Discussion of "Borrowing to Save and Investment Dynamics" by Jasmine Xiao

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Overview

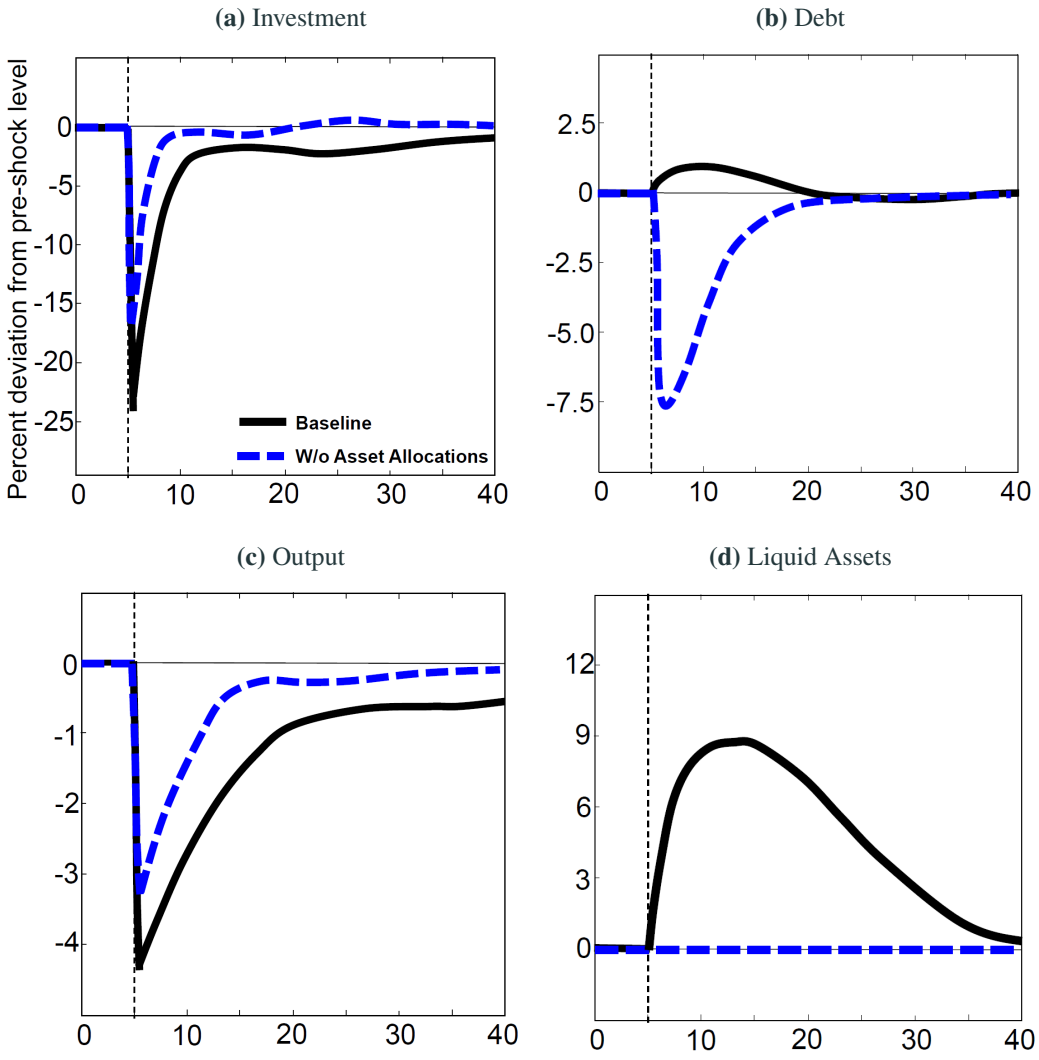
- During the Great Recession, investment by public firms fell ...
- ... but borrowing increased, and cash holdings even more.
- Hard to think about using standard firm models with financial frictions

  typically only **net** debt matters
- This paper extends standard models

  borrowing first, investment/cash decision second

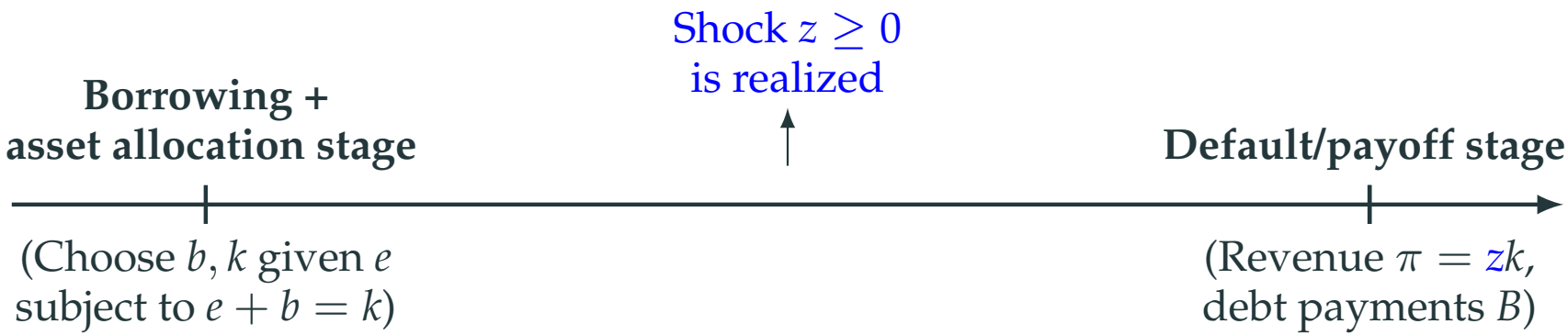
  credit supply + uncertainty shocks generate Great Recession patterns

Overview


(a) Investment
(b) Debt
(c) Output
(d) Liquid Assets
Percent deviation from pre-shock level
Baseline
W/o Asset Allocations
0
-5
-10
-15
-20
-25
2.5
-2.5
-5.0
-7.5
-1
-2
-3
-4
12
9
6
3
10
20
30
40

1. The mechanism

A basic model



- default, iff, $zk \leq B$
- deadweight loss $1 - \chi > 0$ in default
- $B = B(k, b, e)$, endogenous
- $r = 0, \quad \mathbb{E}(z) > 1.$

