Macroprudential policy and the conduct of monetary policy

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Incorporating Financial Stability into Inflation Targeting
25 November 2011, Istanbul

Warning, disclaimer and advertisment

This presentation does not reflect the view of Banque de France

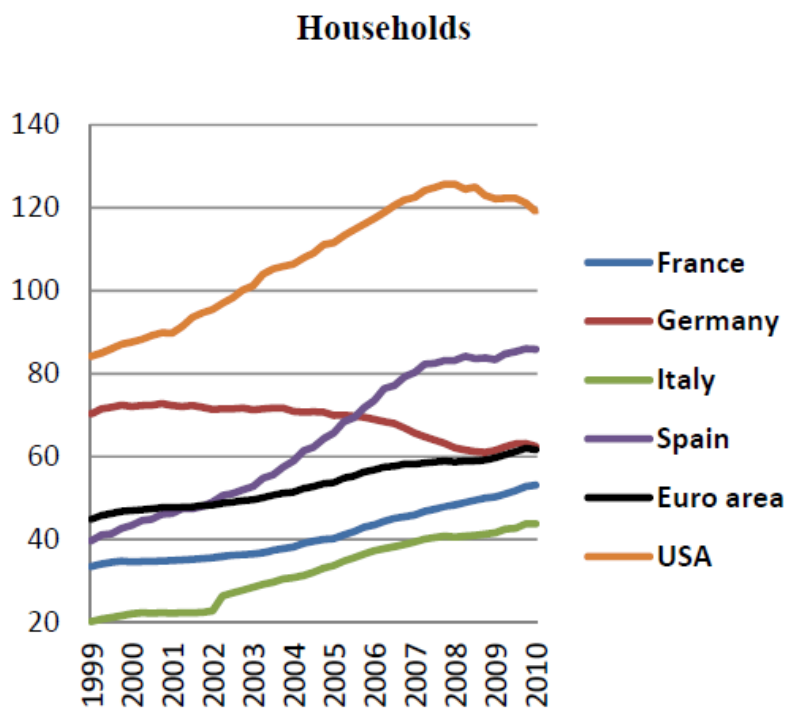
Results are very preliminary

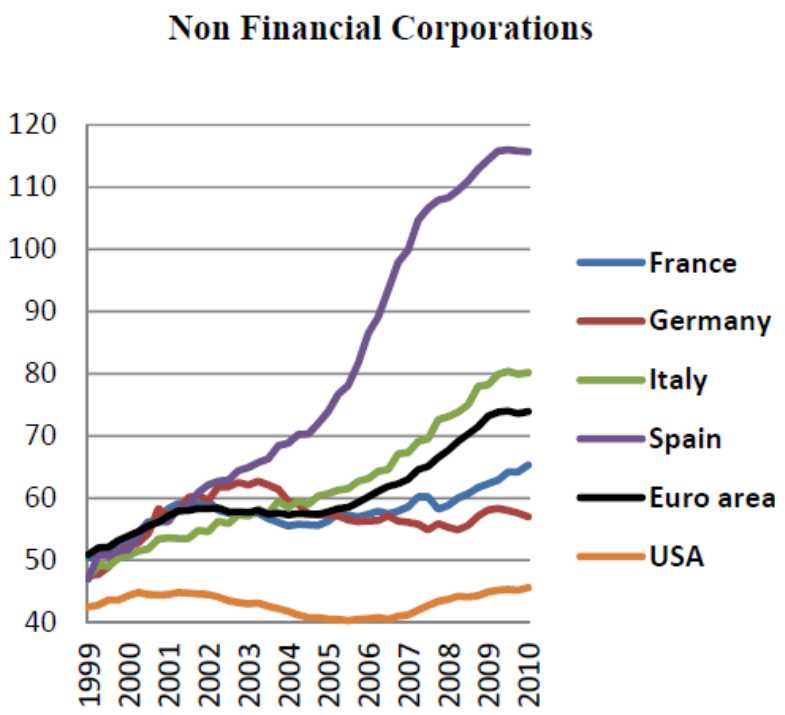
Twin "research" paper: Would Macroprudential Policies have Prevented the Great Recession? by P. Antipa (BdF), E. Mengus (TSE) and B. Mojon (BdF)

Comments very welcome

Stylized facts

Build up of financial imbalances and...

