Anatomy of Corporate Borrowing Constraints

Chen Lian MIT

Yueran Ma Harvard

NBER Monetary Economics Meeting

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:

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

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**

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**

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

Aggregate share by type :

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

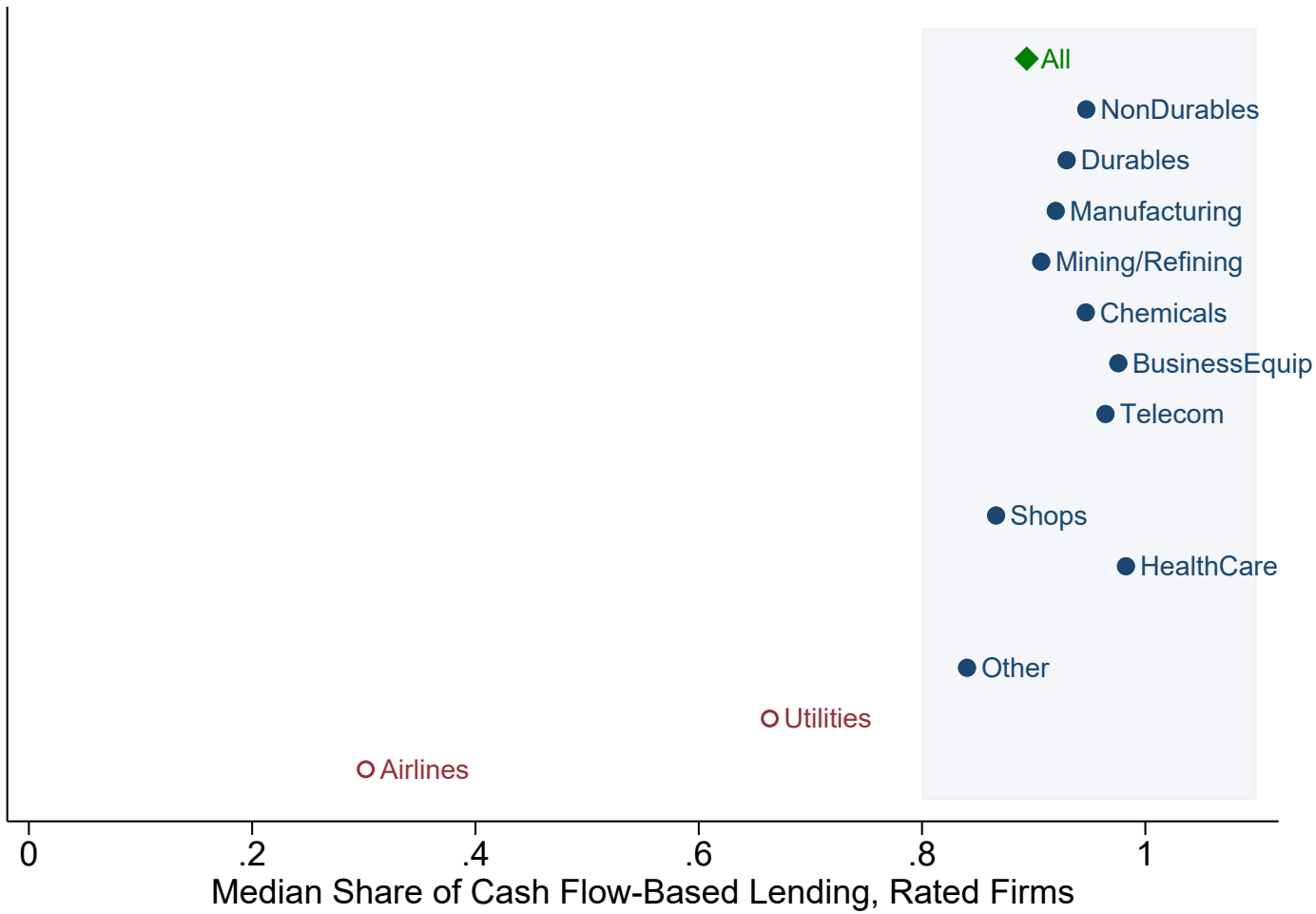
Integrate data from many sources: aggregate & debt level

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

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

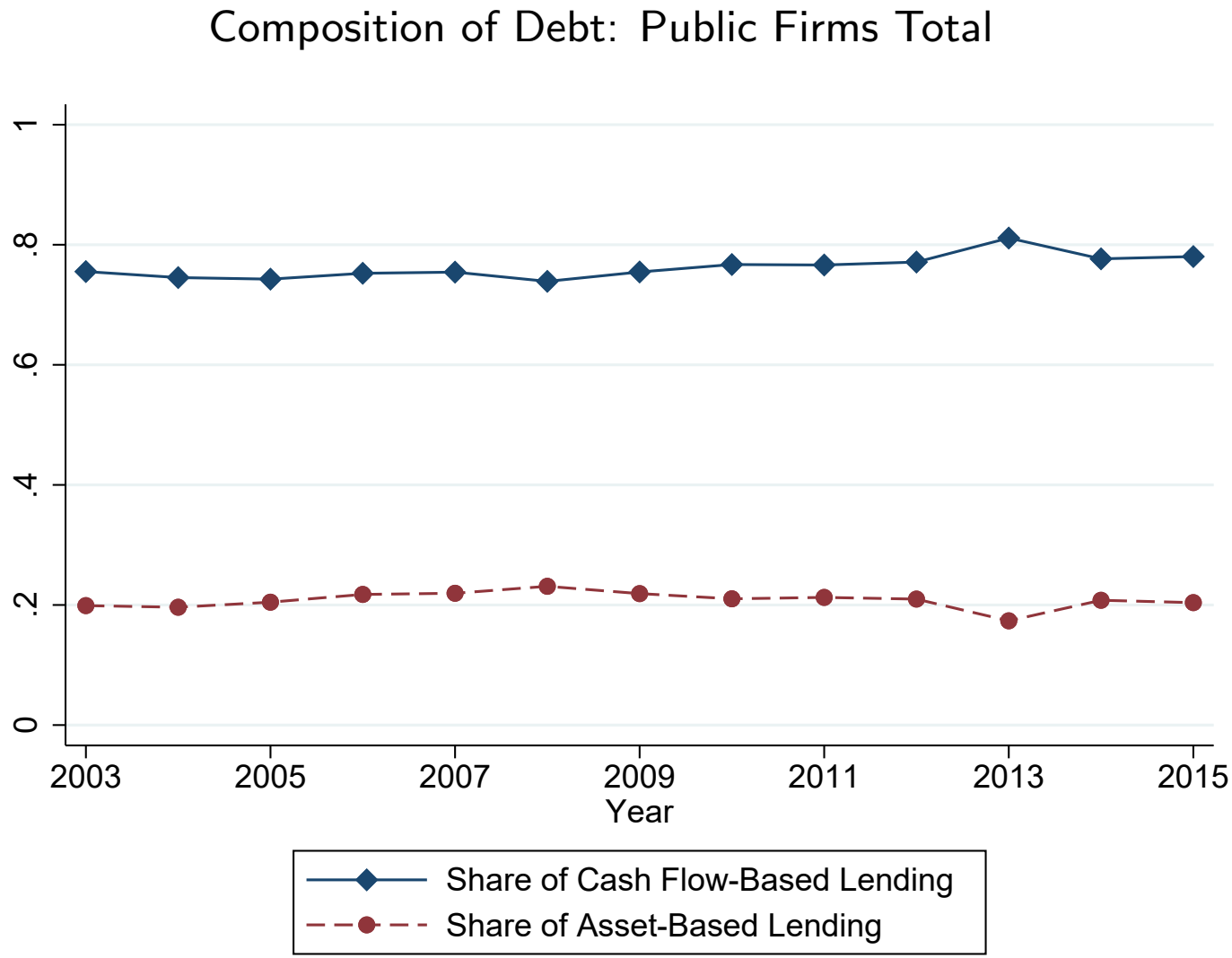
Similar in most industries

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: minimum earnings to debt payments: $r_t b_t \leq \theta \pi_t \Rightarrow b_t \leq \frac{\theta \pi_t}{r_t}$

- 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
  - found in $\sim$**60%** of large public firms
  - $+$ credit market norms

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: minimum earnings to debt payments: $r_t b_t \leq \theta \pi_t \Rightarrow b_t \leq \frac{\theta \pi_t}{r_t}$

- 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
  - found in $\sim$**60%** of large public firms
  - $+$ credit market norms

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: minimum earnings to debt payments: $r_t b_t \leq \theta \pi_t \Rightarrow b_t \leq \frac{\theta \pi_t}{r_t}$

- 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
  - found in $\sim$**60%** of large public firms
  - $+$ credit market norms

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: minimum earnings to debt payments: $r_t b_t \leq \theta \pi_t \Rightarrow b_t \leq \frac{\theta \pi_t}{r_t}$

