

# Macroeconomic Models with Financial Frictions

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# Motivation I

- Traditional dynamic equilibrium macro models embody variations of a **Modigliani-Miller** environment.
- For example, in the standard RBC and New Keynesian models (**Smets-Wouters/Christiano-Eichebaum, and Evans**):
  - ① Firms' ownership structure is irrelevant.
  - ② Firms' capital structure is irrelevant.
  - ③ Financial institutions are irrelevant (no need to intermediate, to undertake maturity transformation, or to create information insensitive securities).
  - ④ Complete asset markets for households and firms.
  - ⑤ Money is introduced in a *ad hoc* way through Money-in-Utility or Cash-in-Advance.

## Motivation II

- Hence, in this type of models, allocations of funds are efficient (or, perhaps, constrained-efficient).
- Main consequences:
  - ① Wealth distribution is irrelevant.
  - ② Hard to use to interpret much of the empirical evidence.
  - ③ Hard to think about many issues in asset pricing, such as spreads among internal and external finance.
  - ④ There is little room to think about finance-related policy.

# Savers and Investors I

- However, there is a fundamental issue in real life: savers and investors are different agents and they need to meet and trade.
- Differences in:
  - ① Discount factors (deterministic or stochastic).
  - ② Risk aversion.
  - ③ Intertemporal substitution.
  - ④ Technology.
  - ⑤ Location.
  - ⑥ Expectations.

# Savers and Investors II

- Issues of:
  - ① Asymmetric information (moral hazard, adverse selection,...).
  - ② Lack of commitment (partial pledgability).
  - ③ Nominal versus real contracting  $\Rightarrow$  zero lower bound of nominal interest rates.
  - ④ Limited liability.
  - ⑤ Limited markets (for instance, only uncontingent debt).
- Key idea: wealth distribution matters!

# A Phantom Menace

- This lack of understanding of the consequences of the problem of matching savers and investors was a nagging worry for macroeconomists:
  - ① They suspected they were missing important mechanisms.
  - ② Numerous banking and financial crisis.
  - ③ Experience of the Great Depression
- Classics deal with many of these issues:
  - ① Fisher (1933).
  - ② Keynes (1936).
  - ③ Minsky (1957).
  - ④ Friedman and Schwartz (1963).
  - ⑤ Kindelberger (1978).

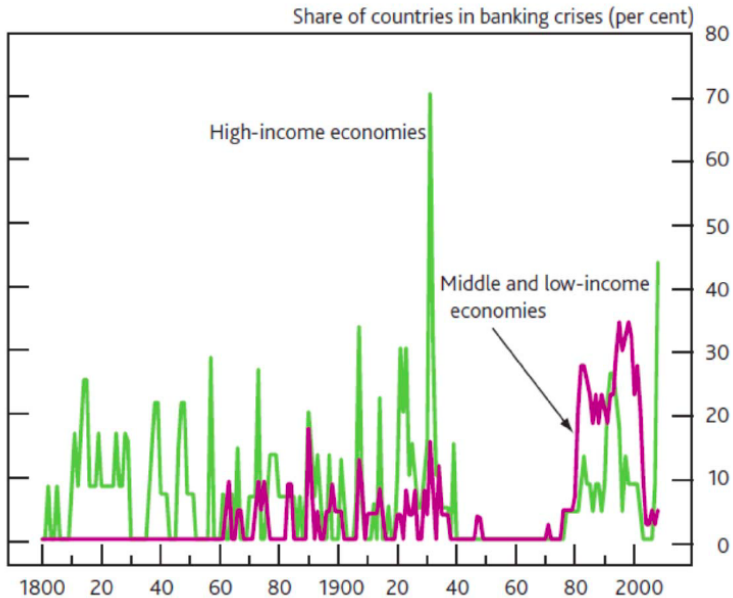
## A Renewed Challenge

- However, relatively little progress was made using modern economic theory (except in international finance and in banking!)
- After the Great Recession of 2007-2011, there is no excuse not to analyze the interactions between the macroeconomy and the financial markets in much more detail.
- A lot of recent work.
- Unfortunately, our understanding is still limited.