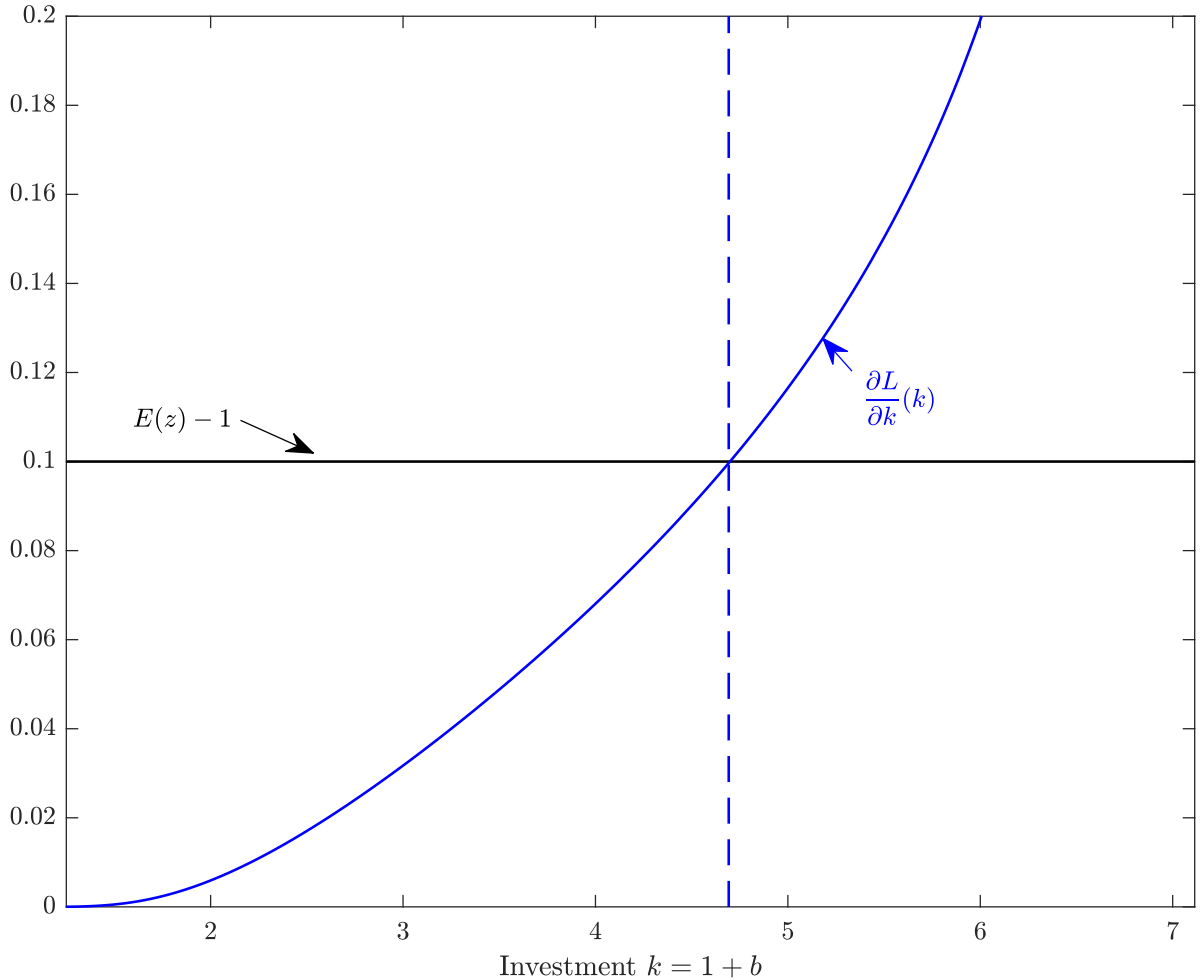
A basic model

$$W(k) = \text{equity value} = \quad 1 \quad + \underbrace{\mathbb{E}(z)k - k}_{\text{frictionless firm value}} \underbrace{- (1-\chi) \int_{zk \leq B(k)} zk dF(z)}_{\text{deadweight losses } L(k)}$$

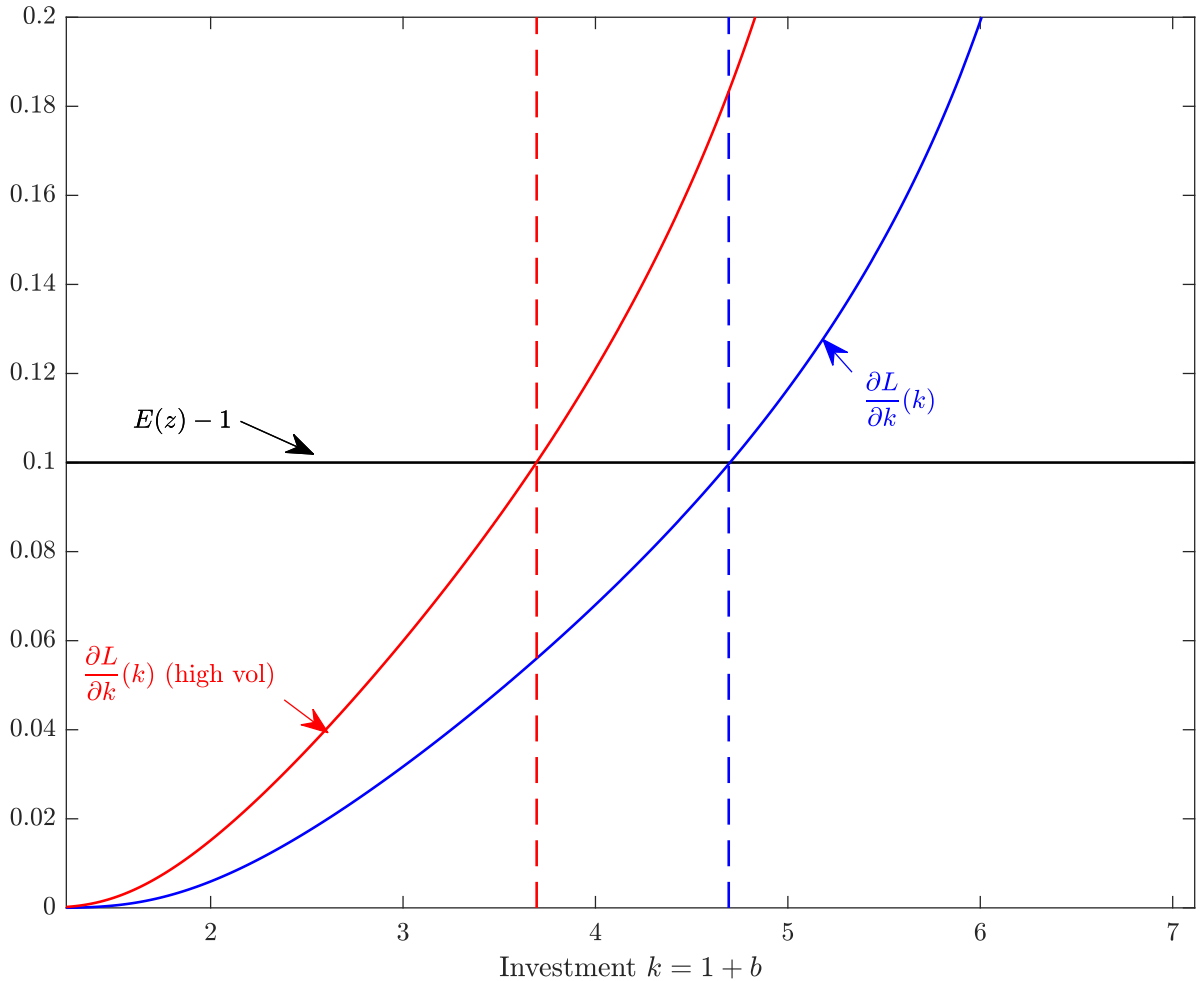
Deadweight losses **convex** in k

$$\mathbb{E}[z] - 1 = \frac{\partial L}{\partial k} = (1-\chi) \left(\underbrace{\int_{z \leq \underline{z}(k)} z dF(z)}_{\text{infra-marginal effect}} + \underbrace{\underline{z} f(\underline{z}) \frac{\partial \underline{z}}{\partial k} k}_{\text{marginal effect}} \right)$$

