Shadow Banking, Macroprudential Regulation and Financial Stability

Margarita Rubio
University of Nottingham

Shadow Banking

Former US Federal Reserve Chair Ben Bernanke, November 2013

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Introduction

- In the aftermath of the financial crisis, there is consensus on the need of macroprudential policies to smooth the financial system and therefore enhance its resilience
- However, the jurisdiction to which macroprudential policies are applied may matter for their effects
  - If there are financial institutions that escape regulation, this latter could not have the desired effects on financial stability $=>$This is the case with **shadow banking**

Shadow Banking definition

- The definition of shadow banking is broad but it usually responds to the following features:
  - in credit intermediation, it performs a function similar to that of regular banks
  - this function is performed frequently by several players interacting with each another, usually via the financial market
  - shadow banking entities are neither subject to banking regulation or oversight, nor do they have access to deposit guarantee schemes or central bank money.

Shadow Banking and Regulation

- Shadow institutions are not subject to the same prudential regulations as traditional banks
- Shadow banking poses then regulatory arbitrage concerns:
  - Shadow banking activity can be used to circumvent and undermine banking regulations, leading to unintended spillovers of regulation
  - When shadow banks undertake bank-like functions, large risks are created which could potentially be destabilizing for the entire financial system

Pros and cons of Shadow Banking

- Shadow banking activities constitute a very useful part of the financial system
  - They provide a valuable alternative to bank funding and helps support real economic activity, providing healthy competition for banks
- However, its main concern is that it can become a source of systemic risk

In this paper

- I develop a model that constitutes a policy framework to evaluate the unintended effects of macroprudential policies when they leak to the shadow banking sector
- The model aims at including all the relevant ingredients that account for the presence of a sector that it is not regulated, that it, benefits and costs.

Overview

- DSGE model with housing
- Three types of agents:
  - Borrowers, who face collateral constraints
  - Private lenders, which represent the shadow banking system
  - Regulated banks
- Financial regulation
  - Capital requirements and the loan-to-value ratio (LTV)
  - Private lenders are not be subject to the same banking regulation as traditional banks

Two versions

- Basic Model: The proportion of shadow banking in the economy is exogenous
- Full Model: I endogeneize the proportion and it is a choice variable

Research Questions

- What are the implications of shadow banking for financial stability and welfare
- What is the best way to approach regulation in the presence of shadow banking
  - LTV regulation
  - Basel regulation

Borrowers

Borrowers are more impatient than savers and solve the following optimization problem:

$$\max_{b_t^H, b_t^F, l_t} E_0 \sum_{t=0}^{\infty} \gamma^t \left(\ln c_t + j \ln h_t - \frac{(l_t)^\eta}{\eta} \right)$$

subject to the flow of funds:

$$c_t + q_t (h_t - h_{t-1}) + R_{t-1}^F b_{t-1}^F + R_{t-1}^L b_{t-1}^L = b_t^F + b_t^L + w_t l_t$$

And the borrowing constraints

The collateral constraints

$$R_t^F b_t^F \leq m_F \alpha q_{t+1} h_t$$

$$R_t^L b_t^L \leq m_L (1 - \alpha) q_{t+1} h_t$$

Private Lenders

Private lenders (Savers) maximize their utility function on consumption, housing and labor hours:

$$\max_{b_t^L, h_t', , l_t} E_0 \sum_{t=0}^{\infty} \beta^t \left(\ln c_t' + j \ln h_t' - \frac{(l_t')^\eta}{\eta} \right)$$

Subject to the budget constraint:

$$c_t' + q_t \left(h_t' - h_{t-1}' \right) + b_t^L + d_t = R_{t-1}^L b_{t-1}^L + R_{t-1}^D d_{t-1} + w_t' l_t'$$

Banks

Banks solve the following problem:

$$\max E_0 \sum_{t=0}^{\infty} \delta^t \left[\log Div_t\right],$$

Subject to the budget constraint:

$$Div_t + R^D_{t-1} d_{t-1} + b^F_t = d_t + R^F_t b^F_{t-1},$$

The bank, by regulation, has capital requirements:

$$\frac{b^F_t - d_t}{b^F_t} \geq CRR.$$

Firms

- Firms produce the final consumption good
- Firms maximize profits subject to the production function by using labor from both types of households:

$$\max \Pi_t = y_t - w_t l_t - w'_t l'_t,$$

$$y_t = A_t l_t^{\nu} l_t'^{1-\nu},$$

where A_t represents a technology parameter.

