Optimal Macroprudential Rules

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INTRODUCTION

- **Macroprudential policy** has been a response to the global financial crisis.
- One example: **dynamic capital requirements**, implemented in the Basel III framework through a countercyclical capital buffer.
- Theoretical studies of dynamic capital requirements do not have a unique policy recommendation, although **countercyclical policy** is found optimal more often.
- Welfare analysis is often conducted under simplifying assumptions. Usually, only one welfare relevant agent (household).

THIS PAPER

- **Three welfare relevant,** utility maximizing, risk averse **agents**: bankers, entrepreneurs, households.
- **Two financial frictions**: bankers' borrowing from households limited by the regulatory capital requirement, entrepreneurs' borrowing from bankers limited by the expected future value of their capital stock.
- Binding borrowing constraints result in **inefficient consumption allocation across time** for bankers and entrepreneurs.
- Competitive equilibrium features **inefficient distribution and variance of consumption** across agents.
- The **role of macroprudential policy** in the model can be to alleviate these inefficiencies.
- Macroprudential policy is modeled through **Taylor-type rules** for minimum bank capital requirements.

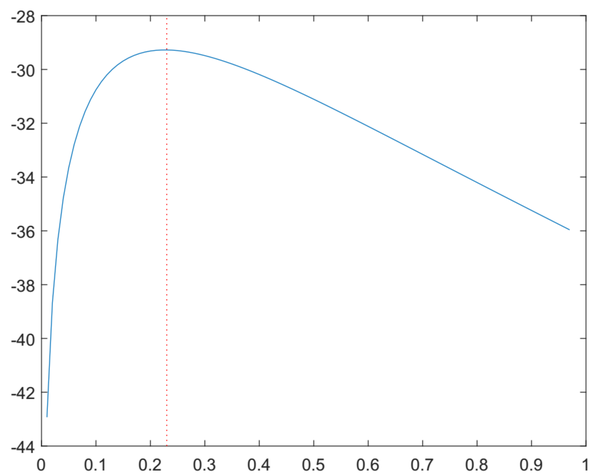
MODEL

- **Bankers** maximize $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta_b^t \ln C_t^b$ subject to $C_t^b + L_t \leq \frac{R_t^l}{1+\pi_t} L_{t-1} - \frac{R_{t-1}}{1+\pi_t} D_{t-1} + D_t$ and $L_t - D_t \geq k_t^m L_t$.
- **Entrepreneurs** maximize $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta_b^t \ln C_t^e$ subject to $C_t^e + W_t N_t + Q_t I_t + \frac{R_t^l}{1+\pi_t} L_{t-1} \leq \frac{Y_t^w}{X_t} + L_t$ and $\mathbb{E}_t\{R_{t+1}^l L_t\} \leq \mathbb{E}_t\{m_t Q_{t+1}(1+\pi_{t+1}) K_t\}$.
- **Households** maximize $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta_h^t \left(\ln C_t^h - \frac{N_t^{1+\varphi}}{1+\varphi}\right)$ subject to $C_t^h + D_t \leq W_t N_t + \frac{R_{t-1}}{1+\pi_t} D_{t-1} + T_t$.
- **Retailers**, **final good producers**, **capital good producers**, **central bank** and **macroprudential authority** complete the model.

EFFICIENT ALLOCATION

- Let $\mathcal{W}_t \equiv \omega_b \mathcal{W}_t^b + \omega_e \mathcal{W}_t^e + \omega_h \mathcal{W}_t^h$, where $\mathcal{W}_t^i$ is a value function of agent i.
- **Social planner** maximizes $\mathcal{W}_t$ subject to resource constraints.
- One important condition is $\frac{C_t^i}{C_t^j} = \frac{\omega_i}{\omega_j}\left(\frac{\beta_i}{\beta_j}\right)^t$.
- In the baseline case of equal Pareto weights, initially there is **equal variance and levels of consumption** for all welfare relevant agents.
- Far from the competitive equilibrium allocation.