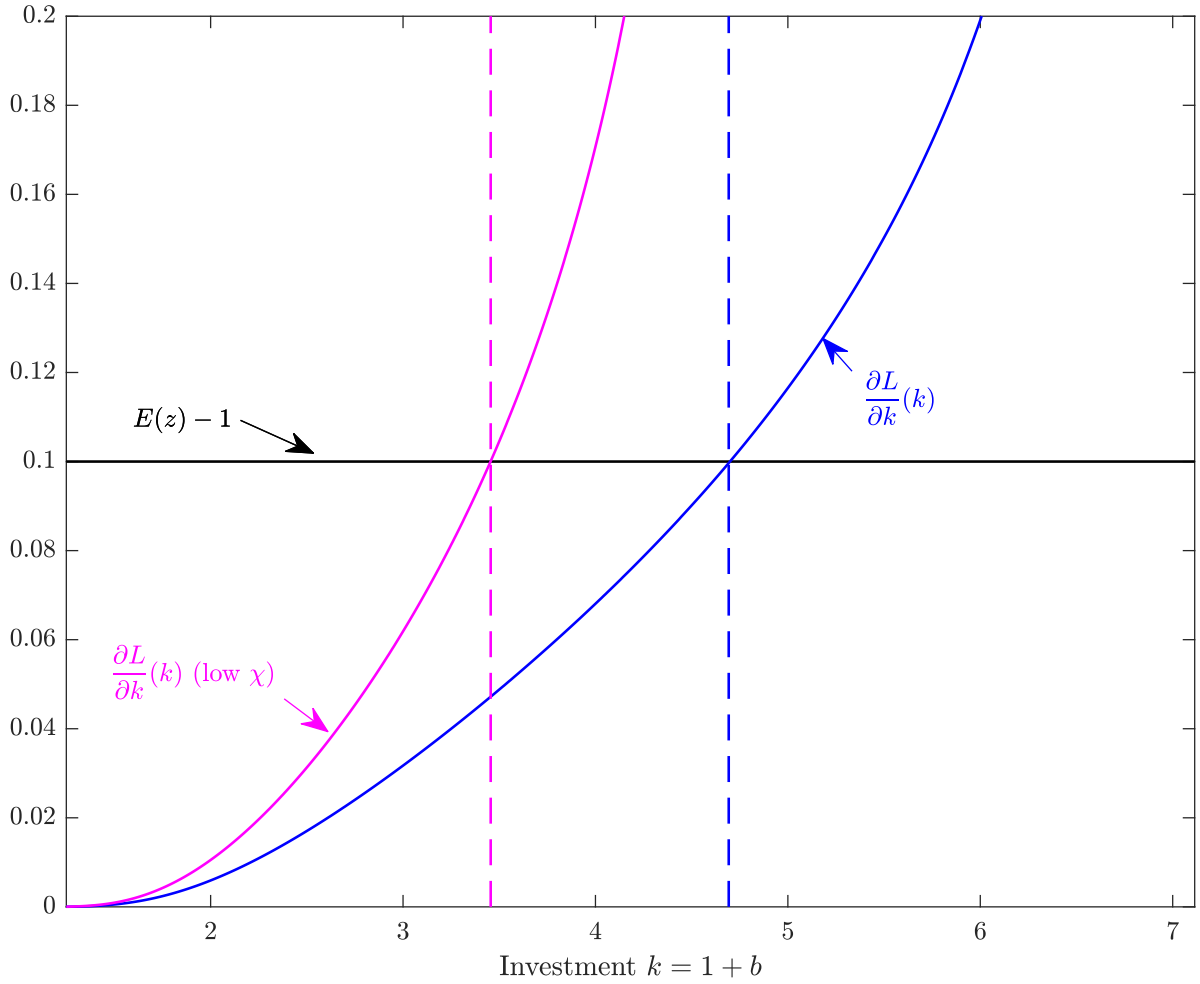
A basic model



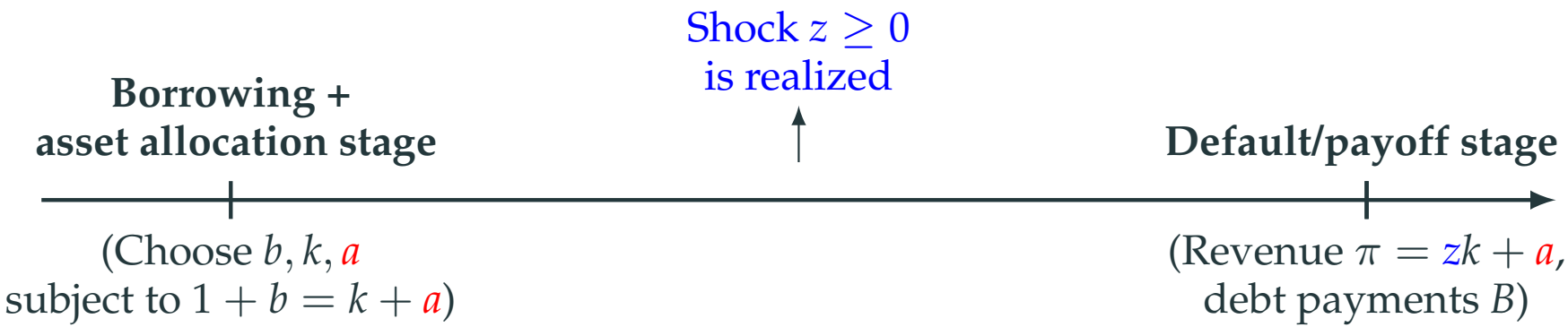
Higher shock variance



Lower recovery rates in liquidation



Adding a safe asset



Adding a safe asset

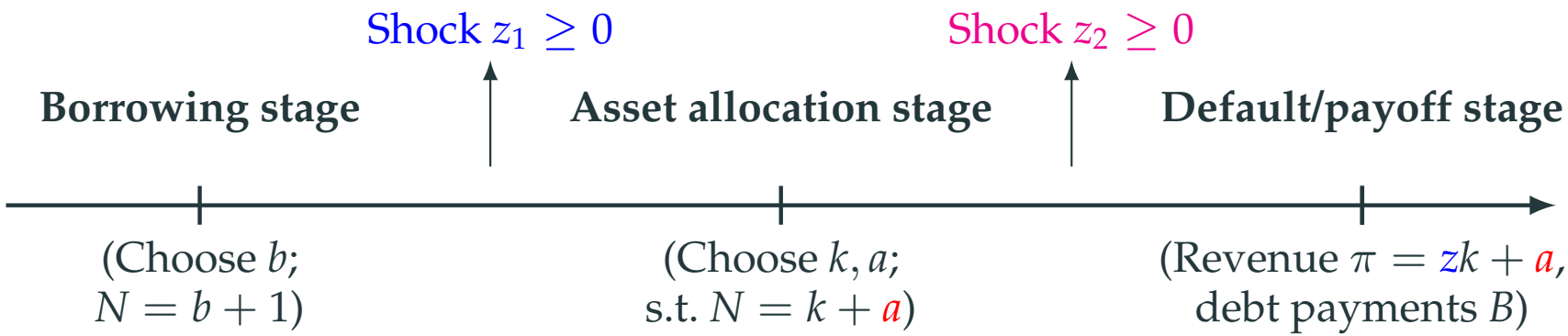
$$W(k,a) = 1 + \underbrace{\mathbb{E}(z)k - k}_{\text{frictionless firm value}} - \underbrace{(1-\chi)\int_{zk \leq B(k)-a} zkdF(z)}_{\text{deadweight losses on } k} - \underbrace{(1-\chi_a)\int_{zk \leq B(k)-a} adF(z)}_{\text{deadweight losses on } a}$$

Solution: same k before ...

