Targeting financial stability: macroprudential or monetary policy?

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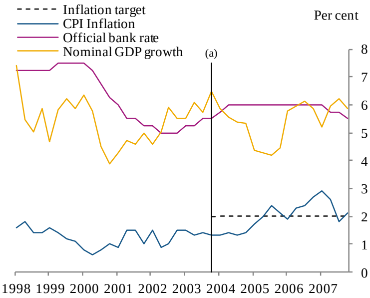
Monetary Policy Challenges from a Small Country Perspective

[1] The views expressed in this paper are those of the authors, and not necessarily those of the Bank of England or its committees.

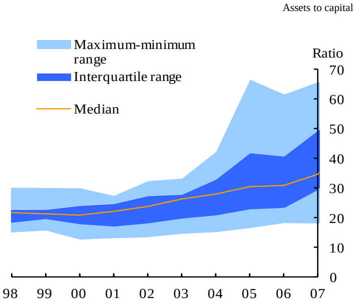
Pre-crisis: UK monetary policy and financial stability

Real economy stability...



(a) Date MPC shifted to a 2% CPI inflation target

...financial instability



Sources: Published accounts and Bank calculations.

Post-crisis views

- Broad agreement on need for tougher structural regulation of financial sector and the role of macroprudential policy...
- ...but this raises questions on the interaction with monetary policy:
    - Should monetary policy also 'lean against the wind'? Or should it loosen to offset the effects of tighter macroprudential policy?
    - Or put differently - when are the two policies substitutes and complements?
- Divergent views among academics and policymakers:
    - Stein (2013) only 'monetary policy gets in all the cracks'
    - Shin (2015) 'both monetary policy and macroprudential policies have some effect in constraining credit growth and the two tend to be complements'
    - Svensson (2015) 'little or no support for leaning against the wind for financial stability purposes

An attempt at an answer

- Develop a simple, common framework for policymakers
- Posit a semi-structural New Keynesian model augmented with a role for credit and a possibility of a financial crisis, (similar to Woodford (2012), Ajello *et al* (2015) and Svensson (2016))
- Introduce macroprudential policy via a countercyclical capital buffer (CCyB) and add a financial stability goal to loss function
- Examine jointly optimal policy, and how it changes at the zero lower bound
- Characterise situations when policies are substitutes or complements, and whether monetary policy should lean against the wind

A basic macro model

- 2 period model
  - Textbook model plus credit spreads, s_1, and a role for credit
- **IS equation**: $y_1 = E_1^{ps} y_2 - \sigma(i_1 - E_1^{ps}\pi_2 + \omega s_1) + u_1^y$
  - $\omega \geq 0$
- **Phillips curve**: $\pi_1 = \kappa y_1 + E_1^{ps}\pi_2 + \nu s_1 + u_1^\pi$
  - $\nu \geq 0$
- **Real credit growth**: $B_1 = \phi_0 + \phi_i i_1 + \phi_s s_1 + u_1^B$
  - $\phi_i, \phi_s < 0$

Adding a macroprudential tool and a financial stability goal

- **Macroprudential policy**: $s_1 = \psi k_1$
    - Higher CCyB, k_1, increases spreads

- **Crisis probability**: $\gamma_1 = \frac{\exp(h_0+h_1 B_1+h_2 k_1)}{1+\exp(h_0+h_1 B_1+h_2 k_1)}$
    - $h_1 > 0$ - high credit growth increases γ_1 - affected by both instruments
    - $h_2 < 0$ - higher CCyB also reduces γ_1 via resilience channel

Optimal policy

- Policymaker minimises **loss function**:
  $L = \frac{1}{2}(\pi_1^2+\lambda y_1^2+\beta(\gamma_1(1+\zeta)(\pi_{2,c}^2+\lambda y_{2,c}^2)+(1-\gamma_1)(\pi_{2,nc}^2+\lambda y_{2,nc}^2))$
    - ζ is extra financial stability weight

- Optimal inter-temporal condition:

$$\overbrace{\lambda y_1(-\frac{\nu\psi}{\kappa})}^{\text{marginal cost of CCyB}} = \overbrace{(\frac{\partial\gamma_1}{\partial k_1}+\frac{\partial\gamma_1}{\partial i_1}(\frac{\nu\psi}{\kappa\sigma}-\omega\psi))(-\underbrace{\frac{\partial L}{\partial\gamma_1}}_{\text{cost of crisis}})}^{\text{marginal benefit from lower crisis probability}}$$

