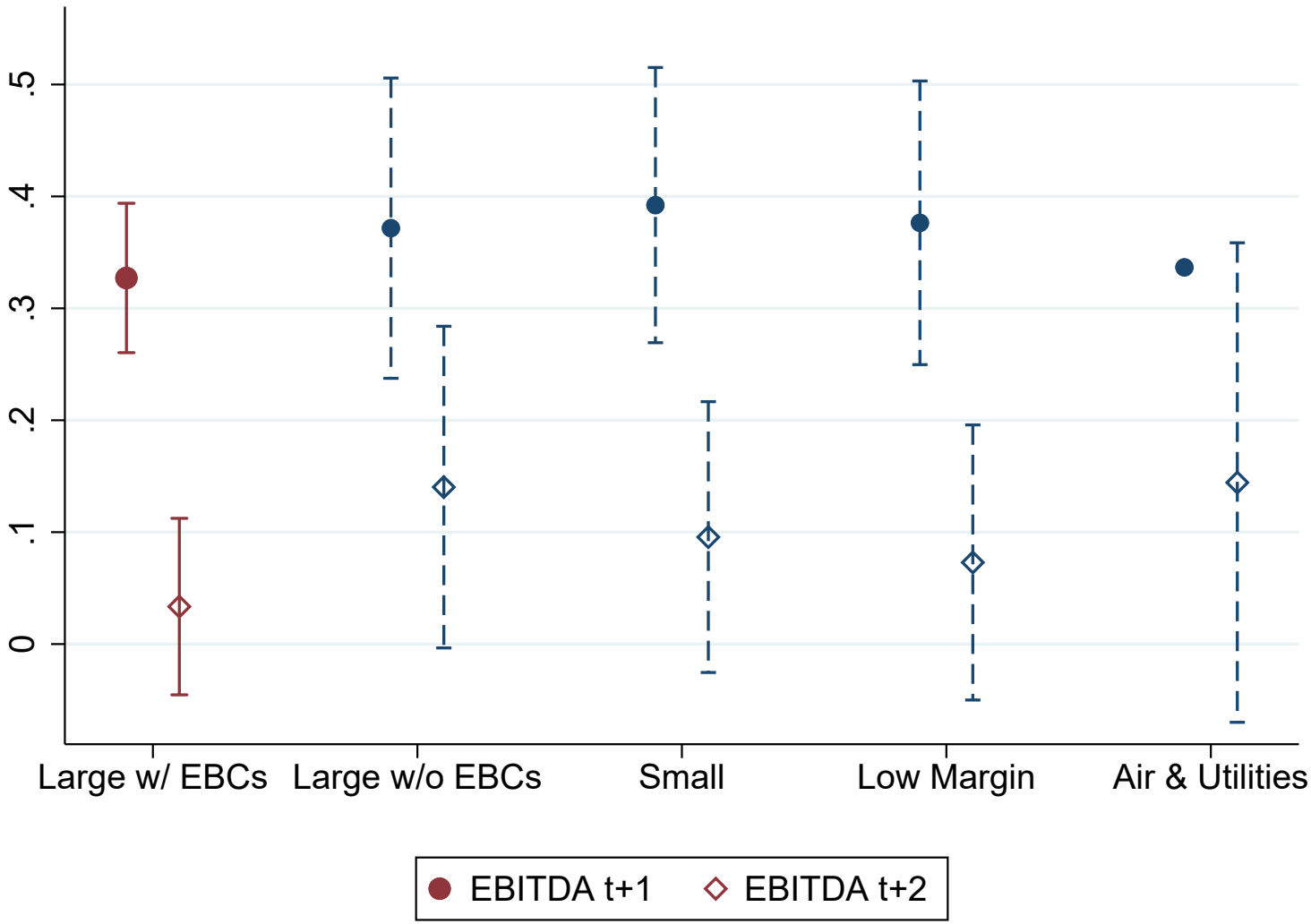
Predicting Future EBITDA

$$Y_{it+k} = \alpha_i + \eta_t + \beta \text{EBITDA}_{it} + \kappa \text{OCF} + X'_{it}\gamma + \epsilon_{it}$$



