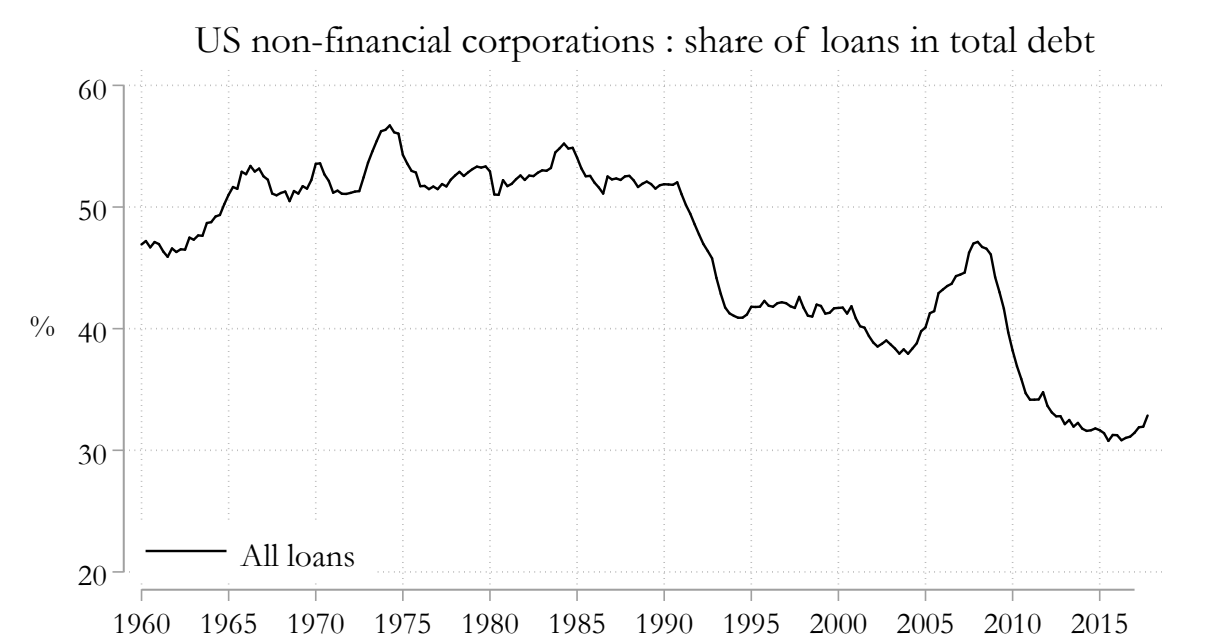
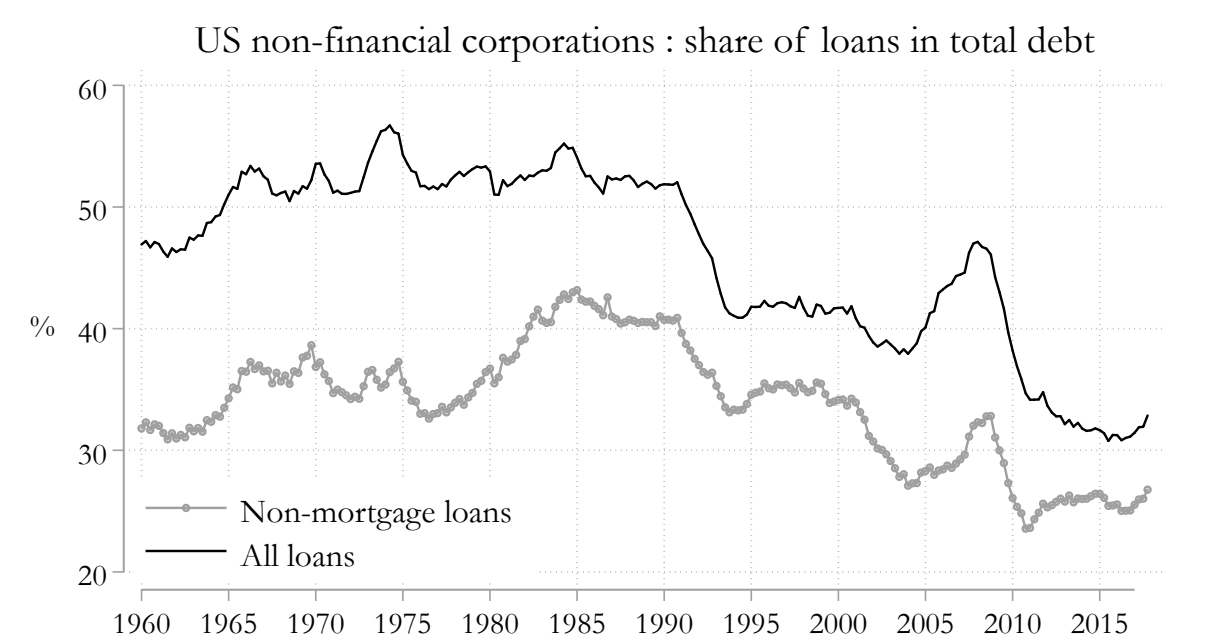
Credit Disintermediation and Monetary Policy

Nicolas Crouzet

Northwestern University and Chicago Fed

Prepared for the 20th Jacques Polak Annual Research Conference


US non-financial corporations : share of loans in total debt
60
50
40
30
20
%
All loans
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015


US non-financial corporations : share of loans in total debt
60
50
40
30
20
%
Non-mortgage loans
All loans
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015

What are the implications for monetary policy?

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?

  bank lending channel (Bernanke and Blinder, 1992)

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?
  - bank lending channel (Bernanke and Blinder, 1992)
  - collateral intensity (Kiyotaki and Moore, 1997)

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?
  - bank lending channel (Bernanke and Blinder, 1992)
  - collateral intensity (Kiyotaki and Moore, 1997)
  - floating vs. fixed rate (Ippolito, Ozdagli and Perez-Orive, 2018)

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?
  - bank lending channel (Bernanke and Blinder, 1992)
  - collateral intensity (Kiyotaki and Moore, 1997)
  - floating vs. fixed rate (Ippolito, Ozdagli and Perez-Orive, 2018)
  - flexibility (Bolton and Freixas, 2006)

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?
  - bank lending channel (Bernanke and Blinder, 1992)
  - collateral intensity (Kiyotaki and Moore, 1997)
  - floating vs. fixed rate (Ippolito, Ozdagli and Perez-Orive, 2018)
  - flexibility (Bolton and Freixas, 2006)

1. Has the "typical" firm really become less bank-dependent?

What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?
  - bank lending channel (Bernanke and Blinder, 1992)
  - collateral intensity (Kiyotaki and Moore, 1997)
  - floating vs. fixed rate (Ippolito, Ozdagli and Perez-Orive, 2018)
  - flexibility (Bolton and Freixas, 2006)

1. Has the "typical" firm really become less bank-dependent?
2. Do less bank-dependent firms respond less to monetary policy shocks?