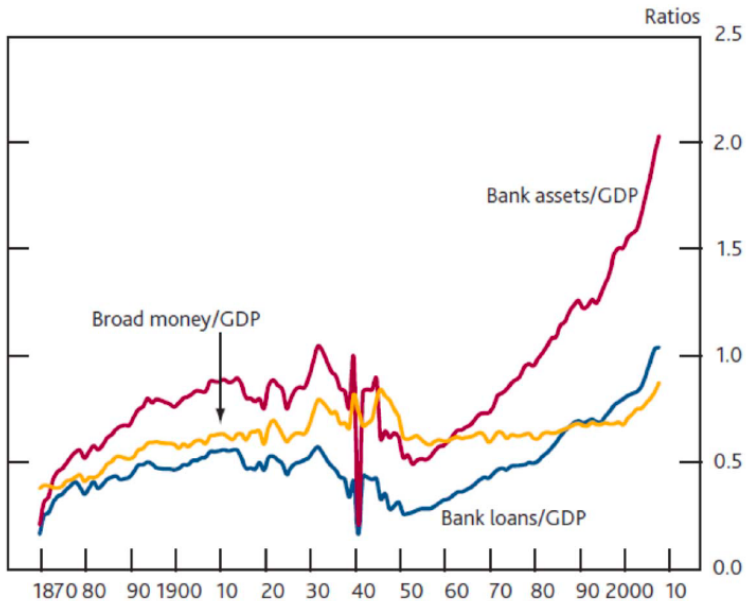
# Empirical Evidence

- Let us take a quick look at the data.
- Unconditional.
- Conditiona:
  - ① Simple conditioning.
  - ② More sophisticated conditioning.





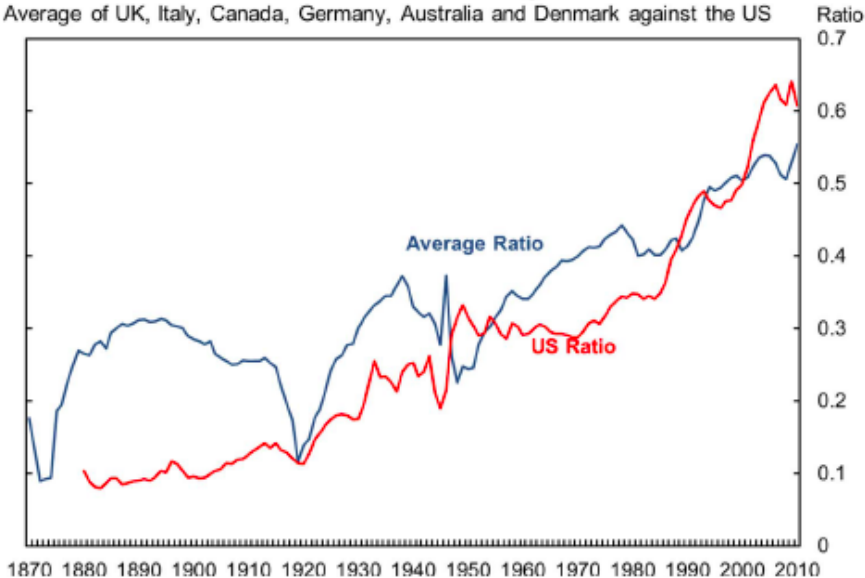
Source: Qian, Reinhart and Rogoff (2010).



Source: Schularick and Taylor (2009).

