Trust and Monetary Policy Behavioural Economic Approach

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Objective of this lecture

- To analyze how trust affects monetary policy
- To do so we use a behavioural macro model
  - in which agents have **cognitive limitations** preventing then from having RE
  - they only understand small bits and pieces of the whole model
  - and use **simple rules** to guide their behavior.
- Rationality is introduced through a **selection mechanism**
  - in which agents evaluate the performance of the rule they are following
  - and decide to **switch** or to stick to the rule depending on how well the rule performs relative to other rules.
- We briefly present the model
- Then we analyze trust in monetary policymaking
- and its relevance today

Basic Model structure: New Keynesian

- **Aggregate demand**
- **Aggregate supply (New Keynesian Philips curve)**
- **Taylor rule**

Introducing heuristics: output forecasting

- Two possible forecasting rules
- Fundamentalist rule: agents forecast output gap to return to steady state (negative feedback rule)
- Extrapolative rule: agents extrapolate past output gap (positive feedback rule)

Inflation forecasting

- Two inflation forecasting rules.
  - One “fundamentalist” rule: agents use inflation target as their forecasting rule
  - The extrapolative rule extrapolates inflation from the past into the future.

- Market forecasts are weighted average of fundamentalist and extrapolative forecasts

$$\tilde{\mathrm{E}}_{\mathrm{t}} y_{t+1} = \alpha_{f,t} \tilde{\mathrm{E}}^{\mathrm{f}}_{\mathrm{t}} \mathrm{y}_{\mathrm{t+1}} + \alpha_{e,t} \tilde{\mathrm{E}}^{\mathrm{e}}_{\mathrm{t}} \mathrm{y}_{\mathrm{t+1}}$$

$$\tilde{\mathrm{E}}_{\mathrm{t}} \pi_{t+1} = \beta_{f,t} \tilde{\pi}^{\mathrm{f}}_{\mathrm{t}} \mathrm{y}_{\mathrm{t+1}} + \beta_{e,t} \tilde{\pi}^{\mathrm{e}}_{\mathrm{t}} \mathrm{y}_{\mathrm{t+1}}$$

$\alpha_{f,t}$ $\beta_{f,t}$ = probability agents choose fundamentalist rule

$\alpha_{e,t}$ $\beta_{e,t}$ = probability agents choose extrapolative rule

- Agents select the rule that forecasts best,
- They switch from the bad to the good forecasting rule

Defining animal spirits

- We define an index of market sentiments, S_t, which we call "animal spirits", and which reflects how optimistic or pessimistic these forecasts are.
- S_t can vary between -1 and +1.
  - When $S_t = -1$ all agents expect decline in output gap
  - When $S_t = 1$ all agents expect increase in output gap
  - When $S_t = 0$ optimists and pessimists cancel each other out

Calibrating the model

- We calibrate the model by giving numerical values to the parameters that are often found in the literature
- And simulate it assuming i.i.d. shocks with std deviations of 0.5%

Behavioral model produces endogenous business cycles

- Behavioral model predicts that large booms and busts are a regular feature of reality.
- And that this is made possible by dynamics of animal spirits
- Distribution of output gap is non-Gaussian (excess kurtosis and fat tails)

Defining trust

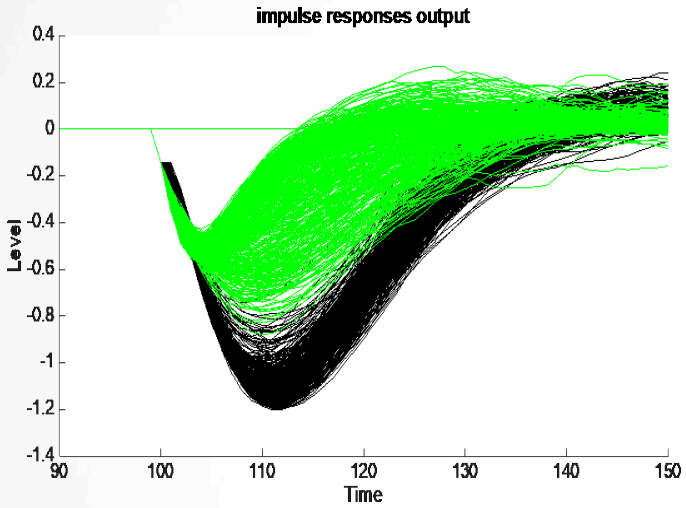
- The first dimension is an institutional one. It is the trust in the central bank that has announced an inflation target. The institutional trust is measured by the fraction of agents $\beta_{f,t}$ using the inflation target as their forecasting rule.
- A second dimension is trust in the future. We will measure this by the degree of optimism or pessimism about future economic activity.
  - We use our index of market sentiments S_t, "animal spirits", which will form the basis for our analysis of trust. This index can change between -1 and +1.