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Controlling for Real Estate Value

	Net LT Debt Iss		CAPX	
	(1)	(2)	(3)	(4)
EBITDA	0.325***	0.330***	0.077***	0.082***
	(0.064)	(0.066)	(0.022)	(0.022)
OCF	-0.135***	-0.134***	0.018	0.019
	(0.037)	(0.037)	(0.015)	(0.015)
Q	0.006	0.007	0.013***	0.013***
	(0.006)	(0.006)	(0.004)	(0.004)
Past 12m stock ret	-0.004	-0.005	0.002	0.002
	(0.006)	(0.006)	(0.002)	(0.002)
Cash Ho	-0.036	-0.037	0.016	0.015
	(0.067)	(0.066)	(0.015)	(0.016)
RE		0.035*		0.036***
		(0.018)		(0.009)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Obs	4,554	4,554	4,540	4,540
R^2	0.116	0.116	0.186	0.194

Standard errors in parentheses, clustered by firm and time
*** p<0.01, ** p<0.05, * p<0.1

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The Form of Cash Flow Matters

- Holding EBITDA constant, higher **net cash receipts**
  - increase internal funds; but **do not** relax borrowing constraints (EBCs)
  - substitute out borrowing: debt issuance $\downarrow$, investment $\uparrow$ (all samples)

- Natural experiments on net cash receipts (Rauh, 2006)
  - shocks to cash positions due to mandatory pension contributions
  - **does not affect EBITDA**
  - higher cash positions, weakly lower debt issuance

back

More constrained firms more sensitive to "cash flows"?

- Traditional view: constrained firms more sensitive to **internal funds**?
  - theoretically ambiguous (Kaplan and Zingales, 1997)
- Evidence above: two sources of sensitivity to "cash flows"
  - 1) increase **internal funds**
  - 2) **relax borrowing constraint (EBITDA)**
- Small firms: **2nd channel** weak
  - cash flow-based lending & EBCs less prevalent
- How "cash flows" are measured matters
  - earnings/EBITDA vs. net cash receipts

More constrained firms more sensitive to "cash flows"?

Large vs. Small Firms

	Net LT Debt Iss				CAPX			
	Large Firm		Small Firm		Large Firm		Small Firm	
EBITDA	0.092***	0.173***	-0.019***	0.001	0.099***	0.078***	0.001	-0.002
	(0.020)	(0.023)	(0.007)	(0.009)	(0.011)	(0.012)	(0.004)	(0.004)
OCF		-0.141***		-0.033***		0.038***		0.005
		(0.022)		(0.011)		(0.008)		(0.004)
Q	0.007***	0.007***	0.004***	0.004***	0.006***	0.006***	0.006***	0.006***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
r_{-12m}	0.001	0.000	0.002	0.002	0.005***	0.005***	0.004***	0.004***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Cash Ho	-0.027	-0.026	-0.055***	-0.059***	0.013*	0.014*	0.005	0.006
	(0.020)	(0.021)	(0.016)	(0.017)	(0.007)	(0.008)	(0.006)	(0.006)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs	26,165	26,164	20,153	20,129	27,982	27,980	21,249	21,222
R^2	0.076	0.080	0.029	0.030	0.129	0.131	0.043	0.043

s.e. in parentheses, clustered by firm and time

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Responses to EBITDA: US vs. Japan