Equilibrium

The total supply of housing is fixed and it is normalized to unity:

$$h_t + h'_t = 1.$$

The goods market clearing condition is as follows:

$$y_t = c_t + c'_t + c''_t.$$

Welfare Measure

- Second order approximation of the utility function of each individual
- Present results in consumption equivalents

Calibration

Parameter Values		
β	.99	Discount Factor for Savers
γ	.98	Discount Factor for Borrowers
δ	.965	Discount Factor for Banks
j	.1	Weight of Housing in Utility Function
η	2	Parameter associated with labor elasticity
ν	.64	Labor-income share for Savers
m_F	0.7	Bank LTV
m_L	0.9	Private Lending LTV
CRR	10.5	Capital Requirement Ratio
ρ	.9	Shock persistence

Impulse Responses

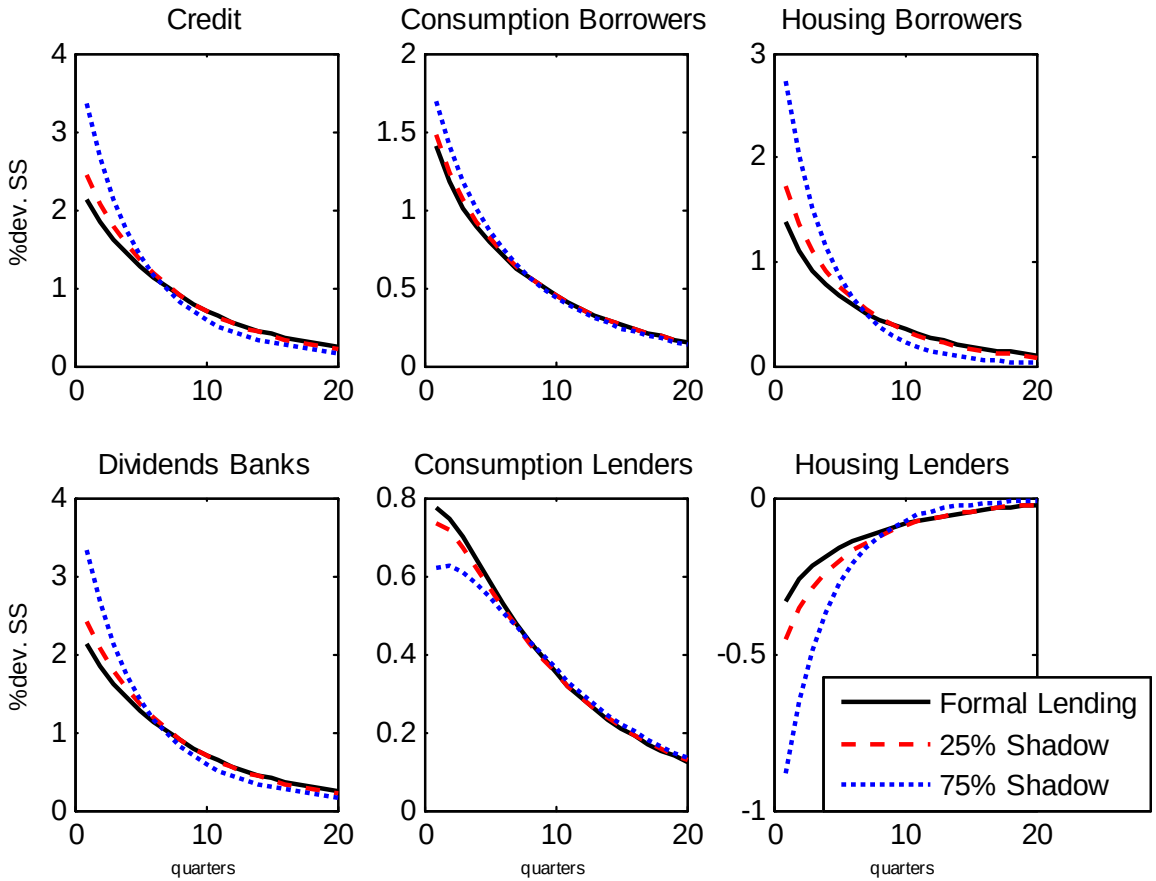

Figure: Impulse Responses to a Technology Shock

Impulse Responses (2)

- Given a positive productivity shock, credit in the economy increases
- However, when the shadow banking sector expands, credit flows in the economy increase even by more
- Shadow banks can help them increase economic activity by making financial services more widely available

