

Monetary and Macprudential Policy Games in a Monetary Union

Richard Dennis Pelin Ilbas

University of Glasgow National Bank of Belgium

October 2016

Background and motivation

- Single monetary authority (ECB)
- Multiple macroprudential authorities
 - ECB and the national authorities have shared competencies with respect to macroprudential policies (Single Supervisory Mechanism)
 - ECB's responsibilities limited to imposing stricter capital requirements foreseen in the EU legislations
- Several players affecting related macroeconomic and financial variables
- Commitment to full cooperation between these players may not be feasible

- Research questions
 - How effective is an SSM-type of institutional framework?
 - Are there alternative settings/delegation schemes that approach more closely the first-best fully cooperative solution?
- Focus on the strategic interactions between multiple – macroprudential and monetary policy – decision makers, in particular:
 - Detect policy inefficiencies arising from cooperative failures
 - Study effectiveness of alternative coordination setups in light of these cooperative failures
 - Quantify the gains (losses?) from cooperation between monetary and macroprudential policies in a monetary union

- Quint and Rabanal (2014)
 - Estimated medium-scale DSGE model of the euro area
 - Nominal and real rigidities
 - Two-region monetary union: core and periphery
 - Two sectors: non-durables and durables (housing)
 - Two households: savers and borrowers
 - Single monetary policy, common and/or regional prudential authorities
- Featuring financial frictions:
 - Financial accelerator on the HH side and residential investment: house price changes affect collateral value used for borrowing, the default rate on mortgages and hence the spread between lending and deposit rates
 - Risk shocks affect macroeconomic conditions and credit markets: borrowers are subject to idiosyncratic housing quality shock, which may lead to defaults and affect the lending-deposit spread

- Strategic interactions between monetary policy and:
 - Common prudential authority at the EMU level
 - Regional prudential authorities
- Optimal discretionary policies with alternative cooperative and timing schemes:
 - Cooperation: policy makers act together much like a single decision maker
 - Non-cooperation: policy makers work separately to meet their own objectives
 - Stackelberg leadership: one policy maker, the leader, first sets policy, after which other policy maker(s), the follower(s), move
- Benchmark policy (first best): Cooperative solution under commitment

(Some) related work

- Policy setup similar to De Paoli and Paustian (2014), but in a richer framework:
 - Estimated, medium-scale DSGE model
 - Open economy: allows for region-specific macroprudential objectives
 - More than 2 players
- Extension of Gelain and Ilbas (2015), Quint and Rabanal (2014) and Angelini et al. (2011):
 - More interaction schemes considered to assess gains from coordination
 - Optimal (discretionary) rules rather than optimized simple rules
 - More than 2 players

Policy objectives

- The goals of monetary policy and macroprudential policy are summarized by loss functions
- Monetary policy:

$$L_t^{CB} = \text{Var}(\pi_t) + \lambda_{\Delta y}^{CB} \text{Var}(\Delta y_t) + \lambda_{\Delta r}^{CB} \text{Var}(\Delta r_t)$$

- (Union-wide) macroprudential policy:

$$L_t^{MP} = \lambda_{cr/y}^{MP} \text{Var}(cr_t/y_t) + \lambda_{\Delta \eta}^{MP} \text{Var}(\Delta \eta_t)$$

- (Regional) macroprudential policy

$$L_t^{MP,c} = \lambda_{cr^c/y^c}^{MP,c} \text{Var}(cr_t^c/y_t^c) + \lambda_{\Delta \eta^c}^{MP,c} \text{Var}(\Delta \eta_t^c)$$

- In light of the model's rigidities, we think of “society's loss” as being the sum of the policymakers' loss functions

- An obvious alternative to our use of loss functions would be to summarize policy objectives using a second order approximation of welfare.
- In general we have no objection to this approach, but for this study we did not find it practical.
 - Some policy goals are specified in legislation and can be more easily captured through loss functions
 - Using welfare-based objectives is less suitable for studying non-cooperation, where the appropriate allocation of goals to policymakers is not clear
 - Welfare-based objectives can often lead to extreme policies, ones in which policy coefficients need to be artificially constrained

Some benchmarks

Table 1: Some benchmark cooperative solutions

	Taylor rule	Optimal cooperative policy		Optimal macroprud. policy (estimated Taylor rule)
		$\lambda_{\Delta y}^{CB} = 1, \lambda_{\Delta r}^{CB} = 0.5, \lambda_{cr/y}^{MP} = 1, \lambda_{\Delta \eta}^{MP} = 0.5$		
		Commitment	Discretion	Discretion
σ_{π}^2	1.123	0.159	0.081	1.276
$\sigma_{\Delta y}^2$	1.973	1.545	1.757	1.744
$\sigma_{\Delta r}^2$	0.305	0.162	0.287	0.280
$\sigma_{cr/y}^2$	82.647	0.027	0.080	0.430
$\sigma_{\Delta \eta}^2$	0.000	0.163	0.178	0.188
L^{coop}	85.896	1.892	2.150	3.683

Does leadership matter?

