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THE SWEDISH FOUNDATION FOR HUMANITIES AND SOCIAL SCIENCES

Challenges for Macro Models of Financial Frictions

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- Every major recession preceded by large disturbances in financial markets
- Tobin's critique of Friedman–Schwartz:
  - *Post hoc ergo propter hoc?*
  - Subsequently, therefore consequently?

Macro Approach

- Build structural macroeconomic model
- Discipline parameters to be consistent with key observations about financial and real variables
- Use model to evaluate policy
- Mark Gertler a leader in applying this approach to financial friction models
    - Financial accelerator mechanism has been very helpful

A Popular View of Business Cycles: Financial Accelerator Mechanism

- Investment affected by net worth
- Some shock hits
  - Unexpected deflation (Irving Fisher)
  - Sunspot (multiple equilibria, bank runs)
- Net worth falls
- Investment falls
- Aggregate output falls

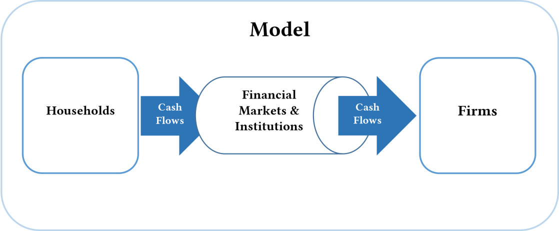
Key Ingredients in Many Financial Friction Models

- Typical firm needs external funds to finance investment
- Agency costs induce wedge between internal and external funds
- Binding collateral constraints
- Fluctuations in wedge/constraint affect investment in a big way

Challenges:

Aggregate Data

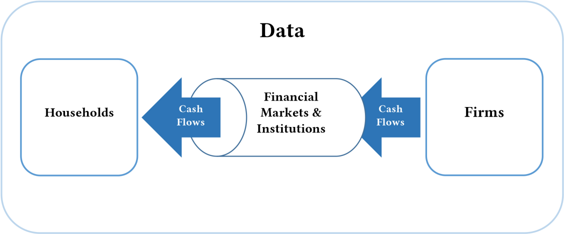
- Financial friction models working through investment channel



- Pipes get clogged

Which Way Do Funds Flow?

- Financial friction models working through investment channel



- Problem: In data, flows go other way

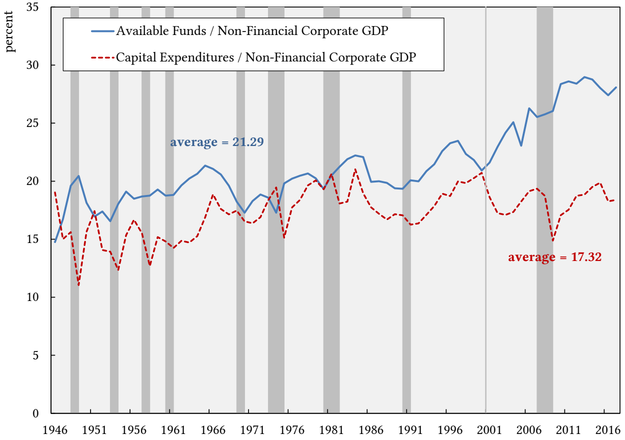
Does Typical Firm Use External Funds to Finance Investment?

- Can firms finance investment without using external funds?
- Use data from from *Flow of Funds* for all non-financial corporations
- Two series:

$$\begin{aligned} \textit{Available Funds from Current Flows} =& \textit{Revenues} - \textit{Wages} - \textit{Materials} \\ & - \textit{Interest Payments} - \textit{Taxes} \\ \textit{Gross Investment} =& \textit{Capital Expenditures} \end{aligned}$$

- Available funds do not include current *stocks* of financial assets

Available Funds and Gross Investment, US Non-Financial Corporations



Source: Flow of Funds

- Firms can finance investment without using external funds

Does Typical Firm Use External Funds to Finance Investment?

- No, for aggregate of US corporations
  - In aggregate, firms have funds from current operations to finance investment
- Punchline: Even in deep recessions, if firms cut back on dividends and stopped accumulating financial assets they can comfortably pay for investment

- In models, internal rate of return $\gg$ external cost of capital
- Firms desperate for external financing to invest in profitable projects
- Firms jealously guard internal funds
- Managers of firms with profitable projects never pay dividends, never accumulate financial assets: $d_{i,t} = 0$ for all constrained firms i

What Does the Data Look Like?