Cash holding policy?

- When $\chi_a = 1$: any (a,b) such that $b - a + 1 = k^*$
- When $\chi_a < 1$: $a = 0$

This paper


Shock $z_1 \geq 0$
Shock $z_2 \geq 0$
Borrowing stage
Asset allocation stage
Default/payoff stage
(Choose b; $N = b + 1$)
(Choose k, a; s.t. $N = k + a$)
(Revenue $\pi = zk + a$, debt payments B)

Asset allocation stage

$$\tilde{W}(B,N) = \max \int_{z_1 z_2 k \geq B-a} (z_1 z_2 k - (B-a))\, dF(z_2) \quad \text{s.t.} \quad k + a = N$$

$$a = \begin{cases} 0 & \text{if} \quad z_1 E(z_2) \geq 1 \\ 0 & \text{if} \quad z_1 E(z_2) < 1 \quad \text{and} \quad \dfrac{B}{N} \geq d^* \\ N & \text{if} \quad z_1 E(z_2) < 1 \quad \text{and} \quad \dfrac{B}{N} \leq d^* \end{cases}$$

where:

$$\int_{z_1 z_2 N \geq d^* N} (z_1 z_2 N - d^* N)\, dF(z_2) = N - d^* N.$$

Asset allocation stage

Who saves?

- negative NPV ($E(z_2)z_1 < 1$)
- low leverage ($B/N < d^*$)

Borrowing stage

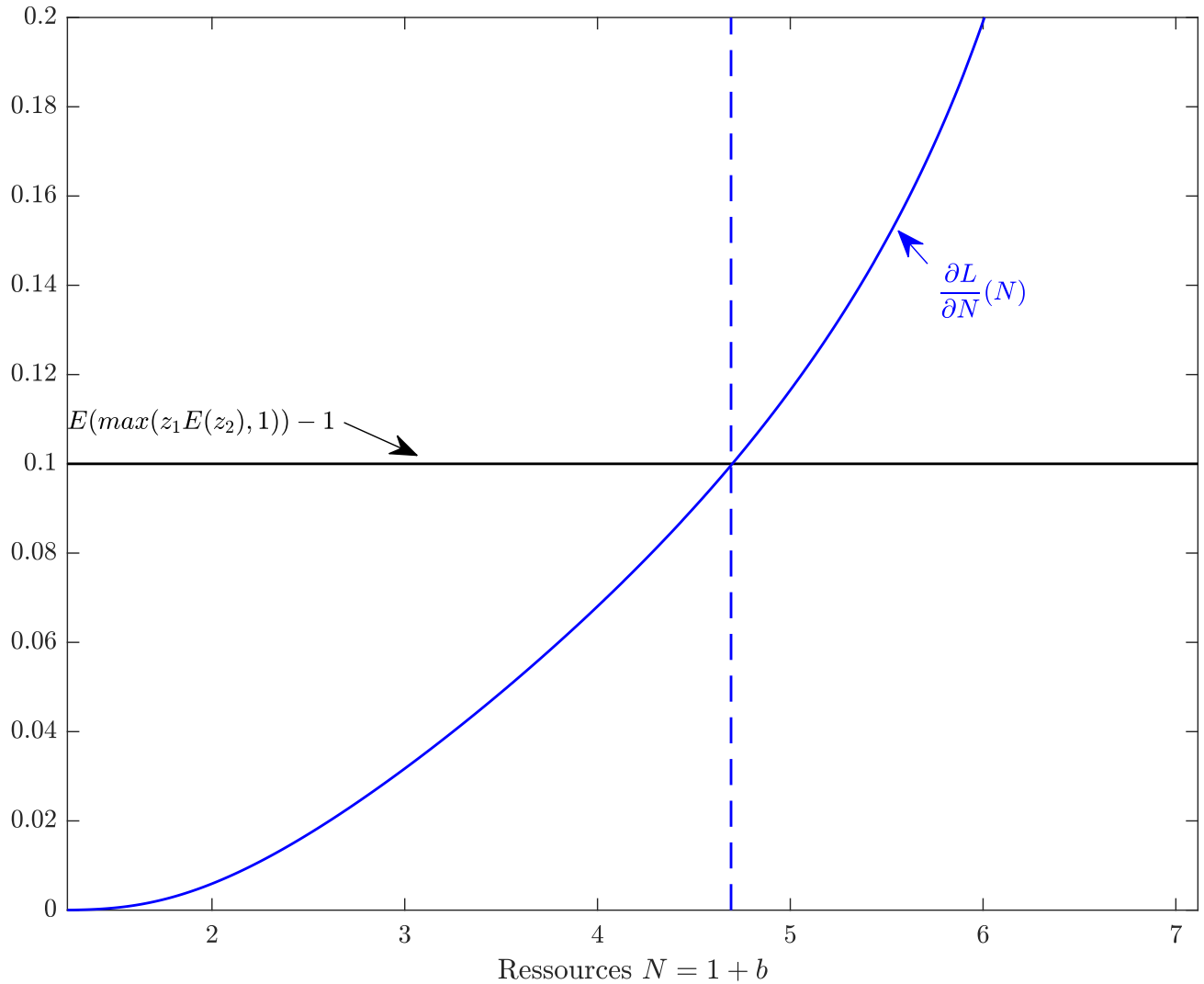
If $B(N) \geq d^* N$ (high leverage) — same as baseline model

$$W(N) = 1 + \underbrace{\mathbb{E}(z_1 z_2)N - N}_{\text{frictionless firm value}} \underbrace{- (1-\chi) \int_{z_1 z_2 N \leq B(N)} z_1 z_2 N dF(z_1) dF(z_2)}_{\text{deadweight losses on } N}$$

If $B(N) < d^* N$ (low leverage)

$$W(N) = 1 + \mathbb{E}\left(\max(z_1 \mathbb{E}(z_2), 1)\right)N - N$$
$$- (1-\chi) \int_{z_1 E(z_2) \geq 1} \int_{z_1 z_2 N \leq B(N)} z_1 z_2 N dF(z_1) dF(z_2)$$