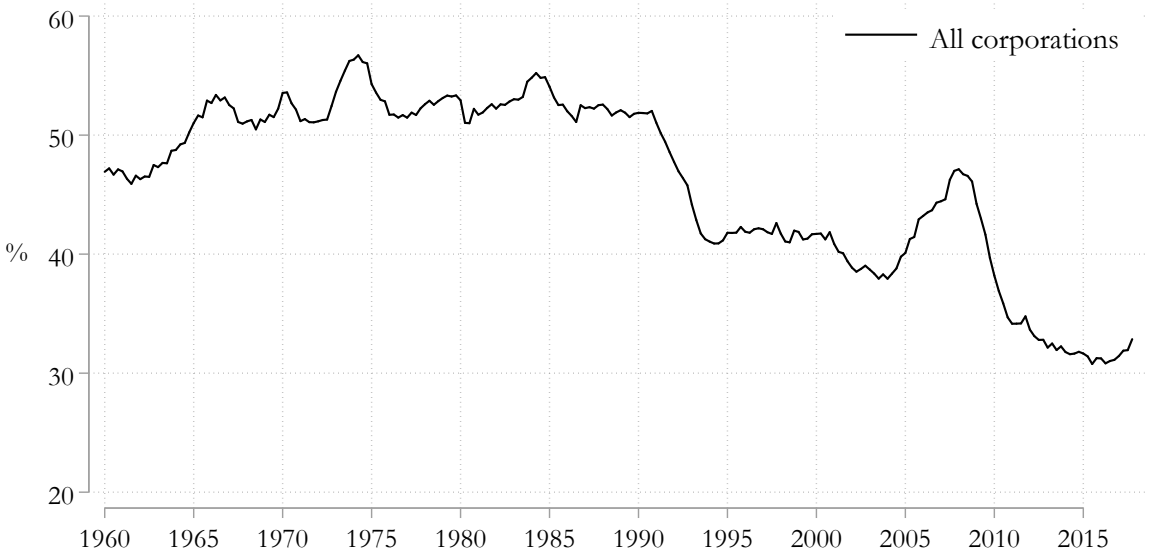
What are the implications for monetary policy?

- Should the bank dependence of firms matter for monetary policy?
  - bank lending channel (Bernanke and Blinder, 1992)
  - collateral intensity (Kiyotaki and Moore, 1997)
  - floating vs. fixed rate (Ippolito, Ozdagli and Perez-Orive, 2018)
  - flexibility (Bolton and Freixas, 2006)

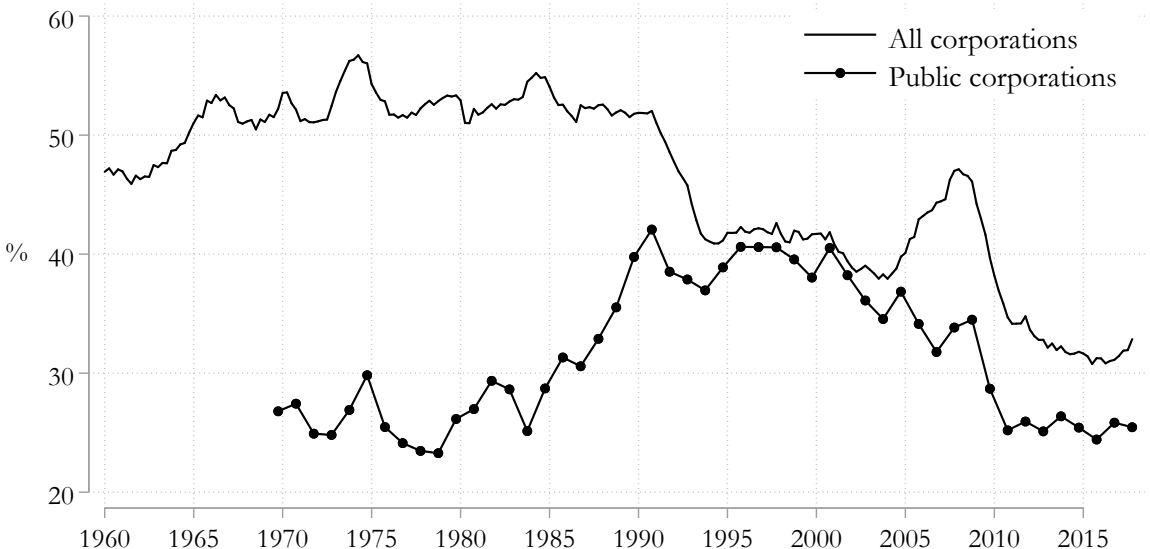
1. Has the "typical" firm really become less bank-dependent?
2. Do less bank-dependent firms respond less to monetary policy shocks?
3. Has monetary pass-through declined as a result?

1. Have US corporations really become less bank-dependent?

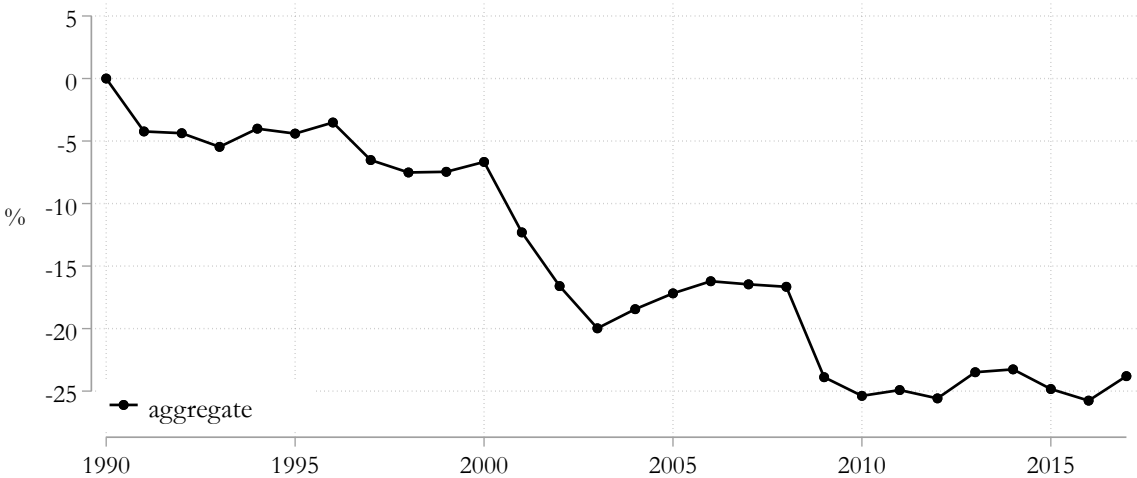
The share of loans at public vs. private corporations



The share of loans at public vs. private corporations

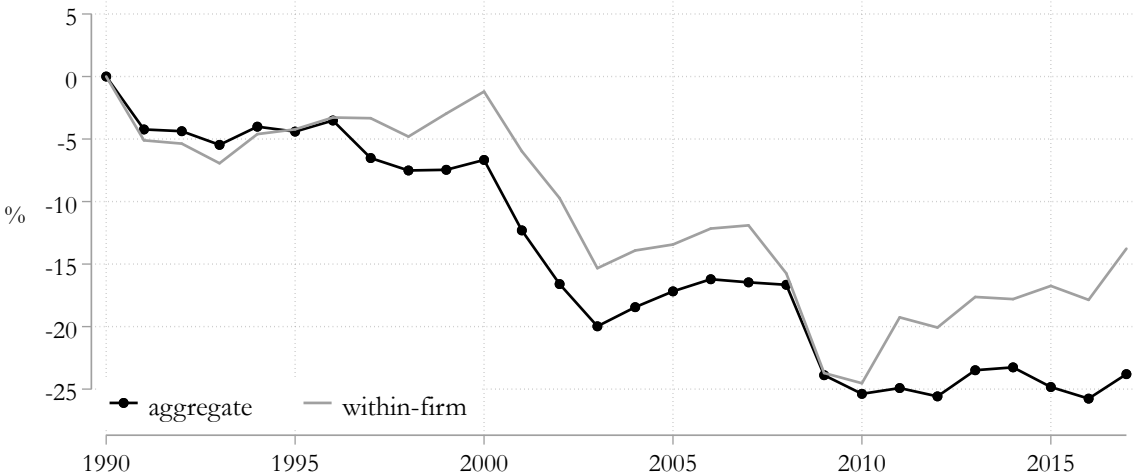


Has the share of loans at the average public corporation changed?