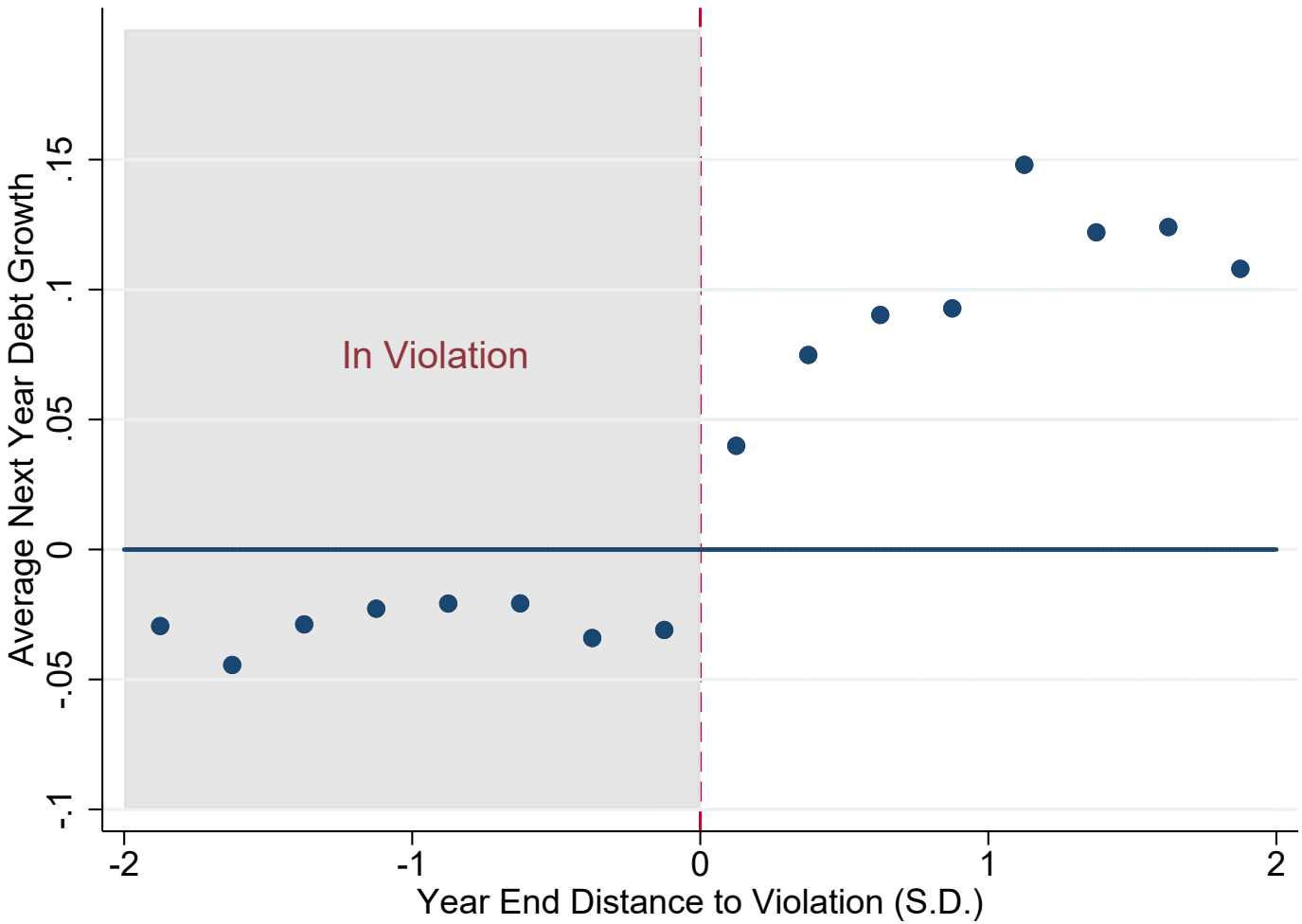
- Apply at **firm level**
- π_t : EBITDA (earnings before interests, taxes, depreciation, and amortization) in past 12 months
  - excludes non-operating income, windfalls; not literal cash receipts
- Important source: financial covenants of loans & bonds
  - found in $\sim$**60%** of large public firms
  - $+$ credit market norms

Earnings-Based Covenants

- Financial covenants: legally binding provisions
  - loans: assessed **quarterly** based on financial statements
  - matter for both **issuance** and **maintenance** of debt
- 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

Earnings-Based Covenants as Debt Limits

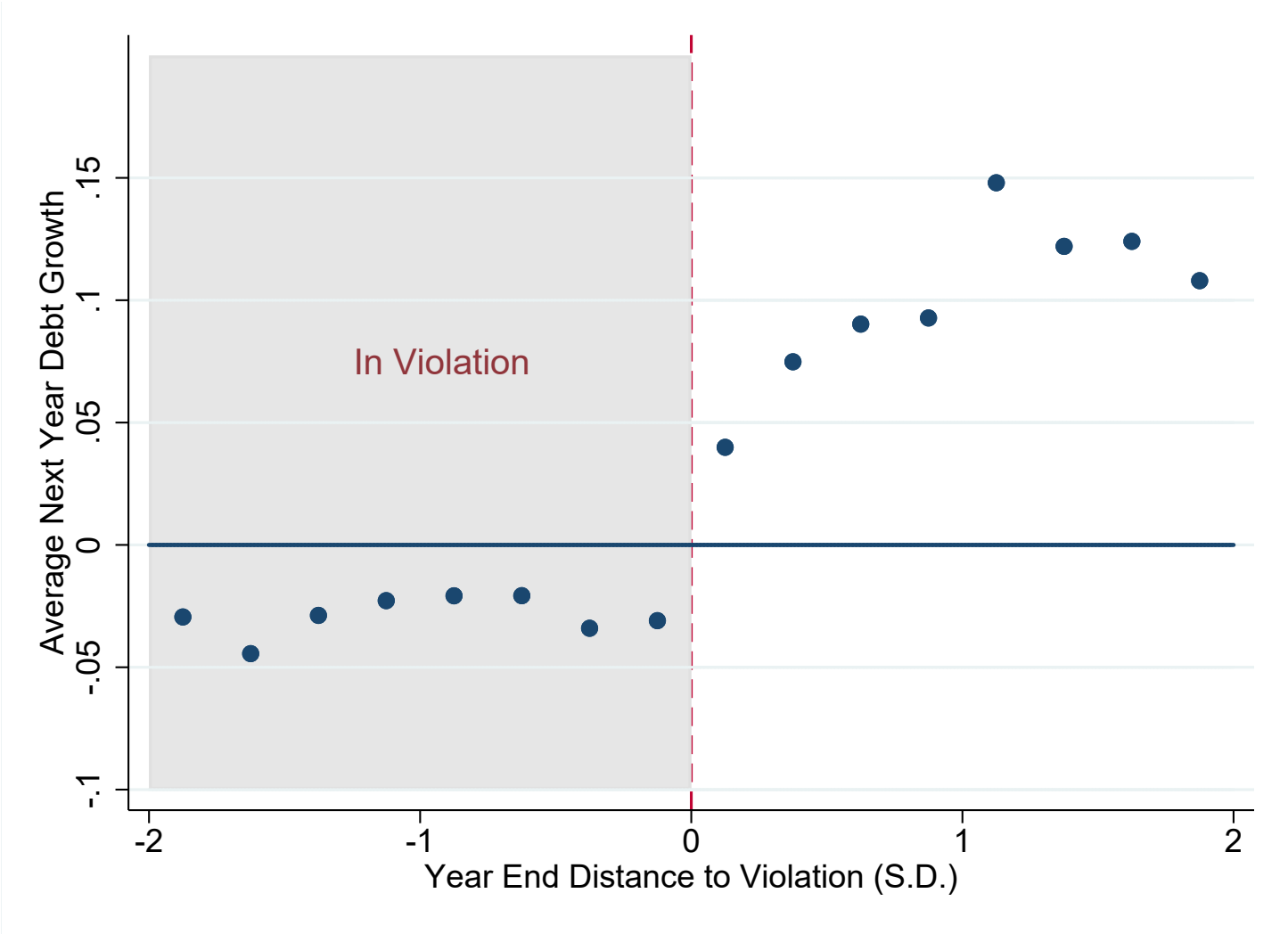
Negative debt growth post violation (DealScan)



- 10% large firms w/ DealScan loans violate a year; 20% $<$ 0.5 s.d.

Earnings-Based Covenants as Debt Limits

Negative debt growth post violation (DealScan)



- 10% large firms w/ DealScan loans violate a year; 20% $<$ 0.5 s.d.

Earnings-Based Borrowing Constraints

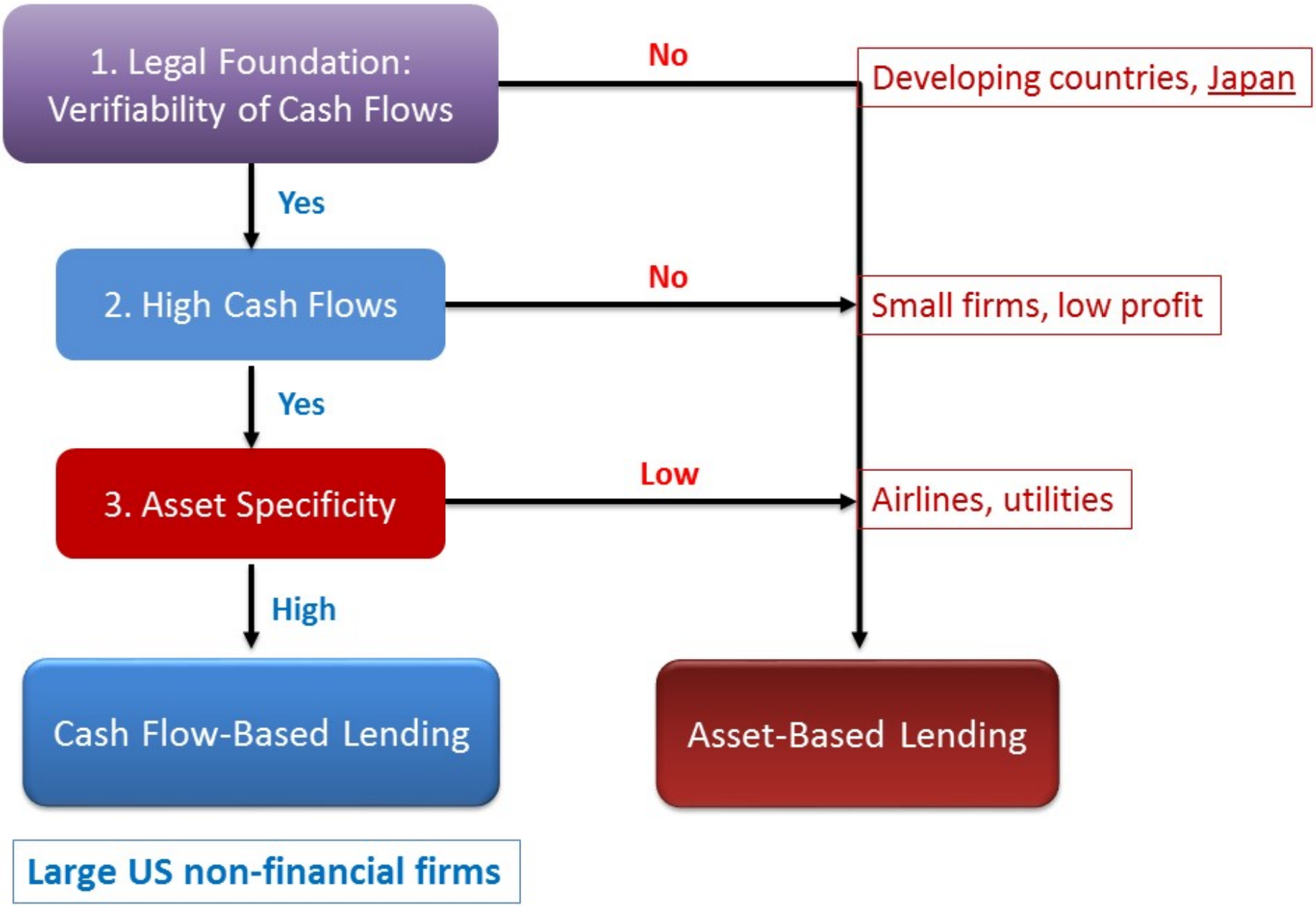
"I think collateral is there mostly for some regulatory reasons. What banks really care is your EBITDA and coverage ratio."

