Macroeconomic stabilization policies: Grafting macro-prudential tools in a macroeconomic framework

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Outline of the presentation

1. Motivation
2. The macroeconomic framework
3. Macro-prudential policy
4. Interaction between monetary and macro-prudential policies
5. Conclusions and further research

1. Motivation

- Global financial crisis has prompted an intense debate on role of macroprudential policy in achieving financial stability
- Broad agreement that macro-prudential policies should tackle systemic risk
- Less agreement on definition of macroprudential policy and choice of instruments

1. Motivation (cont'd)

- Systemic risk is "*a risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy*" (definition adopted by G20)
- Definition is vague and dependent on time- and economy-specific circumstances
- Hard to model in a macroeconomic framework

1. Motivation (cont'd)

Paper studies:

- role of macro-prudential policies
- interaction between macro-prudential and monetary policies

using a general equilibrium model with financial frictions and a simplified banking sector, estimated for the euro area over the period 1998:1-2009:1

- Paper is part of a research project going on at Banca d'Italia on macroeconomic effects of changes in bank capital regulation

2. The model

- New Keynesian core with real and nominal frictions
- Financial frictions and heterogeneous agents
- Housing as collateral for loans by households, physical capital for loans to entrepreneurs
- Monopolistic competition in banking sector
- Banks raise deposits and grant loans
- Role for bank capital in supply of loans

For the interested reader, see "*Credit and Banking in a DSGE model of the euro area*", forthcoming, and "*Pro-cyclicality of capital requirements: is it a problem? How to fix it?*", forthcoming

2. The model (cont'd)

- Varying capital-to-assets ratio is costly
- Quadratic term captures (in a reduced form, *ad hoc way*) trade-offs involved with holding bank capital

$$R_t = r_t - \kappa^b \left(\frac{K_t^b}{L_t} - \nu \right) \left(\frac{K_t^b}{L_t} \right)^2 + mkp_t$$

K^b bank capital, J^b bank profits and L total loans

- The lower the capital asset ratio, the higher the interest rate charged on loans. Issue of symmetry

2. The model (cont'd)

Gerali *et al.* (2010):

$$a\left(\frac{K_t^b}{L_t}-\nu\right)^2$$

ANP's paper:

$$a\left(\frac{K_t^b}{w_t^F L_t^F + w_t^H L_t^H}-\nu_t\right)^2$$

Basel II weights (defined and estimated in Angelini *et al.*, 2009)

Time-varying capital requirements

3. Macro-prudential policy

- Several proposals to reduce pro-cyclicality induced by Basel II have been put forward
- One possibility is to adjust capital requirements in a countercyclical fashion

$$\nu_t = (1-\rho_\nu)\bar{\nu} + (1-\rho_\nu)\chi_\nu X_t + \rho_\nu \nu_{t-1}$$

- Countercyclical regulatory policy: $\chi_\nu > 0$
- X_t is an information variable, e.g. loans or output growth, loans-to-output ratio

3. Macro-prudential policy (cont'd)

- Policy-maker tries to stabilize output and loans-to-output ratio by minimising loss function

$$L^{mp} = \sigma^2_{l/y} + k_y \sigma^2_Y + k_v \sigma^2_{dv}$$

- Macro-prudential policy should ensure "*the stable provision of financial intermediation services to the wider economy, [avoiding]* the boom and bust cycle in the supply of credit …" (Bank of England, 2009)