The borrowing to save model



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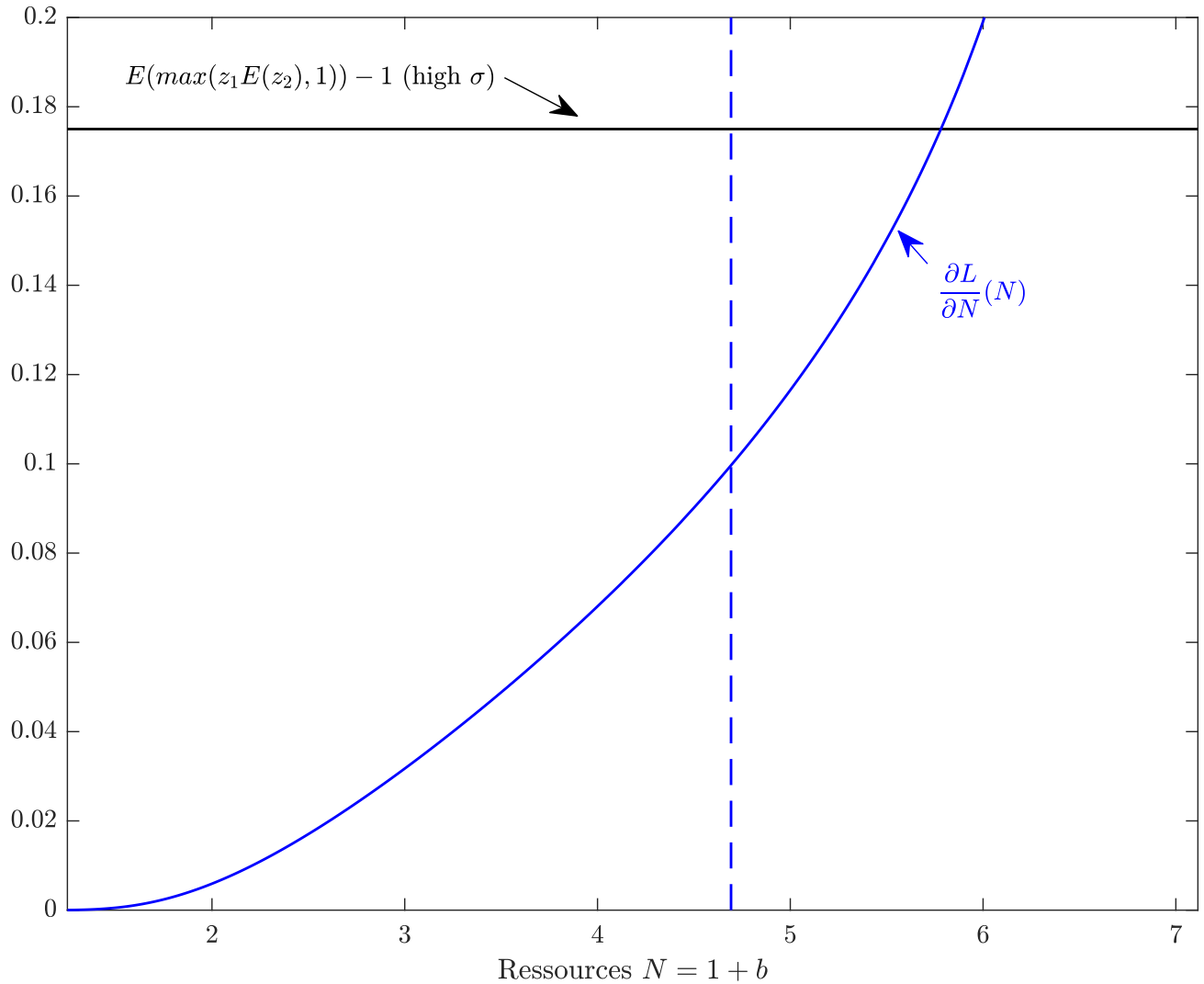
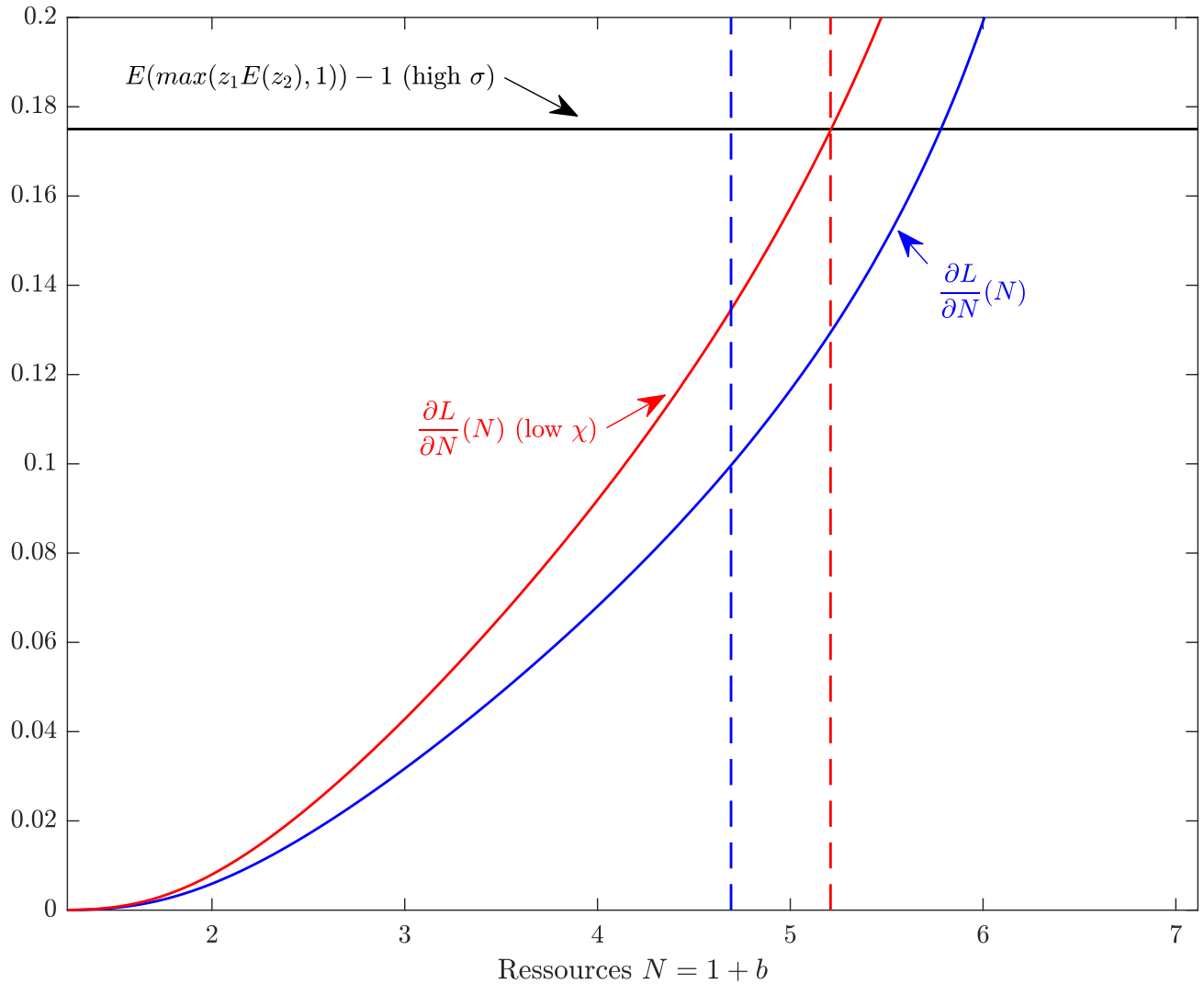


Lower recovery rates in liquidation



The borrowing-to-save mechanism

- Increase in borrowing **and** decline in investment?

  high $\sigma \implies$ more N

  low $\chi \implies$ higher (?) leverage B/N

  both might lead to more investment ... but I might be wrong!