—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. Financial Variables, Borrowing Constraints, Firm Outcomes

How do **financial variables** affect firms' borrowing constraints & outcomes **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. Financial Variables, Borrowing Constraints, Firm Outcomes

How do **financial variables** affect firms' borrowing constraints & outcomes **on the margin**?

2.1 Role of Cash Flows

2.2 Role of Physical Collateral Value

Firms are constrained, but a different type

Role of Cash Flows

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

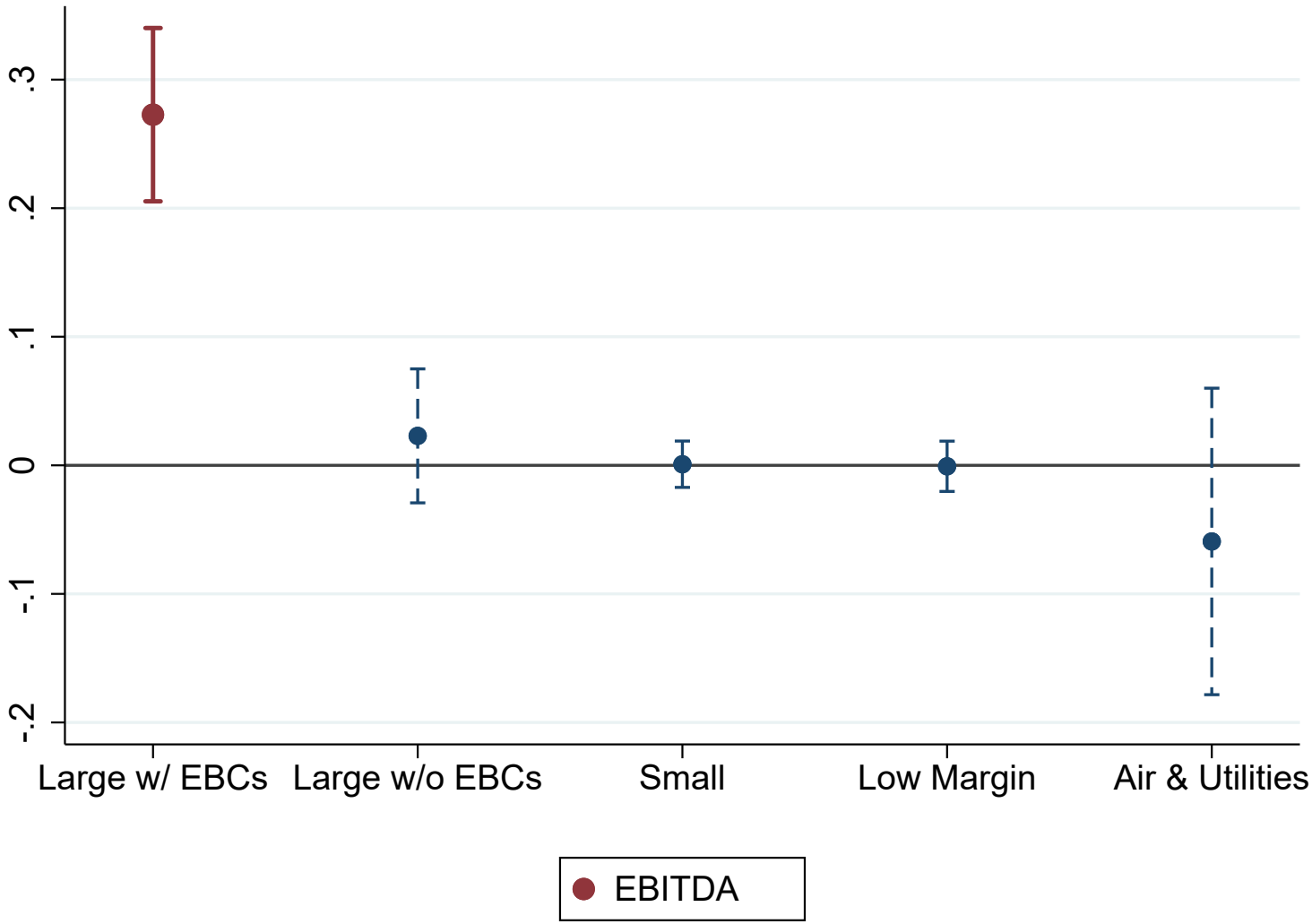
- Mechanism: cash flows in the form of operating earnings
  - **relax** earnings-based **borrowing constraints**
  - crowd in borrowing & investment
- Concentrated in firms borrowing CFL & have EBCs
  - not in ABL firms
- Empirical tests: traditional approach + natural experiment
- Old literature: main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

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

Traditional Approach: Sensitivity to EBITDA

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



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)

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

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***** (0.212)	**-0.721***** (0.134)	**-0.520**** (0.208)
Obs	686	435	727

s.e. in parentheses

Accounting Natural Experiment

Second Stage

	Large **w/ EBCs**	Large w/o EBCs	Small
	Net LT Debt Iss		
$\widehat{EBITDA}_i^{06}$	**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

How do **financial variables** affect firms' borrowing constraints & outcomes **on the margin**?

2.1 Role of Cash Flows

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
  - no significant collateral damage to major US non-financial firms
- Financial acceleration among non-financial firms
  - asset price feedback may dampen

Borrowing Sensitivity to Property Value

- Measure firm real estate value
  - Method 1. traditional estimates: Chaney-Thesmar-Sraer
  - Method 2. hand collect property-level data from 10K filings

	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

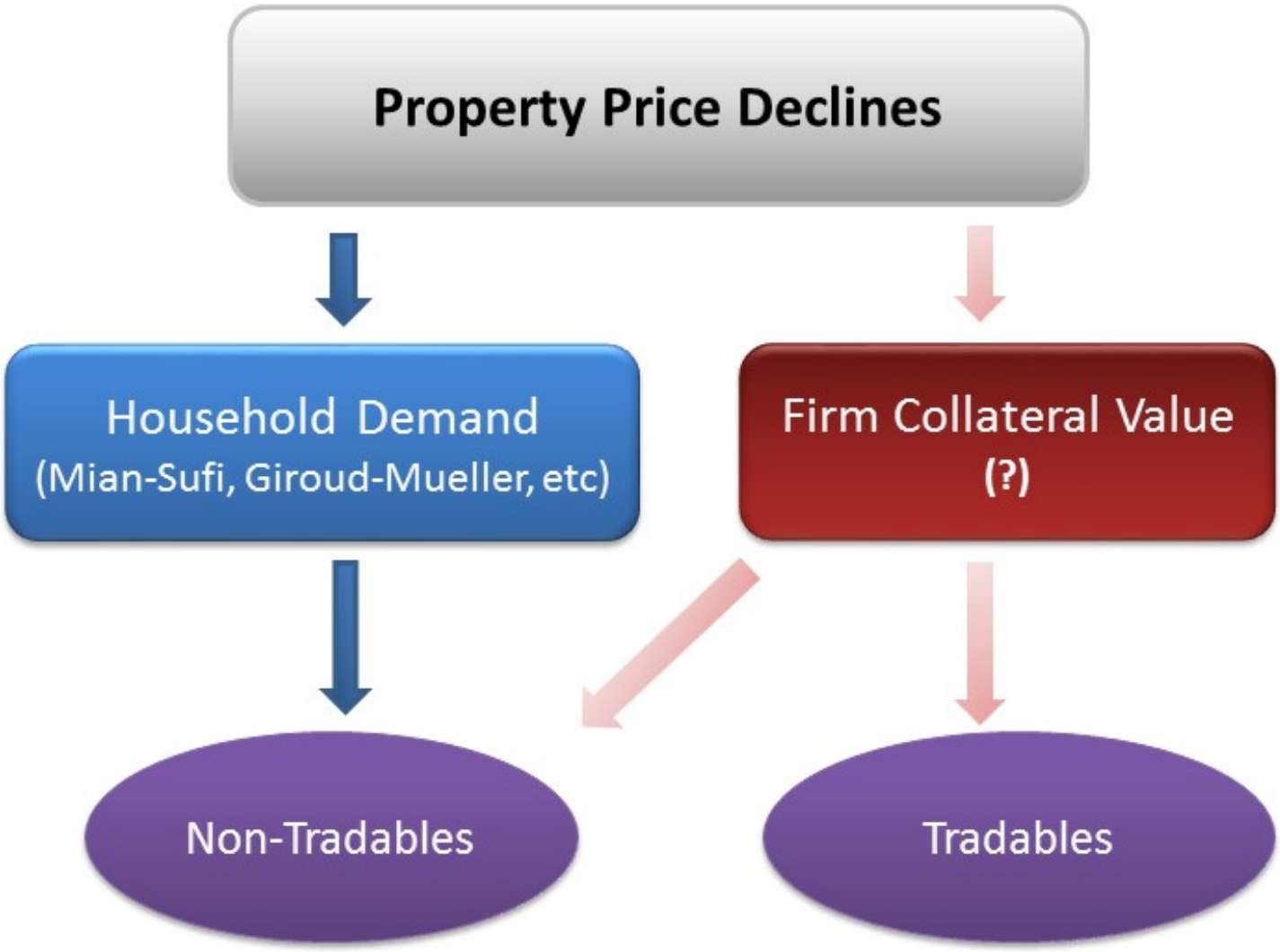
s.e. in parentheses, clustered by firm and time