- Managers have excess funds from operations to pay dividends, accumulate financial assets
- In the aggregate firms do not seem to be constrained

Challenges:

Disaggregated Data

Do Disaggregated Data Show Different Pattern?

- Begin by analyzing investment and available funds across size classes
- Use data from corporate income tax returns
- Data available by asset size classes
  - Can each size finance investment internally?

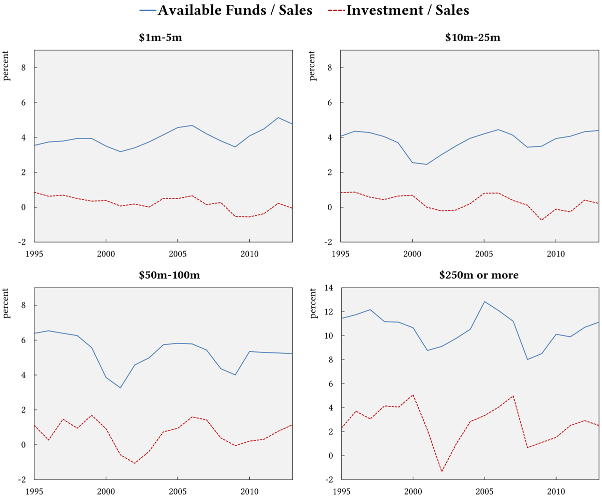
$$(Available\ Funds)_{i,t} > (Investment)_{i,t}$$

  - Or, do some sizes need to obtain funds from other sizes?

$$(Available\ Funds)_{i,t} < (Investment)_{i,t}\,, \qquad for\ some\ i$$

- Do funds flow across size classes?

Available Funds and Gross Investment by Asset Class



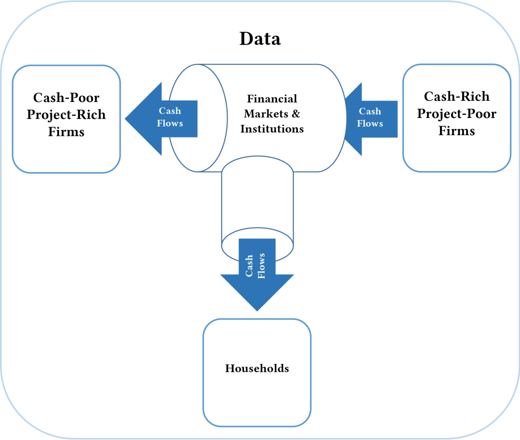
Source: Statistics of Income

- Funds do not flow across size classes

Is There Hope for Models with Financial Frictions?

Yes, There Is Some!

Financial Flows across Firms



- How important is this channel?

Funds Flow across Firms

- How much would investment fall if no firm can invest more than available funds?
- Use data from *COMPUSTAT*
- Compute available funds for each firm, each time period
- AF_{it} = Available funds for firm i in period t
- I_{it} = Gross investment by firm i in period t

Available Funds and Investment

- Use of external funds to finance investment

$$EF = \frac{1}{T} \sum_{t=1}^{T} \frac{\sum_i \left[(I_{it} - AF_{it}) \mid I_{it} > AF_{it} \right]}{\sum_i I_{it}}$$

- How much investment falls if firms lose access to external funds

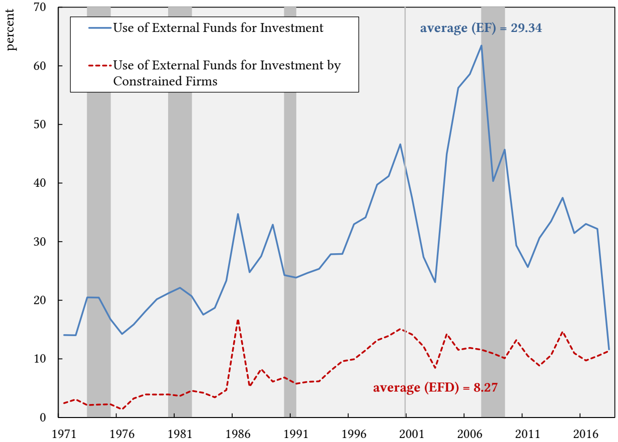
$$EFD = \frac{1}{T} \sum_{t=1}^{T} \frac{\sum_i \left[(I_{it} - AF_{it}) \mid I_{it} > AF_{it}, d_{it} = 0 \right]}{\sum_i I_{it}}$$