- "Precautionary" mechanism?

  avoid negative NPV investment

  transfer from **low** to **high** prod states

- **suggestion :**
  - "minimal working example", (more) tractable (CRS? or need DRS?)
  - better comparison to corp financial precautionary models (Opler, Pinkowitz, Stulz, Williamson, 1998; Acharya, Almeida, Campello, 2007)

2. Empirics

Evidence in support of the mechanism

1. Is the behavior of the ***average*** Compustat firm consistent with the model?
   - Jordà projection on indicator for recession starts
   - control for firm fixed effects (consistent w/ model)

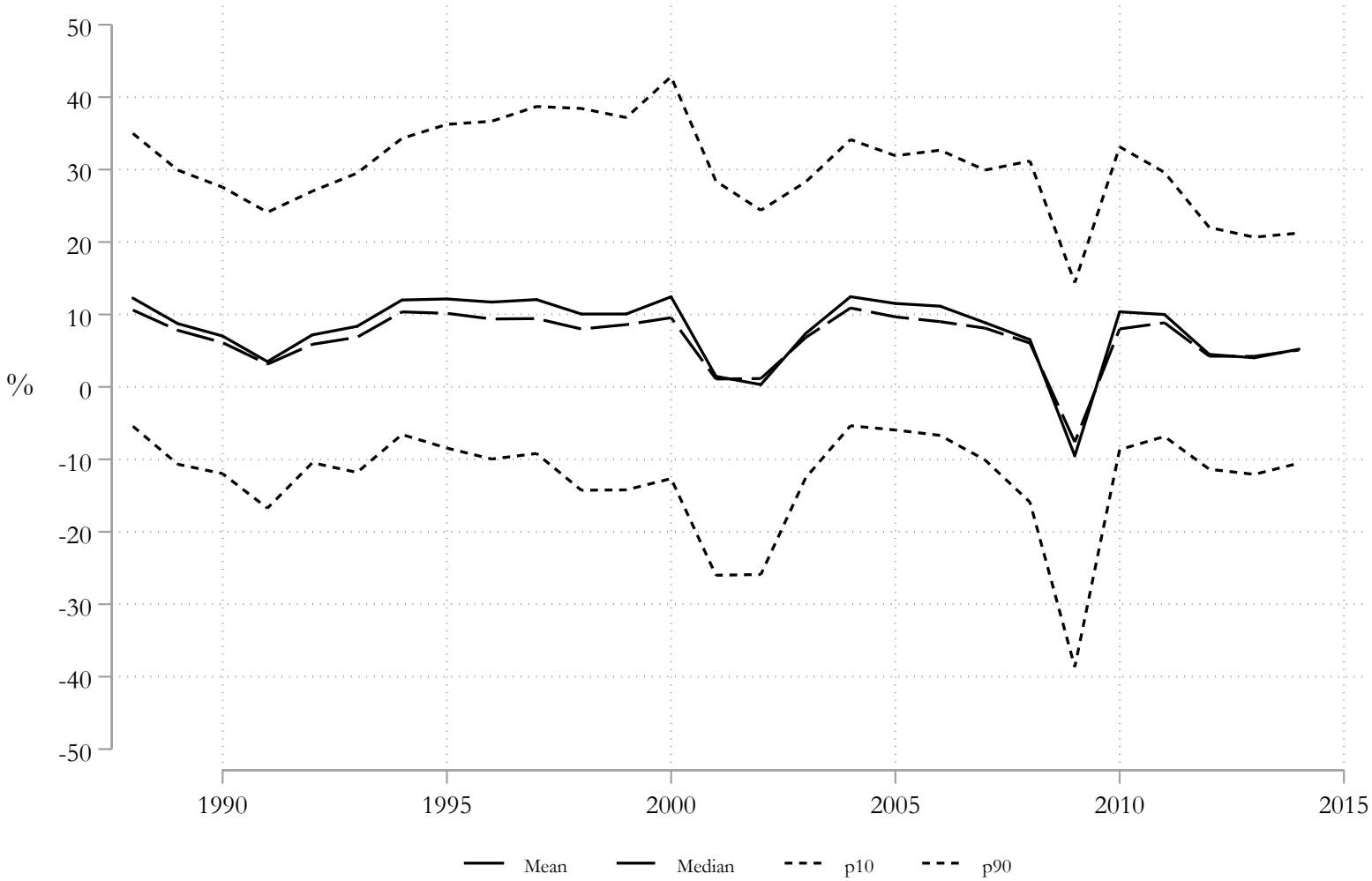
2. How does the response of ***cash holdings*** depend on:
   - interaction w/ proxies for default risk (distance to default)?
   - interaction w/ proxies for idiosyncratic vol?