OPTIMAL CONSTANT CAPITAL REQUIREMENTS



DYNAMIC CAPITAL REQUIREMENTS

- **Macroprudential rules** are of the form $k_t^m = k^m + \upsilon\left(\frac{x_t}{x} - 1\right)$ or $k_t^m = k^m + \upsilon(x_t - x)$.
- As x_t, I use **loans**, **output**, and **loans-to-output ratio**.
- **Social welfare function** is $\mathbb{E}(\mathcal{W}_t)$.

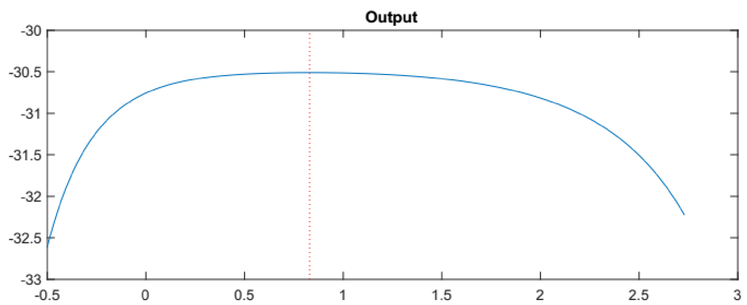
WELFARE GAINS

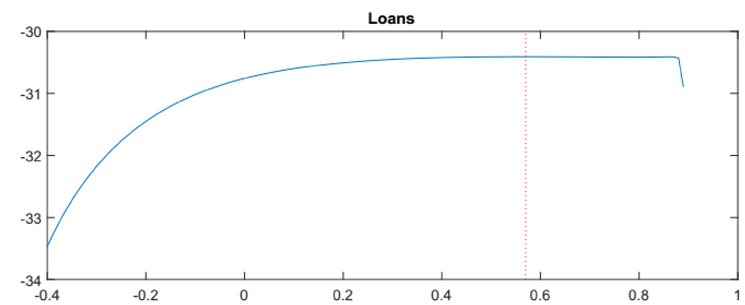
	Output	Loans	Loans/Output
Optimal υ	0.83	0.57	0.06
Bankers, gain, %	0.45	-0.87	4.75
Entrepreneurs, gain, %	6.45	11.62	-1.52
Households, gain, %	-0.60	-0.97	-0.14
Aggregate gain, %	0.53	**0.75**	0.34

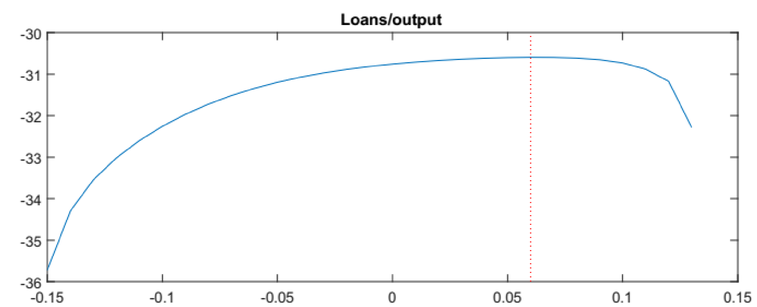
Gains are in permanent consumption units.

- **Entrepreneurs benefit the most** from macroprudential policy. It helps to significantly reduce the variance of their consumption by decreasing the magnitude of the financial accelerator effect.
- The optimal **rule based on loans is welfare maximizing**.
- The **loans-to-output ratio performs the worst** out of the indicators considered. This is in line with some empirical criticism of the credit-to-GDP gap employed in the Basel III framework.

OPTIMAL DYNAMIC CAPITAL REQUIREMENTS







CONCLUSIONS

- **Optimal macroprudential rules are countercyclical** as long as Pareto weight for households is not very high.
- **Entrepreneurs gain, while households lose** from countercyclical macroprudential policy.
- The result is in general **robust** to alternative calibration of the steady state loan-to-value ratio, as well as to monetary policy under strict or flexible inflation targeting.
- A more general optimal **two-variable rule** based on output and loans **does not Pareto dominate** any of the optimal one-variable rules.