- How much investment falls if non-dividend-paying firms lose access to external funds
- In models, prototypical firm that uses external funds pays zero dividends

Available Funds and Investment

- If all firms lose access to external funds, investment falls by 29.34%
- If "constrained" firms lose access to external funds, investment falls by 8.27%
- This is exceptionally extreme exercise

Fraction of Investment Financed Externally



Source: COMPUSTAT

- Individual firms do use external funds to some extent
- "Constrained" firms account for a small fraction of investment

aggregate

Does Typical Firm Use External Funds to Finance Investment?

- No, for aggregate of US corporations
- In disaggregated data
  - Publicly held firms: 71–92% of investment financed internally
  - Privately held firms (Amadeus): only 10% of investment financed internally
- Reallocation channel promising for privately held firms
- Needs models with heterogeneous firms

How Might Financial Frictions Work?

- Financial frictions affect privately held firms
  - Changing dividends affect consumption of owners
  - Note, if individual publicly owned firm changes dividends, consumption of owners unaffected
- Need large firms to be affected indirectly: Spillovers?
- See Shourideh & Zetlin-Jones for best effort to date
- Input-output structure, working capital also possibilities worth exploring

Can Signaling Models Save the Day?

- Managers may be reluctant to cut dividends for fear of sending adverse signals
- Problem 1: In data, much of the gap between available funds and investment consists of accumulation of financial assets. No signaling issue here
- Problem 2: Behavior documented here is about responses to *aggregate shocks*, not idiosyncratic shocks. Signaling less plausible with aggregate shocks
- Usual response: Don't take constraints too seriously. Metaphor for some other story

Key Assumptions that Give Models Quantitative Bite

- Entire capital stock has to be refinanced every period
- Think of a firm that does not plan to access financial markets for investment
  - Why should it care about financial markets?
- If only investment has to be externally financed, quantitative effects likely minor

Credit Spreads and Wedges

- Are credit spreads in the data informative about wedges in the model?
- In model, wedges are gaps between firms' internal rate of return and rate at which households are willing to provide funds
- In data, households and mutual funds hold most of the debt and make portfolio decisions
- Usual finance model says credit spread due to default risk
- What's the connection between default risk and firms' internal rate of return?

Are Banks Special?

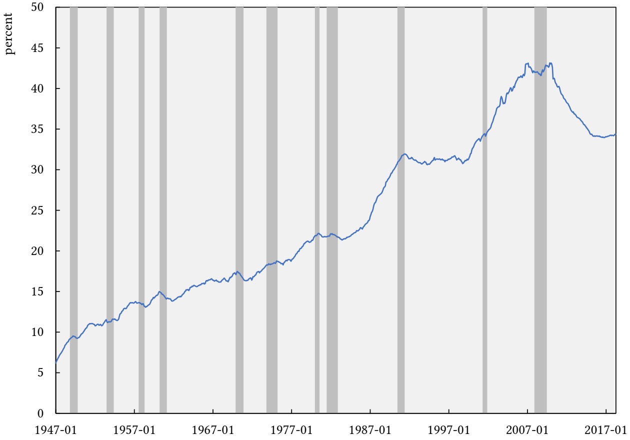
Are Banks Special?

- Banks have lots of short-term debt
- More so than pension funds, mutual funds, insurance companies
- Diamond-Dybvig: Technology differences for short- and long-run projects, liquidity shocks
- Popular story: Incentive problems in managing financial assets can change risk easily. Need short-term debt to discipline managers

What Do Bank Do in the Data?

- Mainly in the land trading business
- Do we really need overnight paper to fund 30-year mortgages?
- Seems like a crazy financial system

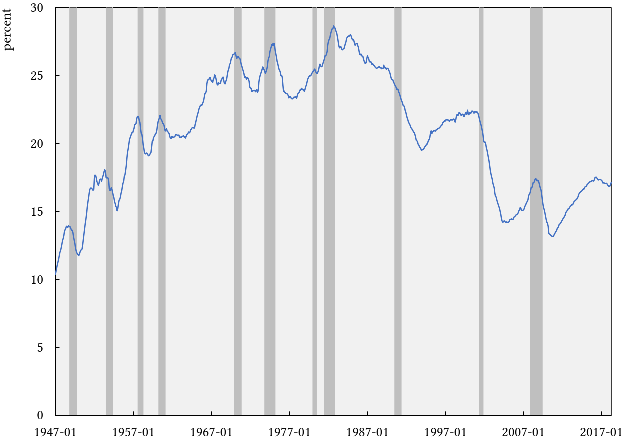
Mortgage and Agency- and GSE-Backed Securities to Bank Credit