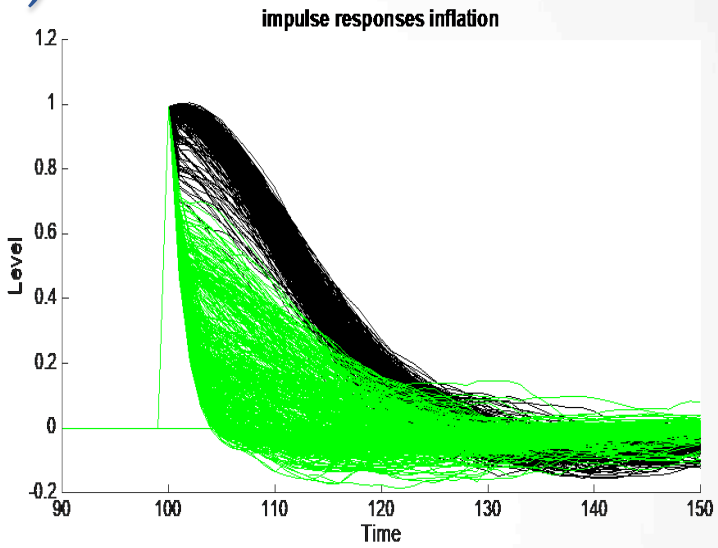
- We analyze the importance of trust in the transmission of shocks
- We focus first on supply shocks
- and analyze big shocks
- We contrast with demand shocks
- We do sensitivity analysis: large versus small shocks

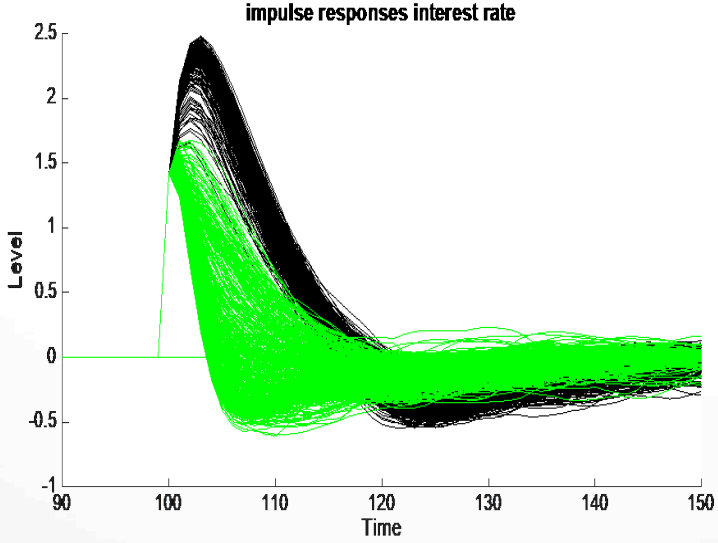
Impulse responses to supply shocks

- We compute 1000 impulse responses to a large supply shock
- Each impulse response is computed for different realizations of the stochastic shocks in the model
- We will see that the initial conditions matter
- A very large shock, i.e. a 10 standard deviation shock.
  - It corresponds to the size of the shock observed in early 2020
  - when GDP dropped by 10% to 20% in many countries as a result of the worldwide shutdown of production.
- Impulse responses are expressed as multipliers, i.e. they are divided by the shock

