

# “Appropriate macroeconomic policy for complex economies”

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The opinions expressed in this discussion are personal and do not necessarily reflect the views of the European Central Bank

# Summary

- Ambitious paper. Many non mainstream features. Interesting applications
- Focus on heterogeneity/distributional issues, not just aggregate variables
- Policy analysis

## General points

- How different from mainstream DSGE models?
- Model validation
- Policy analysis: what is the benchmark?

## Differences compared to mainstream models

- "Emergent properties of a simulated system in which **heterog. agents routinized behaviors** are aggregated [...] The outcomes result from the local interactions between a decentralized collection of **boundedly rational agents**"
- "Routinized behaviour" means "ad hoc" assumptions (eg hand-to-mouth consumers, wages adjusted through specific rule, evolution of firms' mark up)
- Is bounded rationality a plus for policy analysis—compared to optimising behaviour under incomplete information?

## Example: financial frictions

- Working capital assumption (consumption goods firms have to pay wages in advance)
- Exogenous loan-to-value ratio (ie leverage) constraint + interest rate spread as an exogenous function of credit rating (determined by banks within 4 quartiles). Explicit heterogeneity. Cyclical properties?
- Compare to CSV model: leverage is endogenous; spread is jointly determined with leverage and countercyclical (but no heterogeneity)

## Differences compared to mainstream models

- "Crises and failures [...] in agent based models can be endogenously created"
- Complex treatment of firm specific innovation, but ultimately "technology shocks" – endogenous financial crises?
- How important is nonlinearity? How different is a "crisis" from a normal recession?

## How different from mainstream models

- Mainly concerning "ad hoc" assumptions
  - Perhaps more realistic, but unclear at the moment
  - Illustrate the effects of a financial crisis—destruction of firms' net worth? How different from a large technological recession?
  - Is nonlinearity important?



# Model validation

- Complex model. Need to resort to numerical analysis. Calibration as in standard models. "The model is able to robustly account for a wide set of empirical stylised facts"
- How strict is the empirical validation? "Consumption [...] net investment, changes in inventories, productivity, nominal wages, inflation [...] firms debt and bank profits are procyclical; unemployment, prices, markups [...] and bank losses are countercyclical".
- $C_t = w_t$ ; constant spreads?

# Model validation

Description	Symbol	Value
Number of firms in capital-good industry	$F_1$	50
Number of firms in consumption-good industry	$F_2$	200
Number of commercial banks	$B$	10
Consumption-good firm mark-up rule	$\mu_2$	0.20
Uniform distribution supports	$[\phi_1, \phi_2]$	[0.10,0.90]
Wage setting $\Delta \overline{AB}$ weight	$\psi_1$	1
Wage setting $\Delta cpi$ weight	$\psi_2$	0.05
Wage setting $\Delta U$ weight	$\psi_3$	0.05
Tax rate	$tr$	0.10
Unemployment subsidy rate	$\varphi$	0.40
Target interest rate	$r_{target}$	0.03
Target inflation rate	$dcpi_{target}$	0.02
Banks deposits interest rate	$r_{depo}$	0
Banks reserve interest rate	$r_{res}$	$= (1 - 0.33) * r_t$
Public bonds interest rate	$r_{bonds}$	$= (1 - 0.33) * r_t$
Banks loan rate (class 1)	$r_{deb}$	$= (1 + 0.3) * r_t$
Bank capital adequacy rate	$\tau_b$	0.08
Share of bonds repaid each period	$bonds_{share}$	0.025
Shape parameter for the distribution of banks' clients	$pareto_a$	0.08
Scaling parameter for interest rate cost	$k_{const}$	0.1
Capital buffer adjustment parameter	$beta$	1
Fiscal rule max deficit to GDP	$def_{rule}$	0.03