# Ratio of Real Estate to Total Lending

Average of UK, Italy, Canada, Germany, Australia and Denmark against the US



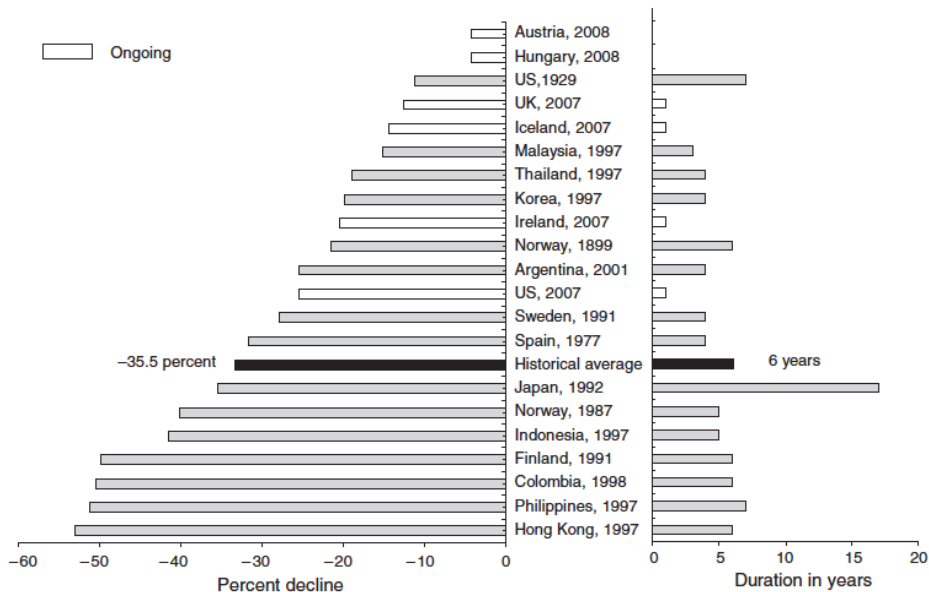


FIGURE 1. PAST AND ONGOING REAL HOUSE PRICE CYCLES AND BANKING CRISES: PEAK-TO-TROUGH PRICE DECLINES (*left panel*) AND YEARS DURATION OF DOWNTURN (*right panel*)

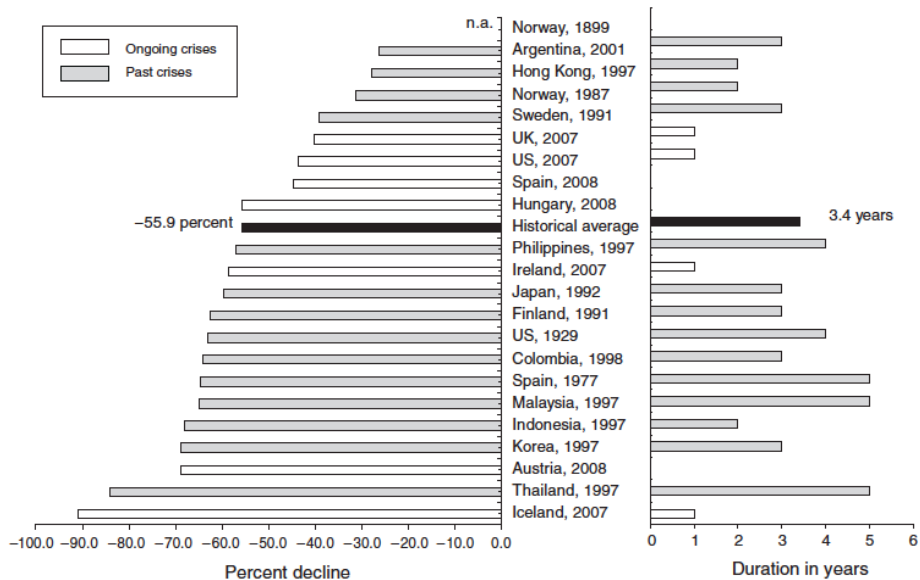


FIGURE 2. PAST AND ONGOING REAL EQUITY PRICE CYCLES AND BANKING CRISES: PEAK-TO-TRough PRICE DECLINES (*left panel*) AND YEARS DURATION OF DOWNTURN (*right panel*)