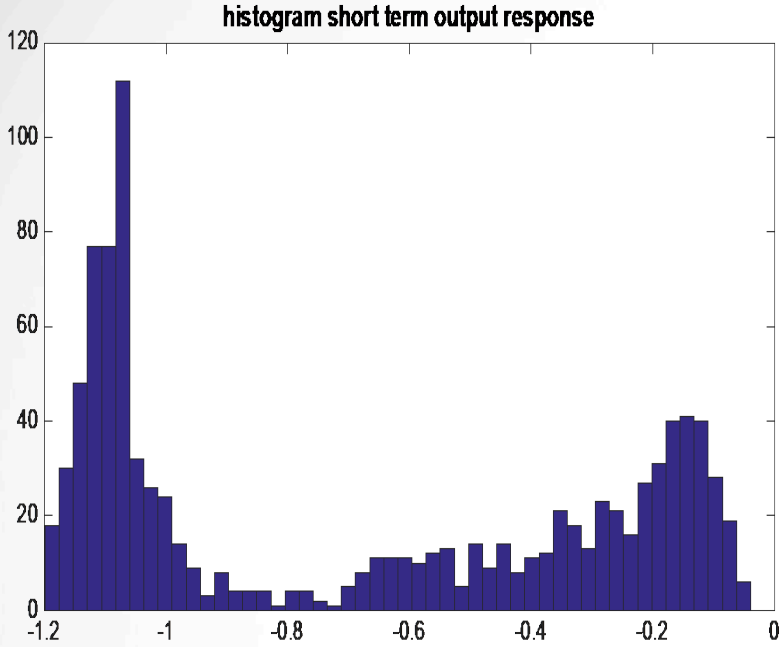
Impulse responses: Large supply shock (10 std)