- 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

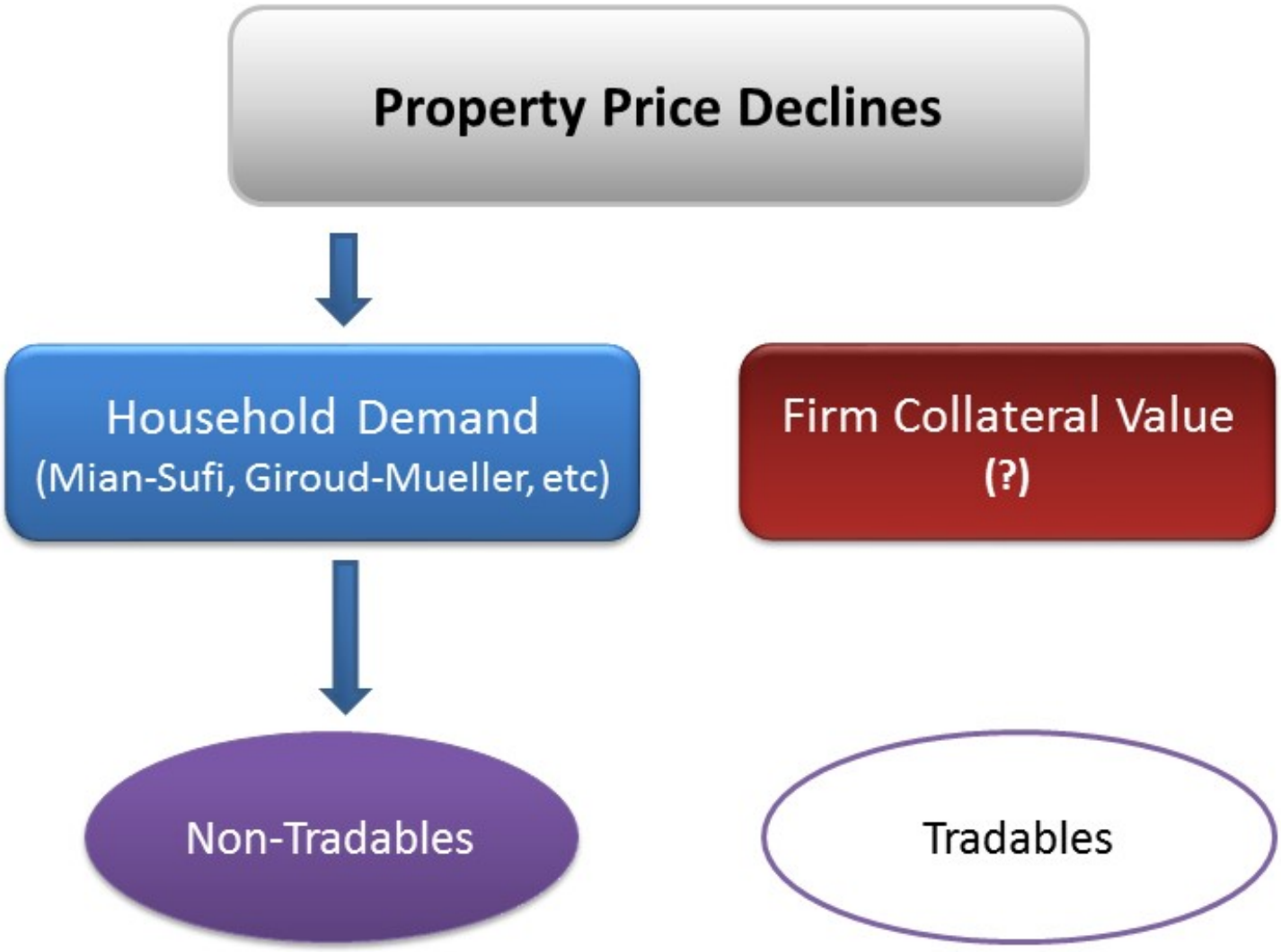
Great Recession: Property Price Effects



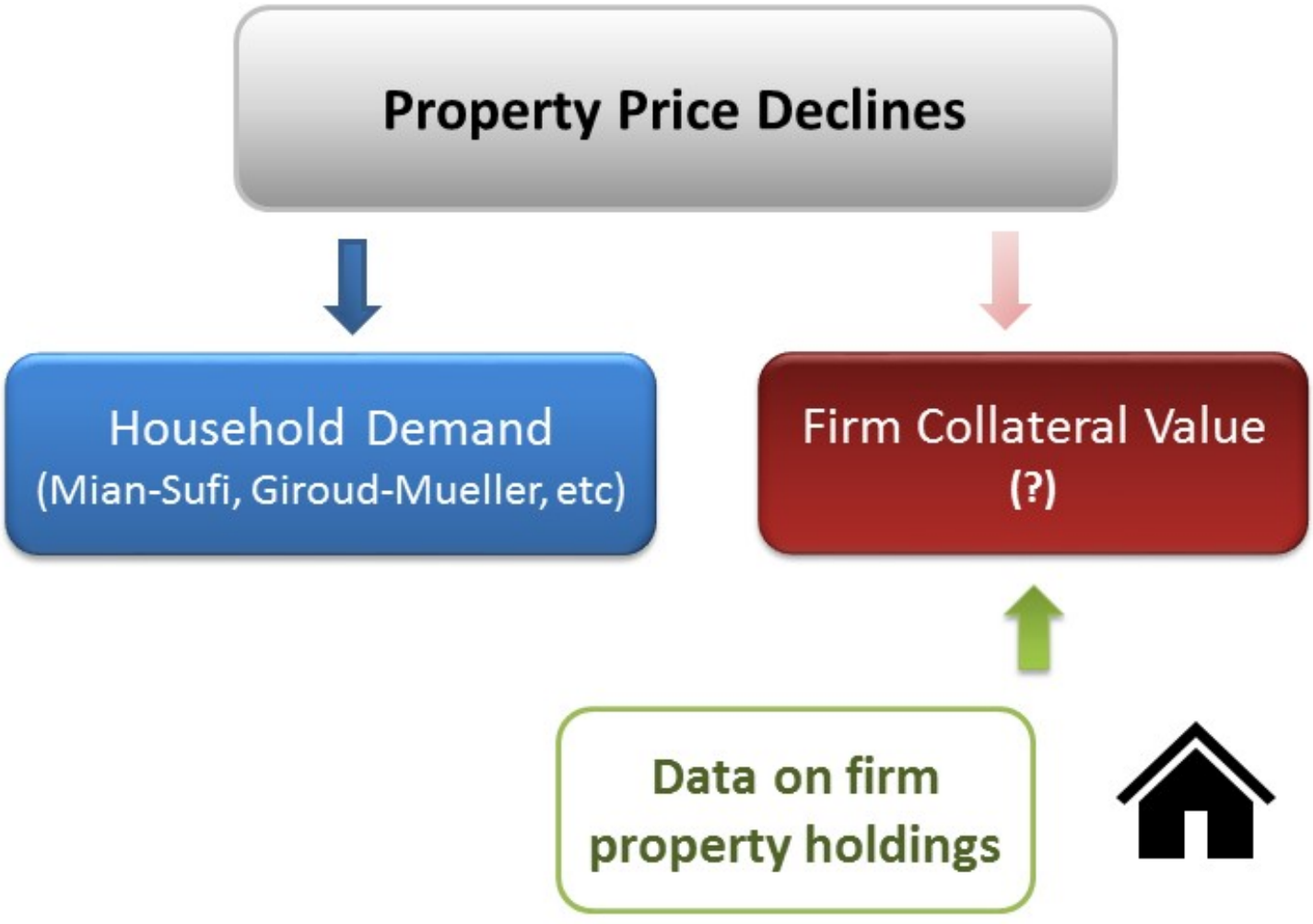
Great Recession: Property Price Effects



Great Recession: Property Price Effects



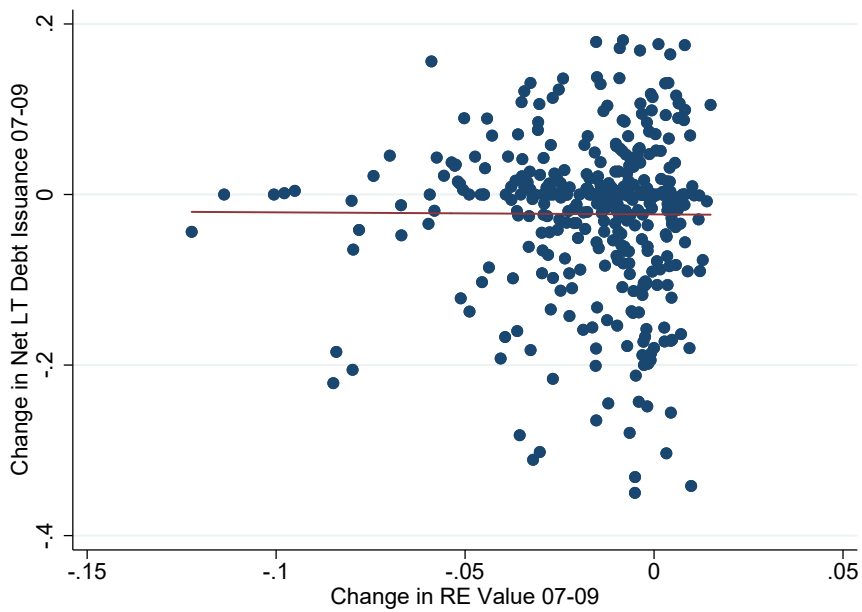
Great Recession: Property Price Effects



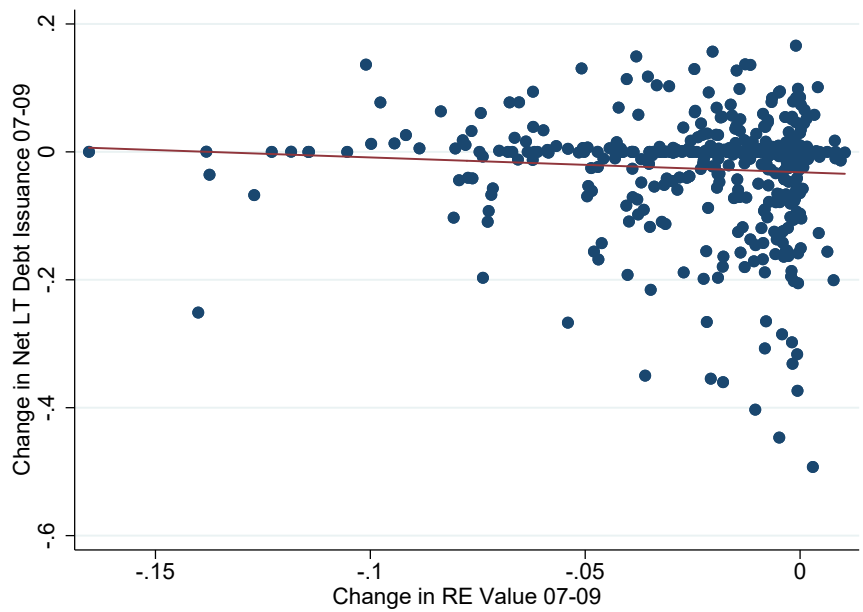
Great Recession: Property Price Effects

- $\Delta Y_i^{07-09} = \alpha + \lambda \Delta \text{RE}_{i,06}^{07-09} + \eta \text{RE}_{i,06} + \phi \Delta P_i^{07-09} + X_i' \gamma + u_i$
  - $\Delta \text{RE}_{i,06}^{07-09}$: 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: Financial Factors

- **Firm collateral damage** $\Delta \text{RE}_i^{07-09}$: no significant effects
- Endogeneity concern:
  - $\Delta \text{RE}_i^{07-09}$ bias down if firms w/ more RE less sensitive to local demand
  - can look at tradables only (70% of sample) $\Rightarrow$ results similar
- **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