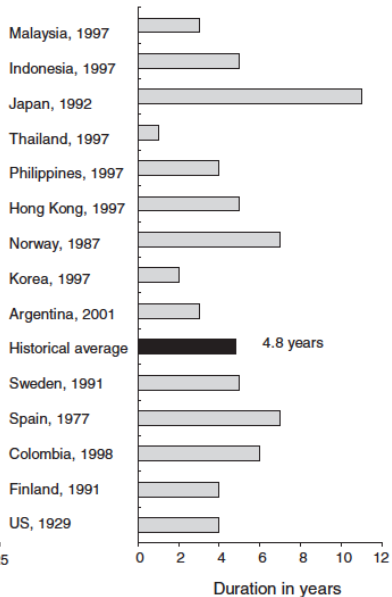
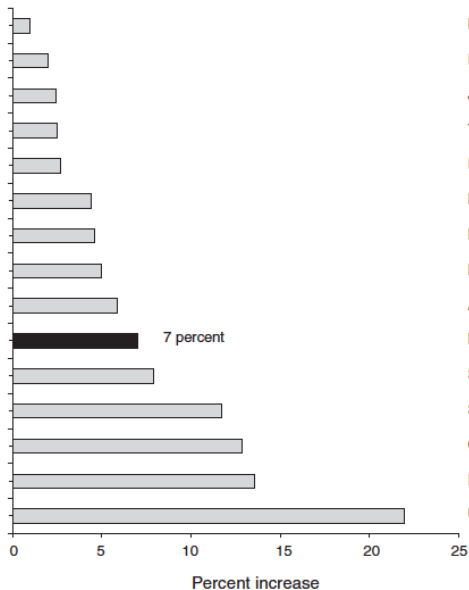


FIGURE 3. PAST UNEMPLOYMENT CYCLES AND BANKING CRISES: TROUGH-TO-PEAK  
 PERCENT INCREASE IN THE UNEMPLOYMENT RATE (*left panel*) AND YEARS DURATION OF DOWNTURN (*right panel*)

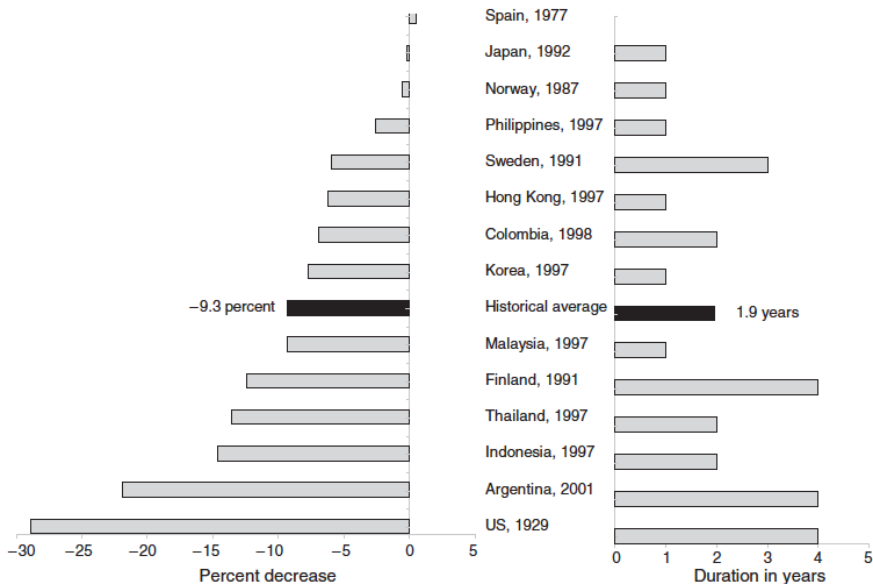


FIGURE 4. PAST REAL PER CAPITA GDP CYCLES AND BANKING CRISES:  
PEAK-TO-TROUGH DECLINE IN REAL GDP (*left panel*) AND YEARS DURATION OF DOWNTURN (*right panel*)

