Intra-Financial Lending, Credit, and Capital Formation

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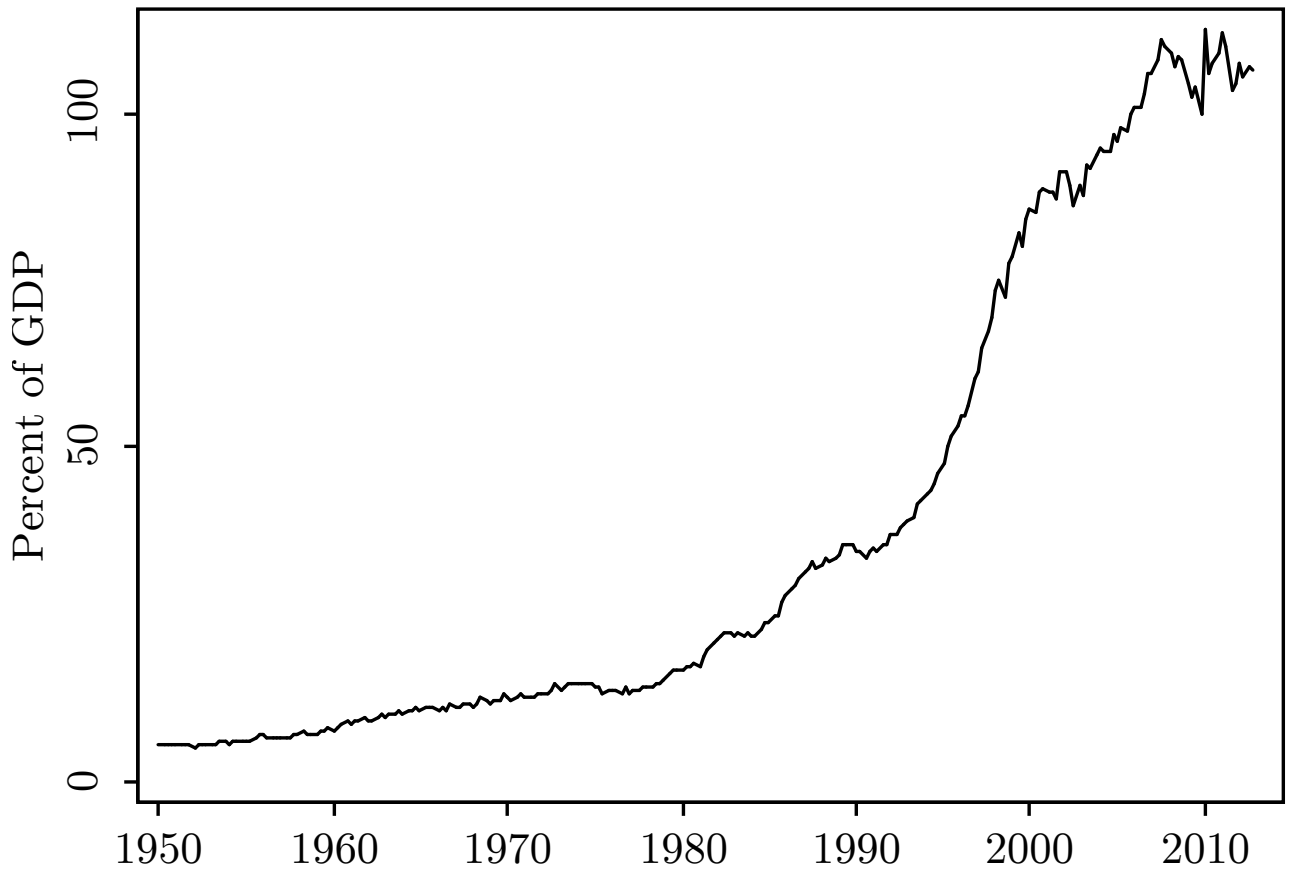
Thanks to...

Institute for
New Economic Thinking

Background

- Vast expansion of the financial system...
- Intra-financial lending: banks lending to each other
- Since the 1980s, intra-financial assets as a share of total financial assets (IFA share) has increased dramatically
- What impacts has this had on the real economy?

Figure : Intra-Financial Assets as a percent of GDP



3 perspectives

Potential impacts of increased IFA:

1. Financial efficiency view
   - lower cost of capital
   - liquidity services
   - risk dispersal
   - higher credit and investment

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2. Financial instability view
   - greater "interconnectedness" $\longrightarrow$ risk concentration
   - higher leverage and financial fragility
   - increased credit during bubble phase but unsustainably

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   - greater "interconnectedness" $\longrightarrow$ risk concentration
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3. Financial inefficiency / rent-extraction view
   - greater rent extraction along intermediation chain
   - capital is "diverted" away from investment in real sector
   - lower credit and investment

Data

- Flow of Funds Accounts (FoF)
- The ideal would be to have micro-level data
- FoF is not meant to answer this kind of question
- Can't directly observe "network structure" of financial system
- But with a few (heroic) assumptions we can come up with some rough estimates

Data

- What we can observe...