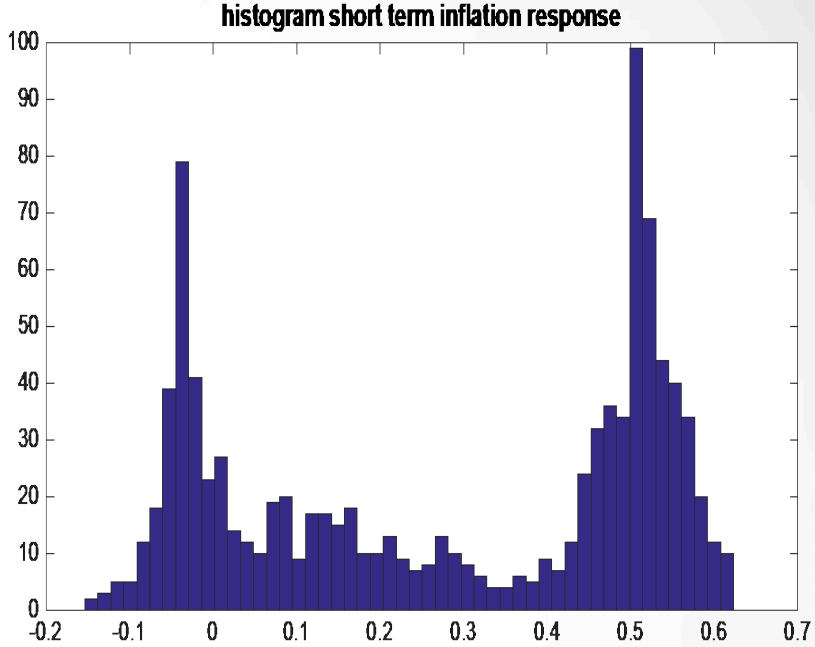


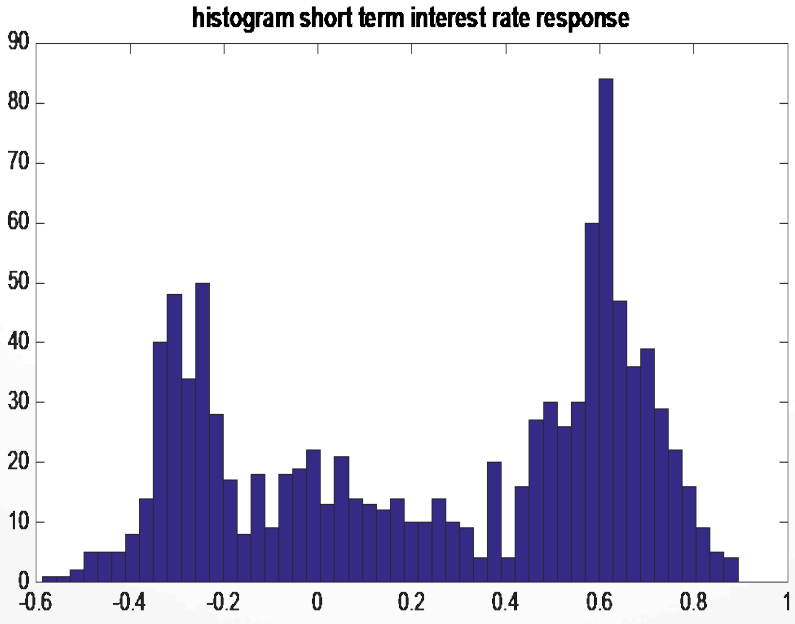




Frequency distribution of impulse responses (12 periods after shock)







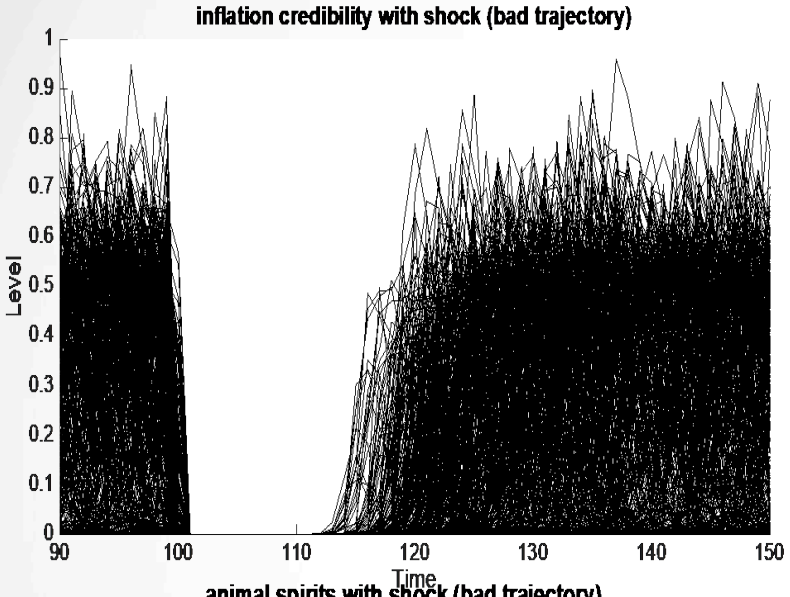
Why do bifurcations occur?

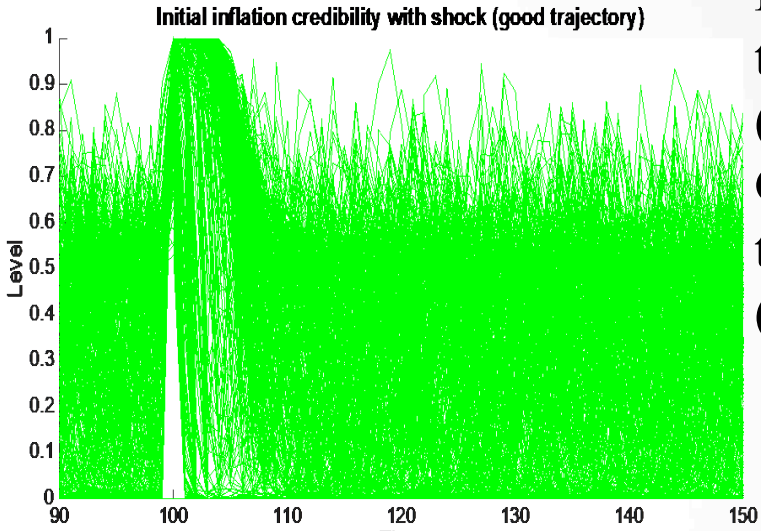
- The bad trajectory is characterized by the fact that immediately after the shock we obtain a limit solution,
  - the inflation credibility drops to zero and animal spirits drop to -1.
  - This means that the mean reverting processes (negative feedback rule) in the expectations formations are switched off and only the extrapolating dynamics (positive feedback rule) is left over.
  - This creates a destabilizing dynamics that keeps the output gap low and inflation high.

How are these trajectories connected to our measures of trust?