Source: Flow of Funds

- Main assets of banks are mortgages

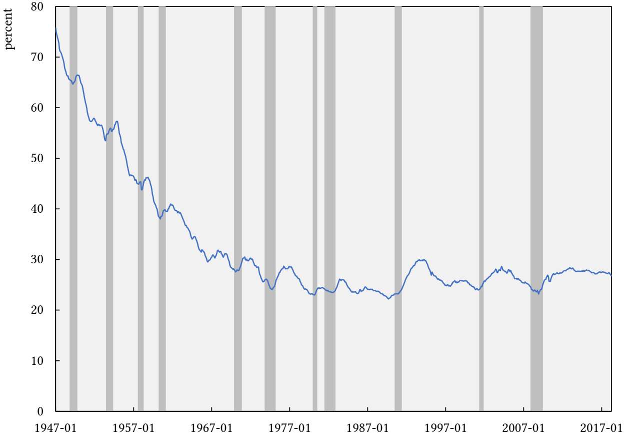
Bank Loans N.E.C to Bank Credit



Source: Flow of Funds

- Loans to businesses is small

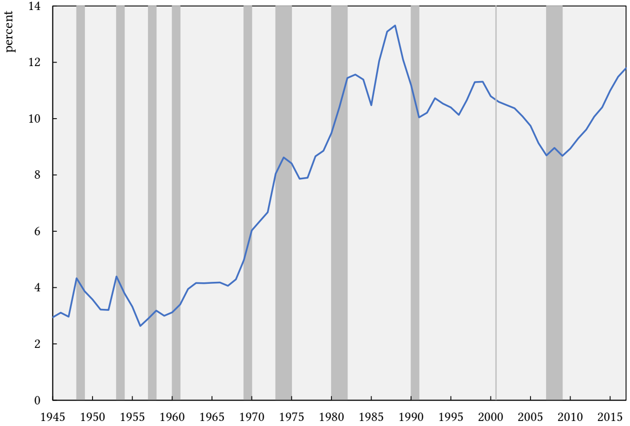
Securities to Bank Credit



Source: Flow of Funds

- Banks don't hold much by way of securities

Mortgages and MBS Held by Bank-Like Entities to Total Mortgages



Source: Flow of Funds

- Entities other than banks hold most mortgages

Summing Up

- Great deal of progress in developing models of financial frictions
- Move toward quantitative models deserve *tons of applause*
- Financial factors and frictions undenyably important
- Spillovers, input-output structures, working capital channels worth pursuing

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- Frictions in existing models still look like metaphors for unmodeled stories
- When metaphors conflict so much with data

Summing Up

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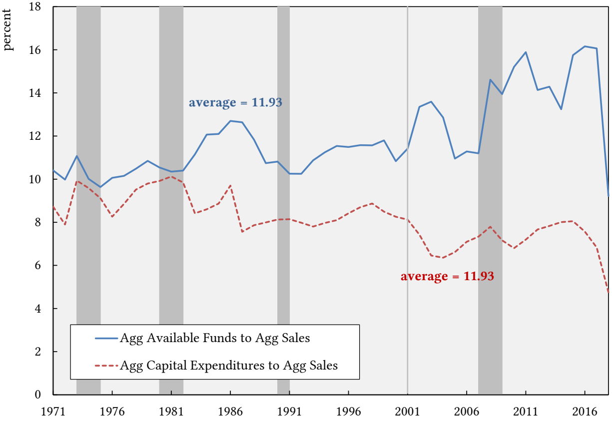
- Financial factors and frictions undenyably important
- Spillovers, input-output structures, working capital channels worth pursuing
- Frictions in existing models still look like metaphors for unmodeled stories
- When metaphors conflict so much with data
  - Time to model the unmodeled stories or change horses

Appendix

Available Funds and Capital Expenditures



Source: COMPUSTAT

- In the aggregate, COMPUSTAT firm can finance investment internally

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