	Change in Book Debt				CAPX Investment			
	US Large NF		JPN Large NF		US Large NF		JPN Large NF	
EBITDA	0.160***	0.283***	-0.178***	-0.022	0.099***	0.078***	0.037***	0.017
	(0.028)	(0.025)	(0.021)	(0.016)	(0.011)	(0.012)	(0.012)	(0.011)
OCF		-0.194***		-0.329***		0.038***		0.020**
		(0.030)		(0.020)		(0.008)		(0.010)
Q	0.003*	0.003*	0.013***	0.011***	0.006***	0.006***	0.008***	0.008***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
r_{-12m}	0.003	0.003	-0.004***	-0.004***	0.005***	0.005***	-0.001	-0.001
	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Cash Ho	0.020	0.023	-0.072***	-0.081***	0.013*	0.014*	-0.012	-0.012
	(0.028)	(0.028)	(0.016)	(0.017)	(0.007)	(0.008)	(0.008)	(0.007)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs	27,936	27,919	20,422	20,338	27,982	27,980	20,176	20,086
R^2	0.116	0.123	0.112	0.169	0.129	0.131	0.071	0.070

s.e. in parentheses, clustered by firm and time

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Summary Statistics: Firm Real Estate

	Method 1	Method 2	All w/ RE
	Panel A. 2002—2015		
Market Value RE/assets	0.21	0.13	-
Market Value RE/market cap	0.21	0.12	-
Book PPE/assets	0.25	0.21	0.25
EBITDA/l.assets	0.14	0.13	0.12
Q	1.15	1.14	1.10
Debt/assets	0.22	0.19	0.24
Log assets	7.08	6.30	6.84
Asset-based lending/debt	0.12	0.25	0.22
Cash flow-based lending/debt	0.85	0.66	0.74
Fraction of large firms	0.76	0.63	0.71
Fraction w/ EBCs	0.60	0.55	0.56
	Panel B. 2007—2009		
$\Delta \text{RE}_{06}^{07-09}/\text{assets}_{06}$	-0.01	-0.01	-
$\Delta P^{07-09}(\text{HQ})$	-0.07	-0.08	-0.07
$\Delta \text{EBITDA}_{06}^{07-09}/\text{assets}_{06}$	-0.02	-0.01	-0.01
$\Delta \text{CAPX}_{06}^{07-09}/\text{assets}_{06}$	-0.01	-0.01	-0.01

Borrowing Sensitivity to Property Value: Tradables Only

	Net LT Debt Iss		Δ Asset-Based		Δ CF-Based	
	(1)	(2)	(3)	(4)	(5)	(6)
RE (Method 1)	**0.024**		0.060**		-0.090***	
	(0.031)		(0.030)		(0.027)	
RE (Method 2)		**0.063****		0.075*		-0.003
		(0.031)		(0.040)		(0.022)
EBITDA	0.182***	0.136***	0.119***	0.065**	0.121*	0.109**
	(0.055)	(0.043)	(0.046)	(0.033)	(0.071)	(0.050)
OCF	-0.155***	-0.170***	-0.109***	-0.141***	-0.097**	-0.089*
	(0.035)	(0.045)	(0.039)	(0.035)	(0.047)	(0.048)
Q	0.006	0.016**	-0.005*	0.003	0.002	0.013
	(0.005)	(0.007)	(0.003)	(0.003)	(0.008)	(0.008)
Cash Ho	-0.047	-0.074***	-0.081***	-0.063**	0.040	-0.020
	(0.038)	(0.027)	(0.030)	(0.029)	(0.040)	(0.036)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Obs	3,174	2,820	3,174	2,820	3,174	2,820
R^2	0.111	0.122	0.212	0.234	0.211	0.195

s.e. in parentheses, clustered by firm and time

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Property Price Collapse: US vs. Japan

	CAPX Investment						
	Japan (Gan 07)	US					
Period	1994—1998	2007-2009		2007-2011		2009-2013	
Specification	LAD	OLS	LAD	OLS	LAD	OLS	LAD
RE 1989	-0.165						
	(0.016)						
RE 2006	-	0.007	0.014	-0.001	0.007	-0.01	0.004
Method 1	-	(0.009)	(0.008)	(0.008)	(0.005)	(0.009)	(0.004)
RE 2006	-	0.007	0.002	0.008	0.005	-0.005	-0.004
Method 2	-	(0.007)	(0.004)	(0.007)	(0.005)	(0.005)	(0.005)