- Optimal intra-temporal condition:

$$\bar{\lambda} y_1 + \kappa\pi_1 = 0, \text{ where } \bar{\lambda} < \lambda$$

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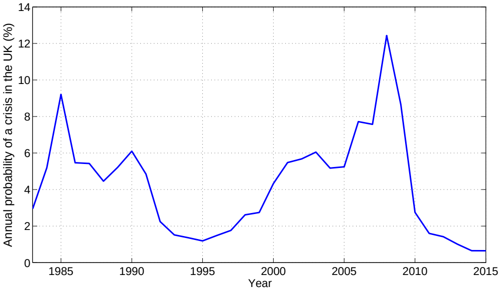
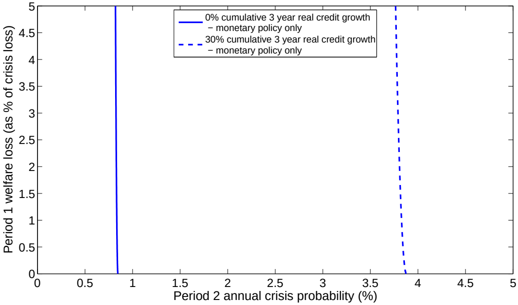
Calibration

- Interpret time period as 3 years to capture credit building up over a longer horizon and policy implementation lags
- Parameters on credit, aggregate demand and supply based on empirical UK literature
- Parameters on the probability of a financial crisis estimated using a cross-country dataset in Bush et al. (forthcoming), giving this implied crisis probability for the UK:

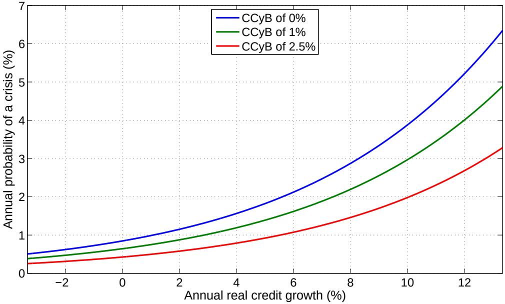


Monetary-financial stability trade-off with monetary policy only



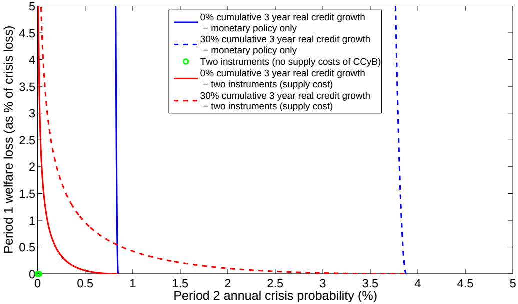
- Monetary policymaker faces steep trade-off if acting alone, especially if credit growth is high

The role of macroprudential policy



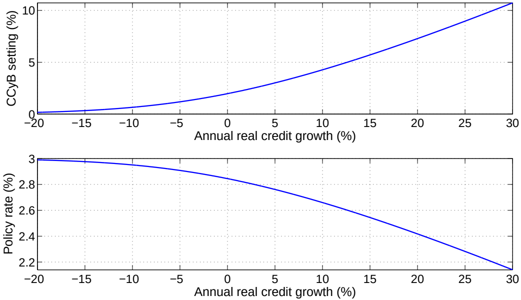
- A higher CCyB implies a lower crisis probability for a given level of credit growth and vice versa

Monetary-financial stability trade-off with macroprudential policy



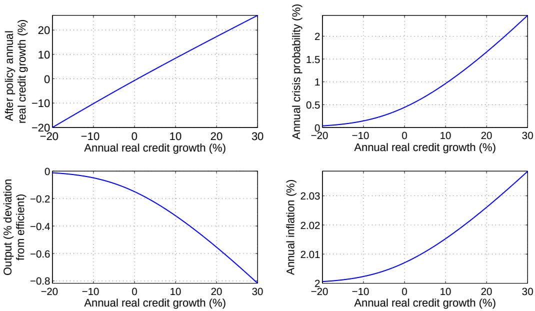
- With active macroprudential policy, each of the two instruments can focus on a single objective