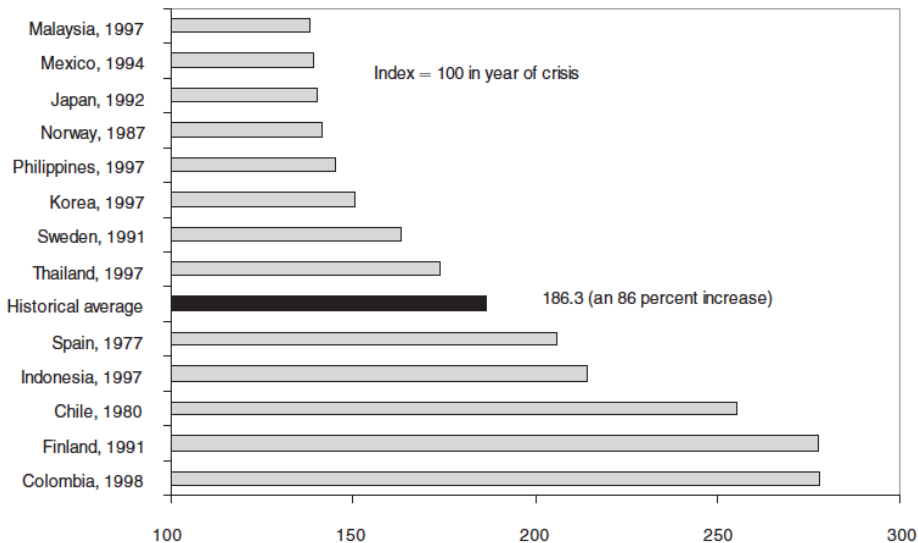
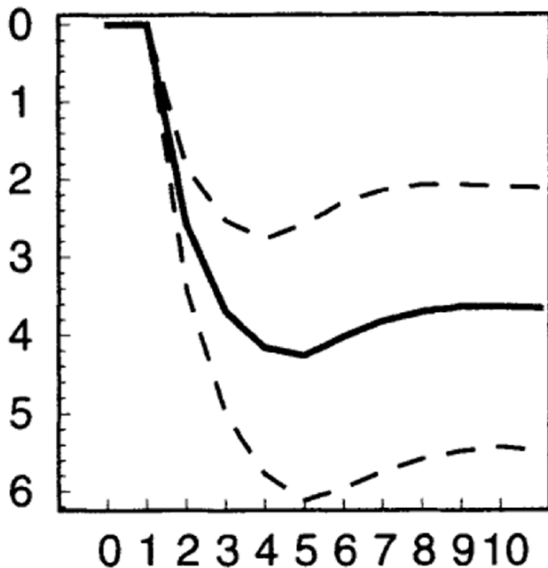