Table 2: Benchmark parameters

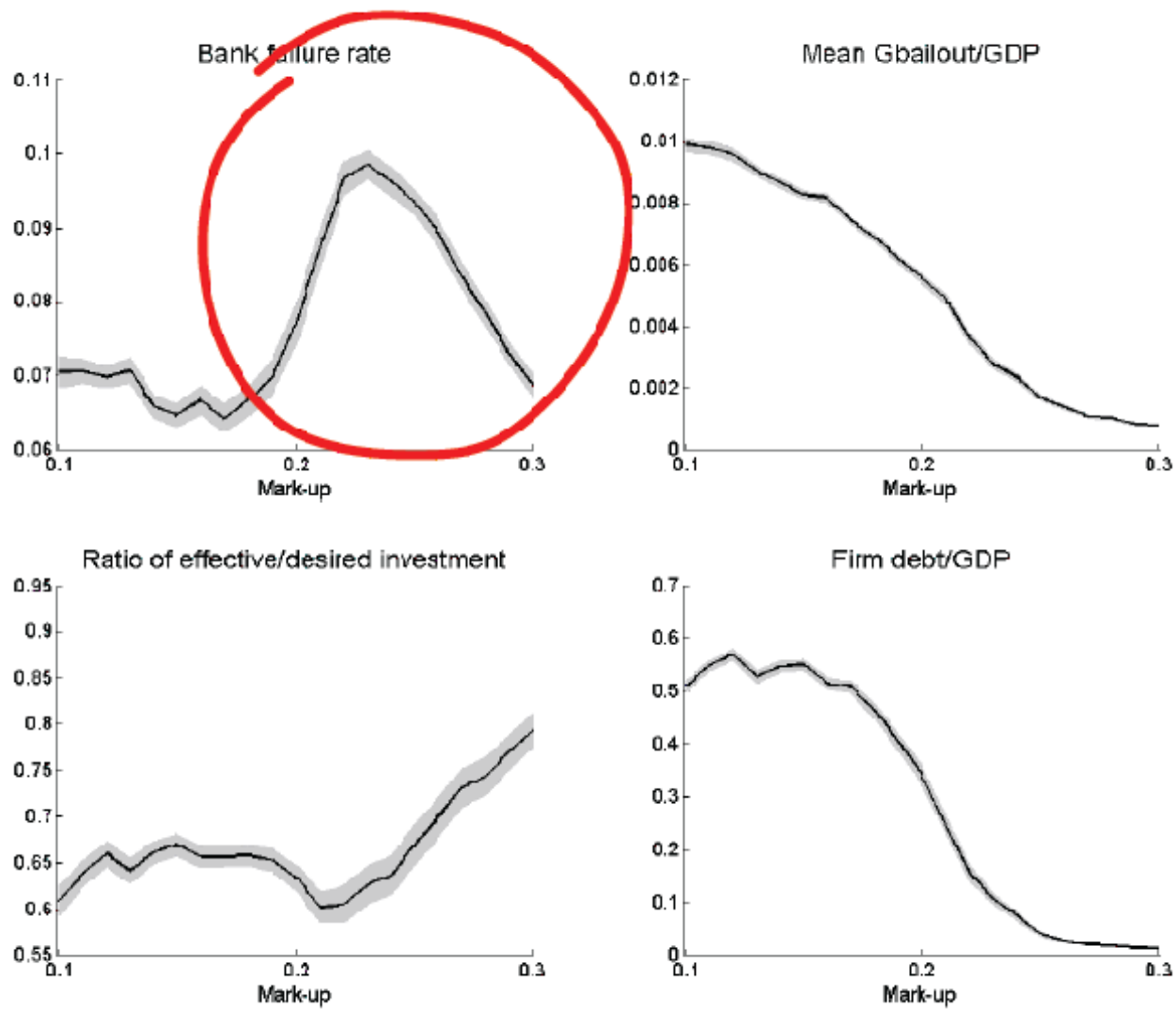
## Model validation

- A more formal quantitative validation would be desirable
  - Can the model replicate the key facts of the financial crisis?