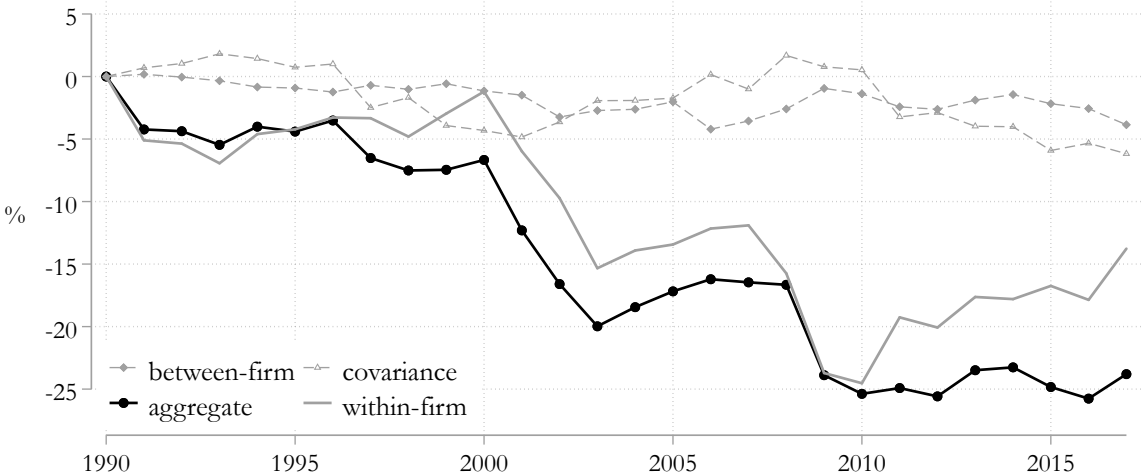
$$\overbrace{\Delta S_t}^{\text{aggregate}} = \overbrace{\Delta s_t}^{\text{within-firm}} + \overbrace{\Delta B_t}^{\text{between-firm}} + \overbrace{\Delta cov_t}^{\text{covariance}}$$

Has the share of loans at the average public corporation changed?



$$\overbrace{\Delta S_t}^{\text{aggregate}} = \overbrace{\Delta s_t}^{\text{within-firm}} + \overbrace{\Delta B_t}^{\text{between-firm}} + \overbrace{\Delta cov_t}^{\text{covariance}}$$

Has the share of loans at the average public corporation changed?



$$\overbrace{\Delta S_t}^{\text{aggregate}} = \overbrace{\Delta s_t}^{\text{within-firm}} + \overbrace{\Delta B_t}^{\text{between-firm}} + \overbrace{\Delta cov_t}^{\text{covariance}}$$

2. Do bank-dependent firms respond more to monetary policy shocks?

Estimating the pass-through of monetary policy shocks

Estimating the pass-through of monetary policy shocks

- US public corporations, quarterly data

Estimating the pass-through of monetary policy shocks

- US public corporations, quarterly data

- Monetary policy shocks: η_t^{HF}

  intraday change in Fed Funds futures (Kuttner, 2001)

  164 FOMC announcement days, 1990q4-2007q4 (Ottonello and Winberry, 2018)

Estimating the pass-through of monetary policy shocks

- US public corporations, quarterly data

- Monetary policy shocks: η_t^{HF}

  intraday change in Fed Funds futures (Kuttner, 2001)

  164 FOMC announcement days, 1990q4-2007q4 (Ottonello and Winberry, 2018)

- Average (β) and differential (δ) effects on investment:

$$\Delta \log(k_{j,t+1}) = \alpha_j + \text{(macro controls)} + \beta \eta_t^{HF} + \varepsilon_{j,t}$$

$$\Delta \log(k_{j,t+1}) = \alpha_j + \text{(sector} \times \text{quarter f.e.)} + \delta \left(\eta_t^{HF} \times s_{j,t-1} \right) + \varepsilon_{j,t}$$

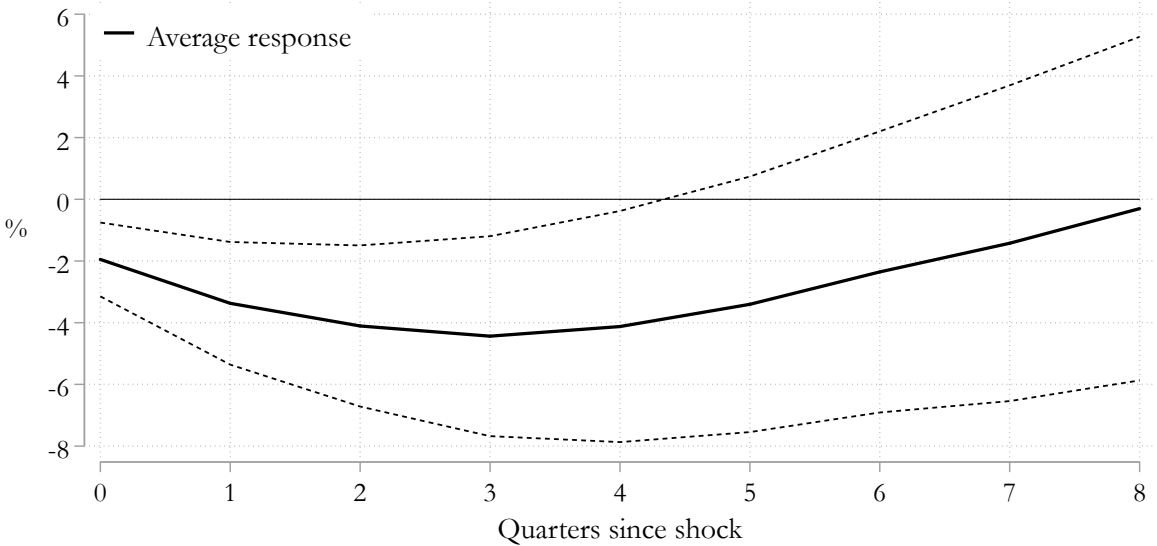
$$s_{j,t-1} \equiv \text{bank loans as \% of total debt}$$