s.e. in parentheses

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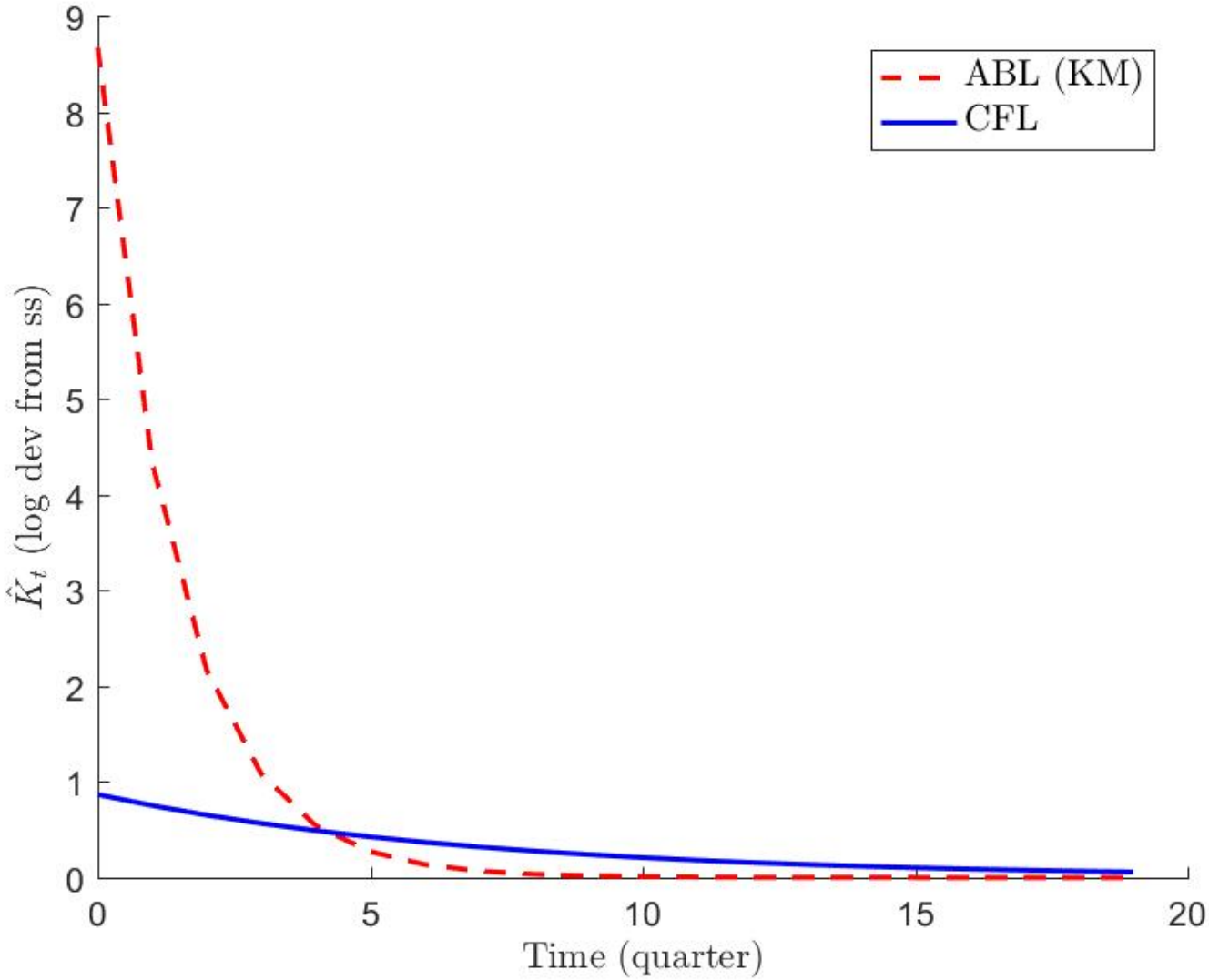
Financial Acceleration



- Set θ so two economies have same SS.