Basel III Regulation and Monetary Policy: A Macroprudential Approach

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Introduction

- The recent financial crisis has made it clear the necessity of introducing policies and regulations to have a stable economic and financial environment
- In order to promote the economic recovery and stabilize the financial sector, some changes to financial regulation have been proposed.
- Basel III (2010) is a comprehensive set of reform measures in banking regulation, supervision and risk management

Motivation

- Higher compulsory capital requirement ratios (CRR) are introduced by Basel I and II (8%), and Basel III (10.5%)
- Basel III adds a countercyclical buffer (CB).
- "The primary aim of the countercyclical capital buffer regime is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build up of system-wide risk" (BCBS, 2010)
- The specific way to implement this CB has not been specified by the Committee

Motivation

- "Macroprudential regulation is concerned with stability of the financial system rather than individual banks: understanding the effects of macroprudential regulation requires a general equilibrium analysis"
  Douglas Gale, 17th september 2014, MMF Conference, Durham

Aim of the Paper

- To study the effects of CRR on the welfare of different agents (borrowers, savers, banks) and society
- To analyze the interaction between CRR and monetary policy
- To find the optimal way to implement the Basel III countercyclical capital buffer as a macroprudential tool to maximize welfare

Model Overview

- DSGE model with a housing market
- Borrowers, savers and banks
- The central bank sets interest rates following a Taylor rule
- The CB of Basel III is represented by a Taylor-type rule for the setting of the CRR

Savers

Savers maximize their utility function by choosing consumption, housing and labor hours:

$$\max E_0 \sum_{t=0}^{\infty} \beta_s^t \left[\log C_{s,t} + j \log H_{s,t} - \frac{(N_{s,t})^{\eta}}{\eta} \right],$$

Subject to the budget constraint:

$$C_{s,t} + d_t + q_t \left(H_{s,t} - H_{s,t-1} \right) = \frac{R_{s,t-1} d_{t-1}}{\pi_t} + w_{s,t} N_{s,t} + \frac{X_t - 1}{X_t} Y_t$$

Borrowers

Borrowers solve:

$$\max E_0 \sum_{t=0}^{\infty} \beta_b^t \left[\log C_{b,t} + j \log H_{b,t} - \frac{(N_{b,t})^{\eta}}{\eta} \right],$$

where $\beta_b < \beta_s$, subject to the budget constraint and the collateral constraint:

$$C_{b,t} + \frac{R_{b,t} b_{t-1}}{\pi_{t+1}} + q_t \left(H_{b,t} - H_{b,t-1} \right) = b_t + w_{b,t} N_{b,t},$$

$$b_t \leq E_t \left(\frac{1}{R_{b,t+1}} k q_{t+1} H_{b,t} \pi_{t+1} \right)$$

Bankers

Bankers solve:

$$\max E_0 \sum_{t=0}^{\infty} \beta_f^t \left[\log Div_{f,t}\right],$$

subject to the budget constraint and the collateral constraint:

$$Div_{f,t} + \frac{R_{s,t-1} d_{t-1}}{\pi_t} + b_t = d_t + \frac{R_{b,t} b_{t-1}}{\pi_t},$$

$$\frac{b_t - d_t}{b_t} \geq CRR$$

Dividends are fully consumed by banks, so that, $Div_{f,t} = C_{f,t}$

Firms

- The intermediate good markets is monopolistically competitive (sticky prices)
- Intermediate goods are produced according to:

$$Y_t = A_t {N_{s,t}}^{\alpha} {N_{b,t}}^{(1-\alpha)},$$

where A_t represents technology and it follows the following autoregressive process:

$$\log(A_t) = \rho_A \log(A_{t-1}) + u_{At}.$$

- Final goods firms aggregate intermediate goods

Equilibrium

The market clearing conditions are as follows:

$$Y_t = C_{s,t} + C_{b,t} + C_{f,t}$$

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

$$H_{s,t} + H_{b,t} = 1.$$

Monetary Policy

- We consider a Taylor rule which responds to inflation and output growth

$$R_t = (R_{t-1})^{\rho} \left((\pi_t)^{\left(1+\phi_{\pi}^{R}\right)} (Y_t/Y_{t-1})^{\phi_y^R} R \right)^{1-\rho} \varepsilon_{Rt}$$