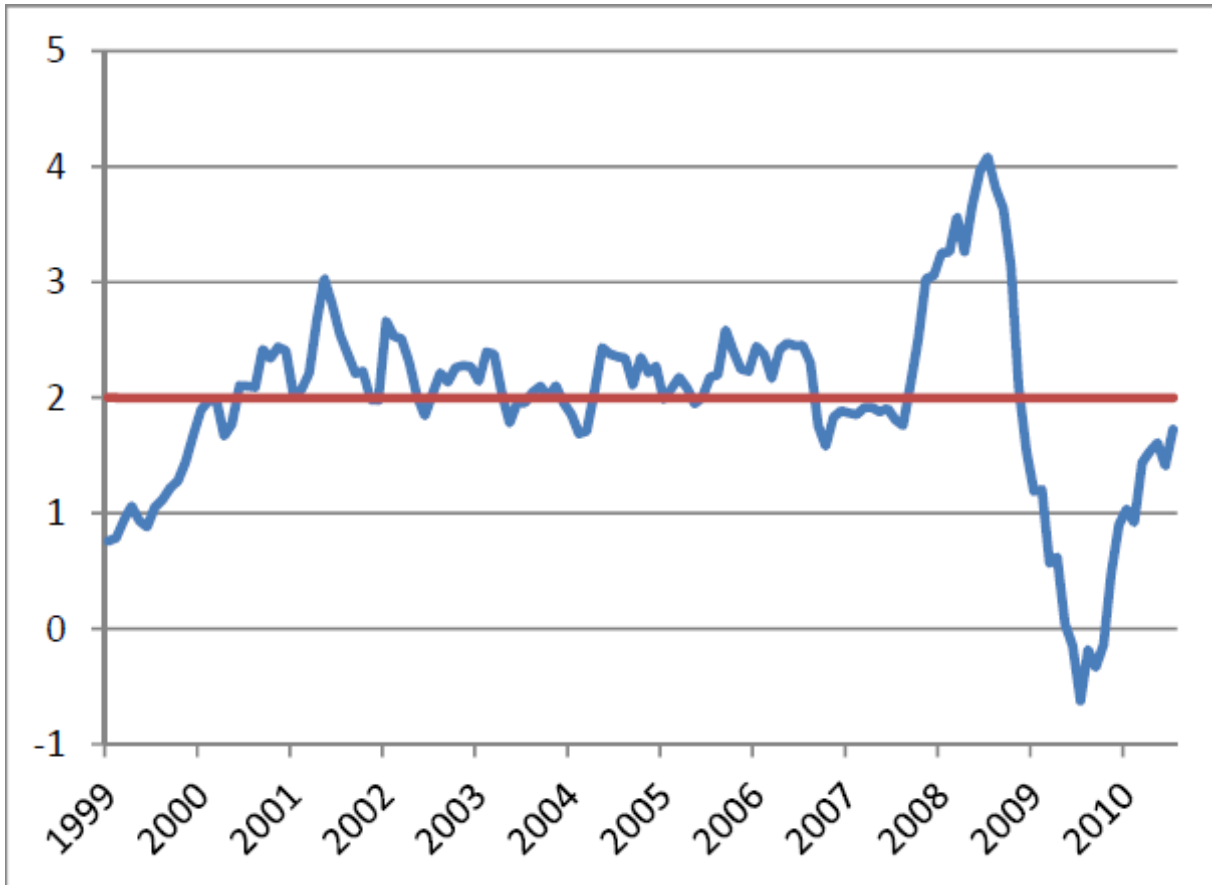




Stylized facts

euro area inflation

...