Financial Stability

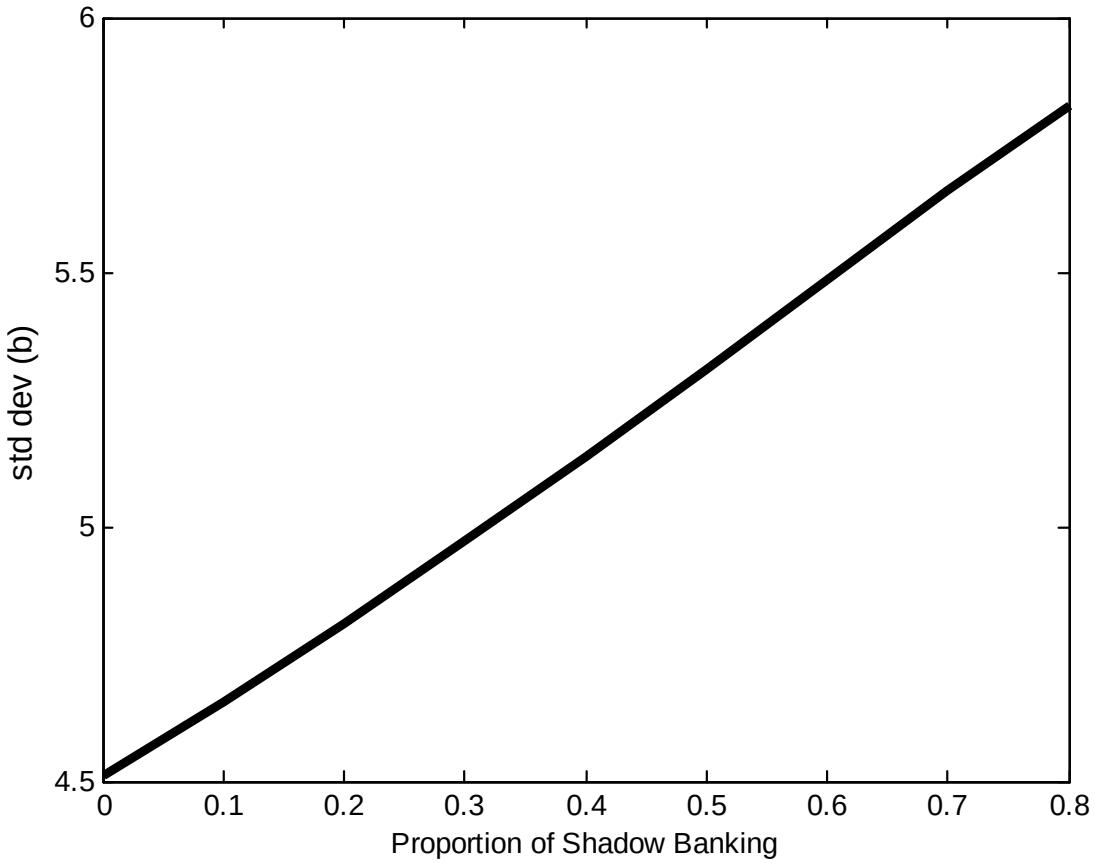

Figure: Shadow Banking and Financial Stability

Financial Stability (2)

- In the model, shadow banking poses risks to financial stability, understood as a larger volatility in financial markets
- Thus, the model displays a trade-off of the presence of shadow banking
  - On the one hand, it fuels credit to the economy, making borrowers more able to consume but this comes at the expense of financial instability