Policy functions for different sizes of credit shock



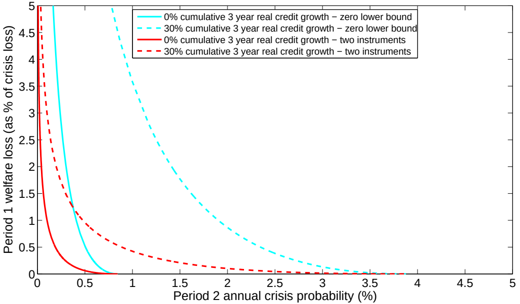
- Optimal policy suggests the CCyB should tighten and monetary policy loosen, in response to a credit shock

Equilibrium outcomes, for different sizes of credit shock



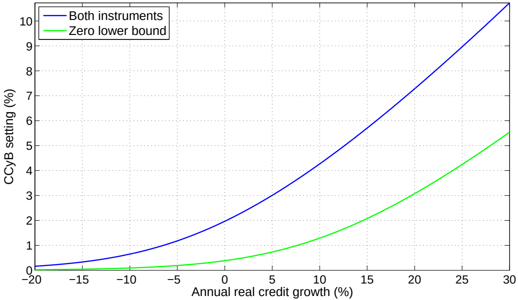
- Using the CCyB means that credit growth has less impact on the crisis probability, but also pushes inflation up and output down

Monetary-financial stability trade-off at the ZLB



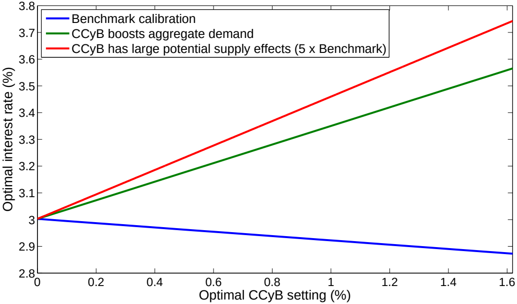
- Policymaker's trade-off worsens if monetary policy becomes constrained

CCyB policy function as credit growth varies



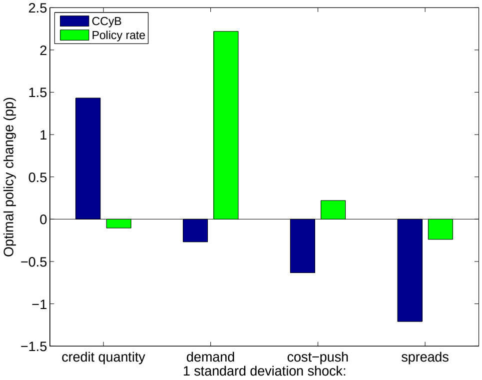
- With monetary policy unavailable, it is optimal to use the CCyB less in response to credit shocks

Complements or substitutes: Parameter choices



- Monetary and macroprudential policies are strategic substitutes so far
- Might be strategic complements if macroprudential policy has large supply effects, or if a higher CCyB boosts aggregate demand, ie if $\nu\psi\frac{\kappa}{\kappa^2+\lambda_y} > \sigma\omega\psi$

Complements or substitutes: Policy responses to shocks



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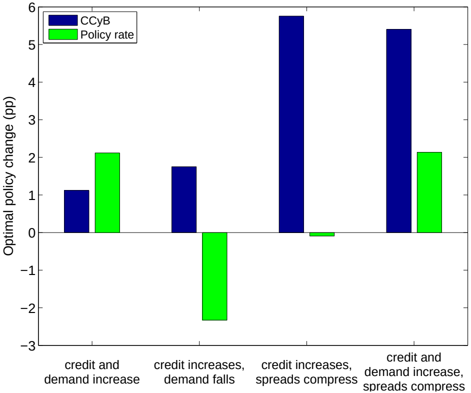

- When credit and demand shocks hit together, instruments are complements
- Eg. when the credit and business cycles are closely aligned