Welfare

- Calculate welfare as a second order aproximation of the future stream of utility of each individual (savers, borrowers and bankers).
- The government aggregates welfare of agents assigning weights to each agent
- The government focuses on welfare of households, since bankers represent a small fraction in the economy

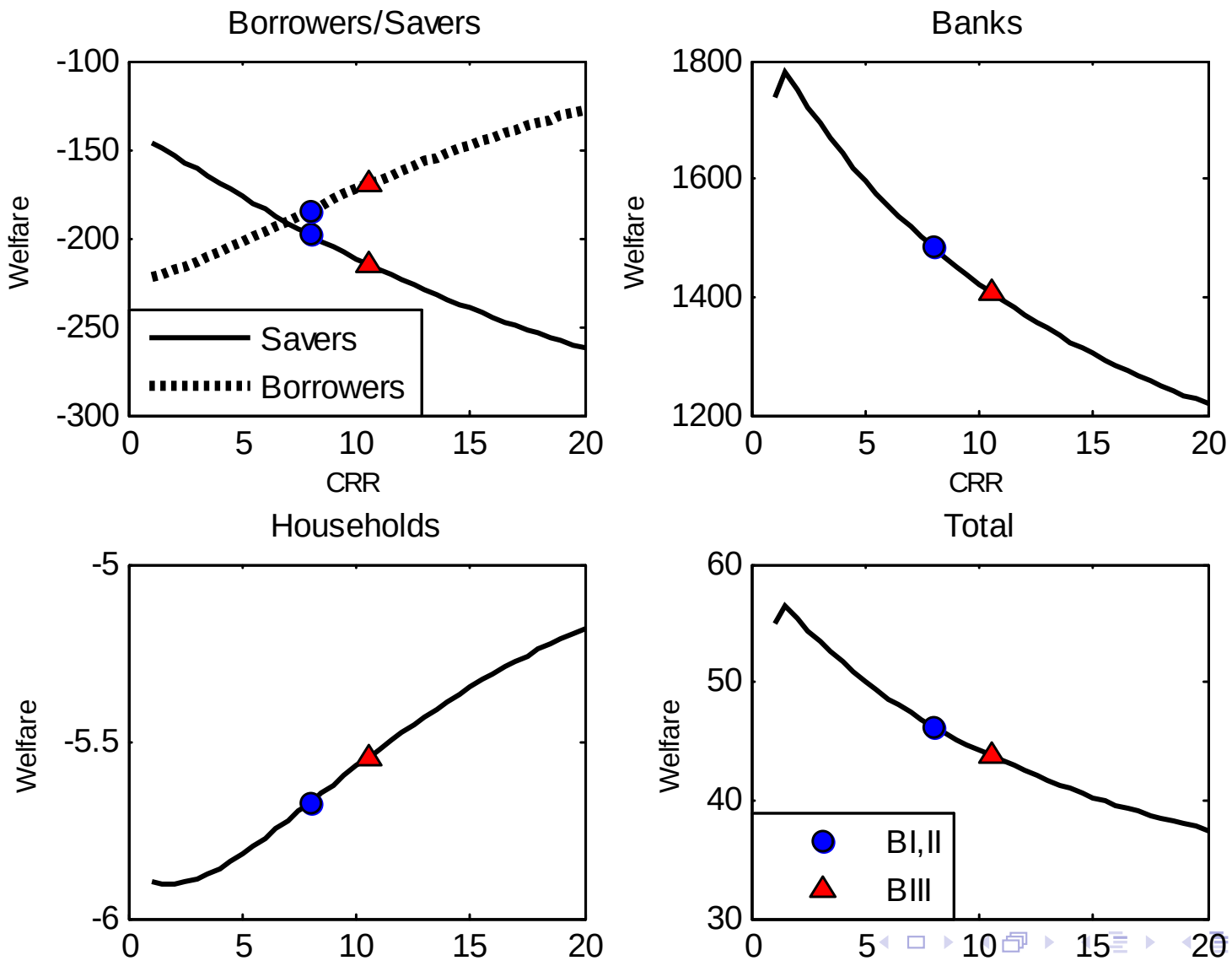
Frictions

- Sticky prices
  - Affects savers
  - Fixed by monetary policy
- Collateral frictions
  - Affects borrowers (they need collateral to take credit, credit friction) and banks (they must have a CRR, loan friction)
  - Fixed by macroprudential policy