$$a_1 + a_2 = l_1 + l_2$$

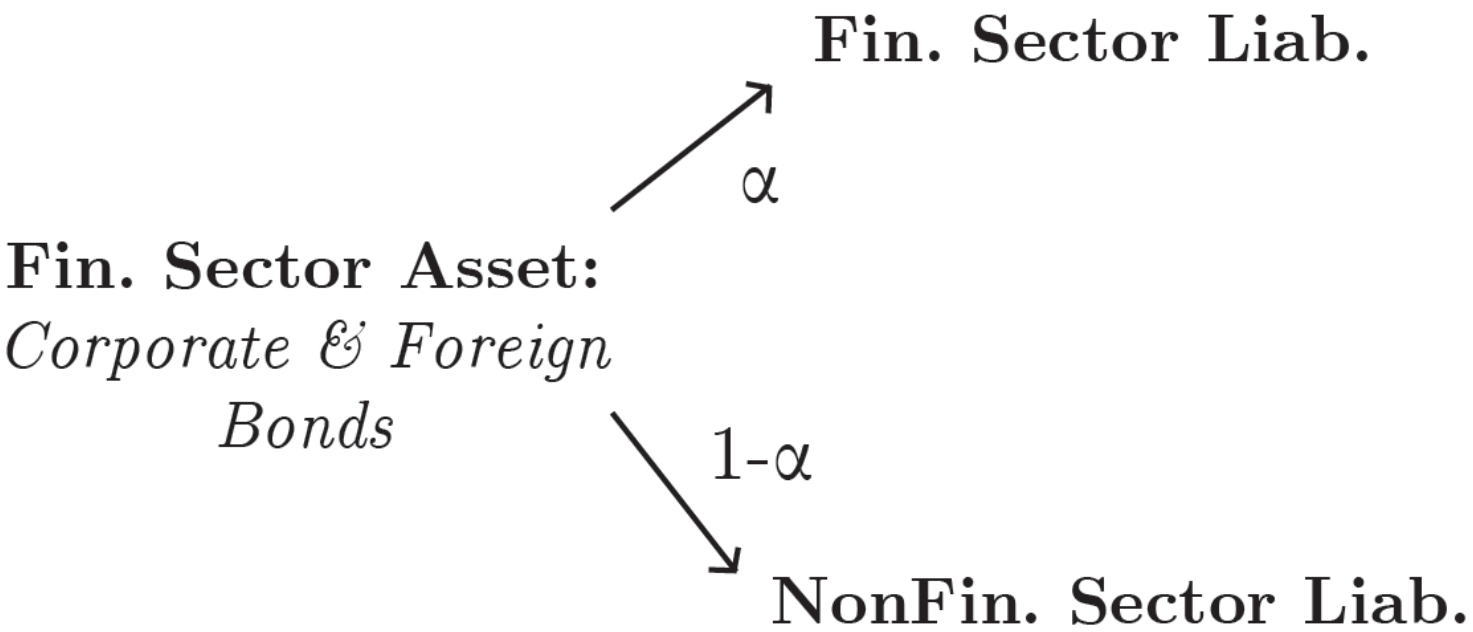
where $1, 2$ are different financial instruments (i.e. bonds, loans, etc.)

- But we would like to observe...

$$a^f + a^n = l^f + l^n$$

where f, n denote the financial and non financial sectors, respectively

Data


Fin. Sector Liab.
α
Fin. Sector Asset:
Corporate & Foreign
Bonds
1-α
NonFin. Sector Liab.

Methodology: calculating intra-financial lending

- Bhatia and Bayoumi (2012)
- Assume "fixed portfolio shares" for each instrument class
- In other words, assume financial sector claims on other financial institutions for each instrument reflect the sector's share of outstanding liabilities of that instrument
- That is,

$$\alpha_i = \frac{\text{financial sector liabilities}_i}{\text{total liabilities}_i}$$

Methodology: calculating intra-financial lending

- Once we calculate the share α_i, intra-financial assets for each instrument type are given by:

$$a_i^f = \alpha_i a_i$$

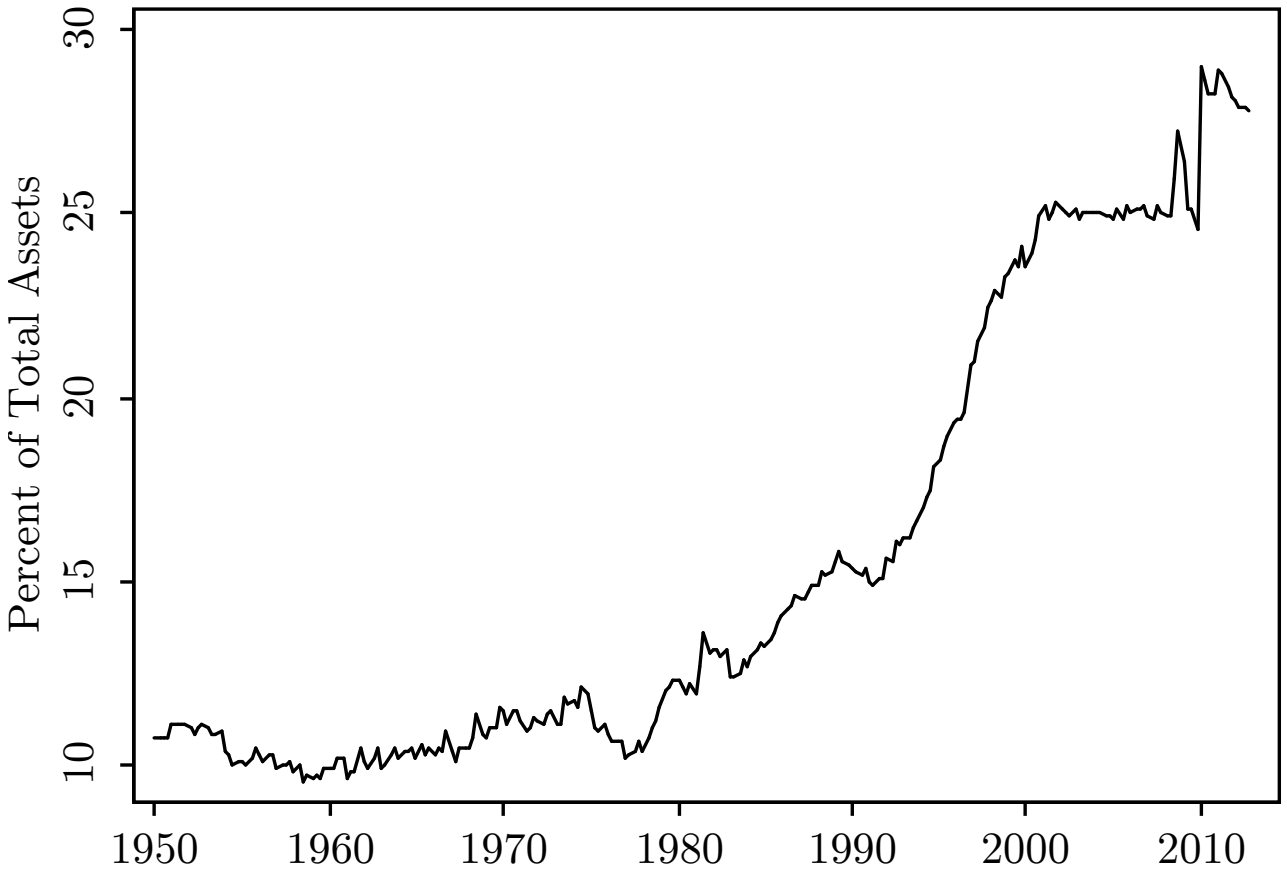
- And total intra-financial assets are:

$$a^f = \sum_i \alpha_i a_i$$

- Therefore, the IFA share is:

$$\text{IFA share} = \frac{a^f}{a}$$

Figure : Intra-Financial Asset Share



Methodology: VAR estimates

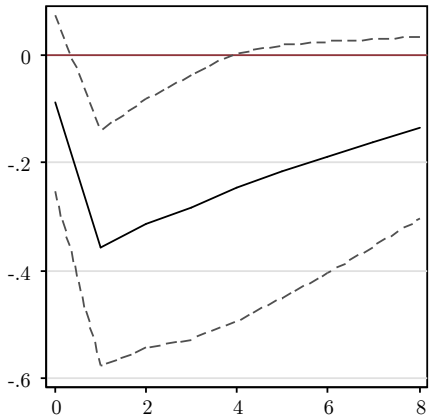
$$\mathbf{y}_t = \mathbf{C} + \mathbf{A}_1\mathbf{y}_{t-1} + \mathbf{A}_2\mathbf{y}_{t-2} + \mathbf{u}_t \tag{1}$$

where

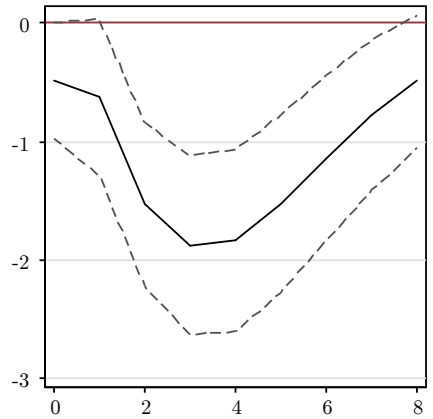
$$\mathbf{y}_t = \begin{bmatrix} \text{IFA share} \\ \text{Credit} \\ \text{Investment} \end{bmatrix} \tag{2}$$

Figure : Orthogonalized impulse response functions

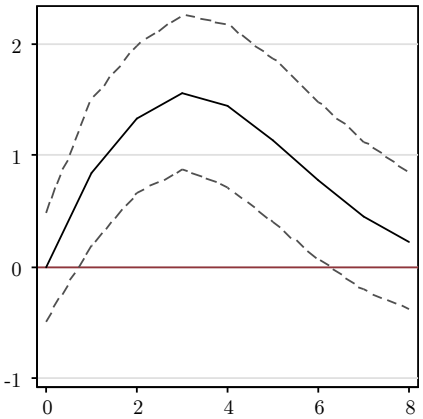
(a) IFA share → Credit



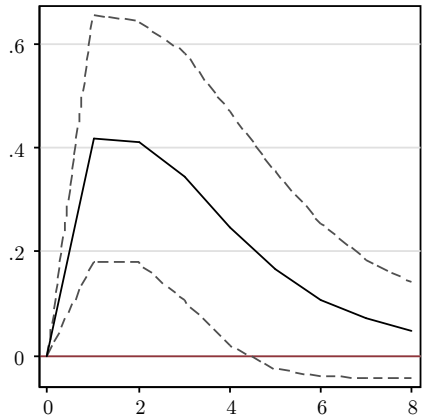
(b) IFA share → Investment



(c) Credit → Investment



(d) Investment → IFA share



Model assumptions violated...

- Null hypothesis of normally distributed residuals is rejected
- Serial correlation

Robustness checks:

- Restricted sample (1950Q1-1999Q4)
- Additional lags
- Exogenous controls (NBER recession dummy, 3 month Treasury, corporate profit index)
- Main results not affected by robustness tests

The Block Bootstrap

Solution: bootstrapping

- Does not impose distributional assumption
- Time series data means traditional bootstrap not valid
- Need to preserve "time dependent" data structure
- Randomly draw "blocks" of contiguous observations

Main results are not affected by residual non-normality

Figure : Distribution of bootstrap point estimates

(a) IFA share → Investment (t-1) **(b)** IFA share → Investment (t-2)

