

# FINANCIAL SECTOR IN MACROECONOMIC MODELS

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# WHAT'S THERE IN THE CURRENT LITERATURE? (1)

## FINANCIAL CONSTRAINTS TIED DOWN TO NET WORTH

- ❖ CSV setting, past cash-flows drive current wealth  $\uparrow \rightarrow$  net worth  $\uparrow \rightarrow$  outside financing  $\uparrow \rightarrow$  investment  $\uparrow$ : Bernanke-Gertler 1989, Bernanke-Gertler-Gilchrist 1999, Holmstrom-Tirole 1997, ... etc
- ❖ TFP causes collateral prices  $\uparrow \rightarrow$  net worth  $\uparrow \rightarrow$  outside (debt) financing  $\uparrow \rightarrow$  investment  $\uparrow$ : Kiyotaki-Moore (1997), ....., etc
- ❖ Cash-flows or TFP causes net worth  $\uparrow \rightarrow$  risk bearing capacity  $\uparrow$  better form of outside financing (more outside equity)  $\rightarrow$  investment  $\uparrow$ : He-Krishnamurthy 2013, Brunnermeier-Sannikov 2014, ...

## SOME OTHER RECENT ATTEMPTS

- ❖ Adrian-Boyarchenko (VaR constraint, 2013), Moreira-Savov (private money creation, 2014)

# WHAT'S THERE IN THE CURRENT LITERATURE? (2)

## AMPLIFICATION OF FUNDAMENTAL SHOCKS

- ❖ Macro tradition: log-linear in steady state, then considering shocks; amplifying if constraint is binding;
- ❖ Finance literature puts risk at top priority. Typically study fully solved global solution; constraint is occasionally binding, boom (small amplification) vs crisis (large amplification)

## TRY TO EMPHASIZE FINANCIAL SECTOR

- ❖ Say, commercial banks, interbank market (Kiyotaki-Gertler 2010)
- ❖ He-Krishnamurthy-Brunnermeier-Sannikov is more like hedge funds or proprietary trading desk in banks
- ❖ Mutual funds is a big finance area but not that into macro research yet

# WHAT'S MISSING (1)

FOCUS ON AMPLIFICATION IN DOWNTURNS;  
UPTURNS?

- ❖ There is some risk accumulation in upturns in existing amplification models (in good time, risk bearing capacity  $\uparrow$ , more investment)
- ❖ Key: do we think “investment booms” in good time is good or bad? If bad, what is the benchmark?

RISK SHIFTING

- ❖ Casual observation: risk-shifting/overinvestment in booms, not in recession
- ❖ **Static** model will say risk-shifting occurs when net worth is low (so bad times)
- ❖ **dynamic** models, in risk-shifting in good times: Martinez-Miera and Suarez (2013), also with net worth but inefficient risky investment opportunities)
- ❖ Naturally, dynamic concern generates precautionary saving motive, which is in common dynamic net worth models

TRANSIT FROM UPTURN TO DOWNTURN

- ❖ Casual observation: slow recovery, but fast collapse
- ❖ Long-lived risky asset seems to be the right ingredient to get this; Cui (2014), Moreira-Savov (2014)

# WHAT'S MISSING (2)

## HETEROGENEITY IN FINANCIAL INTERMEDIARIES

- ❖ Abstract and simplification, so far homogeneous intermediary
- ❖ “Model is map, not picture,” Boston airport, Nobu Kiyotaki
- ❖ But heterogeneity in intermediary sector is too significant to ignore
  - ❖ Mutual funds no leverage, hedge fund highly levered;
  - ❖ Hedge funds more liquid assets, commercial banks highly illiquid assets;
  - ❖ Hedge funds have procyclical leverage, commercial banks countercyclical leverage
  - ❖ Regulations are drastically different...

## INTERACT WITH BUSINESS CYCLES

- ❖ He, Khang, Krishnamurthy: during the worst time 08Q4-09Q1 before large scale government direct purchase, hedge funds selling toxic assets while commercial banks buying. Investment banks, insurance companies, mutual funds, sovereign wealth funds largely stay put

# WHAT'S MISSING (3)

## FUNDAMENTAL SHOCKS VS FINANCIAL SHOCKS

- ❖ Amplification models, by its nature, amplifies and propagates “however small” fundamental shocks
- ❖ Narrowly defined fundamental: TFP. But empirical evidence suggesting this crisis TFP barely moves (a bit debate)
- ❖ 1998 LTCM collapse. People viewed it as financial shock. Do not know what will happen if Fed didn't step in to coordinate the bailout
- ❖ 2000-01 tech bubble burst and recession. Commonly viewed as fundamental shocks, no affect on financial system
- ❖ Muir: banking crisis  $P/D$  drops a lot; in contrast, during wars  $D$  drops but  $P/D$  barely moves
- ❖ Adrian-Etula-Muir (2013): two factor asset-pricing model with market plus broker-dealer leverage works pretty well

## HOW TO MODEL FINANCIAL SHOCKS

- ❖ macro-finance literature reduced form  $\theta$  shock (debt equals  $\theta K$ )
- ❖ Adrian-Boyarchenko 2013: households preference shock drive leverage
- ❖ What is financial shock?

# WHAT'S MISSING (4)

## REAL SIDE FIRMS

- ❖ Firms and banks are combined together in He-Krishnamurthy-Brunnermeier-Sannikov and lots of others

## BANKS ARE NOT LIKE BANKS

- ❖ Doug Diamond's complaint to leading macro-finance DSGE models
- ❖ Often, within the model, the bank is as if another financial institution
- ❖ Regulation is studied without micro-foundation

## LONG-TERM LOAN IS IMPORTANT IN DIFFERENTIATING FIRMS AND BANKS

- ❖ Long-term loan is an important ingredient, but often ignored
  - ❖ Banks/entrepreneurs were assumed to hold equity of firm
- ❖ Why modelling long-term loans could be interesting?
  - ❖ Long-term assets sitting on the balance sheet of banks
  - ❖ Concave payoff, larger slope after a streak of negative shocks

# WHAT'S MISSING (5)

## DEFAULT

- ❖ No default in leading models. Default introduce heterogeneity necessarily
- ❖ Actual default not that important in my mind, systemically important banks do not default anyway
- ❖ The effect of potential default (say potential bail out) might be important