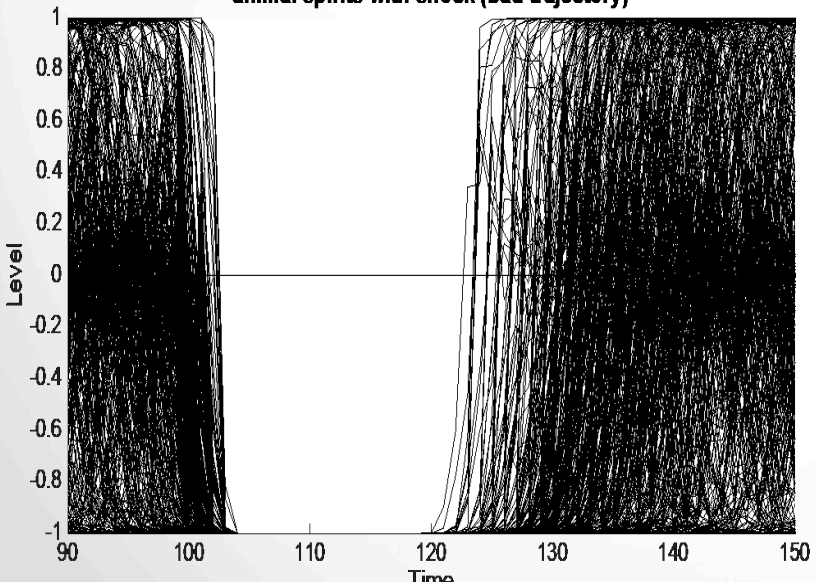
- We show the answer in next figure.
- This presents the evolution of the animal spirits and credibility before and after the supply shock
- Since we run the model 1000 times we obtain 1000 trajectories for these two variables.

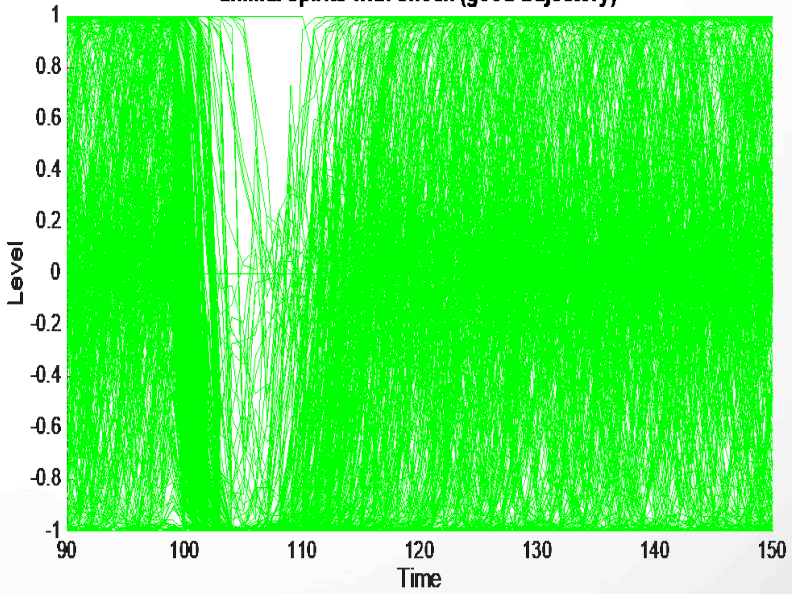
Trust: Inflation credibility and animal spirits with large supply shock





Bad trajectories (in black); Good trajectories (in green).





Role played by initial conditions

- In order to get stuck into bad trajectory, initial conditions must be bad:
  - high inflation expectations and low output.
  - these bad initial conditions make it possible for the large negative shock to push the system towards the limits of zero credibility and extreme pessimism.

- When initial conditions are favorable :
  - low inflation expectations and optimism about the economy
  - same negative supply shock does not push credibility and animal spirits against its limits.
  - **Mean reverting** processes continue to do their work of softening the impact of the supply shock and one ends up in a good trajectory.
- Thus, favourable initial conditions work as a **buffer** preventing large shocks from hitting the boundaries and preventing a collapse of trust.
- Thus, trust is key in smoothly returning the economy to equilibrium.