The set up of macroprudential policies

- **In the US**: Financial Stability Oversight Council
  Headed by the Treasury
  Independent from the Fed
- **In the UK**: Financial Policy Committee
  Within the Bank of England
  Bring together micro & macro-prudential policies
- **In Europe**: European Systemic Risk Board
  Independent from the ECB
  But draws heavily from the ECB
  Lack of effective and autonomous regulatory tools

Motivation

- Institutional context: evaluate impact of new macroprudential regulation (Basel 3) on monetary policy
- Design a model which is (at least somewhat) relevant for this assessment: a role for credit constraints and asset prices
- Assess the relative efficiency of macroprudential policies and monetary policy

Outline

What interaction between monetary and macro-prudential policies
Allude to the model and present the 4 policy regime considered

Report estimation results for euro area (and US), 1985-2010 quarterly

Evaluate efficient macro prud. and monetary policy

The Model

The Iacoviello model
4 alternative policy regimes

Programs of agents in general equilibrium

New-Keynesian framework along the lines of Iacoviello (2005)

- Two types of households (borrowers and savers, former more impatient)
- For entrepreneurs and impatient households, the Euler equation depends on the housing accumulation collateral constraint
- (We are currently moving to only one type of household)

Patient households' program

Maximize:

$$E_0 \sum_{t=0}^{\infty} \left(\beta^P\right)^t \left(\ln c_t^P + j_P \ln h_t^P - \frac{\left(l_t^P\right)^{\eta_P}}{\eta_P} \right)$$

subject to the budget constraint

$$c_t^P + q_t \Delta h_t^P + \frac{R_t B_{t-1}^P}{\Pi_t} = B_t^P + w_t^P l_t^P + F_t$$

First order conditions yield:

$$\begin{aligned}
\frac{1}{c_t^P} &= \beta^P E_t \frac{R_{t+1}}{\Pi_{t+1} c_{t+1}^P} \\
w_t^P &= \frac{\left(l_t^P\right)^{\eta_P - 1}}{c_t^P} \\
\frac{q_t}{c_t^P} &= \frac{j_P}{h_t^P} + \beta^P E_t \frac{q_{t+1}}{c_{t+1}^P}
\end{aligned}$$

Entrepreneurs' program

$$E_0 \sum_{t=0}^{\infty} (\beta^e)^t \ln c_t^e$$

subject to the budget constraint:

$$\begin{aligned} \frac{Y_t}{X_t} + B_t^e &= c_t^e + q_t \Delta h_t^e + \frac{R_{t-1}^e B_{t-1}^e}{\Pi_t} \\ &\quad + w_t^P l_t^P + I_t + \xi_{e,t} + \xi_{K,t} \end{aligned}$$

and the borrowing constraint:

$$B_t^e \leq \theta_t^e E_t \frac{h_t^e q_{t+1} \Pi_{t+1}}{R_t}$$

Entrepreneurs - Production

The production function is Cobb-Douglas:

$$Y_t = A\left(K_{t-1}\right)^{\xi}\left(h^e_{t-1}\right)^{\nu}\left(I^P_t\right)^{(1-\xi-\nu)}$$

The capital acculumation follows:

$$K_t = I_t + (1-\delta)\,K_{t-1}$$

Entrepreneurs - First order conditions

First order conditions are: Euler equation:

$$\frac{1}{c_t^e} = \beta^e E_t \frac{R_t^e}{\Pi_{t+1} c_{t+1}^e} + \psi_t R_t$$

Labor demand:

$$w_t^P = (1 - \mu - \nu) \frac{Y_t}{N_t^P X_t}$$

Housing stock accumulation:

$$\frac{q_t}{c_t^e} \left(1 + \phi_h \frac{\Delta h_t^e}{h_{t-1}^e}\right) = \frac{j_P}{h_t^e} +$$
$$\beta^e E_t \left(\frac{q_{t+1}}{c_{t+1}^e} \left(1 + \phi_h \frac{\Delta h_{t+1}^e}{h_t^e}\right) + \psi_t \theta_t^e q_{t+1} \Pi_{t+1}\right)$$

First policy regime

Benchmark Plain Taylor Rule

Monetary Policy takes the form of an estimated Taylor rule allowing for interest rate inertia

$$R_t = R_{t-1}^{\delta_r}(\overline{R}\pi_{t-1}^{(1+\delta_\pi)}(\frac{Y_{t-1}}{Y})^{\delta_y})^{(1-\delta r)}$$

where $\overline{R}$ and Y are the steady state interest rate and output
This is the policy regime assumed for the estimations in the three countries.