  - variants of KM model: financial amplification may dampen
  - key to the Great Recession: households & financial institutions

Great Recession: Financial Factors

- **Firm collateral damage** $\Delta \text{RE}_i^{07-09}$: no significant effects
- Endogeneity concern:
  - $\Delta \text{RE}_i^{07-09}$ bias down if firms w/ more RE less sensitive to local demand
  - can look at tradables only (70% of sample) $\Rightarrow$ results similar
- **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
  - variants of KM model: financial amplification may dampen
  - key to the Great Recession: households & financial institutions

US vs. Japan

Take nothing for granted

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

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)

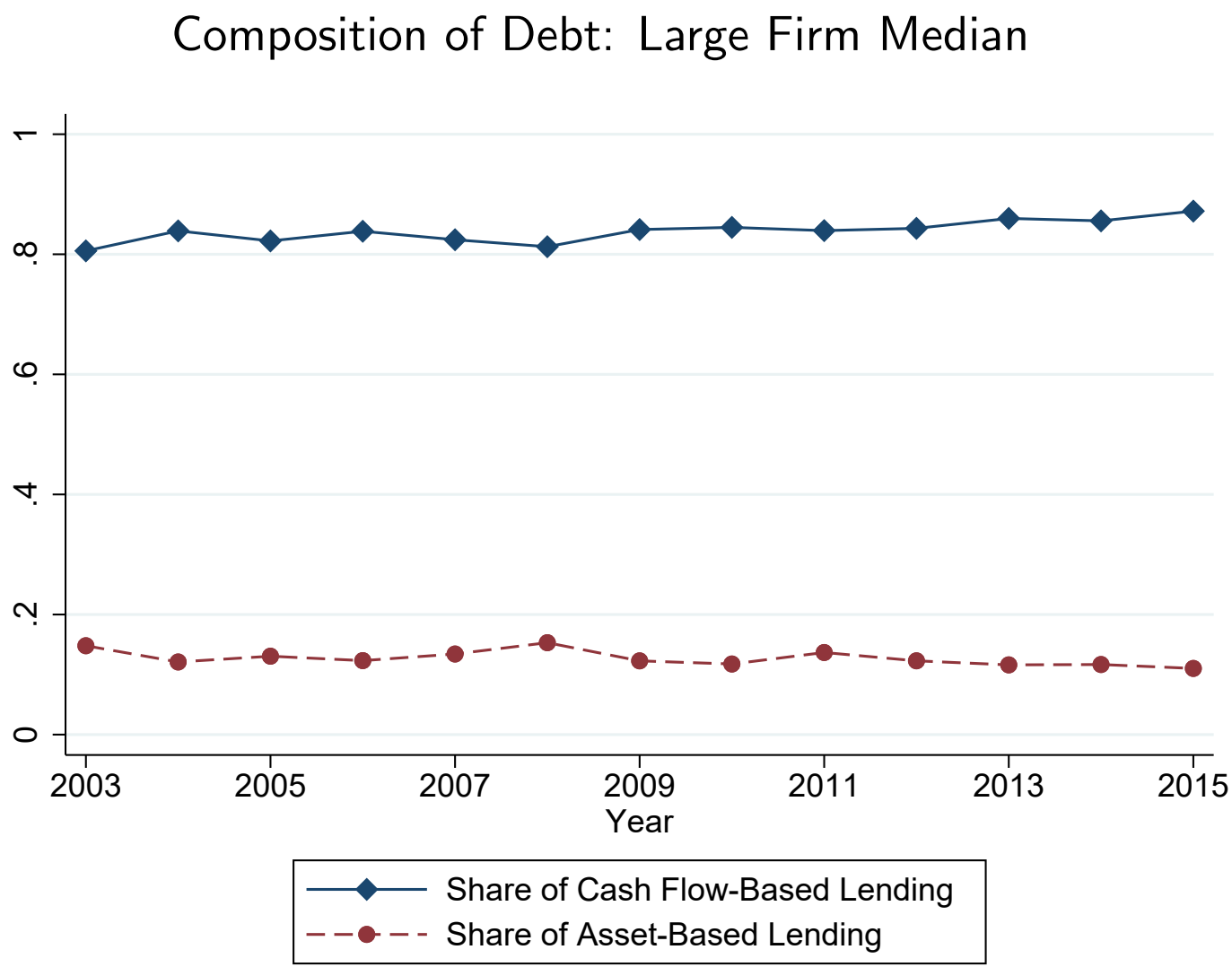
s.e. in parentheses, clustered by firm and time.

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)

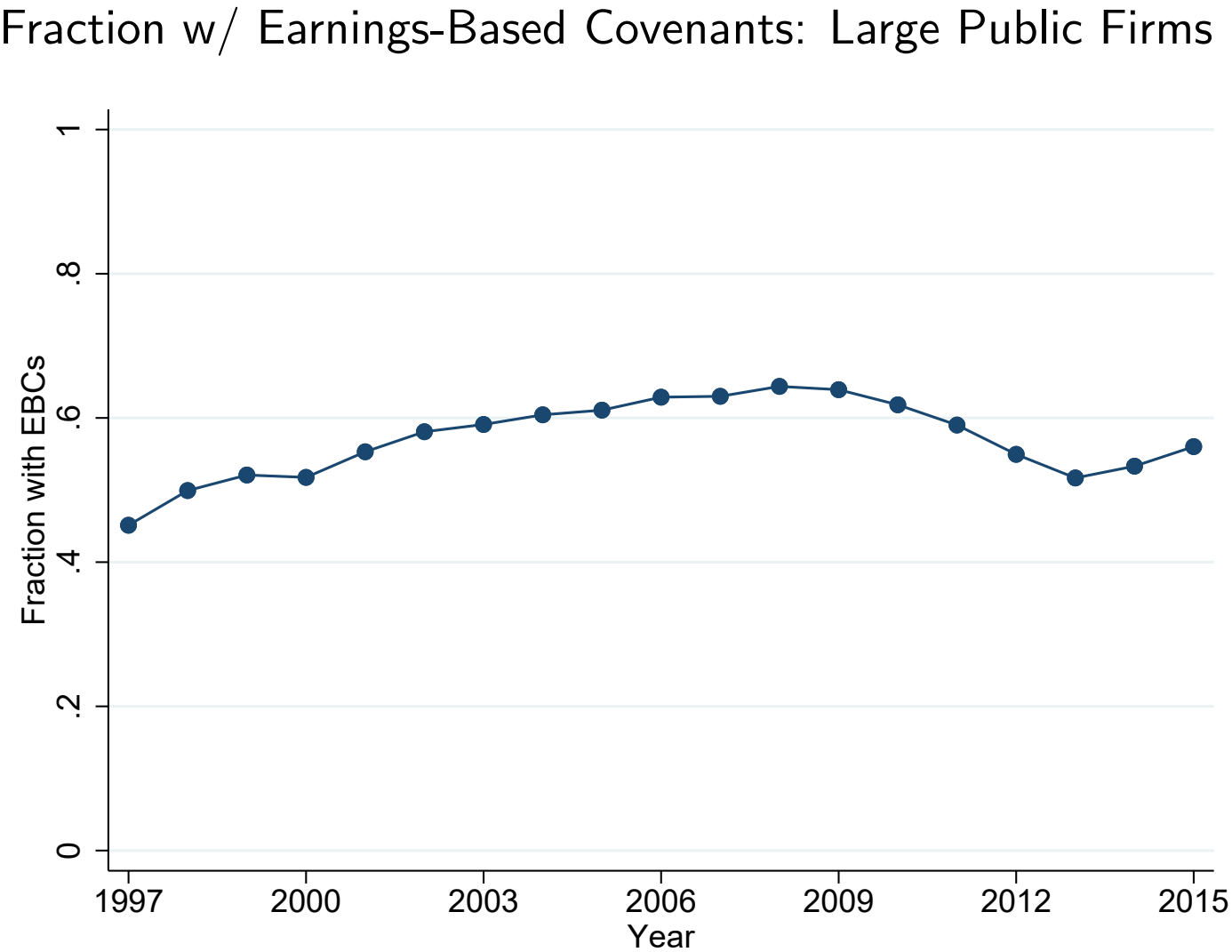
s.e. in parentheses, s.e. clustered by firm and time.