The effect of a 100bps shock to the Fed Funds rate

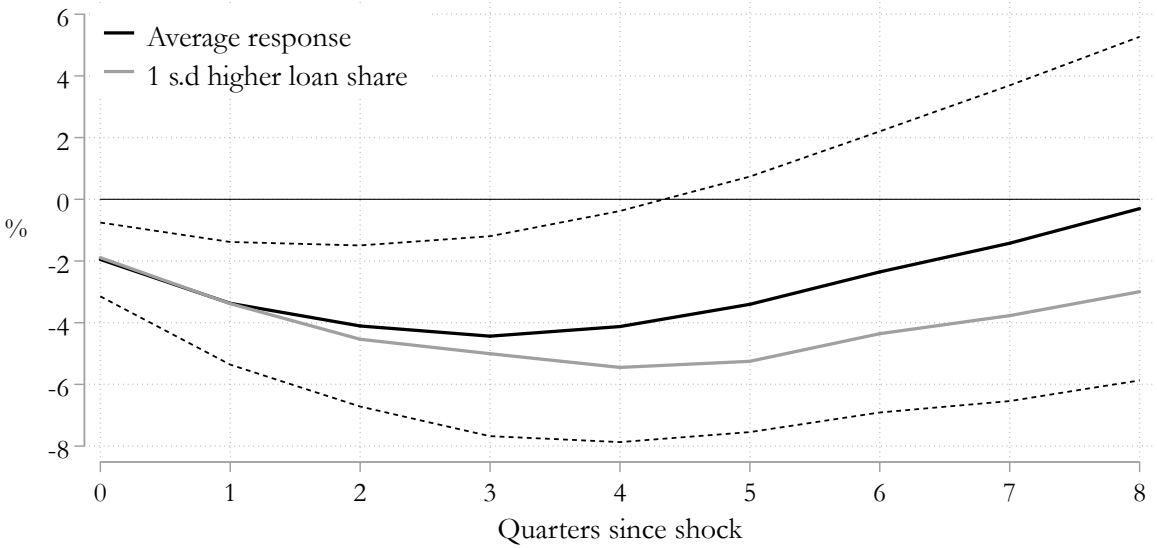
4-quarter investment response

	(1)	(2)	(3)
η_t^{HF}	-4.15*	-4.12*	
	(2.28)	(2.28)	
$\eta_t^{HF} \times s_{j,t-1}$		-1.07	-1.33**
		(0.67)	(0.66)
Macro controls	✓	✓	✗
Firm controls	✓	✓	✓
Sector-time f.e.	✗	✗	✓
R^2	0.259	0.259	0.274
N	189794	189794	189794

The cumulative response of investment



The cumulative response of investment



3. Has disintermediation changed the pass-through of monetary policy shocks?

Constructing the pre- and post-1990 pass-through

Constructing the pre- and post-1990 pass-through

- Fed Funds futures based shocks only available after 1990q4

Constructing the pre- and post-1990 pass-through

- Fed Funds futures based shocks only available after 1990q4

- Use an alternative measure of shocks, η_t^{RR}, with longer time series

  Deviation of implemented rate from internal forecasts (Wieland and Yang, 2016)

  Drawback: potentially correlated with other macro shocks

Constructing the pre- and post-1990 pass-through

- Fed Funds futures based shocks only available after 1990q4

- Use an alternative measure of shocks, η_t^{RR}, with longer time series

  Deviation of implemented rate from internal forecasts (Wieland and Yang, 2016)

  Drawback: potentially correlated with other macro shocks

- In overlapping sample,

$$corr(\eta_t^{RR}, \eta_t^{HF}) = 0.34$$

$$\sigma_{RR} \approx 2 \times \sigma_{HF}$$

MP shock pass-through is stronger in the pre-1990 sample

4-quarter investment response, post-1990

	(1)	(2)	(3)
η_t^{RR}	-2.81**	-2.79**	
	(1.32)	(1.32)	
$\eta_t^{RR} \times s_{j,t-1}$		-0.85***	-1.00***
		(0.29)	(0.28)
Macro controls	✓	✓	✗
Firm controls	✓	✓	✓
Sector-time f.e.	✗	✗	✓
R^2	0.260	0.260	0.274
N	189794	189794	189794

MP shock pass-through is stronger in the pre-1990 sample

4-quarter investment response, pre-1990

	(1)	(2)	(3)
η_t^{RR}	-4.33*	-4.31*	
	(2.48)	(2.48)	
$\eta_t^{RR} \times s_{j,t-1}$		-1.48***	-1.61***
		(0.27)	(0.14)
Macro controls	✓	✓	✗
Firm controls	✓	✓	✓
Sector-time f.e.	✗	✗	✓
R^2	0.323	0.323	0.344
N	111913	111913	111913

Could disintermediation explain the falling pass-through?

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

  total borrowing d

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

total borrowing	d
loan share	$s \in [0, 1]$

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

total borrowing	d
loan share	$s \in [0, 1]$
investment	$k = d + e$

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

total borrowing	d
loan share	$s \in [0, 1]$
investment	$k = d + e$

- Key trade-off: flexibility vs. cost

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

total borrowing	d
loan share	$s \in [0, 1]$
investment	$k = d + e$

- Key trade-off: flexibility vs. cost

loans can be restructured if firm is in financial distress

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

total borrowing	d
loan share	$s \in [0, 1]$
investment	$k = d + e$

- Key trade-off: flexibility vs. cost

  loans can be restructured if firm is in financial distress

  banks' cost of funds $= r + \gamma_b(r) > r =$ cost of funds of bonholders

Could disintermediation explain the falling pass-through?

- Firms with heterogeneous internal funds e

- Given e, choose:

total borrowing	d
loan share	$s \in [0, 1]$
investment	$k = d + e$

- Key trade-off: flexibility vs. cost

  loans can be restructured if firm is in financial distress

  banks' cost of funds $= r + \gamma_b(r) > r =$ cost of funds of bonholders

Choosing investment

Choosing investment

$$\underbrace{\zeta \mathbb{E}(\phi) k^{\zeta-1}}_{\text{MPK}} - \underbrace{(1+r)}_{\text{risk-free rate}} = \underbrace{\gamma_b(r) \times s}_{\substack{\text{bank intermediation} \\ \text{cost}}} + \underbrace{\frac{\partial L}{\partial d}(d, s)}_{\substack{\text{deadweight} \\ \text{liquidation losses}}}$$

Choosing investment

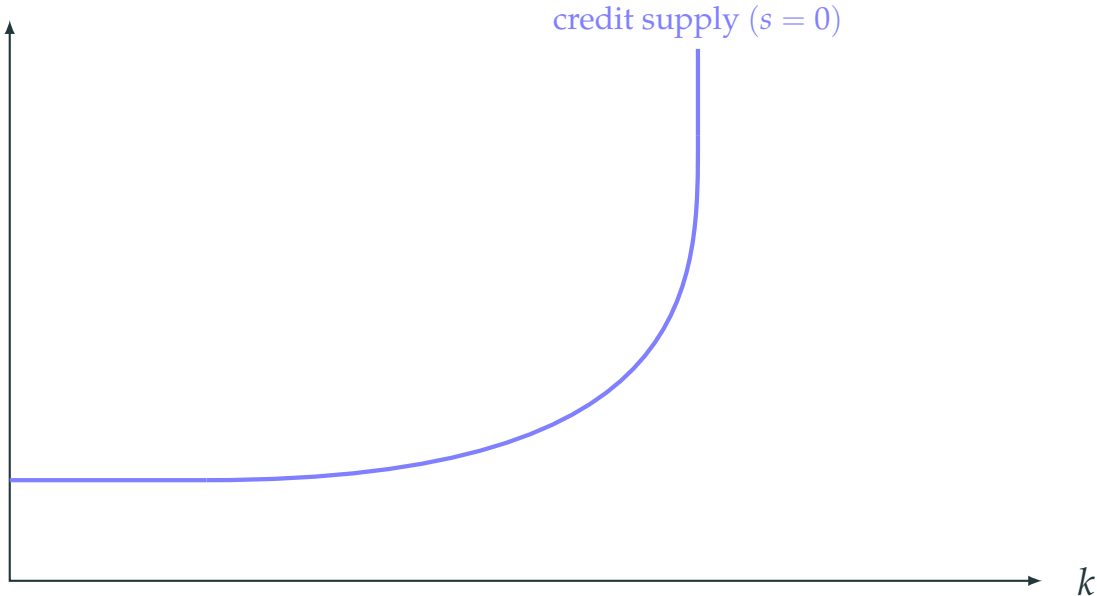
$$\underbrace{\zeta \mathbb{E}(\phi) k^{\zeta-1}}_{\text{MPK}} - \underbrace{(1+r)}_{\text{risk-free rate}} = \underbrace{\gamma_b(r) \times s}_{\substack{\text{bank intermediation} \\ \text{cost}}} + \underbrace{\frac{\partial L}{\partial d}(d, s)}_{\substack{\text{deadweight} \\ \text{liquidation losses}}}$$