	Nash	Monetary leadership	Prudential leadership
	$\lambda_{\Delta y}^{CB} = 1, \lambda_{\Delta r}^{CB} = 0.5, \lambda_{cr/y}^{MP} = 1, \lambda_{\Delta \eta}^{MP} = 0.5$		
σ_{π}^2	0.081	0.078	0.083
$\sigma_{\Delta y}^2$	1.757	1.758	1.758
$\sigma_{\Delta r}^2$	0.287	0.288	0.303
$\sigma_{cr/y}^2$	0.080	0.084	0.082
$\sigma_{\Delta \eta}^2$	0.178	0.188	0.178
L^{coop}	2.150*	2.158	2.164

Some effects of non-cooperation

Table 3: Comparing cooperation and non-cooperation

	Cooperation	Non-cooperation		
	Nash	Nash	Monetary Leadership	Prudential Leadership
	$\lambda_{\Delta y}^{CB} = 1, \lambda_{\Delta r}^{CB} = 0.5, \lambda_{cr/y}^{MP} = 1, \lambda_{\Delta \eta}^{MP} = 0.5$			
σ_{π}^2	0.081	0.100	0.100	0.117
$\sigma_{\Delta y}^2$	1.757	1.834	1.819	1.835
$\sigma_{\Delta r}^2$	0.287	0.349	0.385	0.404
$\sigma_{cr/y}^2$	0.080	0.033	0.041	0.031
$\sigma_{\Delta \eta}^2$	0.178	0.076	0.115	0.080
L^{CB}	1.981	2.108	2.112	2.154
L^{MP}	0.168	0.071	0.098	0.071
L^{coop}	2.150*	2.179	2.210	2.224
L^c	37.990	37.882	37.920	37.884
L^p	85.271	37.844	85.213	85.209

Non-cooperation, but with shared objectives

- The non-cooperative solutions were inferior to the cooperative solution
 - Non-cooperation but with the shared objective of stabilizing the union-wide credit-to-GDP ratio did not perform as well as cooperation.
 - Non-cooperation but with the shared objective of stabilizing union-wide real GDP growth out-performed cooperation
- Non-cooperation can be superior to cooperation
- This raises the broader question of what objectives should each of the policymakers be optimally assigned

Optimal delegation of objectives

- With non-cooperation among policymakers:

- The optimal loss function for the central bank

$$L_t^{CB} = \text{Var}(\pi_t) + \frac{2}{3} \text{Var}(\Delta y_t) + \frac{1}{3} \text{Var}(\Delta r_t)$$

- The optimal loss function for the prudential regulator

$$L_t^{MP} = \text{Var}(c r_t / y_t) + \frac{2}{3} \text{Var}(\Delta y_t) + \frac{1}{3} \text{Var}(\Delta \eta_t)$$

- Overall, these loss functions put relatively more weight on output growth stabilization than “society’s loss” function, and relatively less weight on stabilizing the policy instruments

Regional prudential regulators

Table 7: Comparing cooperation and non-cooperation: 3 policymakers

	Cooperation		Non-cooperation	
	Nash		Monetary leadership	
$\lambda_{\Delta y}^{CB} = 1, \lambda_{\Delta r}^{CB} = 0.5, \lambda_{cr^c/y^c}^{MP,c} = 1, \lambda_{\Delta \eta^c}^{MP,c} = 0.5, \lambda_{cr^p/y^p}^{MP,p} = 1, \lambda_{\Delta \eta^p}^{MP,p} = 0.5$				
σ_{π}^2	0.082	0.100	0.101	
$\sigma_{\Delta y}^2$	1.817	1.830	1.815	
$\sigma_{\Delta r}^2$	0.328	0.353	0.391	
σ_{cr^c/y^c}^2	0.081	0.048	0.055	
$\sigma_{\Delta \eta^c}^2$	0.142	0.118	0.161	
σ_{cr^p/y^p}^2	0.064	0.061	0.068	
$\sigma_{\Delta \eta^p}^2$	0.199	0.180	0.221	
L^{CB}	2.062	2.107	2.111	
$L^{MP,c}$	0.153	0.107	0.136	
$L^{MP,p}$	0.163	0.152	0.179	
$L^{CB+MP,c+MP,p}$	2.378	2.366*	2.426	

Summary

- The discretionary stabilization bias works differently from models without macroprudential policy
 - Policymakers use promises or forward guidance to stabilize the credit-to-GDP ratio
- There was little evidence that policy leadership mattered significantly, and leadership solutions were dominated by the simultaneous move (Nash) solution
- At the union-wide level, cooperation generally gave better outcomes and was preferred especially by the central bank
 - However, stability at the union-wide level masked considerable volatility at the regional level
 - Non-cooperation with output growth as a shared objective out-performed cooperation
- Allowing macroprudential policy to be conducted at the regional level removed the excessive volatility in the regional credit-to-GDP ratios, at the cost of slightly greater inflation and output growth volatility