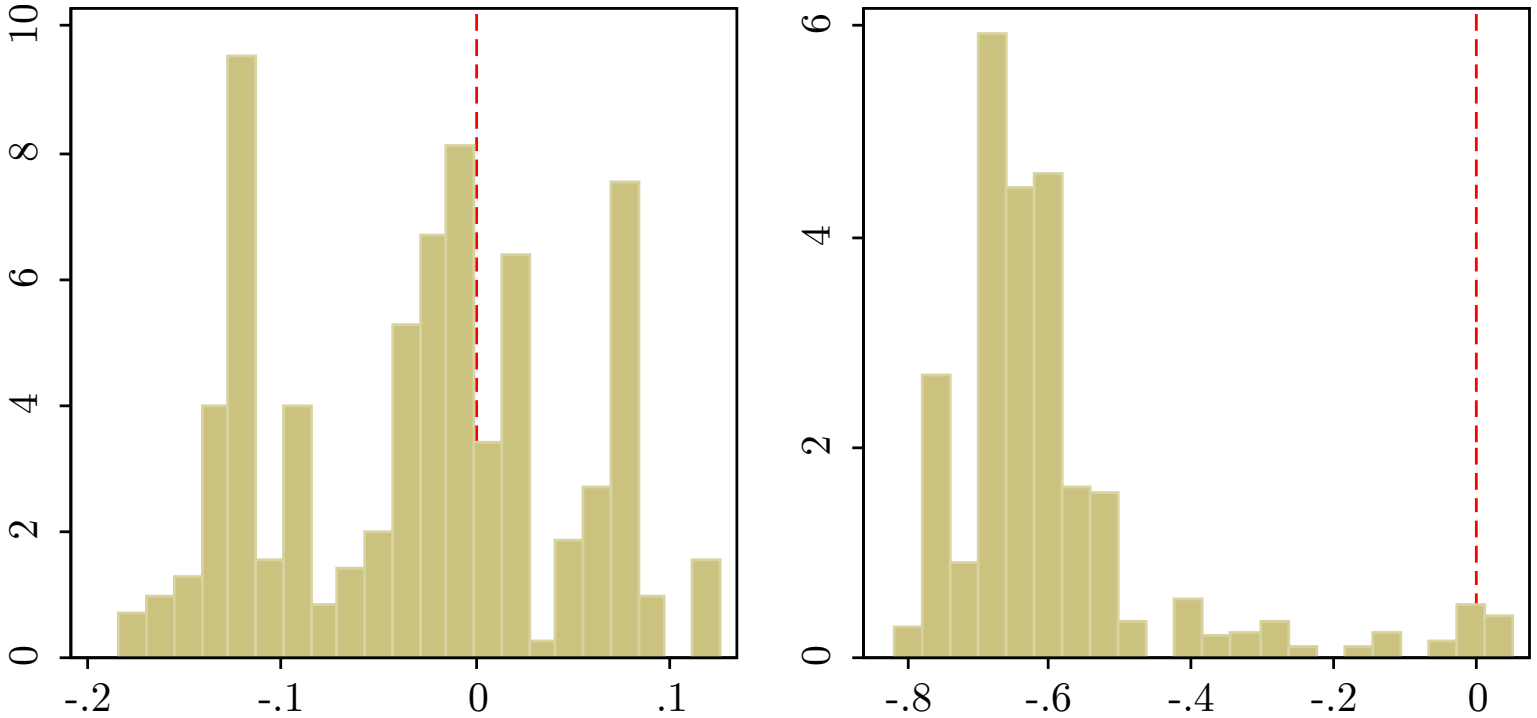
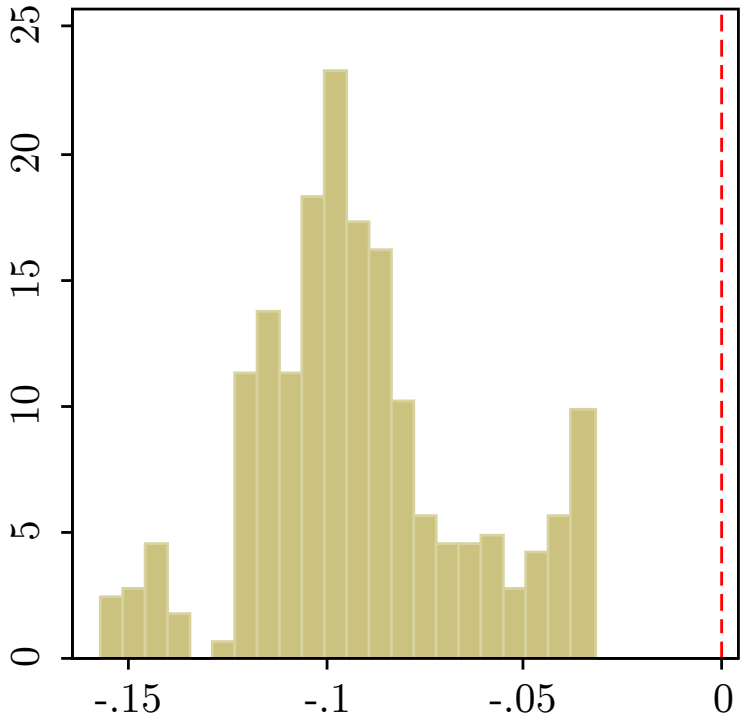
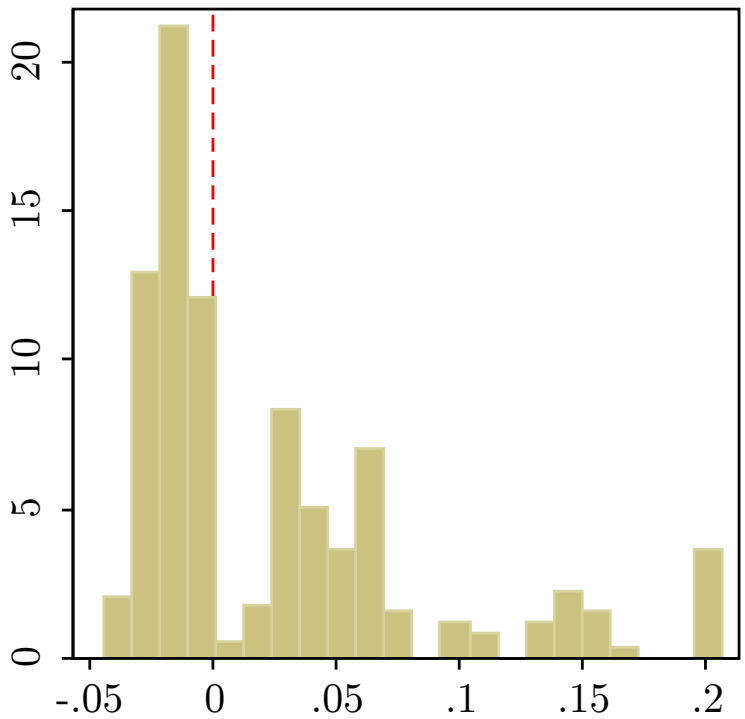