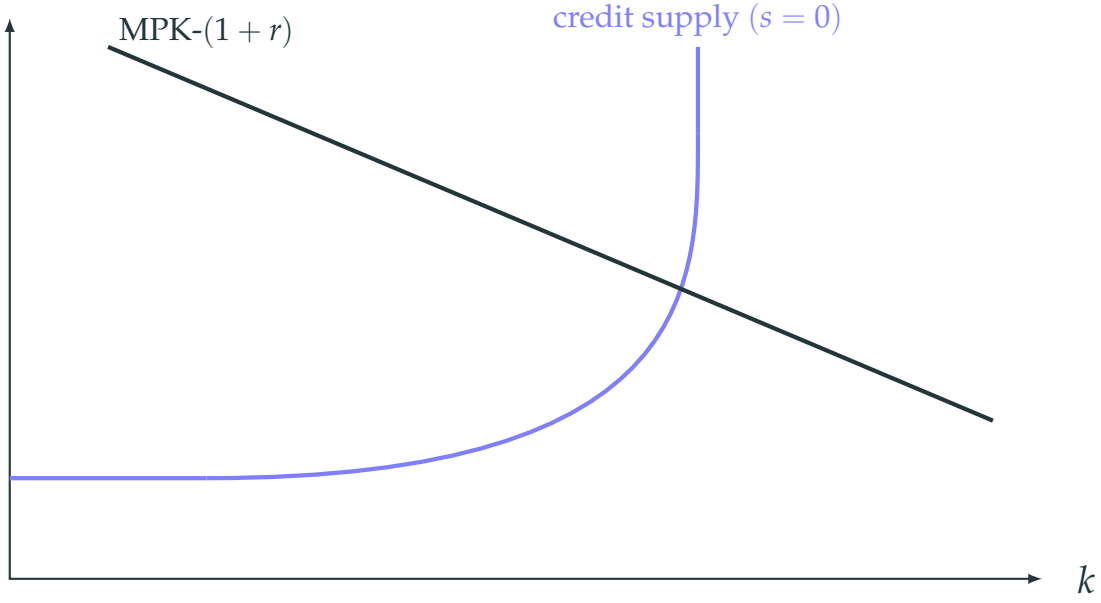
$$\frac{\partial^2 L}{\partial d^2} > 0,$$

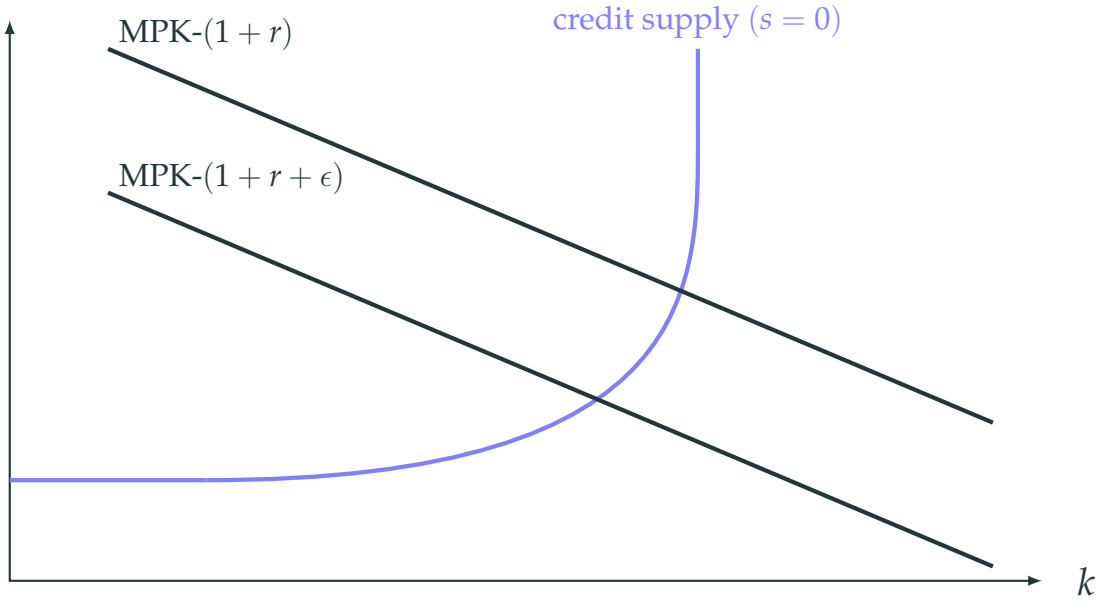
Choosing investment

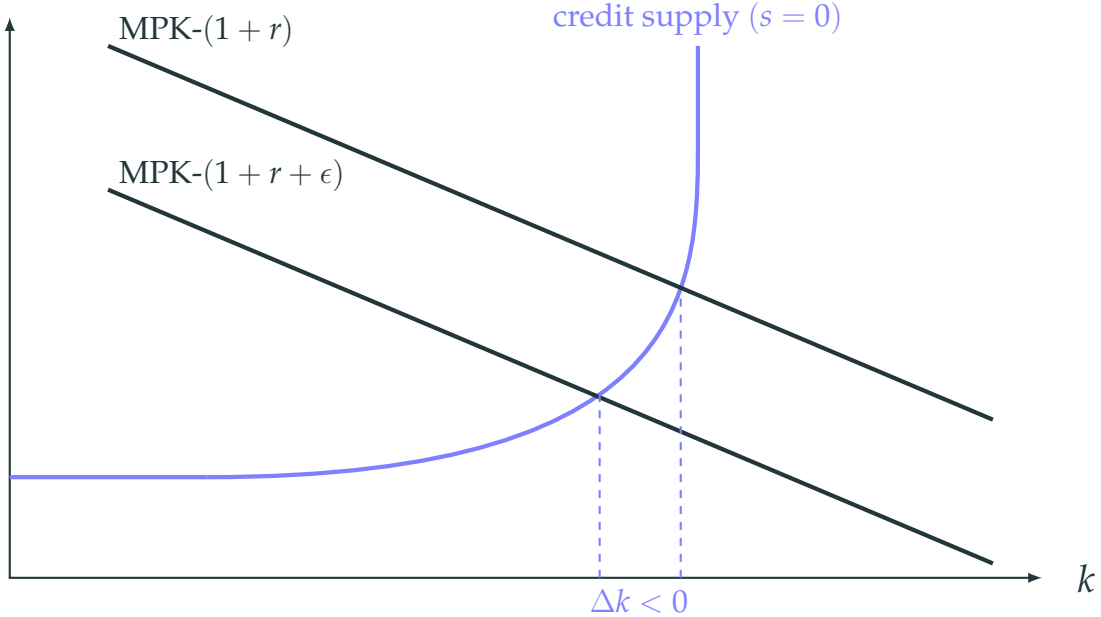
$$\underbrace{\zeta \mathbb{E}(\phi) k^{\zeta-1}}_{\text{MPK}} - \underbrace{(1+r)}_{\text{risk-free rate}} = \underbrace{\gamma_b(r) \times s}_{\substack{\text{bank intermediation} \\ \text{cost}}} + \underbrace{\frac{\partial L}{\partial d}(d, s)}_{\substack{\text{deadweight} \\ \text{liquidation losses}}}$$