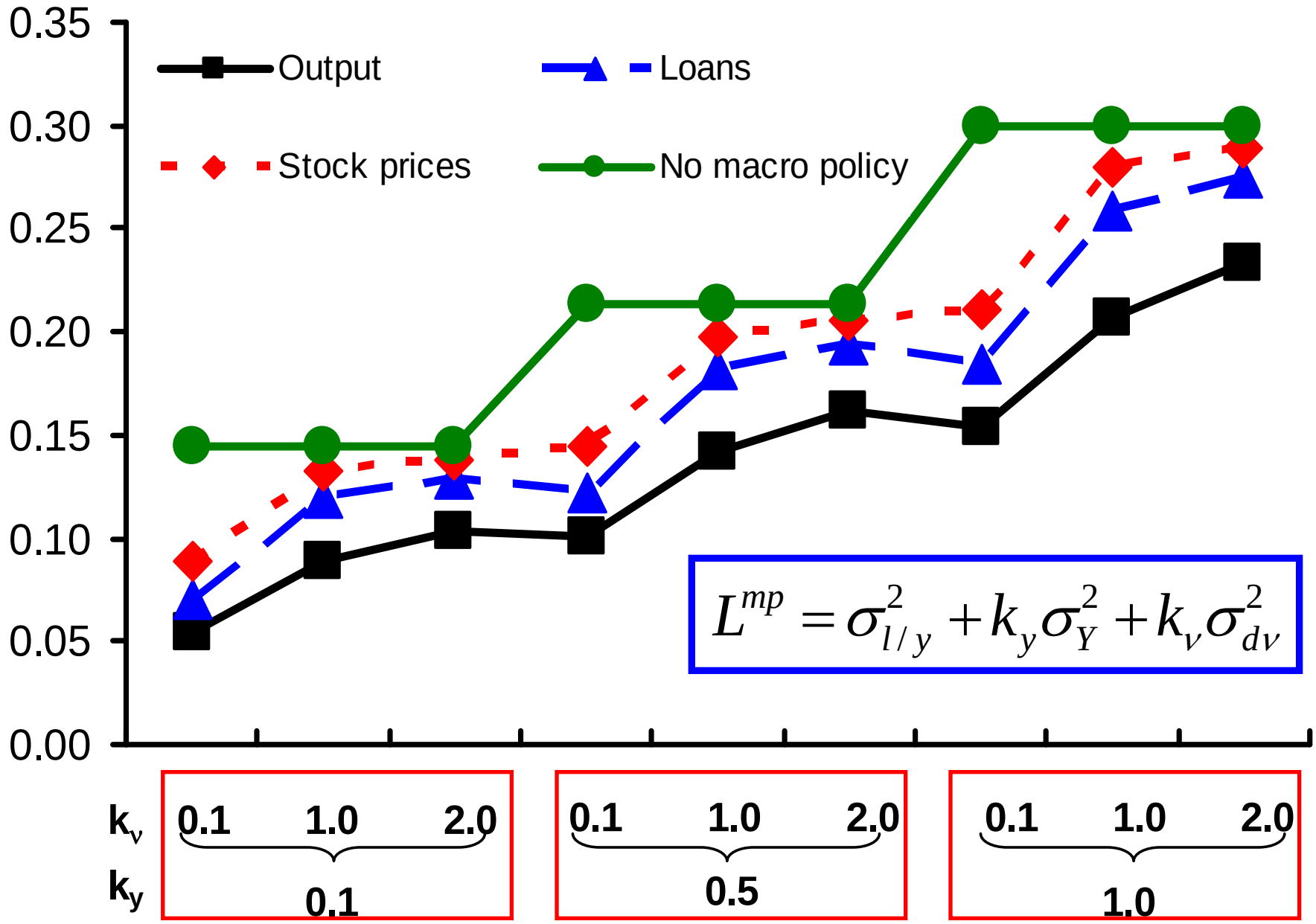
3. Macro-prudential policy (cont'd)

- Models with borrowing-constrained agents are characterized by over-borrowing (e.g. Bianchi, 2010)
- Credit constraints link agents' debt to asset prices
- Credit externality induces private agents to over borrow as agents do not take into account effects of additional borrowing on asset prices
- Justification for stabilizing loan-to-output ratio