Second policy regime

Augmented Taylor Rule

Monetary Policy also reacts to credit developments

$$R_t = R_{t-1}^{\delta_r}(\overline{R}\pi_{t-1}^{(1+\delta_\pi)}(\frac{Y_{t-1}}{Y})^{\delta_y}(\frac{b_{t-1}\Pi_{t-1}}{b_{t-2}\Pi_{t-2}})^{\delta_b})^{(1-\delta r)}$$

Third (and fourth) policy regime

Combine Plain TR (Aug. TR) + targeted lean against credit

The volume of credit obtained by impatient households and entrepreneurs is

$$B_t \leq \theta_t E_t(\frac{q_{t+1} h_t \Pi_{t+1}}{R_t})$$

And macroprudential policy takes the form "corseting" the loan to value multiplier as

$$\theta_t = \kappa(1 + \epsilon_t^{\theta}) \left(\frac{B_{e,t-1}}{B_e^{ss}} \right)^{-\mu}$$

Estimation

Sample: Euro area, US and UK, 1985-2009 period

8 Observables: real GDP and consumption, residential investment, house prices, inflation, 3-month Libor, credit and real wages

8 Shocks: Preferences, time and housing, credit supply, investment efficiency, cost-push, productivity, monetary policy and residual demand

Methodology: Series are detrended seperately, Bayesian estimation à la Smets and Wouters in Dynare

Efficient policies and counterfactuals

- We minimise a "**standard" monetary policy loss function** with respect to the parameters of the policy rules

$$Loss = \sigma_{\pi} + w_y \sigma_y + w_R \sigma_R$$

- This minimisation is conducted for each of the four policy regimes

- We then rerun the model with the estimated shocks applying the efficient policy rule coefficients

Preview of the main preliminary results (before the pictures)

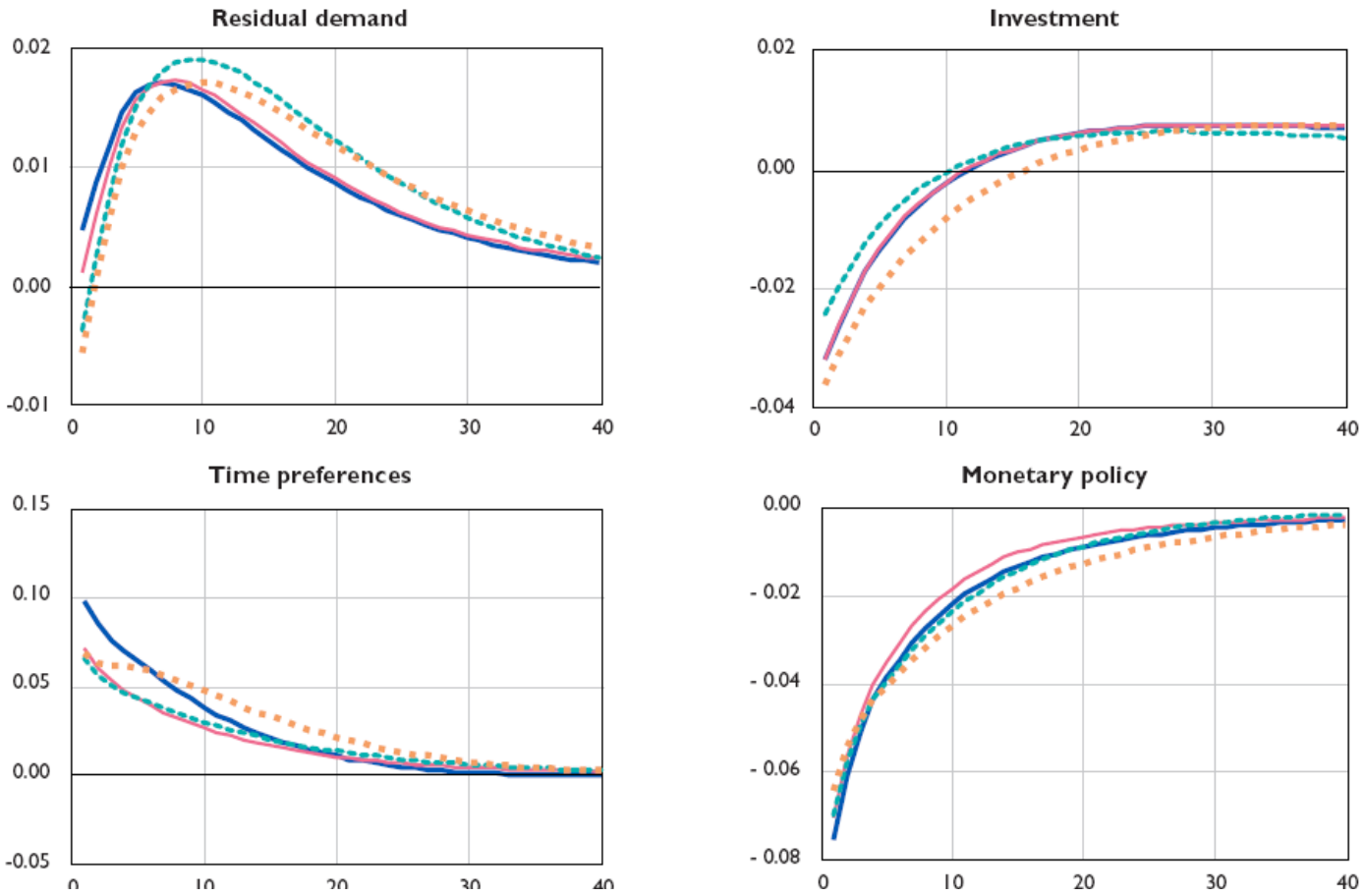
- What changes for inflation dynamics? The policy regime matters only for financial and housing shocks.
- Financial and housing shocks have been so persistent that macroprudential policy would have made a difference if it existed: it would have slowed credit, economic growth and inflation and avoided the Great Recession