3. Do ***cash-rich*** firms grow more slowly during recoveries?
   - interaction w/ lagged cash growth

Empirical remark 1: procyclical skewness

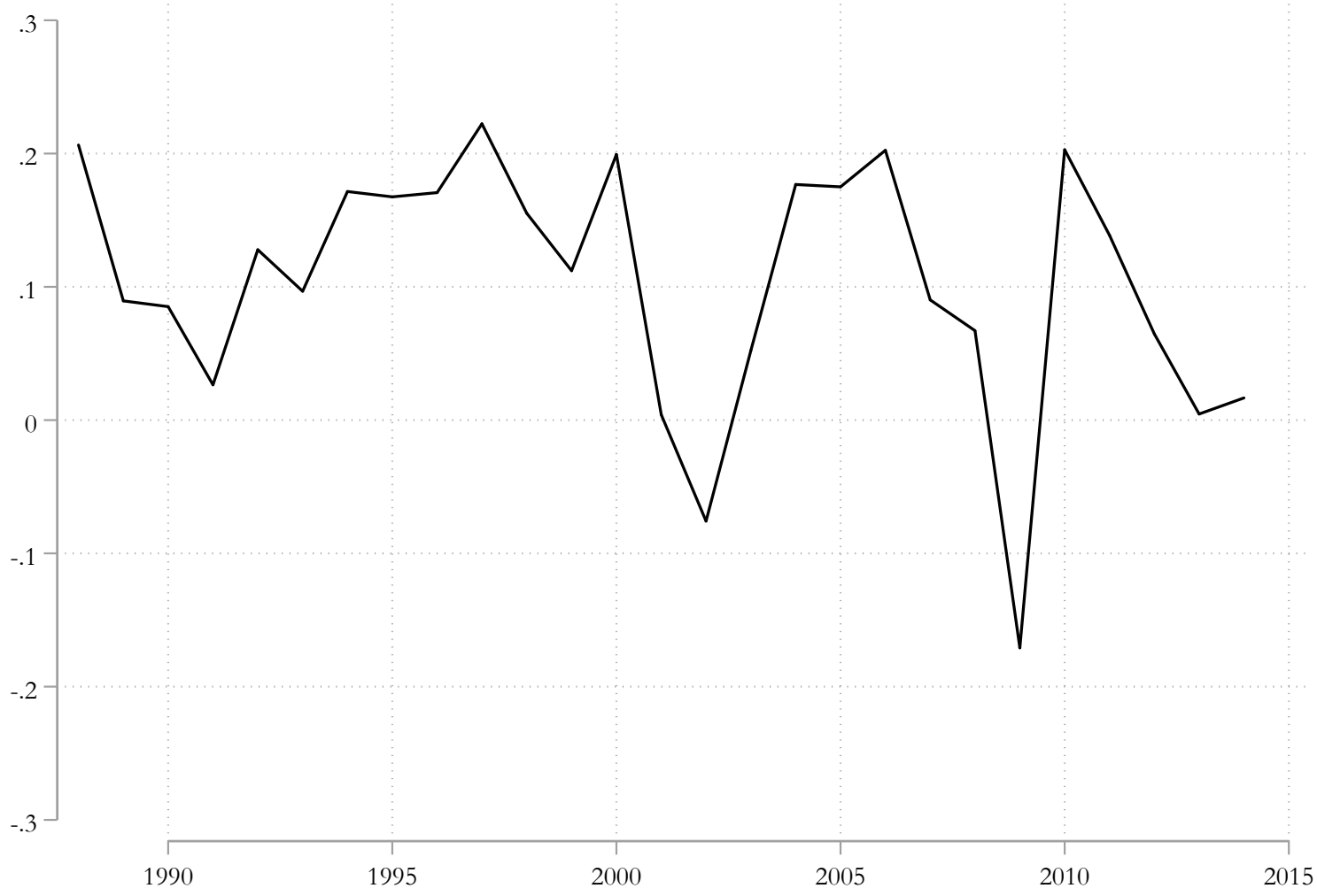
- **Option value** of investing goes up when $\sigma \uparrow$
- More extreme "right-tail" realizations of z_1
- Does this square with the data?

The distribution of revenue growth



Compustat data (annual)

The skewness of revenue growth



Compustat data (annual); Kelly skewness $= \dfrac{p90 + p10 - 2 \times p50}{p90 - p10}$

Empirical remark 1: procyclical skewness

- **Option value** of investing goes up when $\sigma \uparrow$

- More extreme "right-tail" realizations of z_1

- Does this square with the data?

  Compustat revenue growth displays **procyclical** skewness

  see also Salgado, Guvenen and Bloom (2018)

- **Suggestion :** would the mechanism work if σ increase $\implies$ more negatively skewed shocks?

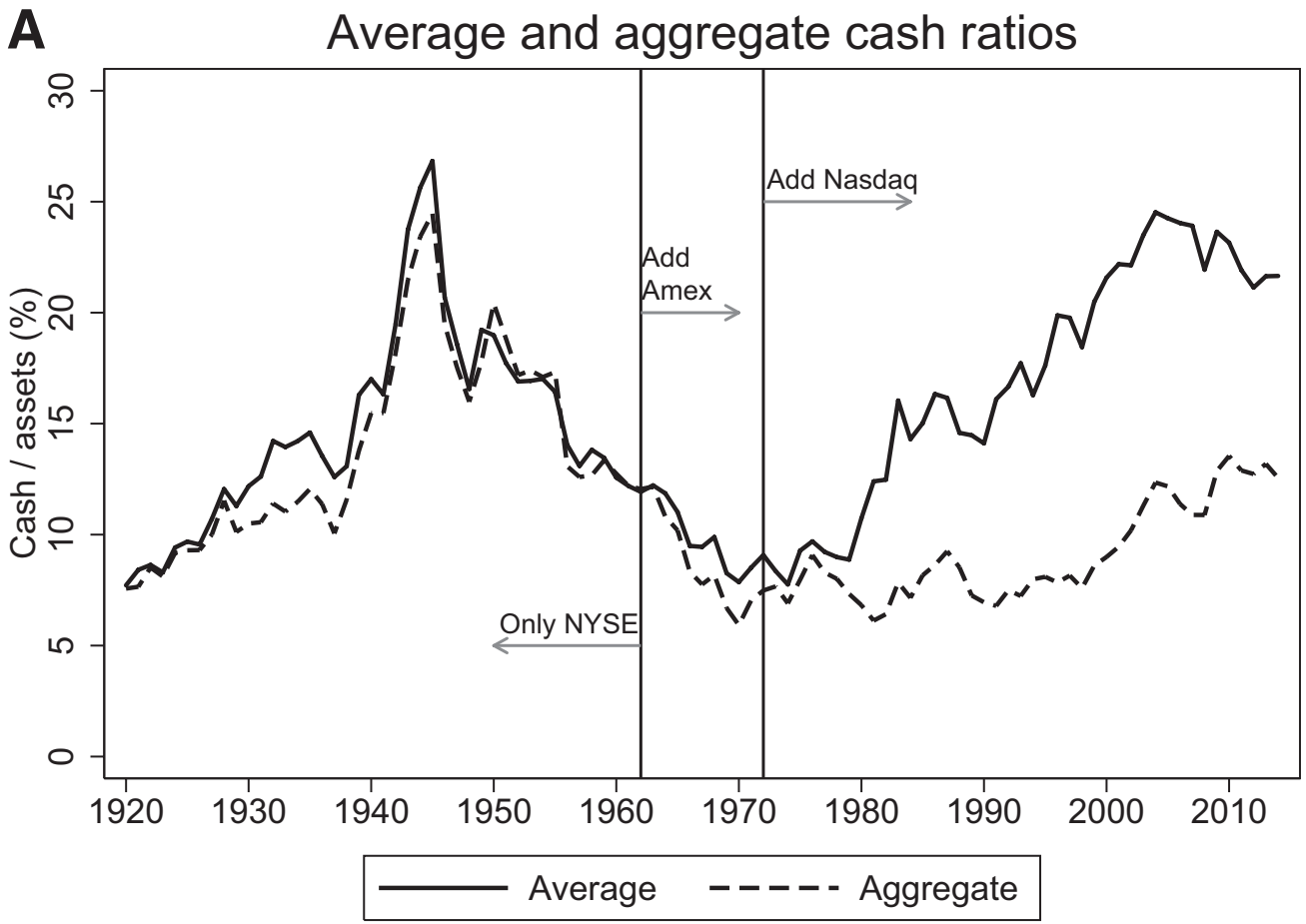
  · static model?