Credit leakage to market-based finance sector

- Assume $\gamma_1 = b\gamma_1^{BL} + (1-b)\gamma_1^{SL}$,
  - $\gamma_1^{BL} = \frac{\exp(h_0 + h_1 BL_1 + h_2 k_1)}{1+\exp(h_0 + h_1 BL_1 + h_2 k_1)}$ - probability of banking crisis
  - $\gamma_1^{SL} = \frac{\exp(h_0 + h_1 SL_1)}{1+\exp(h_0 + h_1 SL_1)}$ - probability of market-based crisis
  - b - share of lending in banking sector
- CCyB (k_1) cannot increase resilience in market-based sector
- Bank and market-based lending determined by:
  - $BL_1 = \phi_0^B + \phi_i i_1 + \phi_s^B s_1 + u_1^B$
  - $SL_1 = \phi_0^S + \phi_i i_1 + \phi_s^S s_1 + u_1^S$
  - $\phi_s^B < 0$, $\phi_s^B > 0$ - CCyB causes credit to leak to market based sector

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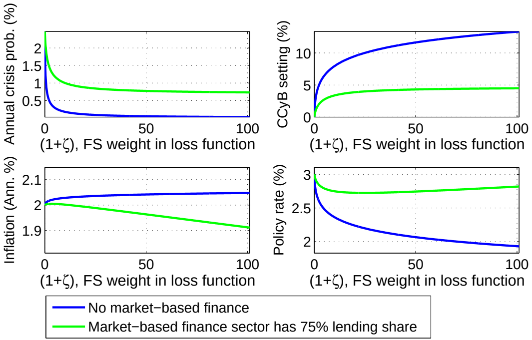
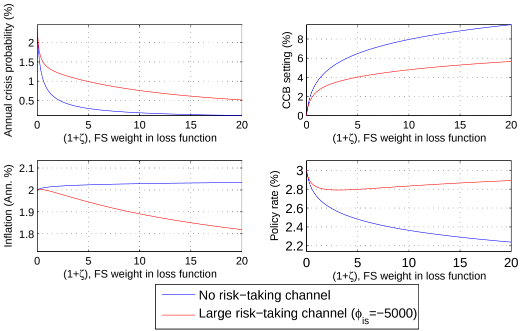
Credit leakage to market-based finance sector



- As macroprudential policies become less effective, there is a larger role for monetary policy to lean against the wind.

A strong risk-taking channel of monetary policy



- $B_1 = \phi_0 + \phi_i i_1 + \phi_s s_1 + \phi_{i,s} i_1 s_1 + u_1^B$, where $\phi_{i,s} < 0$
- As lower interest rates make the CCyB less effective at reducing lending growth, there is a larger role for monetary policy to lean against the wind.

Summary

- Developed a simple framework for modelling optimal monetary-macroprudential policy interactions
- In our benchmark calibration monetary policy and macroprudential policy are strategic substitutes, but could also be complements giving rise to 'leaning against the wind'
- Macroprudential policy may wish to pay more attention to monetary policy goals at the ZLB
- Next steps:
  - Further work on calibration and robustness: gauge quantitative significance of different channels
  - Infinite horizon setting
  - Incorporating product-based macroprudential tools
  - Open-economy considerations/Two-country model

Extra slides

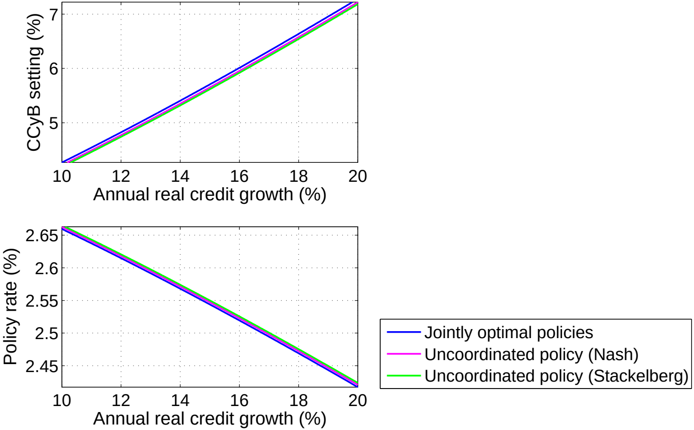
Parameter choices (1)