Figure : Distribution of bootstrap point estimatest

(c) IFA share → Credit (t-1)



(d) IFA share → Credit (t-2)



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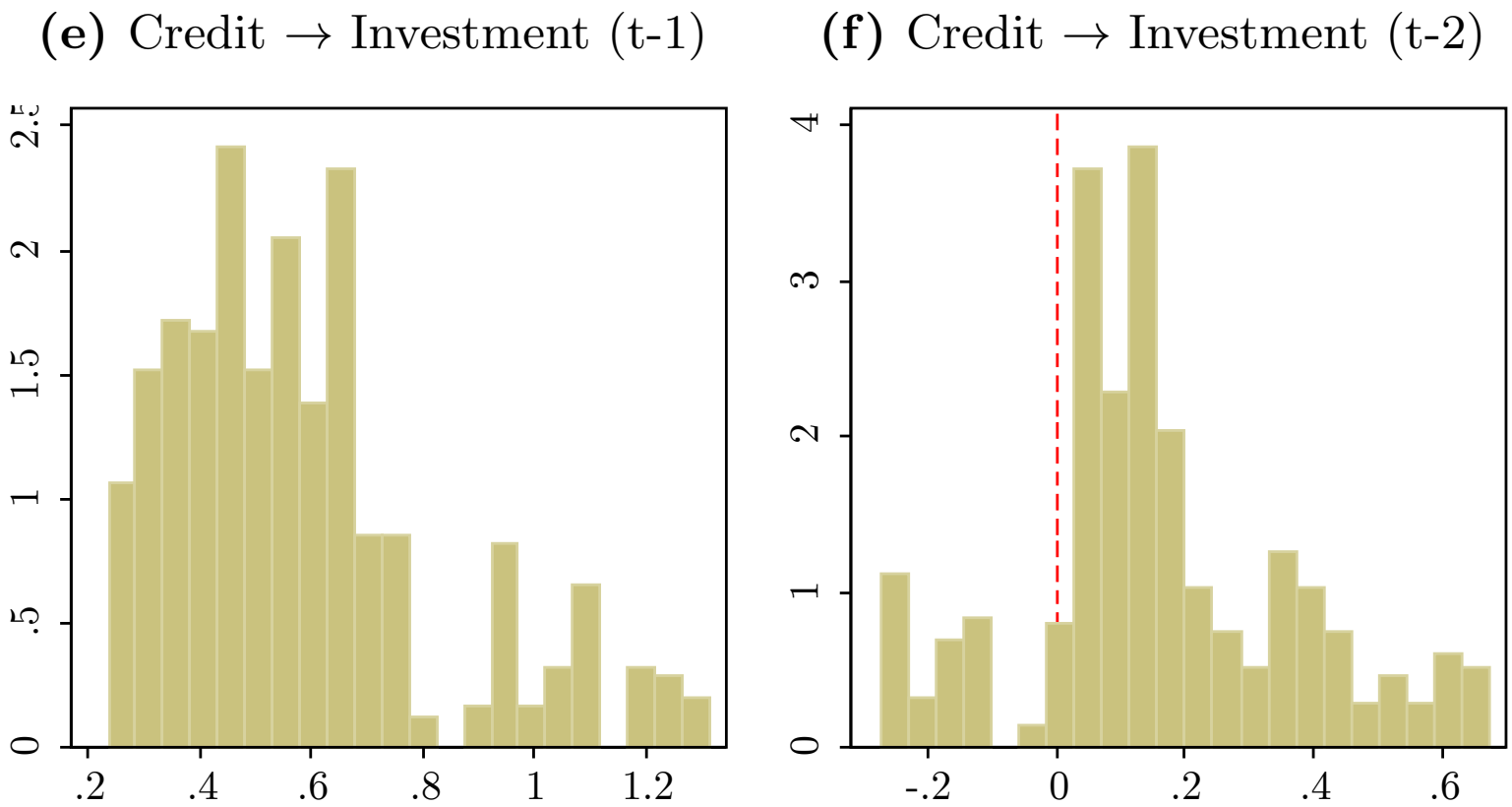


Figure : Baseline model with block bootstrapped 95% C.I.

	(1) IFA			(2) Credit			(3) Investment		
		95 C.I.			95 C.I.			95 C.I.	
VARIABLE	$\hat{\mathbf{A}}$	Lower	Upper	$\hat{\mathbf{A}}$	Lower	Upper	$\hat{\mathbf{A}}$	Lower	Upper
IFA (t-1)	0.580*	0.518	0.678	-0.134*	-0.148	-0.036	-0.068	-0.148	0.090
IFA (t-2)	0.050	0.000	0.118	0.082	-0.033	0.204	-0.386*	-0.767	-0.027
Credit (t-1)	-0.250*	-0.686	-0.086	0.897*	0.858	1.045	0.642*	0.250	1.205
Credit (t-2)	0.268*	0.186	0.649	-0.134*	-0.198	-0.047	-0.162	-0.247	0.607
Investment (t-1)	0.107*	0.067	0.177	0.023	-0.018	0.033	0.899*	0.600	1.186
Investment (t-2)	-0.047	-0.156	0.018	0.004	-0.020	0.051	-0.202*	-0.379	-0.065
Constant	0.000	-0.001	0.001	0.000	-0.001	0.001	0.001	-0.002	0.002

Source: Authors' calculations.