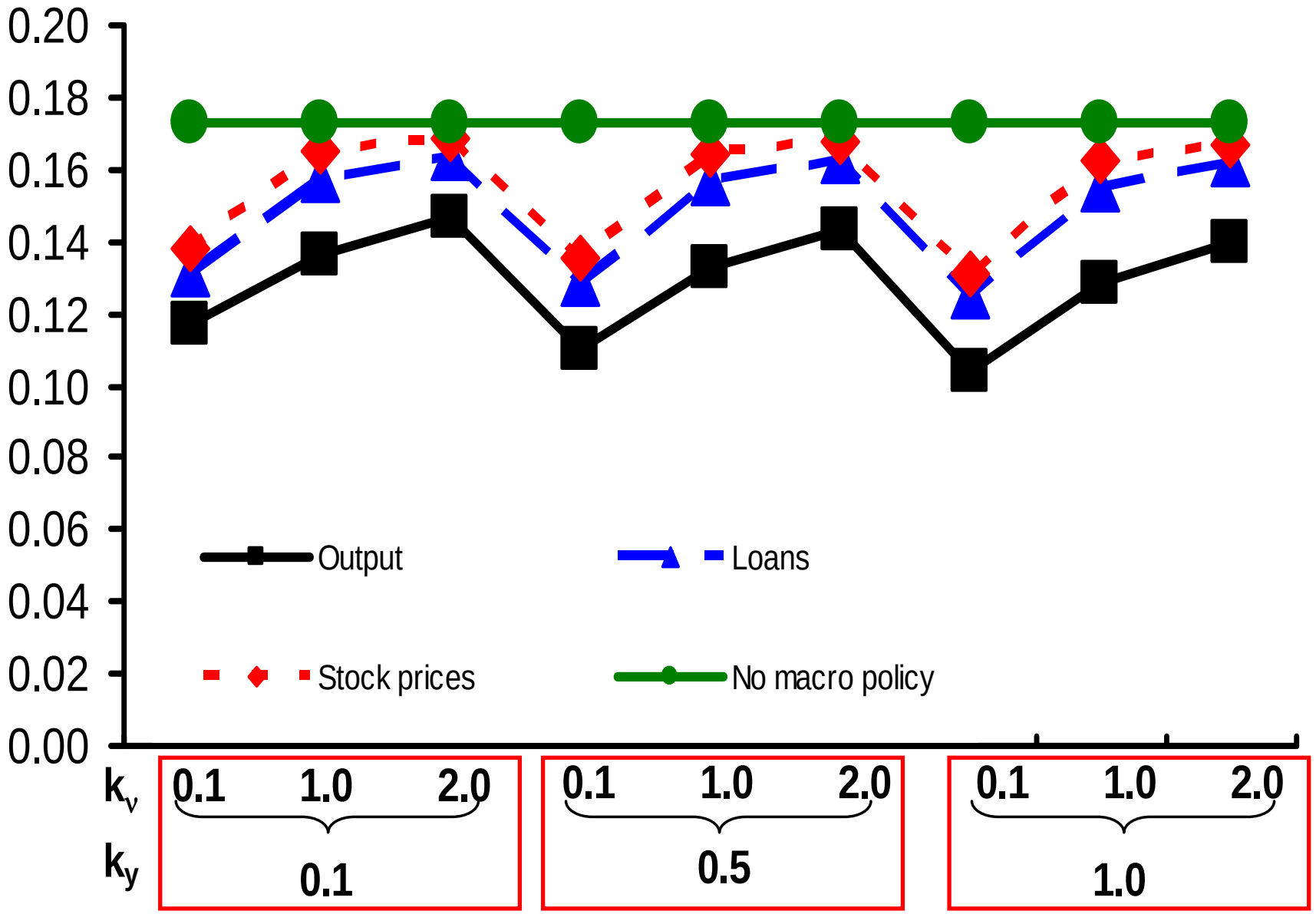
3. Macro-prudential policy (cont'd)

- Find parameters of rule (ρ_v, χ_v) that minimise loss
- Experiment with different versions of rule: output growth, loans growth or equity prices growth
- Assume economy is driven by technology or financial shocks (i.e. shocks to bank capital)
- For the moment, take monetary policy as given

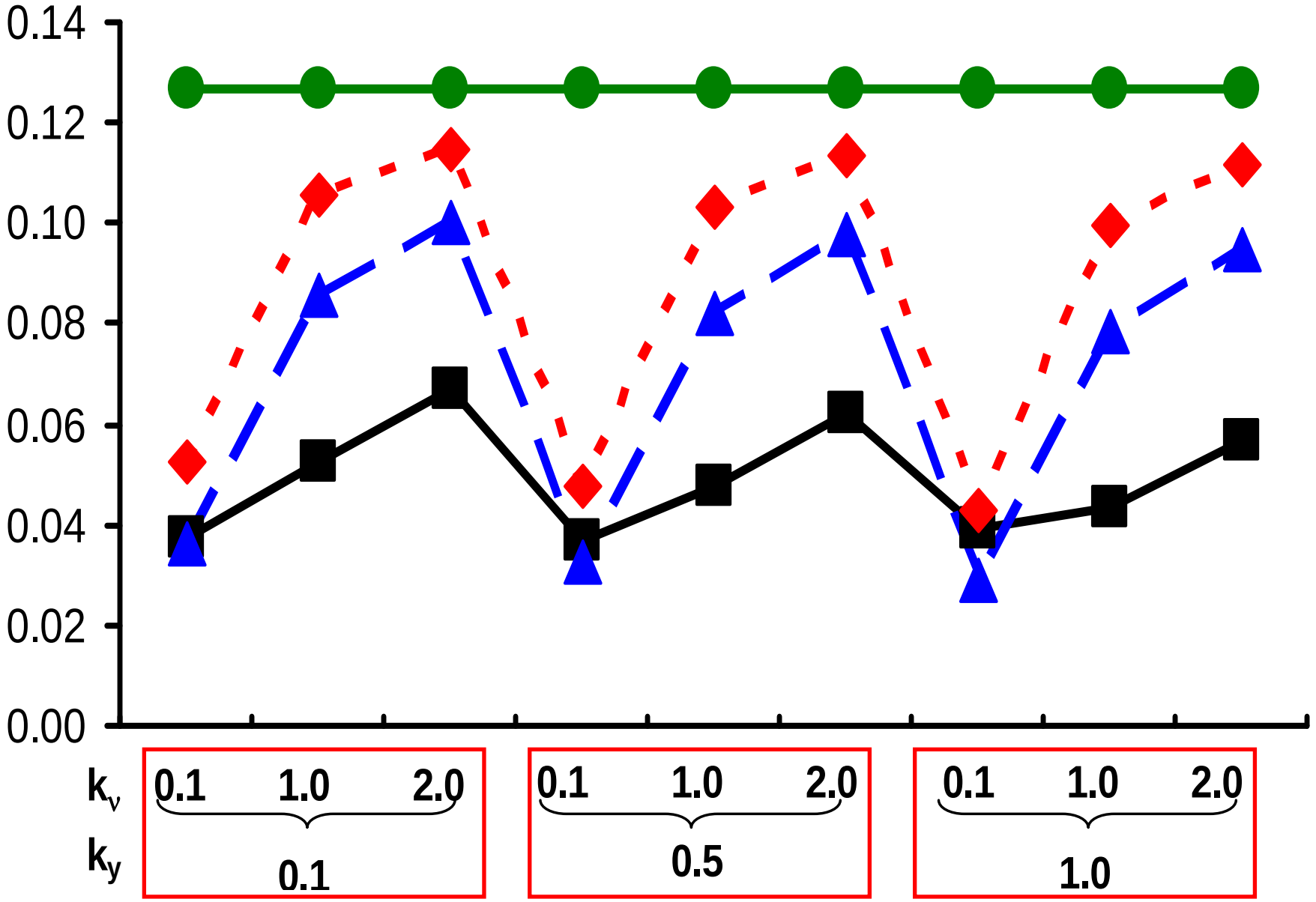
Loss under a technology shock: capital req. rule