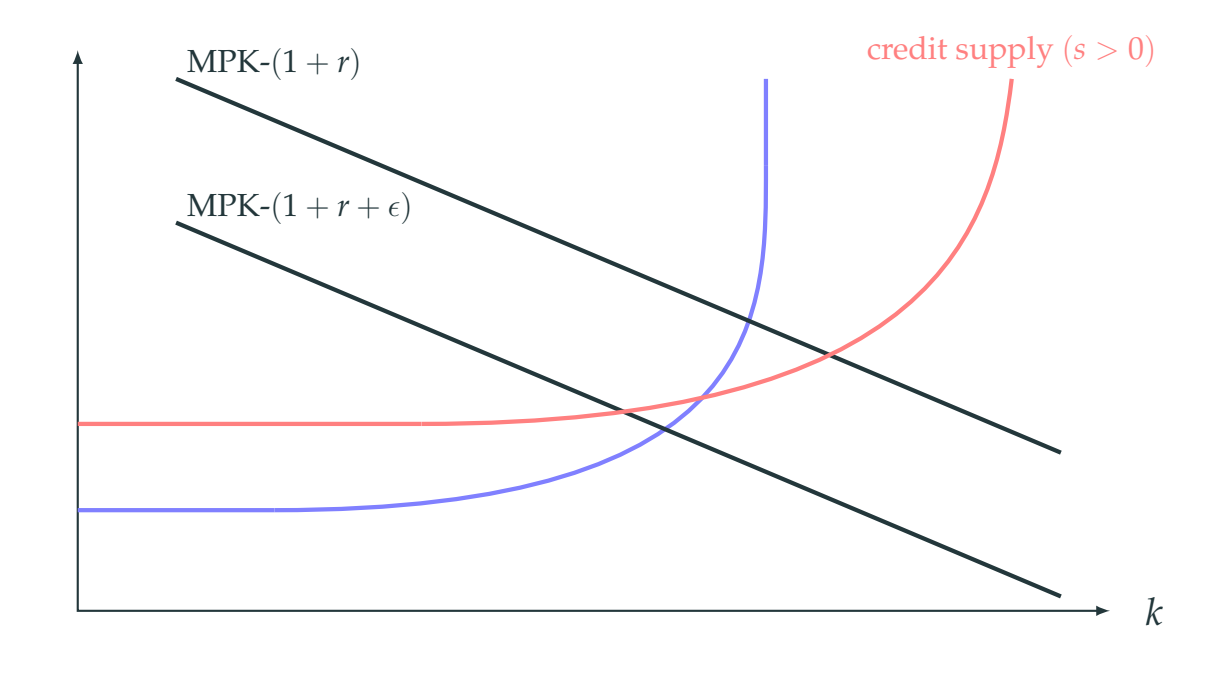
$$\frac{\partial^2 L}{\partial d^2} > 0, \qquad \frac{\partial^2 L}{\partial d \partial s} < 0 \quad \text{(flexibility)}$$