Prevalence of Cash Flow-Based Lending



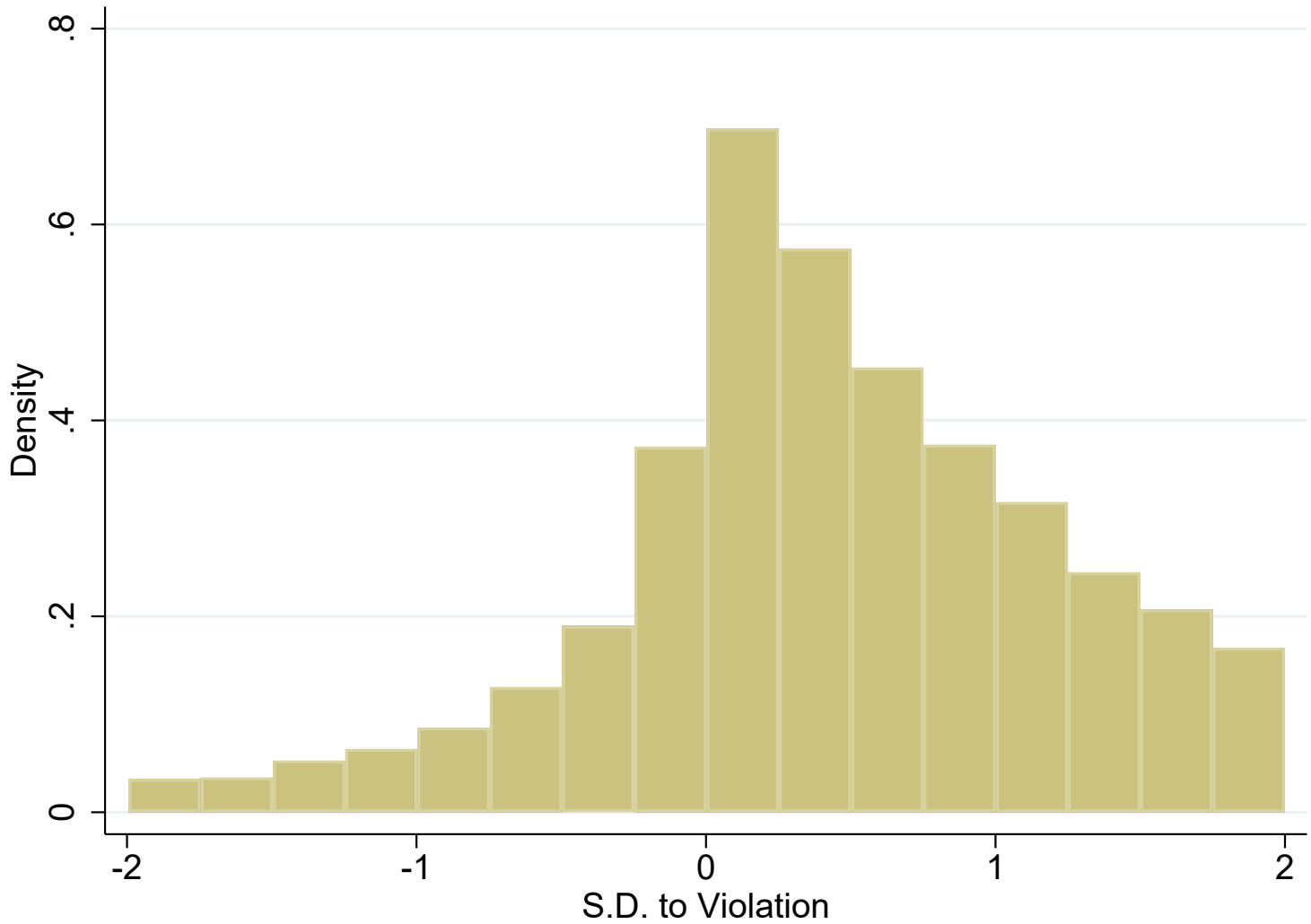
back

Prevalence of EBCs: Large US Firms



back

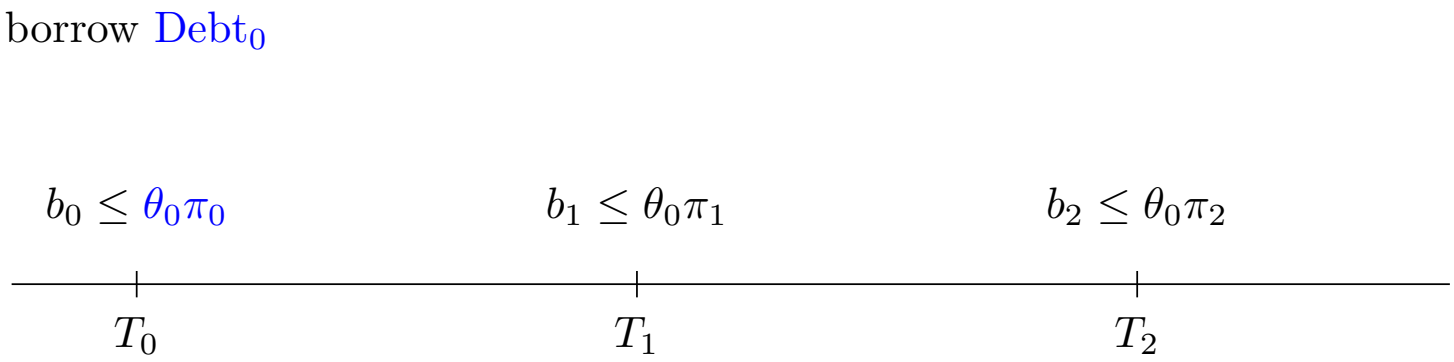
Bunching around Earnings-Based Covenant Threshold