Parameter	Description	Parameter	Notes
Standard Macro Parameters			
β	Discount Factor	0.99	Matches r*=1%
σ	Interest-rate sensitivity of ouptut	0.57	Burgess *et al* (2013)
κ	Slope of the Phillips Curve	1.03	Burgess *et al* (2013)
λ	Weight on output stabilisation	0.05	Standard welfare-based
i^*	Long-run natural nominal rate of interest	3%	Rachel and Smith (2015)
Effect of the CCyB			
ψ	Effect of the CCyB on credit spreads	0.2	1pp equity = 20bps - MAG (2010)
ω	Effect of spreads relative to policy rate on y	1.1	Cloyne *et al* (2015), updated
ν	Effect of spreads on the Phillips Curve	0.41	Franklin, Rostom and Thwaites (2015)
Financial conditions equation parameters			
ϕ_0	Average real credit growth	0.21	Historical average
ϕ_i	Coefficient on interest rates	-1.4	Cloyne *et al* (2015), updated
ϕ_s	Coefficient on spreads	-6.1	Cloyne *et al* (2015), updated

Parameter choices (2)

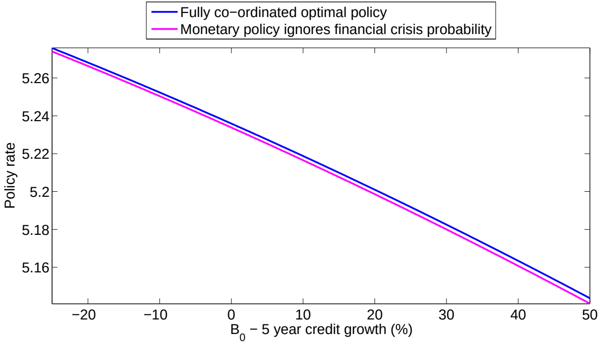
Parameter	Description	Parameter	Notes
Crisis probability equation parameters			
h_0	Constant	$-1.7 + 0.11h_2$	All estimated using
h_1	Coefficient on leverage vairable	5.18	dataset constructed in
h_2	Coefficient on k_1, (resilience effect of CCyB)	-27.8	Bush *et al* (forthcoming)
ϵ	Private sector perception of crisis probability	0.0005	Arbritarily small
Period 2 parameters			
$y_{2,c}$	Deviation of output from efficient in crisis state	-0.032	3.2% lost output per year Brooke *et al* (2015)
$\pi_{2,c}$	Deviation of inflation from target in crisis state	0	No effect
ζ	Extra weight on E(crisis cost)	0	Risk-neutral policy
Shocks			
$SD(u_1^y)$	Standard deviation of demand shocks	0.0125	Similar to risk premium shock in Burgess *et al* (2013)
$SD(u_1^\pi)$	Standard deviation of cost-push shocks	0.0011	Similar to mark-up shocks in Burgess *et al* (2013)
$SD(u_1^B)$	Standard deviation of credit shocks	0.16	Set to match historical data

Coordinated versus uncoordinated policies



- Policies look almost identical with split objectives - there is little need for monetary policy to lean against the wind

Should monetary policy also target financial stability?



- Yes in theory...but according to our calibration, by a very small amount.

Complements or substitutes: Parameter choices

Policy interaction	Δk_1	Δi_1	Parameter case	Intuition
Strategic complements	+ive	+ive	$\nu\psi\frac{\kappa}{\kappa^2+\lambda_y} > \sigma\omega\psi$	(Supply effect of CCB)*(policymaker weight on inflation) $>$ demand effect of CCB
Benchmark: Strategic substitutes	+ive	-ive	$\nu\psi\frac{\kappa}{\kappa^2+\lambda_y} < \sigma\omega\psi$, $\frac{\frac{\partial\gamma_1}{\partial k_1}}{\frac{\partial\gamma_1}{\partial i_1}} > (\sigma\omega\psi - \nu\psi\frac{\kappa}{\kappa^2+\lambda_y})\sigma^{-1}$	Demand effect of CCB is bigger than (weighted) supply effect, but the CCB is still relatively more effective at reducing crisis probability
Strategic substitutes and instrument switches	-ive	+ive	$\frac{\frac{\partial\gamma_1}{\partial k_1}}{\frac{\partial\gamma_1}{\partial i_1}} < (\sigma\omega\psi - \nu\psi\frac{\kappa}{\kappa^2+\lambda_y})\sigma^{-1}$	Relative effect of the CCB/interest rates on crisis probability $<$ relative effect of the CCB/interest rates on demand and supply