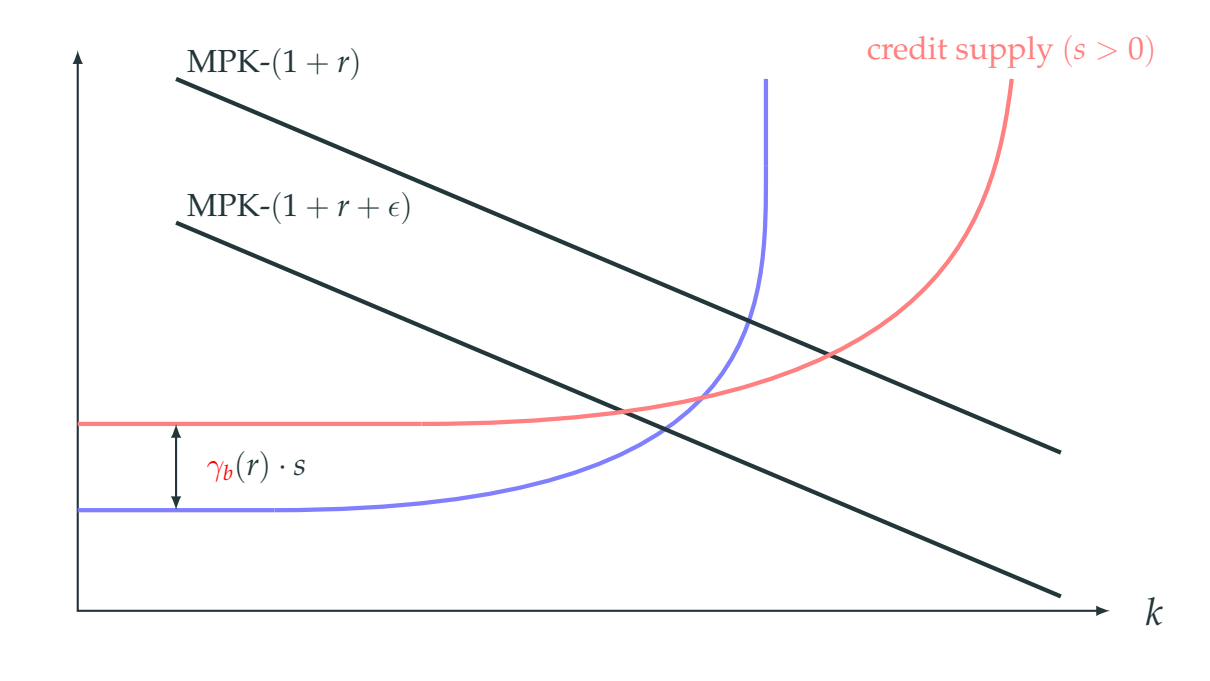

credit supply ($s = 0$)
k

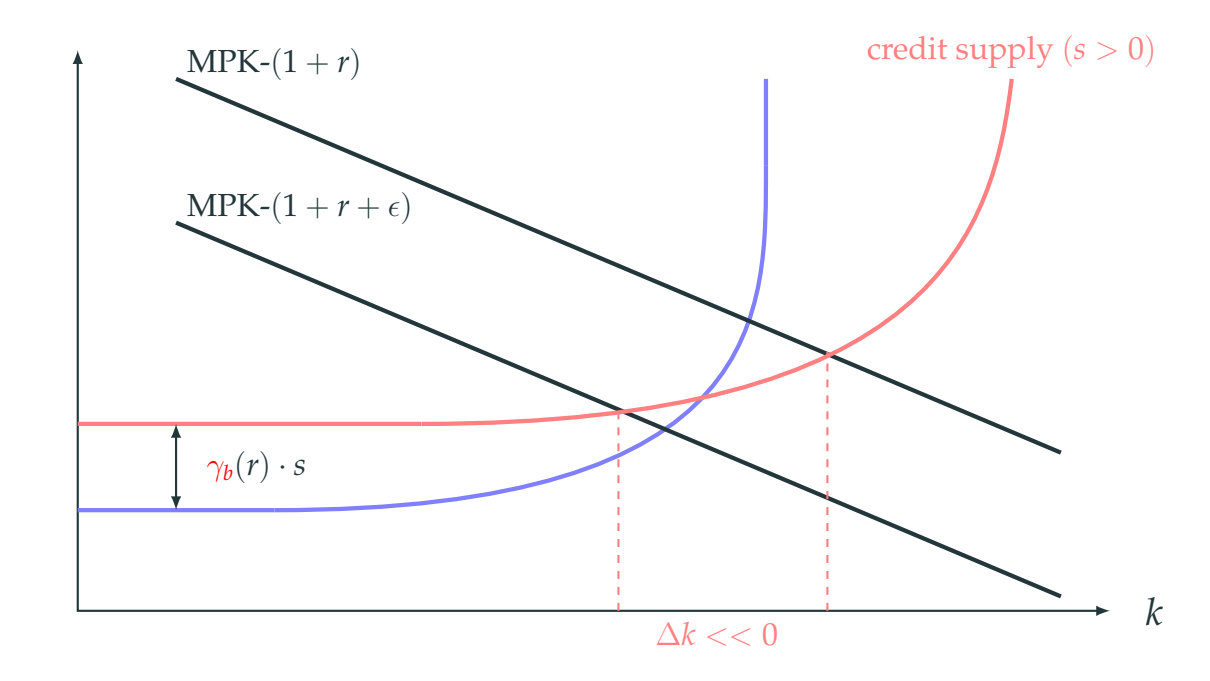

MPK-$(1+r)$
credit supply $(s=0)$
k

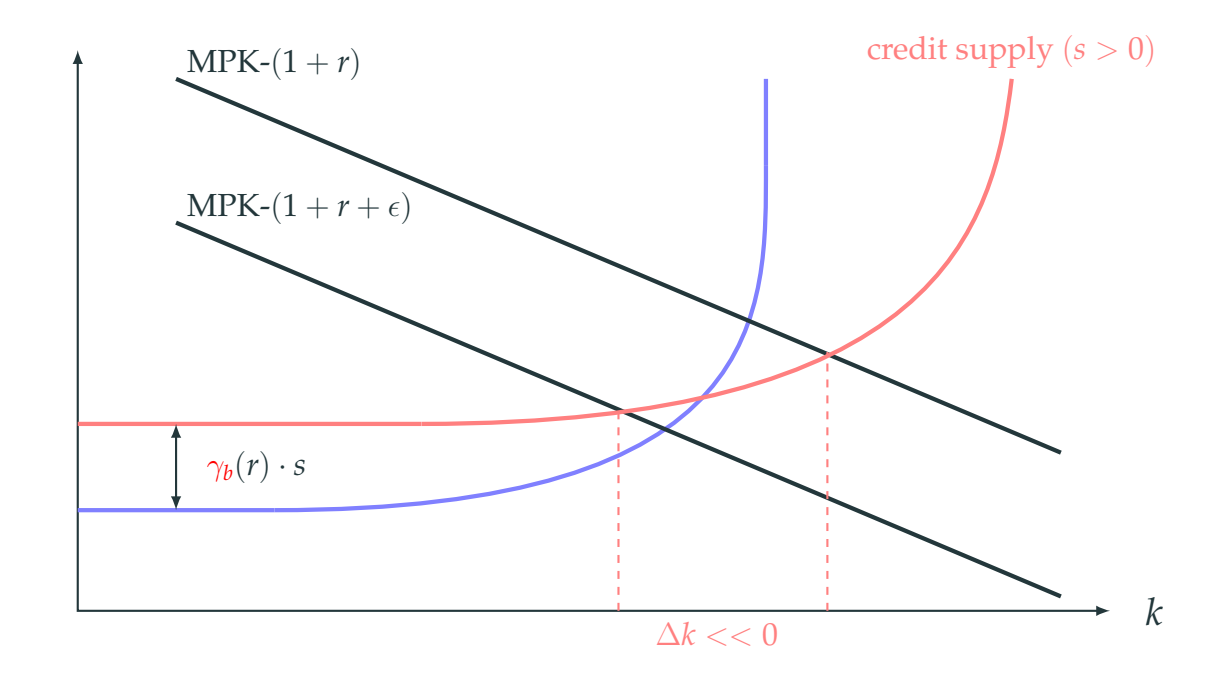

MPK-$(1+r)$
MPK-$(1+r+\epsilon)$
credit supply $(s=0)$
k


MPK-$(1+r)$
MPK-$(1+r+\epsilon)$
credit supply $(s=0)$
k
$\Delta k < 0$

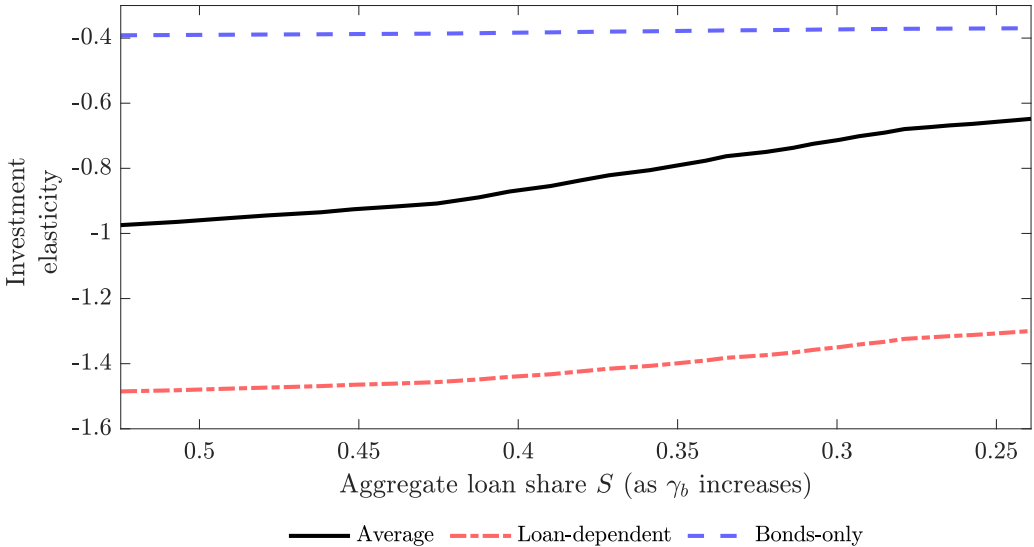

MPK-$(1+r)$
MPK-$(1+r+\epsilon)$
credit supply ($s > 0$)
k


MPK-$(1+r)$
MPK-$(1+r+\epsilon)$
credit supply $(s>0)$
$\gamma_b(r)\cdot s$
k


MPK-$(1+r)$
MPK-$(1+r+\epsilon)$
credit supply $(s>0)$
$\gamma_b(r)\cdot s$
k
$\Delta k << 0$