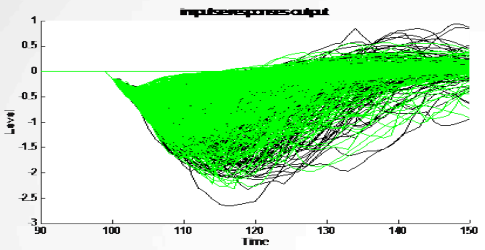
Negative demand shocks

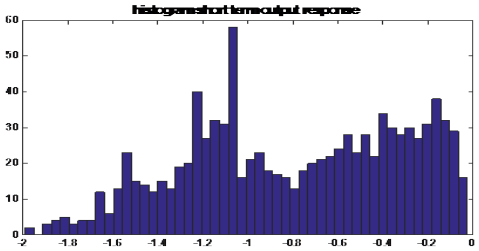
- We analyze large negative demand shocks
- We find similar bi-modal distribution of the impulse responses but less pronounced than in the supply shock
- Explanation:
  - In contrast to a supply shock, a demand shock does not put the central bank in a dilemma situation.
  - Both output and inflation decline and therefore give an unequivocal signal to the central bank that the interest rate should decline.

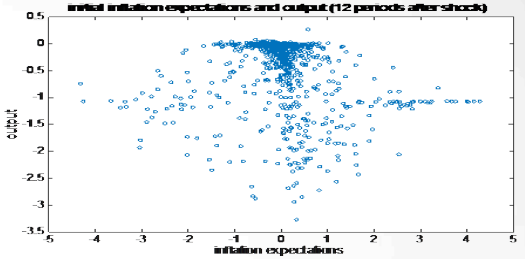
- We find that following the negative shock in demand trust in the central bank (inflation credibility) is very little affected in the bad trajectory and not at all in the good trajectory.