FIGURE 5. CUMULATIVE INCREASE IN REAL PUBLIC DEBT IN THE THREE YEARS FOLLOWING THE BANKING CRISIS

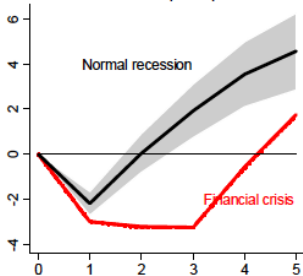


## Cerra and Saxean (2008) Banking Crises

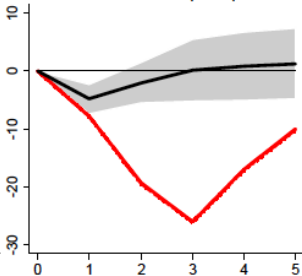


1870-2008

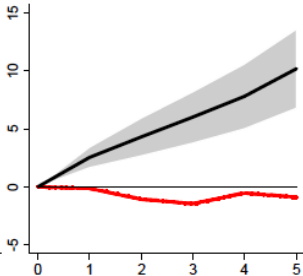
Real GDP per capita



Real Investment per capita

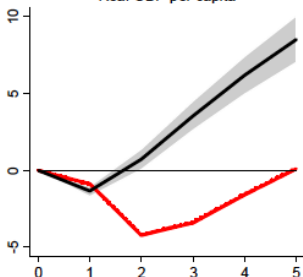


CPI Prices

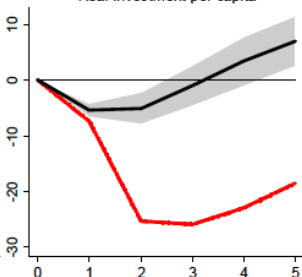


1946-2008

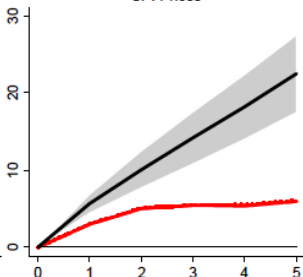
Real GDP per capita



Real Investment per capita

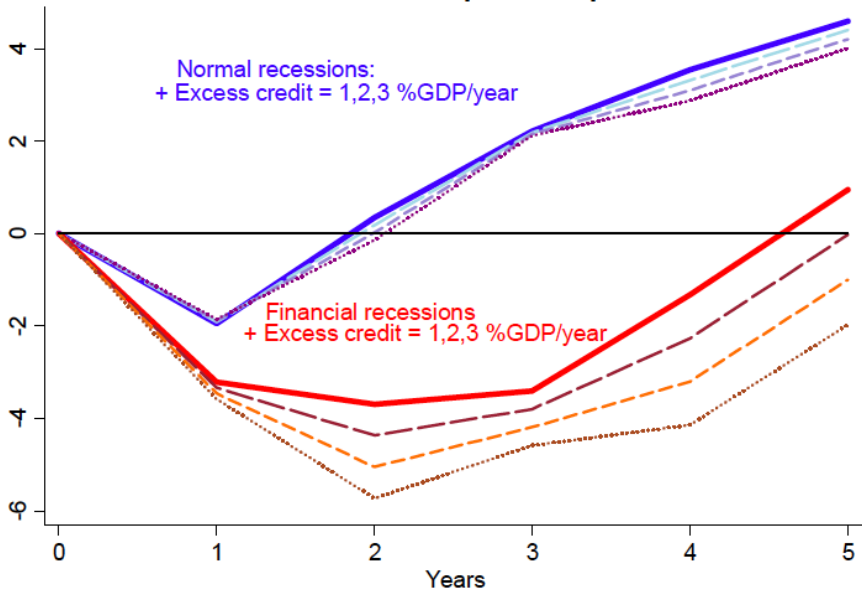


CPI Prices



# Real GDP per capita

Percent



## Potential Issues: Positive

- Bubbles.
- Effects at impact of shocks.
- Persistence of shocks.
- Non-linear amplification mechanisms.
- Fire sales.
- Feedback loops.
- Endogenous risk.
- Liquidity (technological, market, and financing).
- Role for money, public debt, and inflation.

## Potential Issues: Normative

- Monetary policy: conventional and unconventional.
- Fiscal policy: interrelations with monetary policy, role with financial frictions.
- International capital movements.
- Systemic regulator.
- Financial supervision (pecuniary externalities).
- Financial innovation.

# An Analytic Framework

- How can we analyze formally some of these issues?:
  - ① Illustrate how we can incorporate financial frictions in standard macro models.
  - ② Think about limitations of current approaches.
- We want a model:
  - ① With financial markets.
  - ② Where the Modigliani-Miller theorem does not hold.
  - ③ Where we have mechanisms that resemble some of the channels emphasized by observers of the recent market turbulences.
  - ④ Where we can perform quantitative analysis.

# Strategies

- Several approaches:
  - ① Models of constraints on borrowing:
    - ① Collateral constraints.
    - ② Costly state verification.
    - ③ Costly enforcement model.
  - ② Models of financial intermediation.
  - ③ Models of leverage cycles.
  - ④ OLG Models.
- Because of time constraints, I will focus on 1. and 2. Why?
  - ① Historical reasons.
  - ② Foundation of more recent models.

## Things We Will Not Discuss (in Detail)

- ① Money and financial markets.
- ② Zero lower bound.
- ③ Asset pricing.
- ④ Corporate finance and macro
- ⑤ Bubbles.
- ⑥ Non-standard preferences.
- ⑦ International macro.
- ⑧ Political economy.
- ⑨ Optimal policy.



# Andrew Wiles

## On Doing Research

Perhaps I can best describe my experience of doing mathematics in terms of a journey through a dark unexplored mansion. You enter the first room of the mansion and it's completely dark. You stumble around bumping into the furniture, but gradually you learn where each piece of furniture is. Finally, after six months or so, you find the light switch, you turn it on, and suddenly it's all illuminated. You can see exactly where you were. Then you move into the next room and spend another six months in the dark. So each of these breakthroughs, while sometimes they're momentary, sometimes over a period of a day or two, they are the culmination of—and couldn't exist without—the many months of stumbling around in the dark that proceed them.

## Road Ahead

- Integrating macro with finance is one of the great challenges ahead of us.
- While there has been some progress, we are still exploring the first rooms of the mansion.
- We will discuss in this class the introduction of financial frictions.
- But this should be only a first step...