Estimation results for the euro area (1/2)

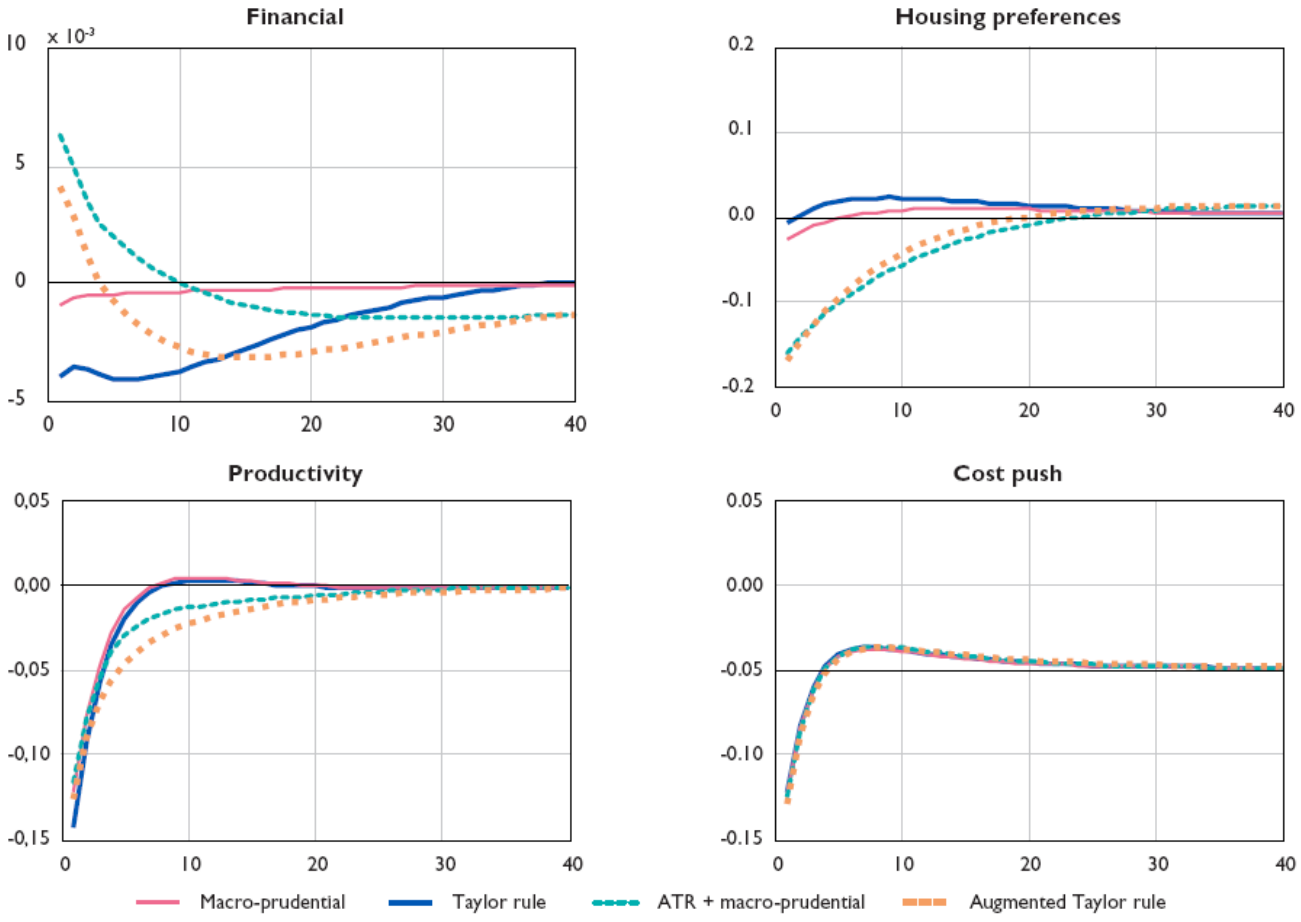
Variance decomposition of the variables according to the model