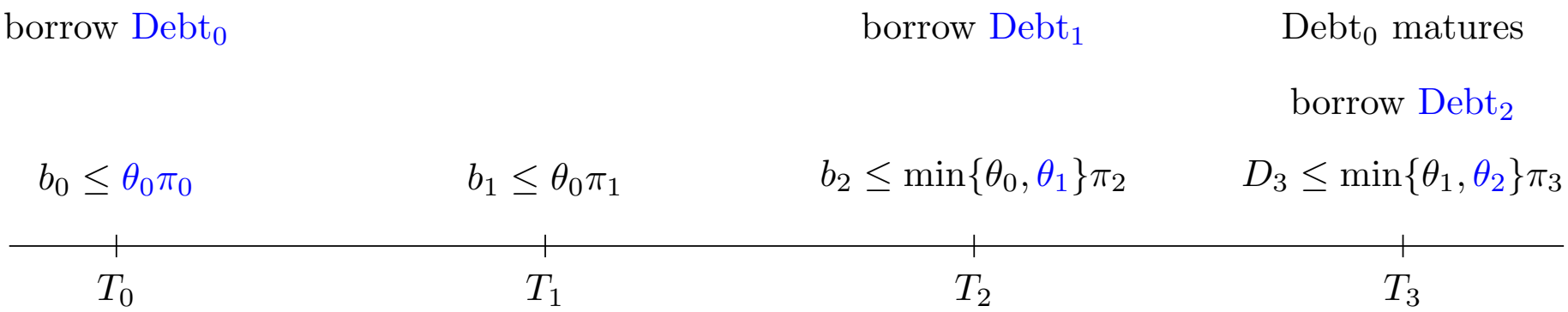
back

Timeline

Single covenant: issuance + maintenance



Multiple covenants: tightest one binds first



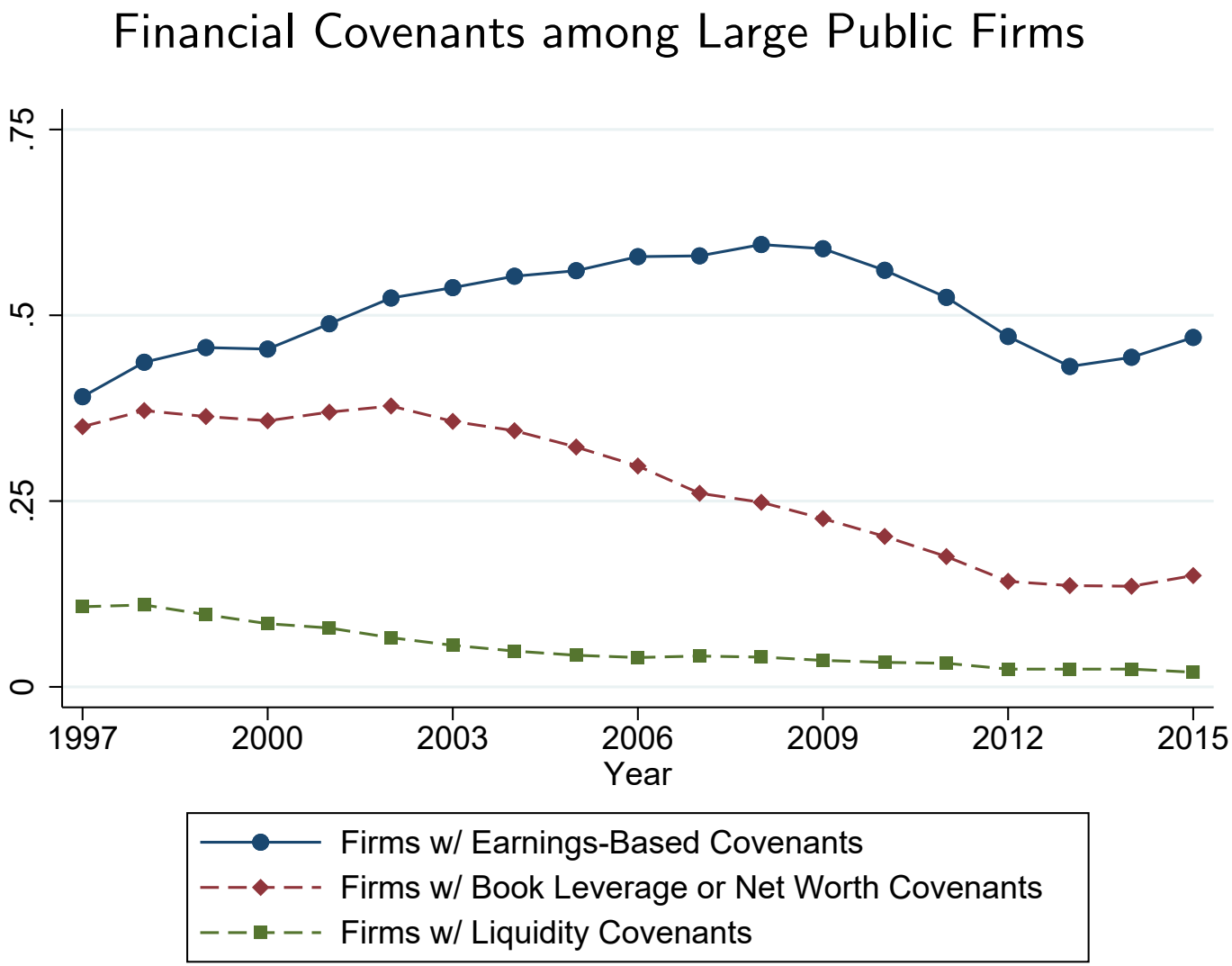
back

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



Why Covenants

If cash flows exogenous and verifiable, no covenants required

Model 1: Incentive provision (a la Innes)

- Moral hazard (non-contractible effort) + verifiable cash flows
- Standard debt: one break for creditor break-even & incentive provision
- Covenant: decouples creditor break-even and incentive provision

Model 2: Contingent Transfer of Control Rights (a la Aghion-Bolton)

- If default likely, can take costly actions to improve bad state perf
- Creditors benefit most; borrower cannot commit
- Covenant: trigger for contingent transfer of control rights

back

Hierarchy of Borrowing

1. Easy ABL: standardized, transferable assets
   - e.g. commercial real estate (office), receivable, inventory, equipment
   - amount limited for most firms
2. Easy CFL: large firms in US
   - e.g. corporate bonds, syndicated loans
3. Costly ABL: specialized assets
   - e.g. specialized inventory, equipment, property
   - small firms need to come here

- Large firms: #1 + #2; small firms: #1 + #3

back

Borrowing Frictions and Financial Variables

$$\max_{I, b \geq 0} \; F(I) - C(b_A, b_C; a, \pi) - I \quad s.t. \; I = w + b_A + b_C$$

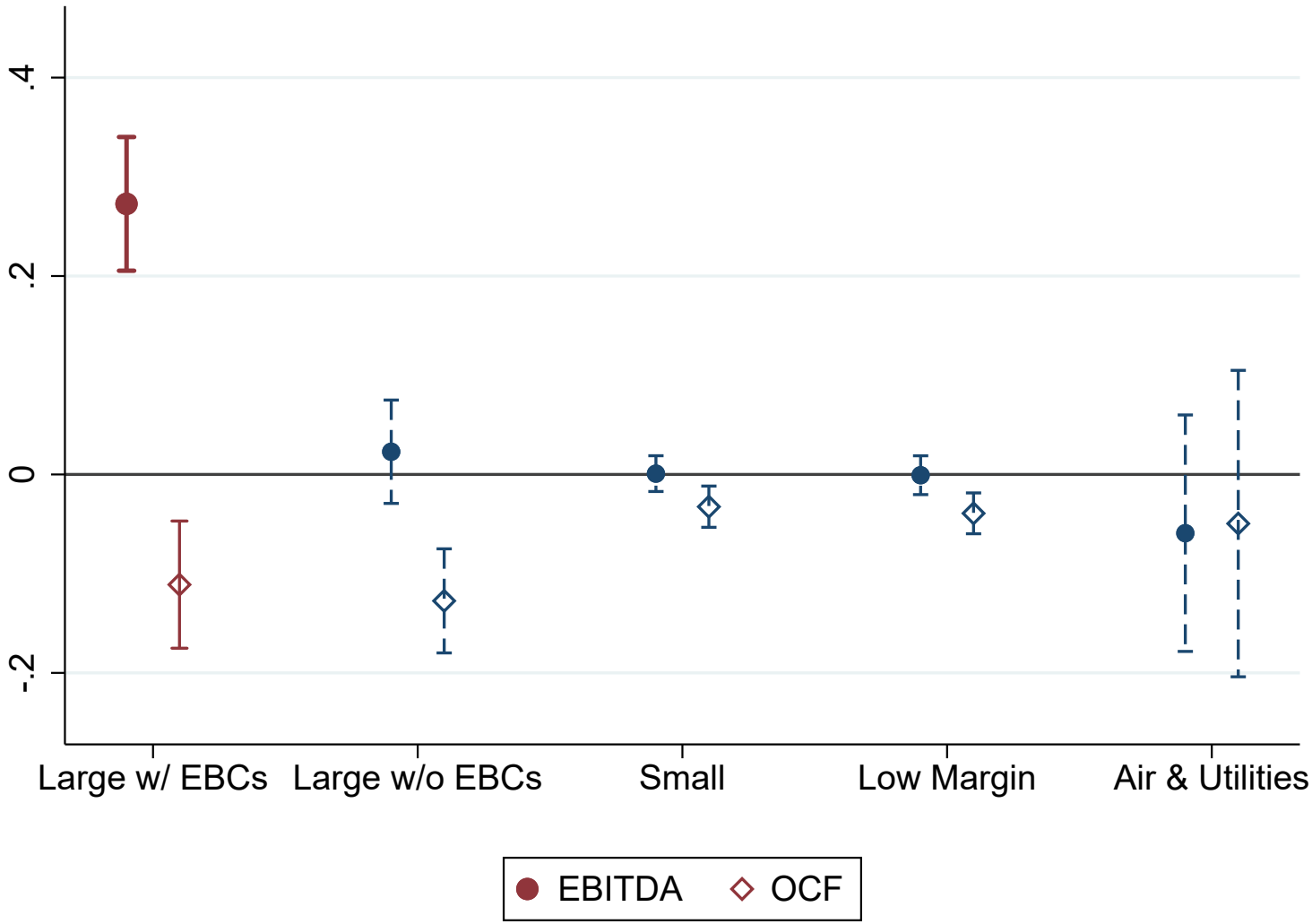
Example:

$$\begin{aligned} C = & \phi^{easyABL} \min\left\{b_A, a^{easyABL}\right\} \\ & + \phi^{hardABL} \min\left\{\max\left\{b_A - a^{easyABL}, 0\right\}, a^{hardABL}\right\} \\ & + \infty \max\left\{b_A - a^{easyABL} - a^{hardABL}, 0\right\} \\ & + \phi^{CFL} \min\left\{b_C + b_A, \theta\pi\right\} + \infty \max\left\{b_C + b_A - \theta\pi, 0\right\} \end{aligned}$$

back

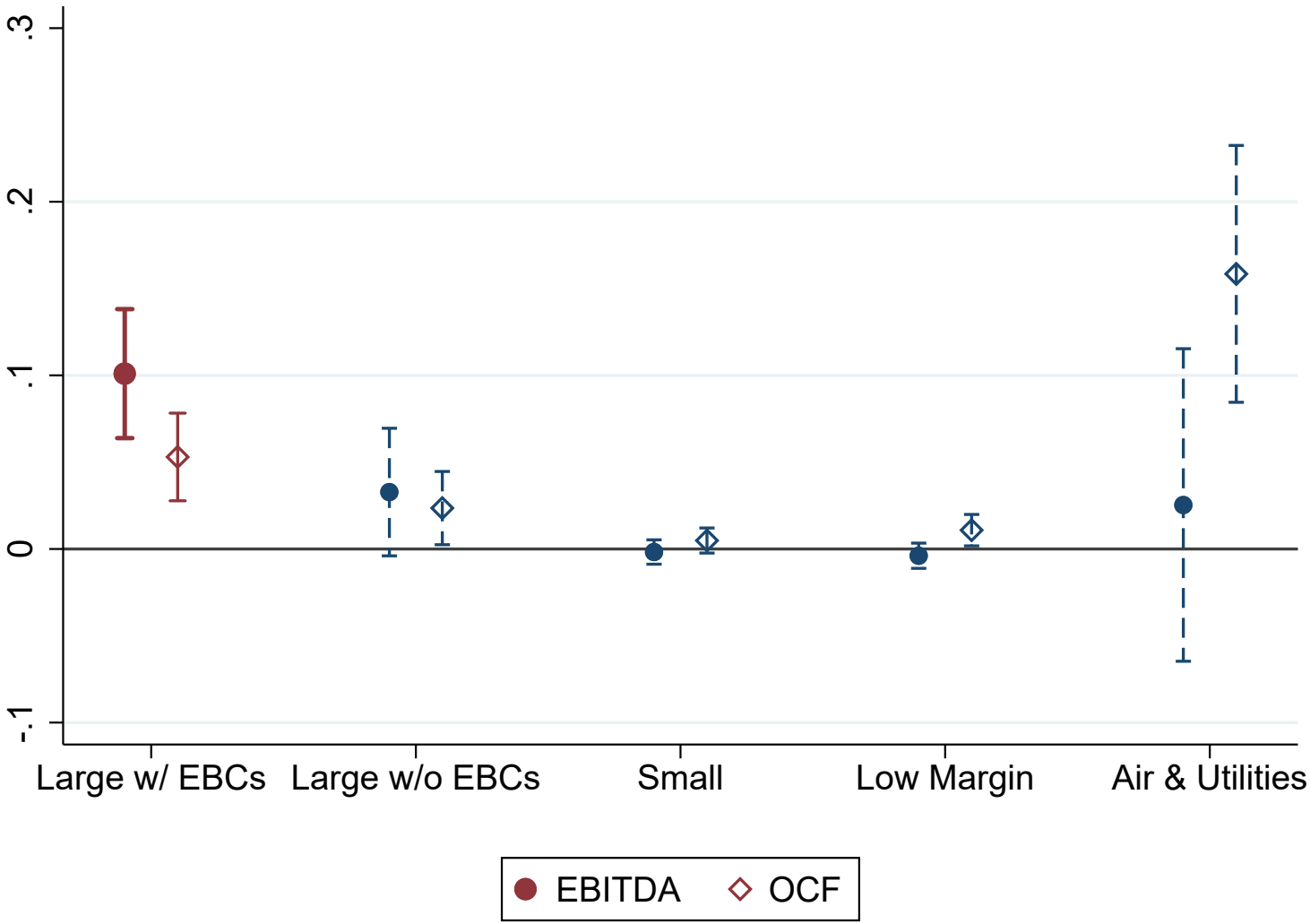
Traditional Approach: Sensitivity to EBITDA

