Household Heterogeneity and Optimal Mortgage Regulation[1]

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[1] The views expressed here are our own and do not necessarily represent those of the International Monetary Fund, the Federal Reserve Board or anyone in the Federal Reserve System.

Motivation

- Loan-to-Value and Debt Service to Income (DSTI) ratios have attracted lots of attention in the post-GFC era to promote stability and improve welfare
- Notable differences between DSTI and LTV ratios
  - DSTI are tailored to individual characteristics, namely income
  - In the US data (Greenwald, 2018)...
    - LTV limits: equally binding before and after the GFC,
    - DSTI limits: (i) no evidence of clear limit before GFC, (ii) clear limit at $\sim$45% after GFC
- We study the optimal choice of DSTIs and the role of income heterogeneity

Why does heterogeneity matter?

- Binding borrowing constraints generate pecuniary externalities that justify policy intervention (e.g. Bianchi 2010; Bianchi and Mendoza 2018), and
  - ...their strength depends on borrowers' consumption, which in turn depends on income among other variables
- Since income varies across households, then the contribution to the pecuniary externality, justifying the policy intervention, also differs
- It is not straightforward that high income households should be subject to tighter regulatory limits compared to low income households

Research questions and framework for analysis

Research questions

- Effect of household heterogeneity on optimal mortgage regulation
- Subtle point: Show how inequality directly affects the policy objective rather than show only the effect of policy on the wealth distribution:

$$\textbf{Macroprudential regulation} \Longleftrightarrow \textbf{Inequality}$$

Not simply: Macroprudential regulation $\Longrightarrow$ Inequality

Framework for analysis

- Economy with **heterogeneous borrowers** and (representative) lenders
- Mortgage borrowing: long-term, possibility of default
- Borrowing constraint in terms of LTV limits

Preview of results

- Identify two distinct externalities justifying mortgage regulation
  - Pecuniary externality operating via the **price on housing**
  - Pecuniary externality operating via the **cost of borrowing**
- Main contribution: Derive optimal **borrower-specific regulation**
  - Heterogeneity implies that the externalities on house prices from one type depend on the externalities imposed by the other type
  - This may sound as a trivial result but counter-intuitively...
- High-income households should be imposed tighter regulation than low income household as they impose stronger externalities on house prices

Related literature

- Literature studying **housing-mortgages-macroeconomy** linkages
  - **Greenwald (2020)**, Diamond and Landvoigt (2019), Ferrante (2019), Elenev et al. (2016) among others
- Literature studying **optimal macroprudential policy** to tackle externalities
  - **Bianchi and Mendoza (2018)**, Davila and Korinek (2018), Stein (2012), Bianchi (2011), Jeanne and Korinek (2010) among others

Agents and choices

- Two types of infinitely-lived agents: Households and Financiers
- Households
  - **High** income and **Low** income
  - Consume consumption goods and housing, invest in home improvements, and borrow in long-term, defaultable, mortgages
- Financiers
  - Risk-neutral agents with “deep pockets:” invest in risk-free assets and risky MBS, which are pass-through vehicles aggregating mortgages to borrowers

Descriptive household's problem

Maximize utility from consumption of goods and housing services, subject to

- Budget constraint: Re-balance mortgage portfolio and holding of houses, borrow for home improvements, and choose current consumption
- Default decision: Optimally choose to default or not
- LTV constraint: Total borrowing cannot exceed a percentage of the value of housing pledged as collateral
- No DSTI constraint: That would be part of optimal regulation

Externalities not internalized by the private households

There are two externalities in the framework justifying policy intervention

1. Private agents ignore how their decisions affect house prices
   - Higher borrowing capacity supports house prices
   - Macroprudential concern: Higher borrowing today puts pressures on house prices tomorrow when constraint bind
   - Heterogeneity plays an important role (next slide)
2. Private agents ignore how their decisions affect the cost of borrowing
   - The effect of heterogeneity on this externality depends on the expected default, which cannot be assessed analytically

The optimal mortgage regulation—Pigouvian tax or DSTI limit—addresses these two externalities

Macroprudential policy

- LTV constraint does not bind today but may bind tomorrow
- If there is no default, we show analytically that
  - High-income households have more potent house price externality $\rightarrow$ tighter regulation
  - High-income households will need to cut consumption more when constraints bind $\rightarrow$ larger impact on house prices

$$\underbrace{\tau_t^{m,H} - \tau_t^{m,L}}_{\text{Pigouvian tax differential between high and low income households}} = \underbrace{\frac{\beta(R+\delta)}{U_{c,t}}}_{\text{is proportional to}} \cdot \underbrace{\left[E_t U_{c,t+1}^{L} - E_t U_{c,t+1}^{H}\right]}_{\text{the difference in expected marginal utilities between low and high income households}} > 0$$

- With default, regulation should reflect the individual effect on the cost of borrowing within the same income-type
  - Yet no direct link of the default externality across heterogeneous households

Conclusions

- Build a model that incorporates important elements of the mortgage market, but is simple enough to perform optimal policy analysis
- Derive borrower specific macroprudential regulation: Pigouvian tax or DSTI limit
- The policy tackles two distinct externalities: pecuniary and risk-taking
- Optimal to impose differential regulation to high- vs low-income households
  - Policy implication: Uniform regulation may be too strict or too lax for some
- Absent default, the differential macroprudential policy takes a very simple form and is proportional to difference in expected marginal utilities