Euro area 1985-2010 sample								
	Inv. Speci	Y/L	Demand	Hous. Pref	Credit	Mon pol	Fiscal	Cost push
Y	48.01	1.25	4.05	13.88	0.26	8.10	3.88	20.56
Cons	36.76	1.47	4.38	20.66	0.26	9.58	1.69	25.20
Inv	83.47	0.47	2.47	3.96	0.25	2.85	0.40	6.13
inflaq	3.70	8.97	13.56	15.39	0.17	5.44	1.41	51.34
R	1.73	31.25	46.38	3.97	0.69	5.68	5.08	5.23
qh	2.26	1.57	0.13	94.69	0.09	0.25	0.30	0.70
credit	0.18	0.02	0.18	43.56	55.85	0.08	0.02	0.12
wage	3.96	56.30	1.37	25.56	0.15	4.94	6.28	1.44
inflan	4.69	9.57	18.11	18.46	0.24	6.99	1.92	40.02

Estimation results (2/2)



Estimation results (2/2)



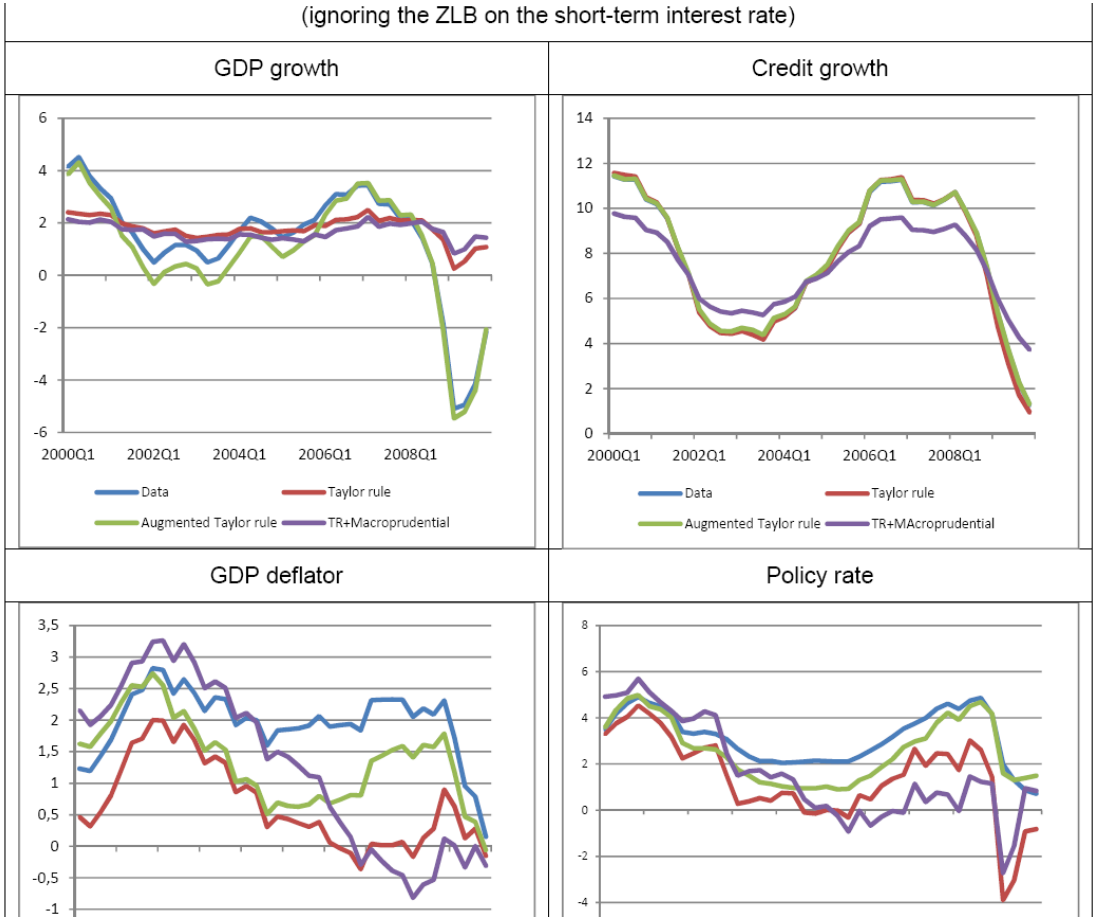
Efficient policies (1/2)

	Interest rate	Inflation	GDP	Credit	Macro Prudential Policy
Estimated Taylor rule coefficients (1985-2010)	0.82	1.72	0.43		
Optimized coefficients (weights inflation, GDP, and interest variability =1)					
Joint optimisation of all policy parameters in each regime					