Output volatility under a technology shock: capital req. rule



Loans-output volatility under a technology shock: capital req. rule



3. Macro-prudential policy (cont'd)

- We find a role for active management of macro-prudential policy
- LTV ratios on loans to HHs as policy instrument: best outcomes when responding to loans growth
- Active management of capital requirements is more effective than managing LTV ratios in reducing volatility of output
- But, benefits not large

4. Interaction

- Should macro-prudential authority and central bank cooperate? Should macro-prudential tools be assigned to central bank?
- **Cooperative** game: a single policymaker has two instruments, policy rate and capital requirements
- **Non-cooperative** game: each policymaker has her own instrument and objective

$$L^{mp} = \sigma^2_{l/y} + k_{y,mp}\sigma^2_Y + k_\nu \sigma^2_{d\nu}$$

$$L^{cb} = \sigma^2_\pi + k_{y,cb}\sigma^2_Y + k_r \sigma^2_{dr}$$

Table 1 – Games between the monetary policy and the macro-prudential authority: Key features of the cooperative and Nash equilibria

	Cooperative equilibrium	Non-cooperative equilibrium	Monetary policy only (no macroprudential policy)
Monetary policy			
ρ_R	0.9988	0.9990	0.9990
χ_π	2.0127	1.7093	1.7090
χ_y	0.9573	61.5092	1.0107
Macroprudential			
ρ_v	0.9990	0.9859	0
χ_v	1.9779	-3.7726	0
Joint loss	0.12037	0.12347 (2.6)	-

$$R_t = \rho_R R_{t-1} + (1-\rho_R)[\chi_\pi \pi_t + \chi_y (y_t - y_{t-1})]$$

$$v_t = (1-\rho_v)\bar{v} + (1-\rho_v)\chi_v X_t + \rho_v v_{t-1}$$

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Macroprudential			
ρ_ν	0.9990	0.9859	0
χ_ν	1.9779	-3.7726	0
Volatilities			
σ_π	0.48	0.50 (5.7)	0.48 (-0.2)
σ_y	3.27	3.23 (-1.2)	3.39 (3.8)
$\sigma_{L/y}$	1.05	1.05 (0.1)	-
$\sigma_{\Delta r}$	0.13	2.16 (1618)	0.09 (-24.5)
$\sigma_{\Delta \nu}$	0.66	1.29 (95.2)	-

4. Interaction (cont'd)

- Similar results hold when we consider a financial shock (i.e. an exogenous fall in bank capital) together with shocks to aggregate demand

- This combination of shocks resembles 2008 financial crisis

- Results are robust to different weights attached to variance of output in loss functions of monetary and macro-prudential policies

5. Conclusions and further research

- Paper finds a role for active management of macro-prudential policy; benefits not large

- Paper highlights potential conflict between macro-prudential and monetary policies

- Results suggest that close cooperation between two policies is desirable as it results in lower volatility of policy instruments

5. Conclusions and further research (cont'd)

We plan to experiment with:

- alternative specification of macroprudential policy rules (e.g. reaction to loans-output ratio)
- forward- or backward-looking policy rules
- asymmetric capital requirements

We would also like to study:

- Effects of liquidity ratio
- Macro-prudential policies with asymmetric loss functions

Thank you