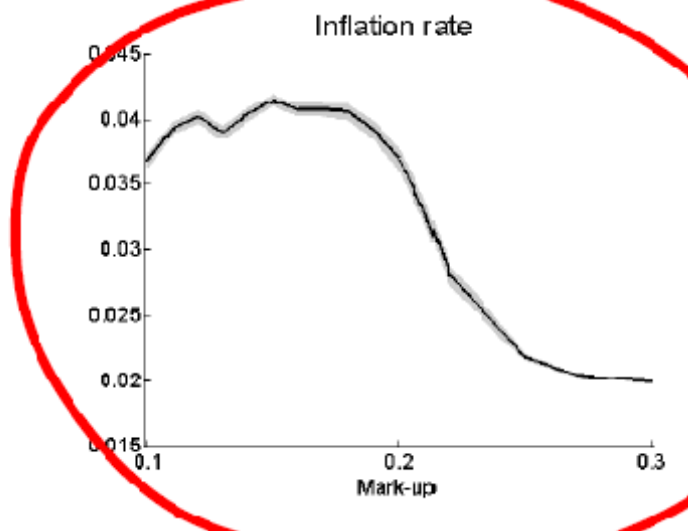
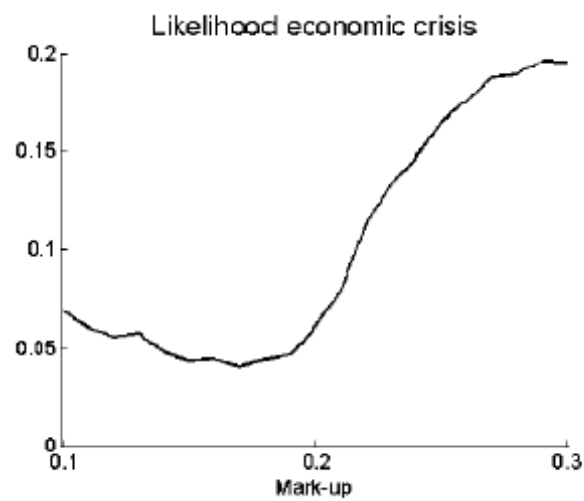
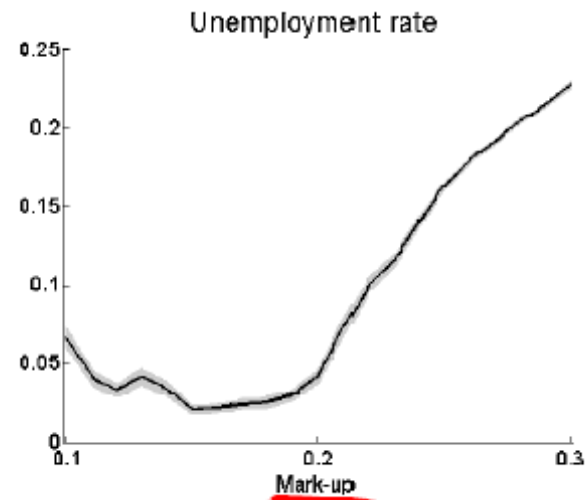
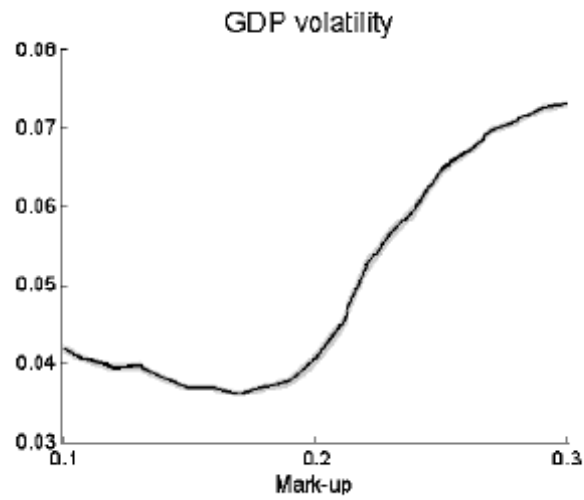
## Model analysis

- " Role of policies under different income distribution levels, by tuning the base mark-up rate of consumption-good firms"
- Is the ultimate objective to improve our understanding of financial crises? Is firms' heterogeneity central?
- More information on the numerical exercise would be useful. Stochastic steady state only?