1 Plain Taylor rule	0.32	1.63	1.33	-	-
2 Augmented Taylor rule	0.67	1.51	0.21	0.04	-
3 PTR + macro-prudential	0.31	1.63	1.35	-	0.74
4 ATR + macro-prudential	0.68	1.51	0.17	0.03	0.51
Optimisation of Taylor rule coefficients for a given macro-prudential policy (tau = 0,5)					
5 Plain Taylor rule	0.26	1.67	1.15		0.50
6 Augmented Taylor rule	0.68	1.51	0.17	0.03	0.50
Optimized coefficients (weights on the variability of inflation = 1, GDP = 0.05 and interest rate = 2.5)					
Joint optimisation of all policy parameters in each regime					
7 Plain Taylor rule	0.66	1.93	0.56	-	-
8 Augmented Taylor rule	0.70	1.50	0.13	0.01	-
9 PTR + macro-prudential	0.87	1.65	0.43	-	0.61
10 ATR + macro-prudential	0.70	1.50	0.13	0.00	0.50
Optimisation of Taylor rule coefficients for a given macro-prudential policy (tau = 0,5)					
11 Plain Taylor rule	0.86	1.63	0.40		0.50
12 Augmented Taylor rule	0.73	1.50	0.13	0.00	0.50

Efficient policies (2/2)

