Optimal Monetary and Prudential Policies

Fabrice Collard (U. of Bern), **Harris Dellas** (U. of Bern), **Behzad Diba** (Georgetown U.), **Olivier Loisel** (CREST)

INTRODUCTION and SUMMARY

CONTEXT

- **Post-crisis consensus**: a new prudential policy (PP) should be in charge of financial stability [e.g., IMF (2013)]
- **Key PP instrument**: bank capital requirements set conditionally on the state of the economy [BCBS (2010)]
- This raises the issue of the **interactions** between PP and monetary policy (MP) [e.g., Yellen (2010)]

CONTRIBUTION

- We develop a model to study **jointly optimal MP and PP**. Its main features are
  - price stickiness, giving a role to MP
  - **limited liability**, giving a role to PP [as in Van den Heuvel (2008), Martinez-Miera and Suarez (2012)]
- We depart from the literature [reviewed by Loisel (2014)] in **two main ways**:
  - by linking the amount of risk to the **type of credit** (not necessarily the volume of credit), so that MP and PP may not affect the same margins
  - by determining the jointly **locally Ramsey-optimal policies** (not jointly optimal simple rules for deviations from non-optimal steady-state values)

MAIN RESULTS

- In our benchmark model, there is a clear-cut **optimal division of tasks** between MP and PP:
  - PP should react only to shocks that affect banks' risk-taking incentives
  - in response to these shocks, MP should move opposite to PP in order to mitigate its macroeconomic effects [as envisaged by, e.g., Yellen (2010)]
- In two extensions, we can account for situations in which MP and PP should both move **counter-cyclically**

BENCHMARK MODEL

- In this model, PP affects both the type and the volume of credit, but MP affects only the volume of credit
- Start from the New Keynesian model with capital, and introduce the following three types of agents:

CAPITAL GOODS PRODUCERS (CGPs)

- **CGPs**
  - buy unfurbished capital x_t, furbish it, and sell furbished capital k_{t+1}
  - are perfectly competitive and owned by households
  - have access to a safe technology (S): $k_{t+1} = x_t$
  - have access to a risky technology (R): $k_{t+1} = \theta_t exp(\eta_t^R) x_t$, where θ_t is a common (systemic) shock, equal to 0 with probability ϕ_t and 1 with probability $1 - \phi_t$
- R is **inefficient** in the sense that $(1 - \phi_t) exp(\eta_t^R) \leq 1$ for all realizations of ϕ_t and η_t^R
- However, because of their **limited liability**, CGPs have an incentive to use R ("heads I win, tails you lose")
- To buy x_t, GGPs borrow from banks (which can **monitor** them) at the nominal interest rate R_t^i with $i \in \{S, R\}$, and those choosing R completely **default** on their loans when R fails

BENCHMARK MODEL (cont'd)

BANKS

- Banks
  - are perfectly competitive and owned by households
  - pay a tax (τ) on their profits
  - finance safe and risky loans with equity and deposits: $l_t^S + l_t^R = e_t + d_t$
- Because of **deposit insurance** and their own **limited liability**, they have an incentive to make risky loans
- They can hide risky loans in their portfolio from the prudential authority up to a fraction γ_t of their safe loans

PRUDENTIAL AUTHORITY (PA)

- PA imposes a risk-weighted **capital requirement** (CR) on banks: $e_t \geq \kappa_t (l_t^S + l_t^R) + \bar{\kappa}\, max(0, l_t^R - \gamma_t l_t^S)$
- This CR enables PA to affect the type of credit: the higher banks' capital e_t, the more banks **internalize the social cost of risk** (as they have more "skin in the game")
- Because risky loans are socially undesirable, PA optimally chooses $\bar{\kappa}$ high enough to deter observable risk taking

RESULTS

PRELIMINARY RESULTS

- There are no equilibria with $0 < l_t^R < l_t^S$ (because limited liability makes banks' profit function convex in l_t^R)
- In equilibrium, the **capital constraint is binding**: $e_t = \kappa_t (l_t^S + l_t^R)$ (because τ makes banks prefer debt to equity)
- A necessary and sufficient condition for existence of an equilibrium with $l_t^R = 0$ is $\kappa_t \geq \kappa_t^*$, where κ_t^*
  - is a function of shocks made explicit in the paper
  - is increasing in $1 - \phi_t$, η_t^R, and γ_t (as the higher these shocks, the higher banks' risk-taking incentives)
  - does not depend on the risk-free deposit rate R_t^D, which is the MP instrument (because of perfect competition and constant returns, R_t^D does not affect the spread $R_t^R - R_t^S$ governing banks' risk-taking incentives)

OPTIMAL MP AND PP

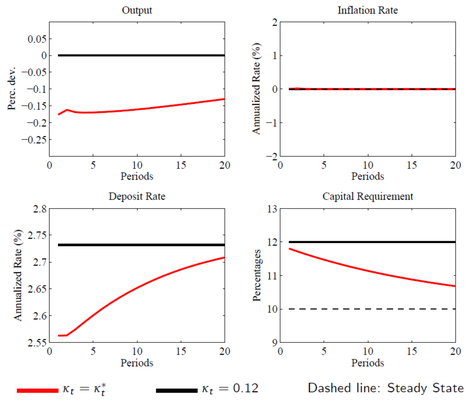
- Let $(R_v^{D*})_{v \geq 0}$ denote the MP that is Ramsey-optimal when PP is $(\kappa_v)_{v \geq 0} = (\kappa_v^*)_{v \geq 0}$
- If the right derivative of welfare with respect to κ_t at $(R_v^D, \kappa_v)_{v \geq 0} = (R_v^{D*}, \kappa_v^*)_{v \geq 0}$ is strictly negative for all $t \geq 0$ ("Condition C"), then the policy $(R_v^D, \kappa_v)_{v \geq 0} = (R_v^{D*}, \kappa_v^*)_{v \geq 0}$ is locally Ramsey-optimal
  - setting κ_t **just below** κ_t^* is not optimal, because it triggers a discontinuous increase in the amount of risk
  - setting κ_t **just above** κ_t^* is not optimal, because it has a negative first-order welfare effect that cannot be offset by any change in R_t^D around its optimal steady-state value R^{D*} (as this change would have a zero first-order effect)
- We check numerically, using Levin and López-Salido's (2004) "Get Ramsey" program, that Condition C is met
- It is met because increasing κ_t from κ_t^* decreases the capital stock, which is already inefficiently low due to the monopoly and tax distortions

RESULTS (cont'd)

NUMERICAL SIMULATIONS

- We calibrate the model and consider two alternative PPs:
  - the optimal PP $\kappa_t = \kappa_t^*$, with a steady-state value $\kappa^* = 0.10$
  - the passive PP $\kappa_t = 0.12$, which also ensures $l_t^R = 0$
- Following shocks affecting banks' risk-taking incentives (η_t^R, ϕ_t, γ_t), optimal MP moves opposite to optimal PP in order to mitigate its macroeconomic effects:

Responses to a positive η_t^R shock



EXTENSIONS

- **Extension 1**: introduce productivity shocks on S positively correlated with productivity shocks on R (leaving MP still unable to affect the type of credit)
- **Extension 2**: assume that banks' marginal monitoring cost is increasing in the aggregate volume of loans [as in Hachem (2010)] (so that MP is now able to affect the type of credit):

Responses to a positive intermediate-goods-sector-productivity shock