# Model analysis



# Model analysis



## Policy analysis: assumptions

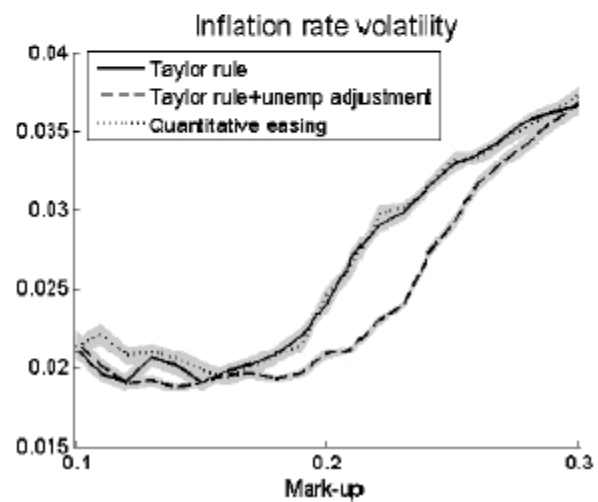
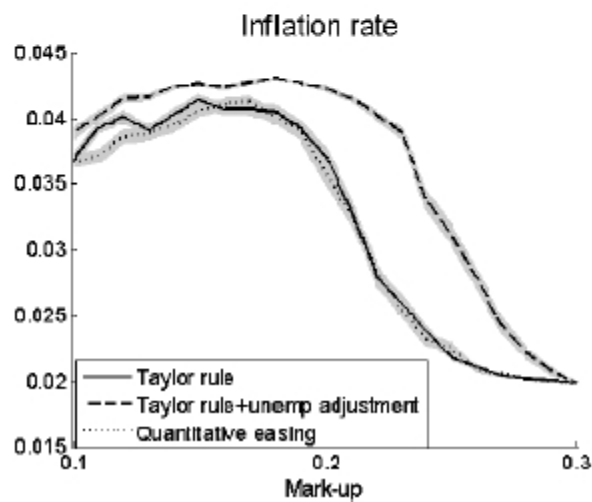
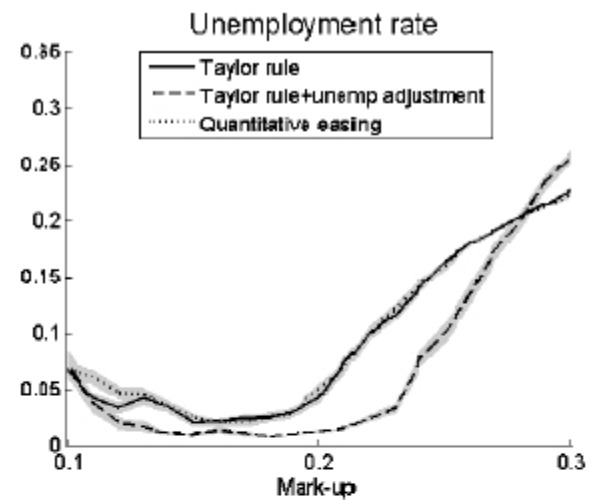
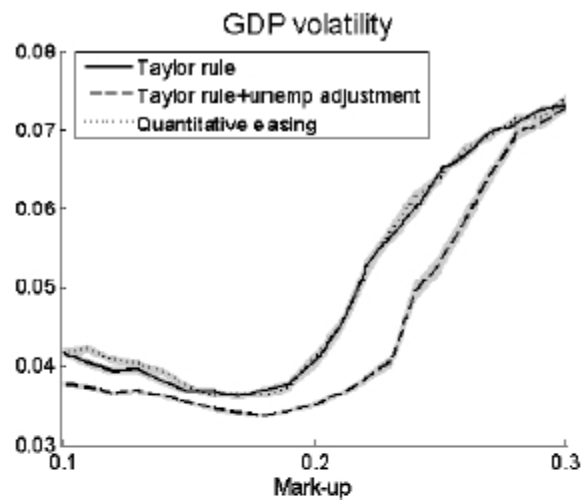
- "Every time a bank fails the government steps in and bails out the bank providing fresh capital" – is this desirable (moral hazard)? Why not alternative forms of public interventions
- "The central bank buys the unsubscribed government debt at zero interest rate". Not realistic.
- Specific monetary policy rule. Why?

# Monetary policy analysis: which benchmark?

- Is it clear that there is scope for government intervention?  
Demand constrained vs credit constrained regimes.
- How is welfare defined?
- "The performance of the economy improves when the CB pursues both price and output stabilisation"



# Monetary policy analysis: which benchmark?



# Policy analysis

- Motivate the many auxiliary assumptions
- Is there an "efficient" benchmark for policy?
- How should we think about welfare?

# Conclusions

- Ambitious paper. Interaction of recessions and income distribution
- Non mainstream approach – intriguing features
- Ready for fiscal and monetary policy experiments?