Rolling VARs

Parameter stability concerns

- Do the parameters vary significantly across time?
- How stable is the estimated relationship?
- Does intra-financial lending have different effects during different periods?

Rolling VAR

- Estimate VAR model over continuous sample "windows"
- Advance estimation window one "step" at a time Allows examination of how the effects evolve over time

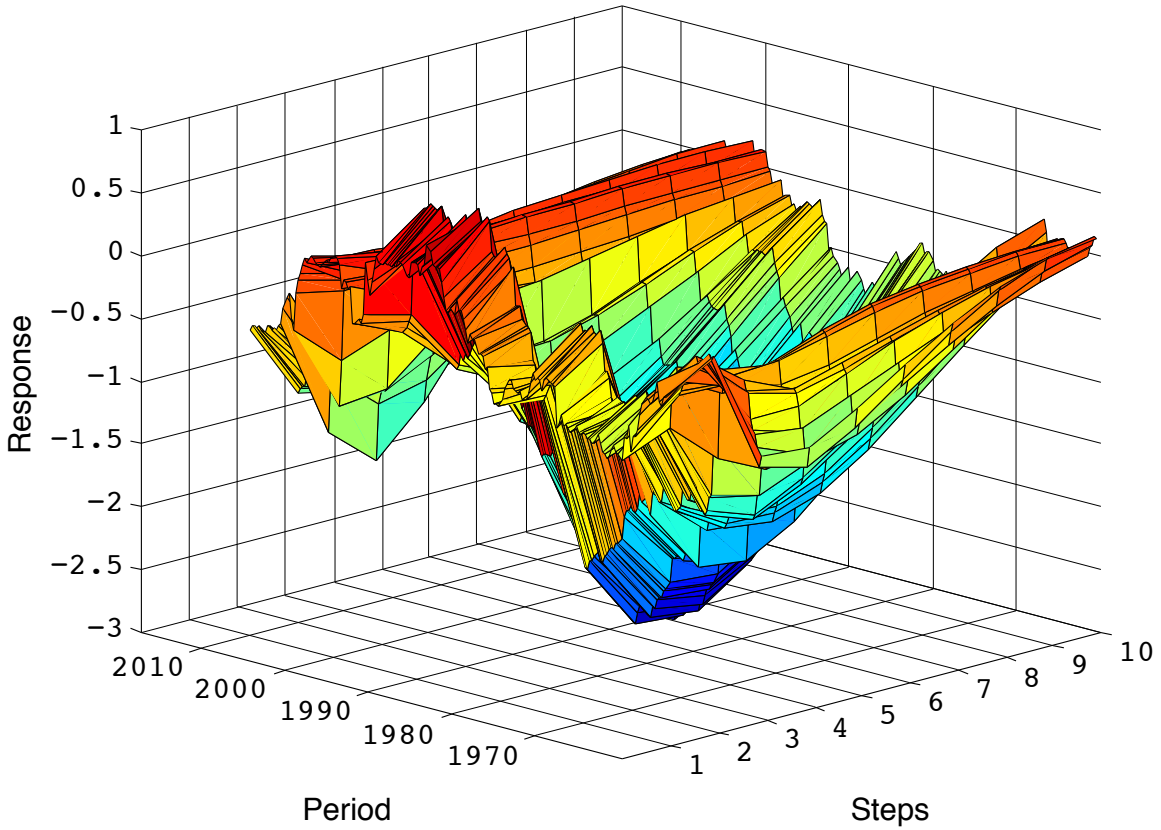
Consider a case with...

- Baseline 3 endogenous variable VAR model
- Window size: 80 observations (20 years at quarterly frequency)
- Step size: 1 period

Results

- Data is consistent with both the *financial inefficiency* & *financial instability* views
- There are two "regimes"
- **Capital diversion regime** – 1950 to 1995 & 2008 to 2012
  - $\uparrow$ IFA share $\longrightarrow \downarrow$ credit $\longrightarrow \downarrow$ investment
- **Bubble regime** – 1995 to 2008
  - IFA share and credit are complementary, but credit growth is probably unsustainable
  - $\uparrow$ IFA share $\longrightarrow \uparrow$ credit $\longrightarrow \uparrow$ investment

Figure : Rolling IRF (IFA share $\longrightarrow$ Investment)