Welfare

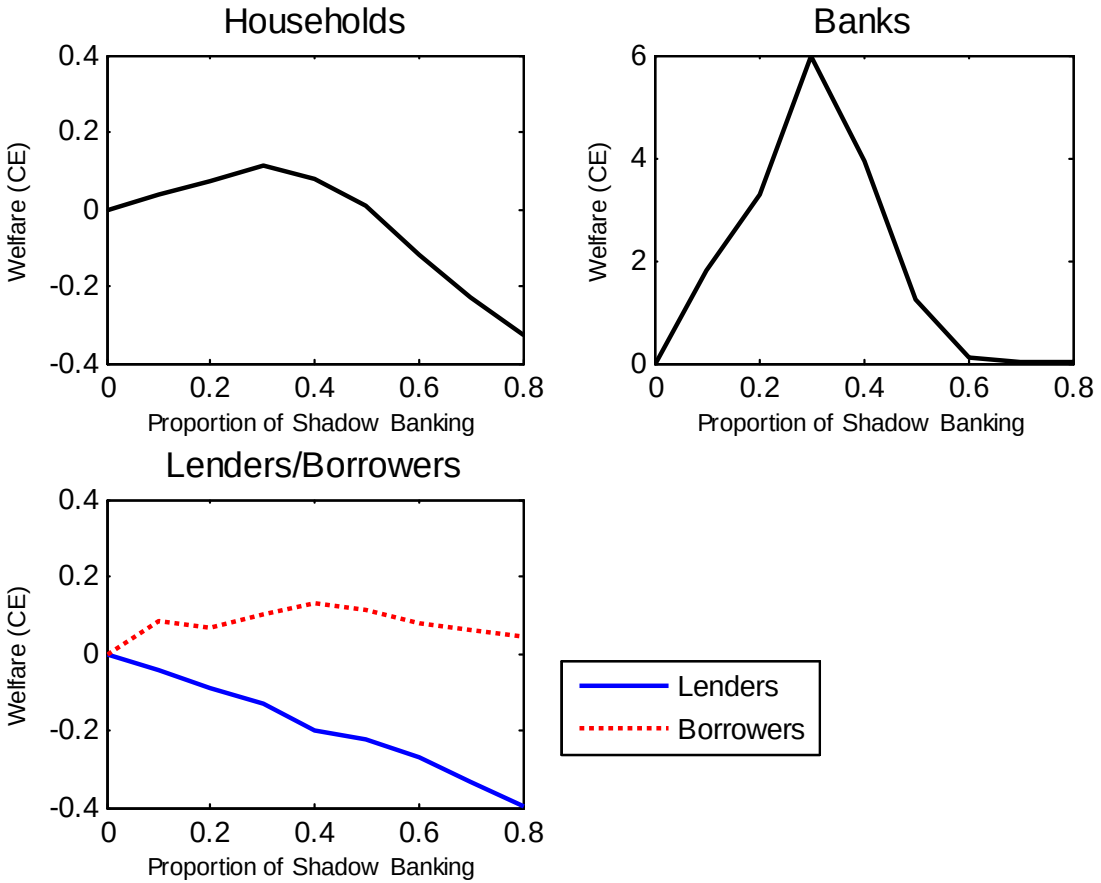

Figure: Welfare values (Consumption Equivalents) implied for different proportions of shadow banking

Welfare (2)

- Households' welfare initially increases because of the increase in credit flow in the economy
  - However, the trade-off that this represents with respect to financial stability makes that benefits start to fade away after a certain threshold
  - The proportion of shadow banking that maximizes households' welfare is around 30%

Allowing for endogenous alpha

The problem of the borrowers becomes the following:

$$\max_{b_t^H, b_t^F, l_t, \alpha_t} E_0 \sum_{t=0}^{\infty} \gamma^t \left(\ln c_t + j \ln h_t - \frac{(l_t)^\eta}{\eta} \right)$$

subject to the flow of funds:

$$c_t + q_t (h_t - h_{t-1}) + R_{t-1}^L b_{t-1}^L + R_{t-1}^F b_{t-1}^F = b_t^L + b_t^F + w_t l_t$$

And subject to the following borrowing constraints:

$$R_t^F b_t^F \leq m_F \alpha_t q_{t+1} h_t$$

$$R_t^L b_t^L \leq q_{t+1} (1 - \alpha_t) h_t \left(1 - (1 - m_L) \frac{q_{t+1} (1 - \alpha_t) h_t}{qh} \right)$$