Empirical remark 2: Trends in cash holding

- It would be nice if the mechanism could speak to cash holding trends

- Enormous increase in cash holdings of US firms over the past 30 years

Trends in cash holdings



From Graham and Leary (2018)

Empirical remark 2: Trends in cash holding

- It would be nice if the mechanism could speak to cash holding trends
- Enormous increase in cash holdings of US firms over the past 30 years
- Suprisingly, trends are **not** driven by **within-firm** increases in cash holdings!

Within-firm trends in cash holdings

	Dependent variable : cash to asset ratio					
	1980-2000	2000-2014	1980-2000	2000-2014	1980-2000	2000-2014
Time trend	0.404***	−0.039	-0.392***	−0.092***	-0.111***	0.046
Firm f.e.	No	No	Yes	Yes	Yes	Yes
No first 4 yrs.	No	No	No	No	Yes	Yes

$p < 0.10$, ** : $p < 0.05$, *** : $p < 0.01$

From Graham and Leary (2018)

Empirical remark 2: Trends in cash holding

- It would be nice if the mechanism could be related to cash holding trends, too

- Enormous increase in cash holdings of US firms over the past 30 years

- Suprisingly, trends are **not** driven by **within-firm** increases in cash holdings!

  within-firm trend in cash holdings seem to be mildly negative

  despite Davis, Haltiwanger, Jarmin and Miranda (2006)

- The model is primarily about a **within-firm** mechanism

  · **suggestion :** increase in cash if σ rises permanently in model?

3. Calibration

Financial frictions and uncertainty

- paper targets excess bond premium of Gilchrist and Zakrajšek (2012) for AR process governing χ

  GZ measure risk premia ***net*** of default risk

- paper targets credit spreads for σ_ψ

  probably too much default (credit spread puzzle)

- important for quantifying precautionary channel

- **suggestion :**
  - match annual estimates of average loss given default from Moody's
    or match annual estimates of average distance to default
    or match default rates
  - report model performance for credit spreads

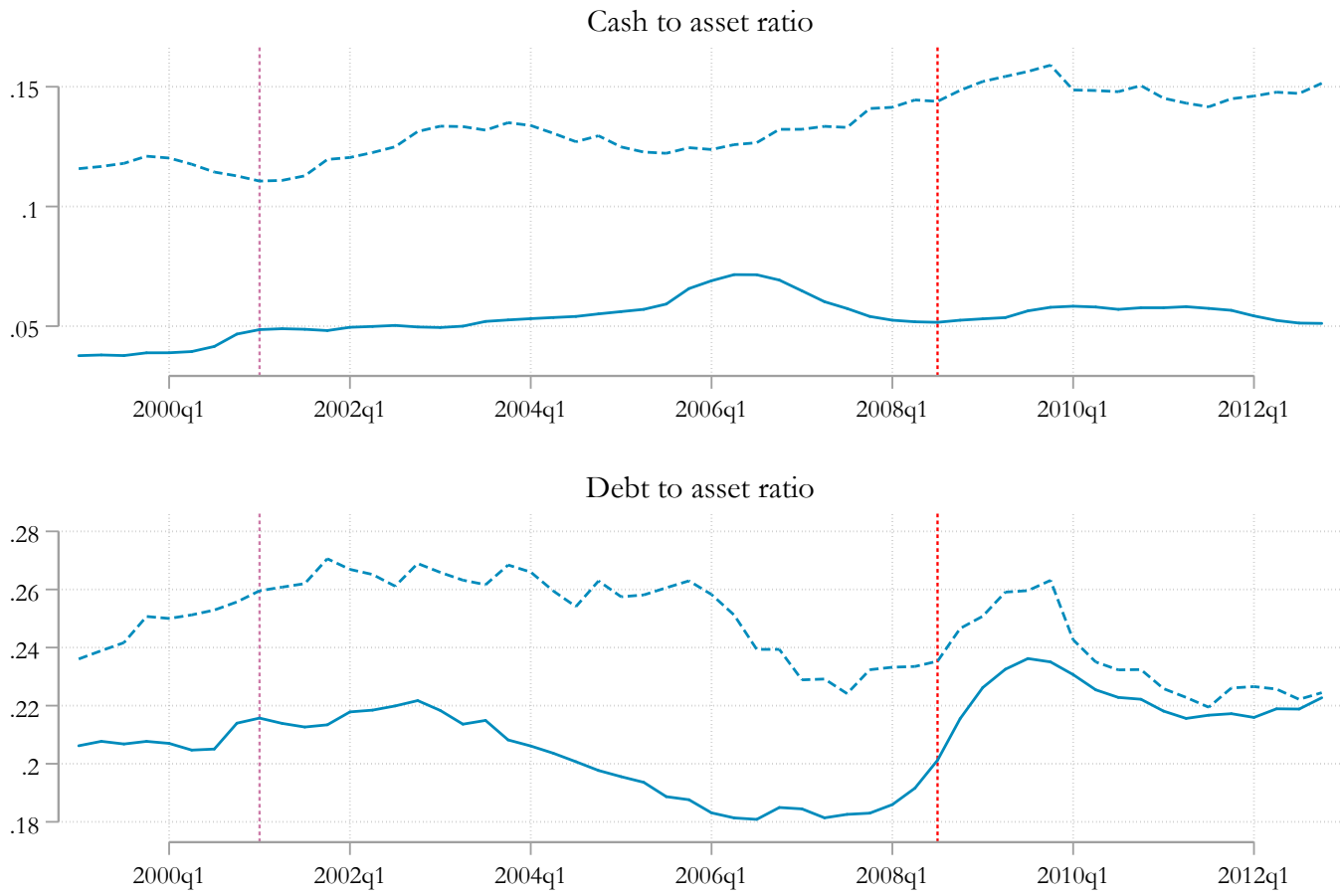
Private and public firms

- Paper contrasts the cash management behavior of public and private firms

  comparing Flow of Funds with Compustat

  (not clear they can be compared ...)

Private vs. public manufacturing firms: QFR



Data from the Quarterly Financial Report public releases. Solid line: more than 1*bn*\$ in assets; dashed line: less than 25*m*\$ in assets.

Private and public firms

- The paper contrasts the cash management behavior of public and private firms

    comparing Flow of Funds with Compustat

    (not clear they can be compared ...)

- Not clear they behaved differently, but let's imagine that's true
- What could explain this difference? Why does the mechanism not apply?

    tighter borrowing constraints?

    different exposure to the vol and credit supply shock?

    access to safe asset?

    suggestion :

        calibrations that could account for the behavior of private firms?

Monetary policy!

- A monetary policy contraction would

  increase the return on the safe asset

  increase borrowing costs even more (Gilchrist and Zakrajšzek, 2012)

- Transmission in the model?

  Two effects:

  1. more costly external finance depresses investment — as in "baseline" model
  2. higher return on safe asset encourages risk-taking — $\neq$ from "baseline" model

  Which firms are most sensitive to the shock?

  suggestion : Jordá projection, cond. on EF premium *and* liquidity

  Jeenas (2018), Crouzet and Mehrotra (2018), Ottonello and Winberry (2018)

Conclusion

Conclusion

- Great paper on an important question

- Push more on explanation of the mechanism and data in support of it!