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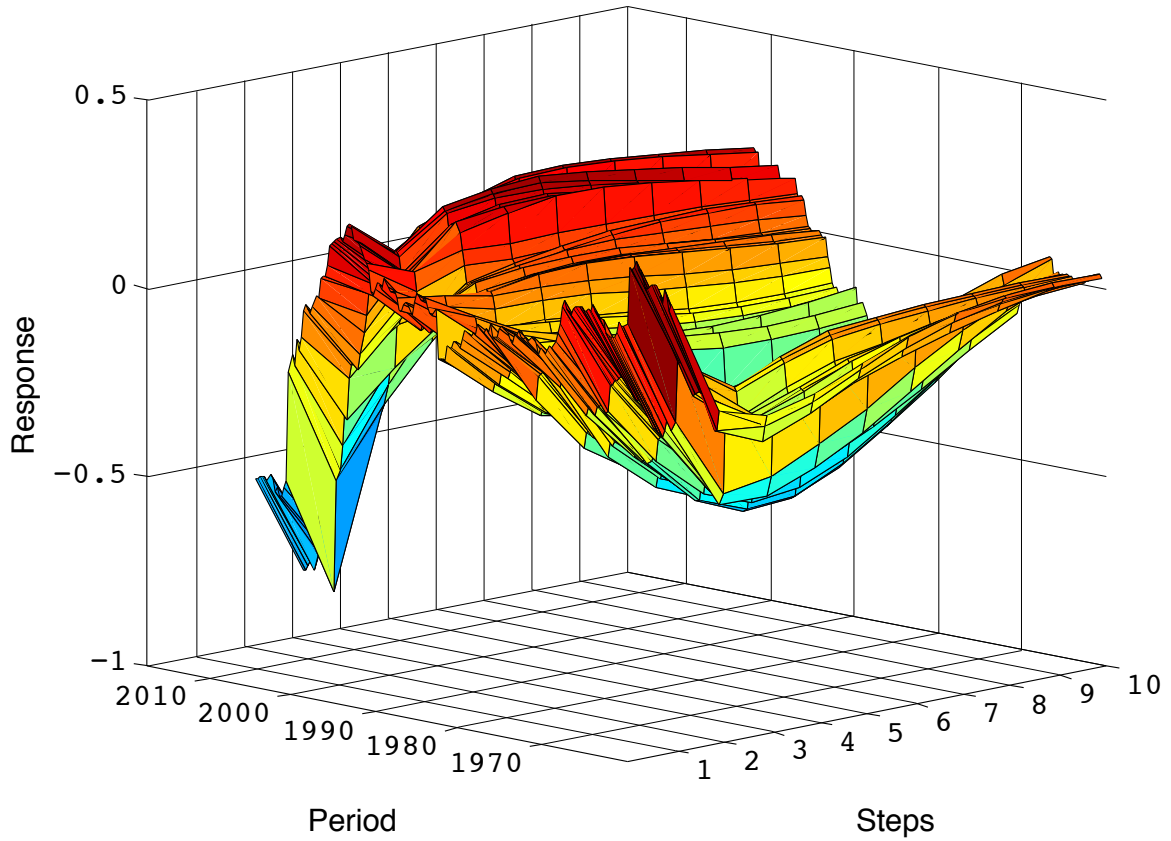

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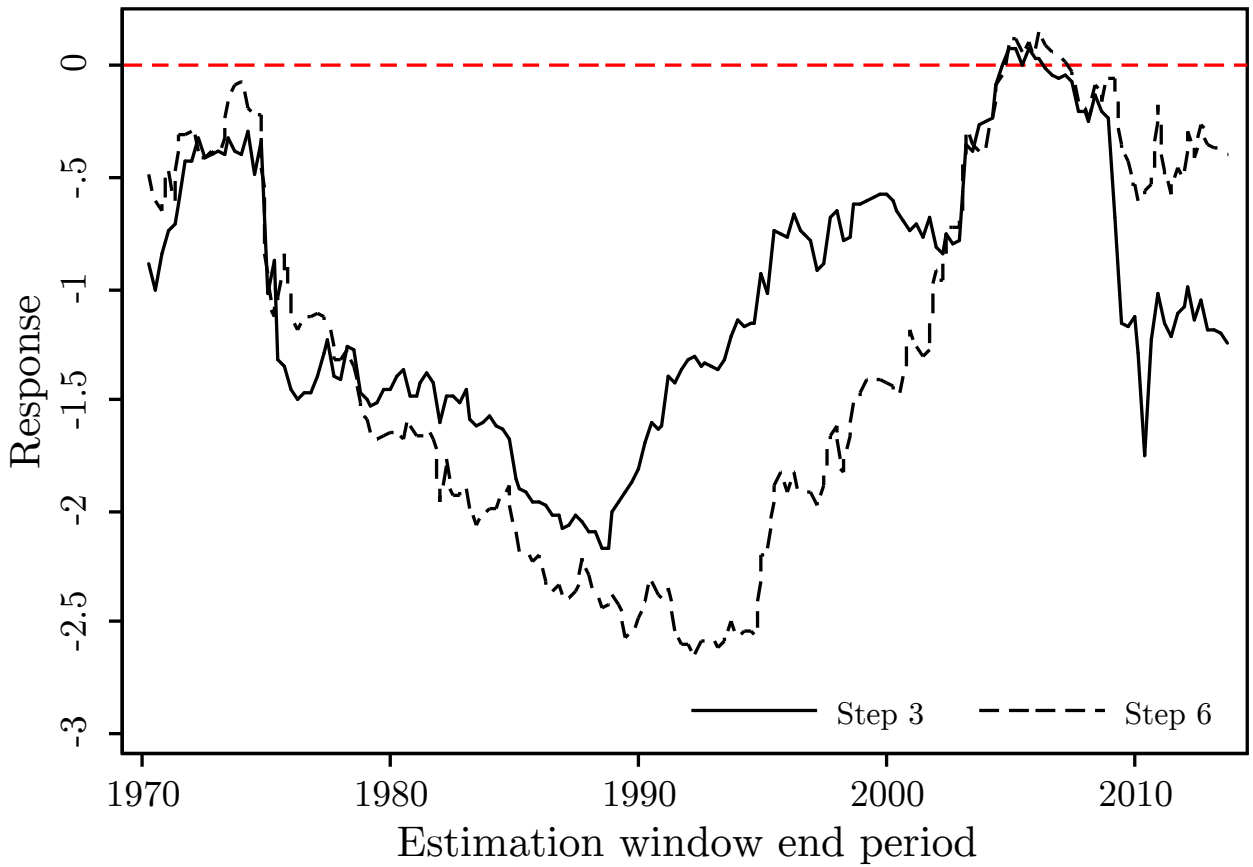