Sensitivity analysis

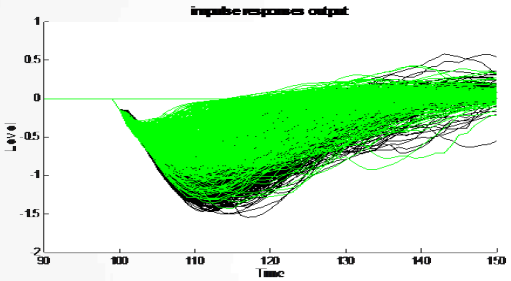
Supply shock = 1

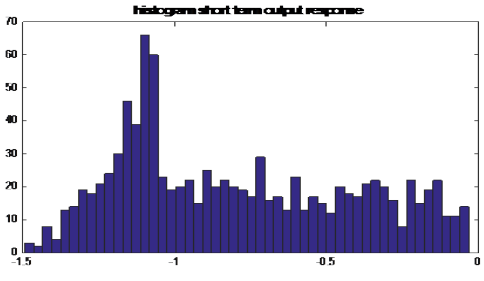


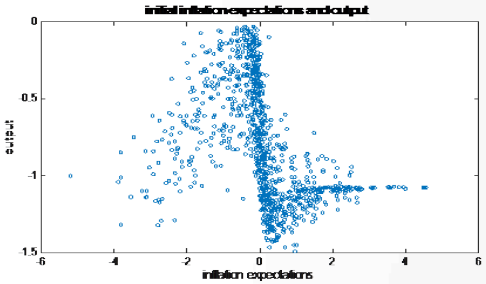




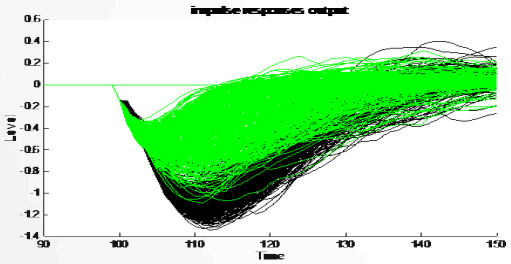
Supply shock = 3

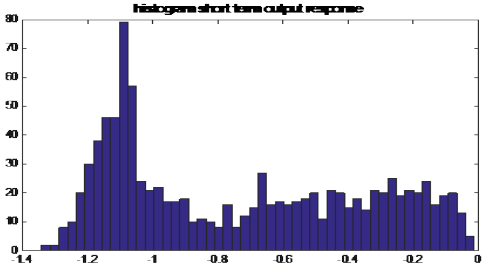


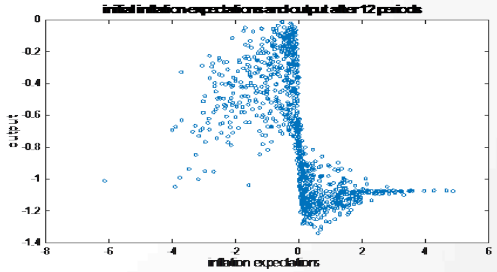




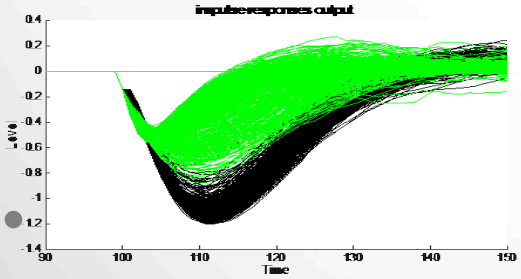
Supply shock = 5

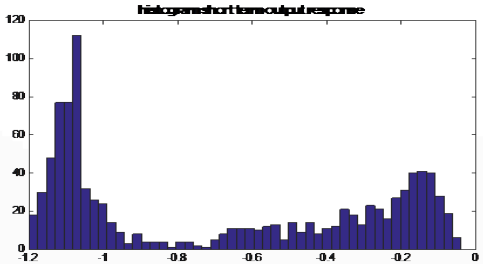


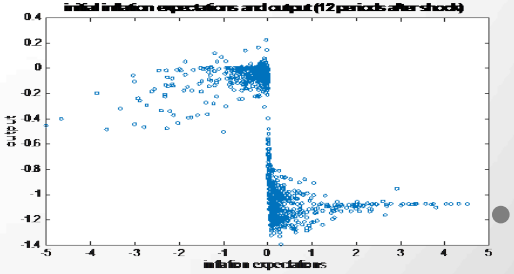




Supply shock = 10





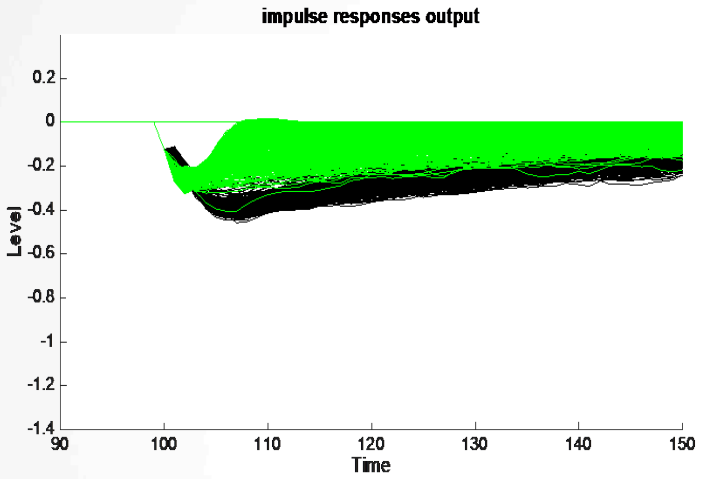


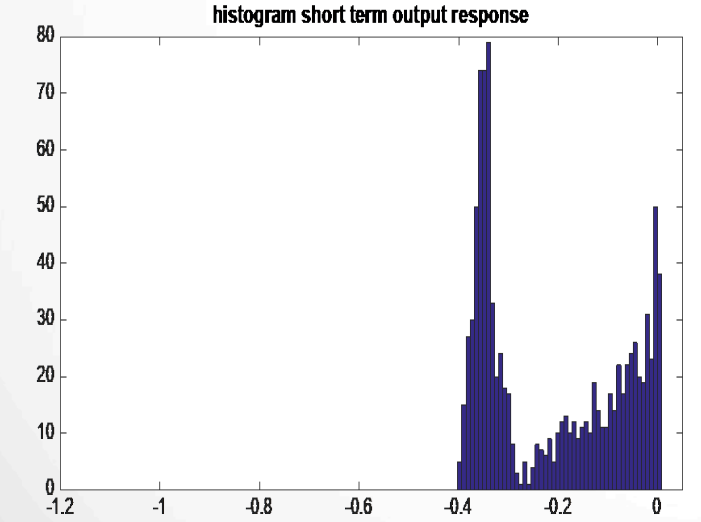
The power of output stabilization: supply shock

- The intensity of output stabilization is measured by the output parameter (c2) in the Taylor rule equation.
- We have set c2 routinely equal to 0.5 in the previously reported results.
- Here we ask the question of how a stronger stabilization effort affects the transmission of a large supply shock.
- We distinguish two output stabilization intensities,
  - a strong one (c2=2)
  - and a normal one (c2=0.5).