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

accounting coef

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

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

back

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

back

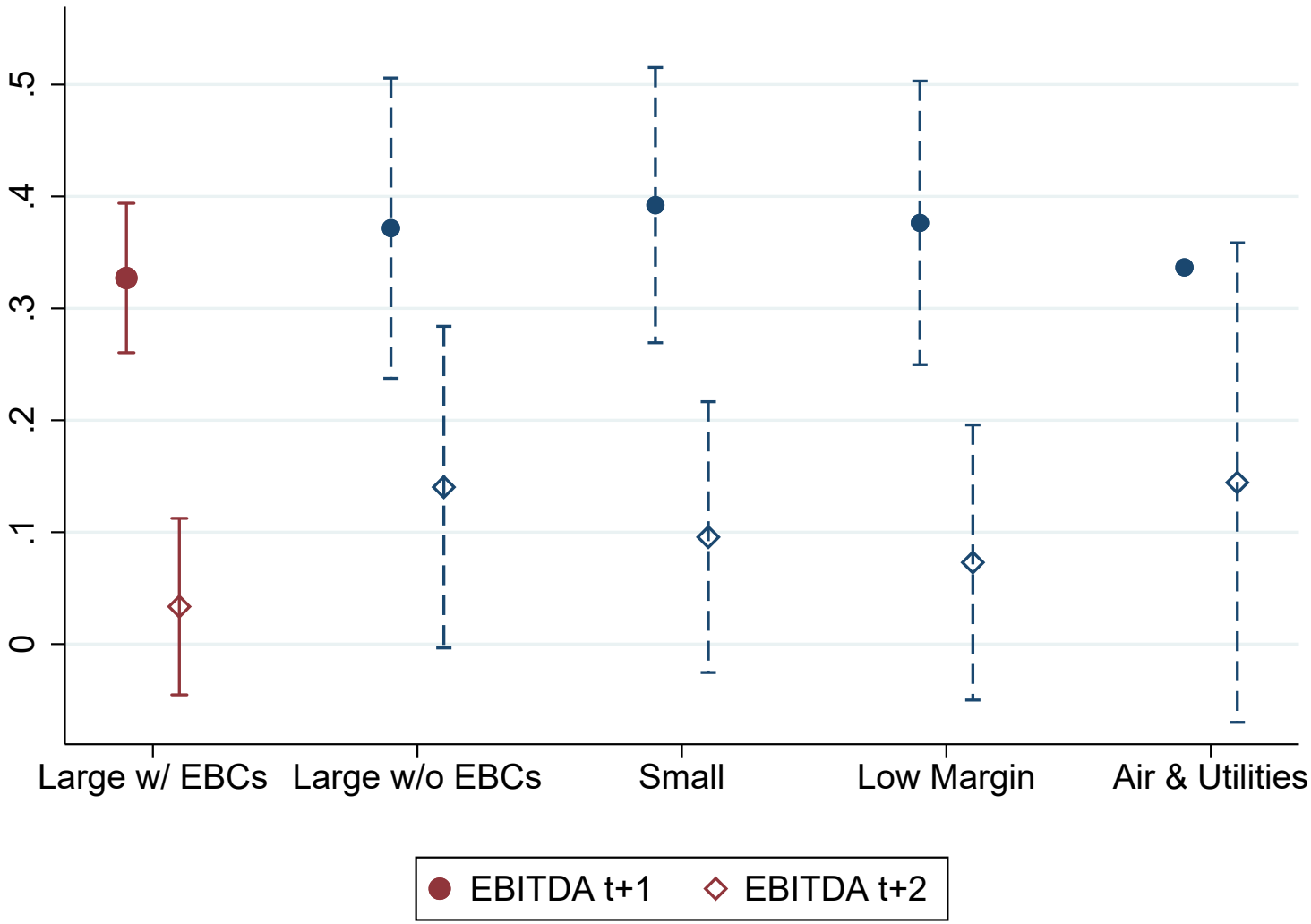
Summary Statistics

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

Predicting Future EBITDA

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



back

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

back

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

back

Responses to EBITDA: US vs. Japan

- Japan: borrowing dependent on physical (real estate) assets
  - bankruptcy courts dysfunctional before 2000s; seizable collateral key

	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

back

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

back

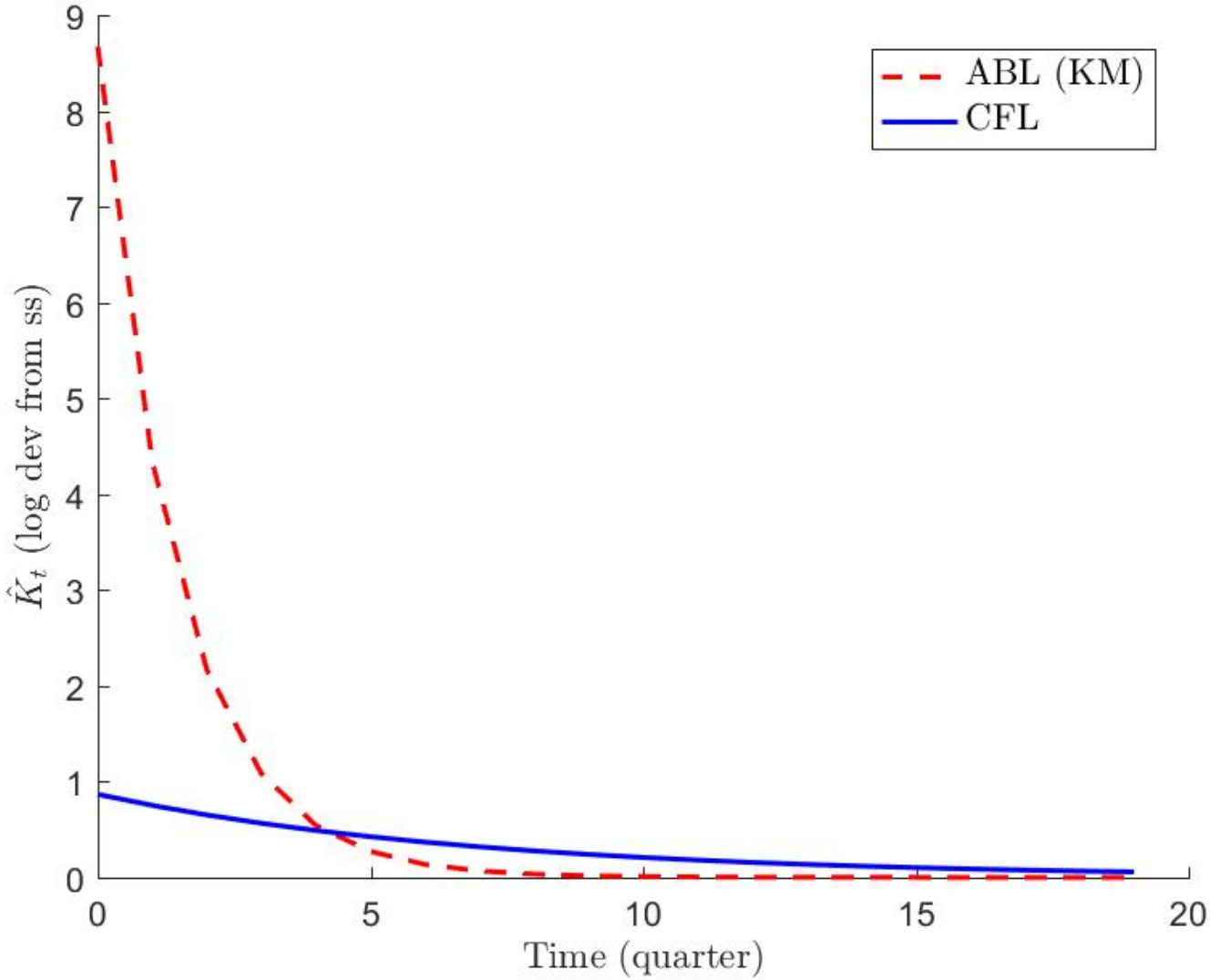
Property Price Collapse: US vs. Japan

	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

back

Financial Acceleration



- Set θ so two economies have same SS.