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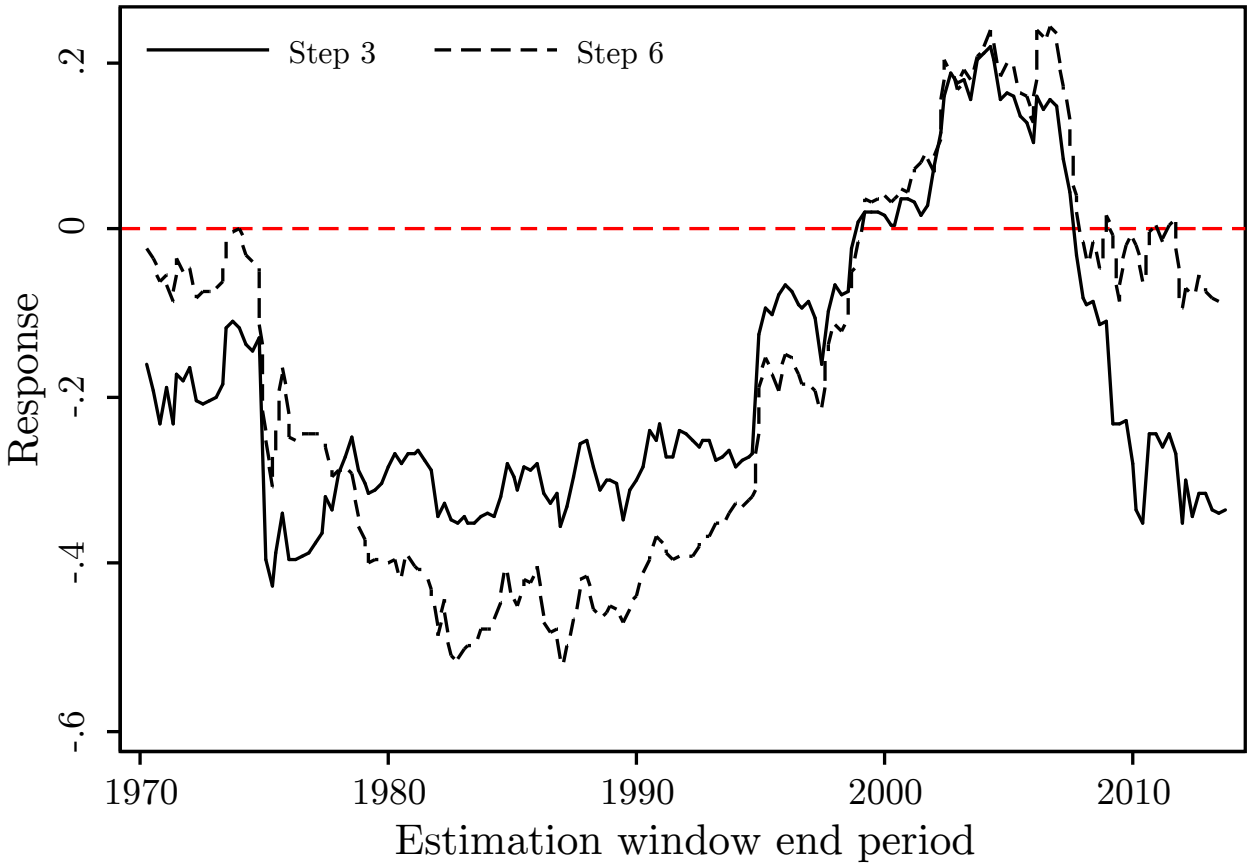

Conclusions...

- Higher intra-financial lending is associated with slower investment
- May operate through credit channel
- No support for financial efficiency view
- Support for both financial inefficiency and instability views
- Dramatic increase in intra-financial lending has probably lowered investment

Thank You

Table : Granger causality tests

Equation	Excluded	χ^2
Investment		
	IFA share	18.38***
	Credit	20.162***
	All	46.246***
IFA share		
	Investment	15.510***
	Credit	8.302**
	All	31.978***
Credit		
	Investment	4.318
	IFA share	10.525***
	All	13.466***

*** p<0.01, ** p<0.05, * p<0.1

Table : Jarque-Bera residual normality test and Lagrange multiplier autocorrelation test

	χ^2
IFA share	733.324***
Credit	23.418***
Investment	21.054***
All	777.797***

*** p<0.01, ** p<0.05, * p<0.1

Figure : Investment equation robustness tests

	1950Q1-2012Q4			1950Q1-1999Q4		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
IFA share (t-1)	-0.113	-0.151	-0.132	-0.060	-0.057	-0.055
	(0.113)	(0.114)	(0.114)	(0.139)	(0.140)	(0.138)
IFA share (t-2)	-0.228**	-0.240**	-0.231**	-0.459***	-0.454***	-0.386***
	(0.112)	(0.111)	(0.112)	(0.141)	(0.140)	(0.141)
Credit (t-1)	0.539***	0.539***	0.555***	0.579**	0.538**	0.557**
	(0.171)	(0.171)	(0.170)	(0.230)	(0.237)	(0.233)
Credit (t-2)	-0.128	-0.105	-0.107	0.120	0.140	0.111
	(0.174)	(0.173)	(0.173)	(0.243)	(0.243)	(0.242)
Investment (t-1)	0.708***	0.682***	0.643***	0.630***	0.622***	0.547***
	(0.064)	(0.064)	(0.067)	(0.070)	(0.071)	(0.076)
Investment (t-2)	-0.062	-0.035	0.028	-0.037	-0.030	0.074
	(0.058)	(0.059)	(0.066)	(0.063)	(0.063)	(0.074)
Constant	0.696	0.951	0.573	0.303	0.803	0.331
	(0.438)	(0.659)	(0.682)	(0.561)	(0.690)	(0.708)
Observations	250	250	249	198	198	197
Additional controls						
Recession dummy	✓	✓	✓	✓	✓	✓
T-bill	✓	✓	✓	✓	✓	✓
Decade dummies		✓	✓		✓	✓
Corporate profits			✓			✓

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1