Shadow Banking and LTV Regulation

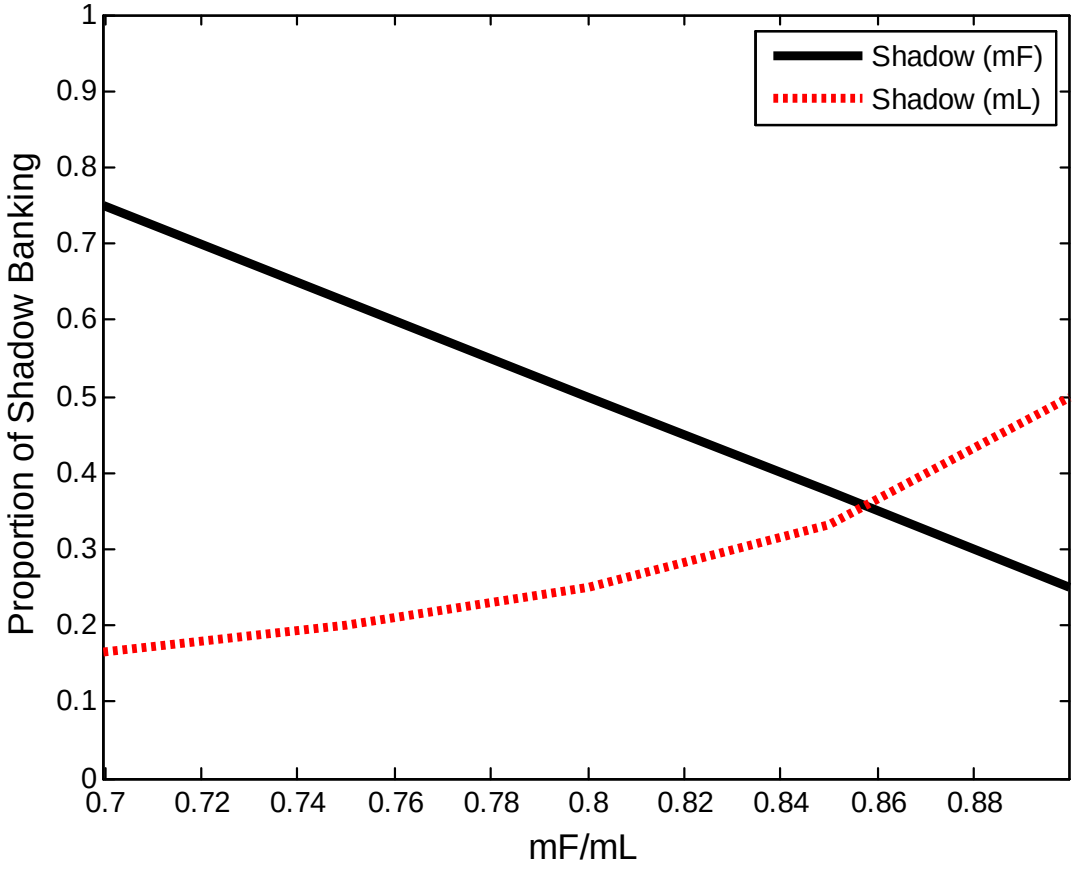

Figure: Proportion of Shadow Banking with LTV Regulation

Shadow Banking and LTV Regulation (2)

- When banking regulation in the formal sector becomes looser, that is, m_F increases for a given m_L, credit will flow to this sector in a linear way and the proportion of shadow banking decreases
- By the same token, stricter LTV regulation on the banking system, would make credit go to the non-regulated sector
- Thus, financial regulation does leak to the less regulated sector, representing the unintended spillovers that regulation may have.

Policy Implications

- In light on these results, it seems appropriate to make an effort in supervising those unregulated entities and trying to enforce them to some limits in LTVs, so that the share of shadow banking does not reach values that can endanger financial stability and decrease welfare.

Shadow Banking and Basel Regulation

Basel Regulation and Financial Stability			
	Basel I/II Formal Banking	Basel III Formal Banking	Basel III All Banks
$\sigma(b)$	5.8629	5.8027	4.5122

Shadow Banking and Basel Regulation (2)

- Introducing a stricter regulation as in Basel III is beneficial for financial stability because it reduces the volatility of credit
  - However, in the hypothetical case in which not only the formal banking sector could be regulated but also the shadow one, the beneficial effects on financial stability could be even stronger
  - The presence of shadow banking may "undo" unintentionally the beneficial effects that banking regulation may have on financial stability

Policy Implications

- Getting rid of the shadow banking at full would be positive for financial stability but would definitely destroy the investment opportunities that an unregulated sector brings to the economy
- The Basel committee should take into account both benefits and costs of shadow banking when considering the extension of their regulatory perimeter
  - The Basel committee, without necessarily aiming at regulating all financial activities in the economy, should make sure that the proportion of non-regulated banks is within the range of welfare-enhancing values (i.e. within values around 30%, according to the model)

Conclusions

- I provide an analytical framework to disentangle the mechanisms behind the implications of a shadow banking sector for financial stability and regulation
  - I use a DSGE model with housing, and three types of agents; borrowers, private lenders and banks
- Shadow banks increase the availability of credit at the cost of more instability in the financial system
- When there is a decrease in the banking sector LTV credit will flow to the industry that is less regulated.
- If Basel regulation could also be applied to the shadow banking sector, it would be more effective for financial stability purposes

Policy Implications

- In terms of LTV regulation, it seems appropriate to make an effort in supervising those unregulated entities and trying to enforce them to some limits in LTVs, so that the share of shadow banking does not reach values that can endanger financial stability and decrease welfare
- On the other hand, the Basel committee should take into account both benefits and costs of shadow banking when considering the extension of their regulatory perimeter
    - Thus, without necessarily aiming at regulating all financial activities in the economy, the implementation of Basel III should make sure that the proportion of non-regulated banks is within the range of welfare-enhancing values