Parameter values

Parameter Values		
β_s	.99	Discount Factor for Savers
β_b	.98	Discount Factor for Borrowers
β_f	.965	Discount Factor for Banks
j	.1	Weight of Housing in Utility Function
η	2	Parameter associated with labor elasticity
k	.90	Loan-to-value ratio
α	.64	Labor income share for Savers
ρ_A	.9	Technology persistence
ρ_j	.95	House price persistence
BI,II CRR	.8	CRR for Basel I, II
BIII CRR	.105	CRR for Basel III

Welfare and the CRR, for given Monetary Policy



Optimal Monetary Policy for different CRR

Optimal Monetary Policy under different CRR						
CRR	$1+\phi_\pi^{R*}$	ϕ_y^{R*}	Houshld Welfare	σ_π^2	σ_y^2	σ_b^2
5%	10.9	3.6	-4.1370	0.16	1.95	2.26
8%(BI, II)	**17.6**	**5.8**	-4.0988	0.16	1.95	2.00
10%	20.7	6.6	-4.0617	0.16	1.96	1.91
10.5%(BIII)	**20.7**	**6.6**	-4.0539	0.16	1.96	1.89
15%	20.5	6.6	-3.9624	0.16	1.96	1.74

A rule for the Countercyclical Capital Buffer

- We propose a Taylor-type rule that includes credit growth in order to explicitly promote stability and reduce systemic risk:

$$CRR_t = (CRR_{SS}) \left(\frac{b_t}{b_{t-1}} \right)^{\phi_b}$$

- This rule states that whenever the regulator observes that credit is growing, they automatically increase the capital requirement ratio to avoid an excess in credit
- We make this countercyclical capital buffer interact with monetary policy and we find the optimal implementation of both policies

Optimal values of the Countercyclical Buffer and Monetary Policy

Optimal Monetary Policy and Basel III^{CB}			
	Basel I, II	Basel III	Basel III^{CB}
ϕ_b^{k*}	-	-	0.1
$1+\phi_\pi^{R*}$	17.6	20.7	51
ϕ_y^{R*}	5.8	6.6	15.5
Households Welfare Gain	-	0.045	0.057
Borrowers Welfare Gain	-	0.012	0.068
Savers Welfare Gain	-	0.033	-0.011
σ_π^2	0.16	0.16	0.15
σ_y^2	1.95	1.96	1.96
σ_b^2	2.00	1.89	1.82

Pareto-superior Outcomes

Optimal MP and Basel III^{CB}, Kaldor-Hicks			
	Basel I, II	Basel III	Basel III^{CB}
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What we do in the paper

- A DSGE model with housing to analyze to assess the welfare effects of the Basel regulations and its interactions with monetary policy
  - We study the CRR and the CB

Effects on welfare of increasing the CRR

- Borrowers benefit from this measure, because it increases financial stability
- Savers and banks are worse off

Interaction of the Basel I, II, and III CRR regulations with monetary policy

- Optimal monetary policy becomes more aggressive the higher the CRR is, to compensate for a lower money multiplier
- Higher CRR increases financial stability

Countercyclical capital buffer proposed by Basel III

- We approximate this regulation by a rule in which the capital requirement responds to credit growth.
- Households' welfare:
  - CB increases welfare in the economy
  - Even though savers are worse off, they can be compensated by borrowers à la Kaldor-Hicks: a Pareto-superior outcome
- For banks, the CB is unambiguously welfare worsening