	GDP	CPI	Interest rate	Loss 1	Loss 2
Stabilization effects of optimized policies (weights inflation, GDP, smoothing =1)					
1 Plain Taylor rule	0.20	0.49	0.96	1.65	-
2 Augmented Taylor rule	0.65	0.28	0.61	1.54	-
3 PTR + macro-prudential	0.17	0.39	0.82	1.38	-
4 ATR + macro-prudential	0.53	0.52	0.79	1.83	-
Stabilization effects of optimized policies (constrained by given macro-prudential policy, above weights)					
5 Plain Taylor rule	0.19	0.36	0.78	1.33	-
6 Augmented Taylor rule	0.53	0.52	0.79	1.83	-
Stabilization effects of optimized policies (weights inflation 1, GDP 0.05, smoothing 2.5)					
7 Plain Taylor rule	0.40	0.54	0.92	-	2.86
8 Augmented Taylor rule	0.82	0.54	0.82	-	2.63
9 PTR + macro-prudential	0.51	0.42	0.65	-	2.07
10 ATR + macro-prudential	0.59	0.50	0.75	-	2.42
Stabilization effects of optimized policies (constrained by given macro-prudential policy, above weights)					
11 Plain Taylor rule	0.52	0.22	0.40	-	1.26
12 Augmented Taylor rule	0.60	0.49	0.74	-	2.37

Would Macroprudential Policies have prevented the Great Recession?



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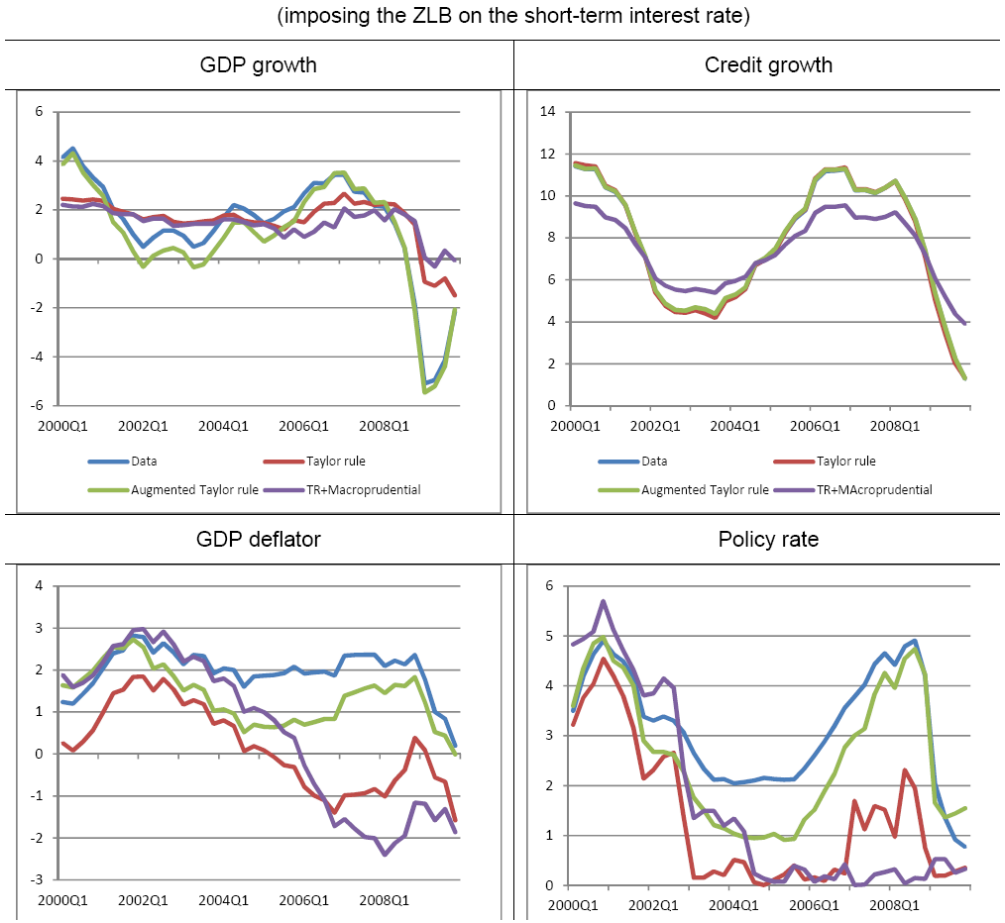

Summary of the main results

1. Use models to test new macro-prudential policies and their interference with monetary policy, estimated à la Smets-Wouters for the euro area and the US
2. We compare 4 policy regimes (with and without Macro Prud $\times$ simple or aug. TR)
3. Macro Prud should facilitate the conduct of monetary policy. It neutralises shocks from the financial sector.
4. Best possible outcome is one where monetary policy and macro-prudential policy use separate instruments