

Remarks

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Firm-financial frictions and macro: an analogy

- Widespread agreement that 'aggregate demand' and monetary policy matter for aggregate economic fluctuations.
- Pre-financial crisis DSGE models focused on nominal rigidities (prices and wages) as the key frictions.
- The key mechanism in those models:
 - ▶ Monetary policy affects interest rates.
 - ▶ Intertemporal substitution by households in frictionless credit markets leads to variations in the demand for consumption (and therefore investment).

Moving beyond inter-temporal substitution

- New data sources, increased capacity to solve more 'realistic' models (Adam Guren discussion)
- Fact 1: Households are heterogeneous and a lot of them are liquidity-constrained.
- Fact 2: Interactions of mortgage markets / large durable good purchases with liquidity-constrained households (DeFusco discussion).
 - ▶ Refinancing channel
 - ▶ Other covenants on mortgages (interest to income, LTV).
 - ▶ Frictions in auto loan markets.
- Fact 3: Disturbances to financial sector have important effects on supply of loans to consumers.

Credibility and the new generation of macro models

- New macro models are incorporating heterogeneity, financial frictions in ways that respect that evidence.
- When we put those frictions in business cycle models, they play a **large quantitative role**
 - ▶ examples: HANK models, Wong (2019), Berger et. al. (2021), Kaplan et. al. (2020).
- They change our minds about **important macro policy issues**
 - ▶ Classic example: efficacy of debt-financed fiscal policy.
- Simple DSGE models are still useful for many purposes but we're moving to richer models with more solid micro foundations.

What about firm-balance sheets and macro?

- We're at an **earlier stage** when it comes to integrating firm-centric financial frictions into macro models.
- Classic literature: firm balance-sheet channel of monetary policy
 - ▶ Bernanke and Gertler (1989), BGG (1999), Kiyotaki and Moore (1997) and Gertler and Kiyotaki (2010).
- Asset values and net worth play a key role in propagating, amplifying shocks.
- Assets must be used as collateral for borrowing or because value of net worth reflects probability of default
 - ▶ external-finance premium.

Main robust prediction of these models

- Firms' borrowing constraints are linked to liquidation value of physical assets.
- Movements in net worth/collateral values can heavily influence borrowing and investment dynamics.
- In principle, net worth channel held promise of a powerful propagation mechanism.
 - ▶ Fire sales of **real** assets, **endogenous** tightening of collateral constraints.

Shortcoming of these models

- Shocks to collateral constraints have important effects in models.
- But the net worth channel doesn't have large propagation effects.
- Kotcherlakota roughly 20 years ago.
- You can get these models to work (see Christiano, Motto and Rostango, 2014)
 - ▶ But you need very specific shocks to interact with financial frictions, e.g. risk shocks.

Different tradition

- Literature modeling heterogeneity along multiple dimensions to study how these affect firm dynamics.
- Early contributions focused on age of firms:
 - ▶ Cooley and Quadrini (2001), Gomes (2001b), Cooper and Haltiwanger (2006), Khan and Thomas (2013), Khan, Senga and Thomas (2016).
- Incorporate financial constraints into standard firm dynamic model with decreasing returns to scale technology

Different tradition...

- In these models age is important.
- Younger firms have higher growth prospects and/or risk
 - ▶ So they're more financially constrained.
 - ▶ Change their borrowing and investment more significantly following a shock.
- Firms typically start with debt-financed investment.
 - ▶ As they approach their efficient level, they invest less, tend to pay off their debts.
- Key prediction: **leverage** is important and decreases with age.

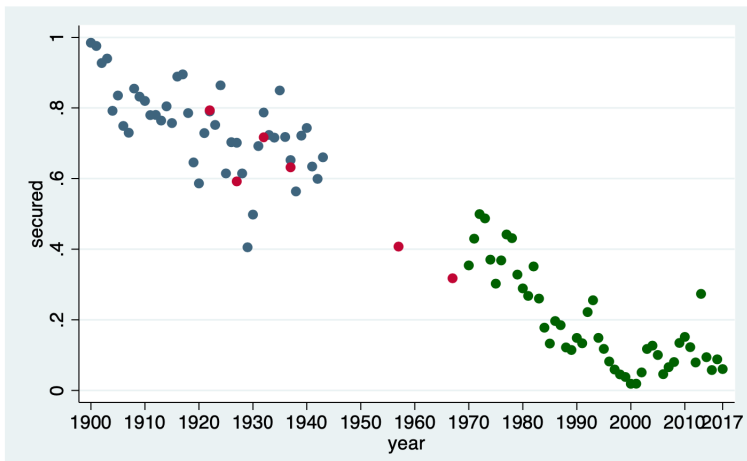
Exciting new empirical literature

- Uses large micro data sets, leverages insights from corporate finance.
- Documents how firm characteristics, including balance sheets, affect impact of monetary policy on firms.
- This literature will lead to **fundamental changes** in how we model financial frictions in macro models.
- Key lesson: **covenants matter** (Chodrow-Reich's discussion)
 - ▶ Those covenants are different across small and large firms
 - ▶ Quantitative macro models need to incorporate empirically realistic versions of those covenants.