MPK-$(1+r)$
MPK-$(1+r+\epsilon)$
credit supply $(s>0)$
$\gamma_b(r)\cdot s$
k
$\Delta k << 0$

The pass-through of MP shocks to investment



4. Take-aways

Take-aways

1. Has the “typical” firm become less bank-dependent?

2. Do less bank-dependent firms respond less to monetary policy shocks?

3. Has monetary pass-through declined as a result?

Take-aways

1. Has the "typical" firm become less bank-dependent?

   yes; the loan share of the "typical" public firm fell by 1/3 since 1990

2. Do less bank-dependent firms respond less to monetary policy shocks?

3. Has monetary pass-through declined as a result?

Take-aways

1. Has the "typical" firm become less bank-dependent?

   yes; the loan share of the "typical" public firm fell by 1/3 since 1990

2. Do less bank-dependent firms respond less to monetary policy shocks?

   yes; 1 s.d. lower loan share $\implies$ 25% lower investment response

3. Has monetary pass-through declined as a result?

Take-aways

1. Has the "typical" firm become less bank-dependent?

   yes; the loan share of the "typical" public firm fell by 1/3 since 1990

2. Do less bank-dependent firms respond less to monetary policy shocks?

   yes; 1 s.d. lower loan share $\implies$ 25% lower investment response

3. Has monetary pass-through declined as a result?

   monetary pass-through is 30% lower in the post-1990 sample

Take-aways

1. Has the "typical" firm become less bank-dependent?

   yes; the loan share of the "typical" public firm fell by 1/3 since 1990

2. Do less bank-dependent firms respond less to monetary policy shocks?

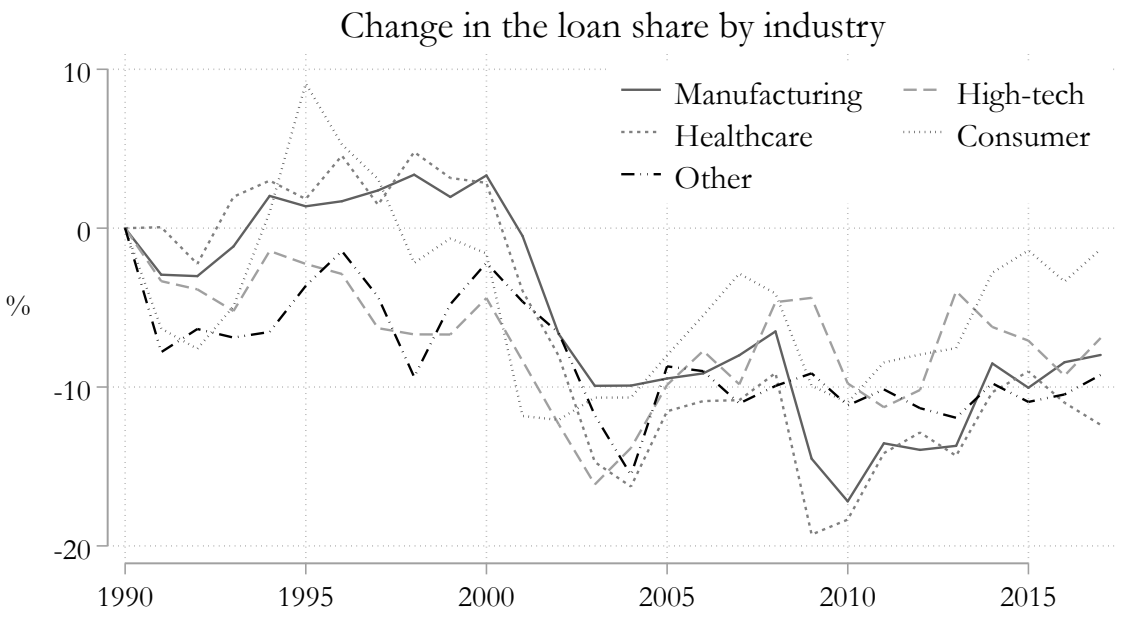
   yes; 1 s.d. lower loan share $\implies$ 25% lower investment response

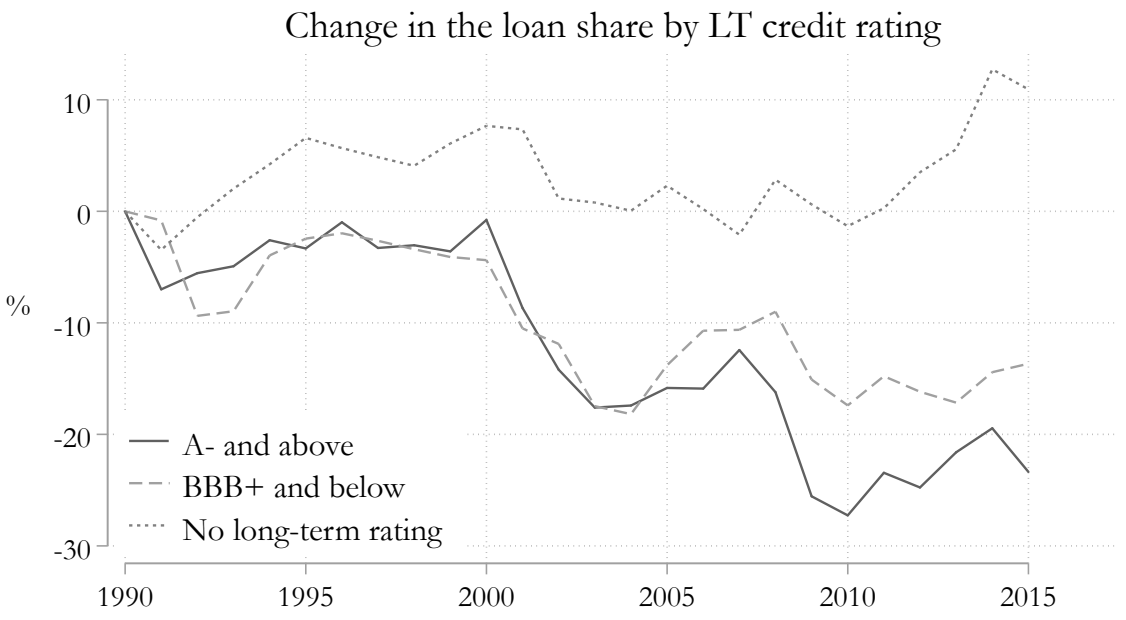
3. Has monetary pass-through declined as a result?

   monetary pass-through is 30% lower in the post-1990 sample

   model suggests disintermediation could help account for this decline

More


Change in the loan share by industry
10
0
-10
-20
%
1990
1995
2000
2005
2010
2015
Manufacturing
High-tech
Healthcare
Consumer
Other


Change in the loan share by LT credit rating
10
0
-10
-20
-30
%
A- and above
BBB+ and below
No long-term rating
1990
1995
2000
2005
2010
2015