Some time-series evidence

- Benmelech Kumar and Rajan (2020): issuance of secured debt by U.S. corporations declined dramatically over the twentieth century.
- Almost all debt issued in the early years was backed by collateral.
 - ▶ Secured bonds accounted for 98.5% of total bond issuance in 1900.
 - ▶ In early 2000s, secured bond issuances were below 5% of total bonds issued.
- Secured debt as a fraction of overall corporate debt (including bank loans) outstanding has also declined.

Figure 7: Secured debt as a fraction of total debt issuance, 1900-2017



Ling and Ma (2020): detailed micro evidence

- For US non-financial firms,
 - ▶ 20% of debt by value is based on easy-to-value physical assets
 - ▶ 80% is based predominantly on cash flows from firms' operations.
- More plausible to model borrowing-constraints on medium and large firms as restricting total debt as a function of cash flows measured using operating earnings.
 - ▶ Firms are less vulnerable to collateral damage from asset price declines,
 - ▶ Fire sales in physical assets aren't an important source of amplification / propagation.

More on differences between different types of firms

- Important differences between small and larger firms (Chodrow-Reich and Fallato (2021))
- Cloyne et. al. (2020): after a monetary policy tightening.
- Borrowing only declines for the younger/non- dividends group.
 - ▶ There's a sizable fall in net worth and a rise in interest payments for all groups of firms.
 - ▶ Borrowing of young/no-dividends firms is highly correlated with collateral values but is far less correlated with earnings.
 - ▶ Borrowing of older dividend payers is mostly earnings-based.

Cloyne et. al.

- Interpret their findings as indicating that the capital expenditure of younger non-dividend payers is constrained by their asset values and/or net worth.
- As monetary policy changes affect asset prices, this magnifies the investment response.
- Older companies, rely on a more diverse set of funding sources and their investment decisions are, therefore, less vulnerable to fluctuations in asset prices.
- Chodrow-Reich and Fallato (2021): very interesting analysis of differences between small and large firms yesterday.

Cloyne et. al.

- Younger firms paying no dividends account for over 75% of the response of aggregate investment to a monetary policy shock.
- They view their results as
 - ▶ Supportive of first-generation financial friction models, certainly for young firms
 - ▶ Challenge to theories stressing importance of leverage.
- Do we need to reconcile with Yueran and Ma (2020)
 - ▶ Equilibrium interaction of small and large firms.

A different cut of the data: Ottonello and Winberry (2020)

- Look at monetary transmission mechanism using quarterly Compustat data.
- Argue that firms with low default risk – those with low debt burdens and high “distance to default” – are the most responsive to monetary shocks.
- Interpret these findings using a heterogeneous firm NKmodel with default risk.
- Low-risk firms are more responsive to monetary shocks because they face a flatter marginal cost curve for financing investment.
- Very interesting paper but important to note that financial frictions in their model don't generate large macro effects.

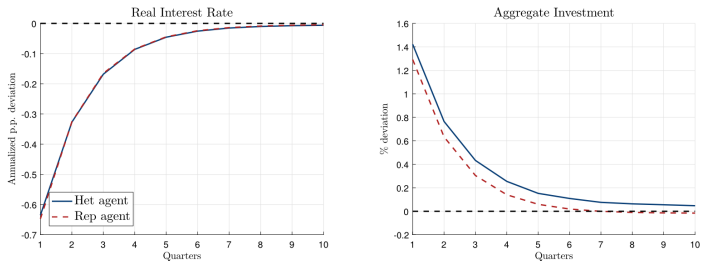


FIGURE 8.—Aggregate impulse responses in full model vs. rep firm model. Notes: “Het agent” refers to calibrated heterogeneous firm model from the main text. “Rep agent” refers to a version of the model in which the heterogeneous production sector is replaced by a representative firm with the same production function and no financial frictions.

Lessons for macro

- Mainstream macro models focus on first generation of financial frictions: liquidation value of physical assets.
- Very hard to come away from the new empirical literature thinking this is a big issue for most firms.
- Banks never lent against $E_t p_{t+1} k_{t+1}$. If anything growth of organizational K makes this channel less plausible.

Lessons for macro

- New generation of models build on new micro evidence about the nature of covenants and paying attention to institutional reality.
- Example: Greenwald (2020), Liang and Ma (2020), Dreschel (2020), Ivashina, Laeven, and Moral-Benito (2020).
- Someone (me?) needs to put Chodrow-Reich and Fallato (2021) in a DSGE model.