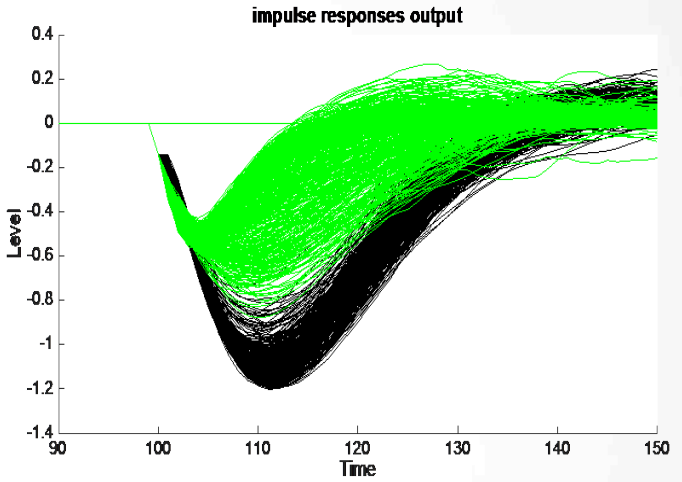
Transmission of large supply shock under strong and normal stabilization

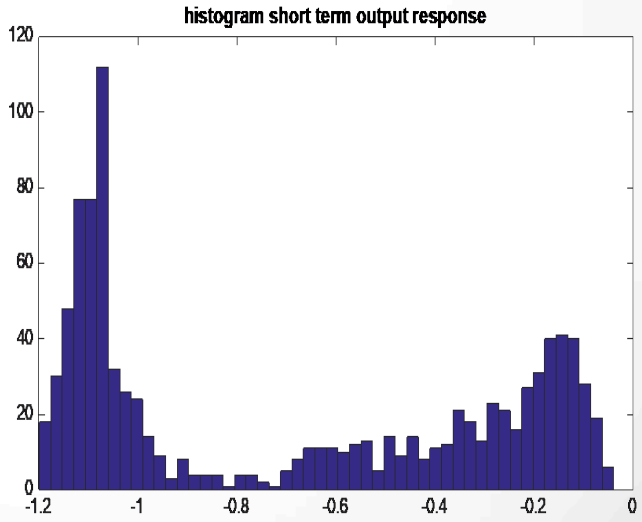
Strong stabilization (c2=2)





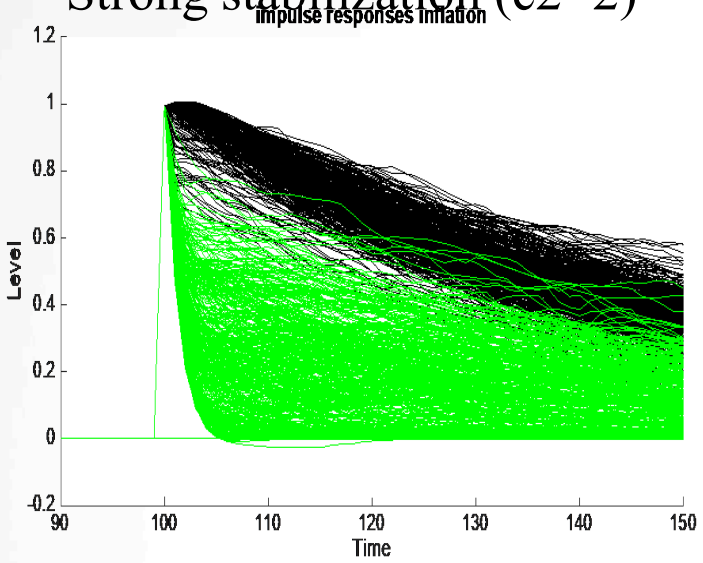
Normal stabilization(c2=0.5)

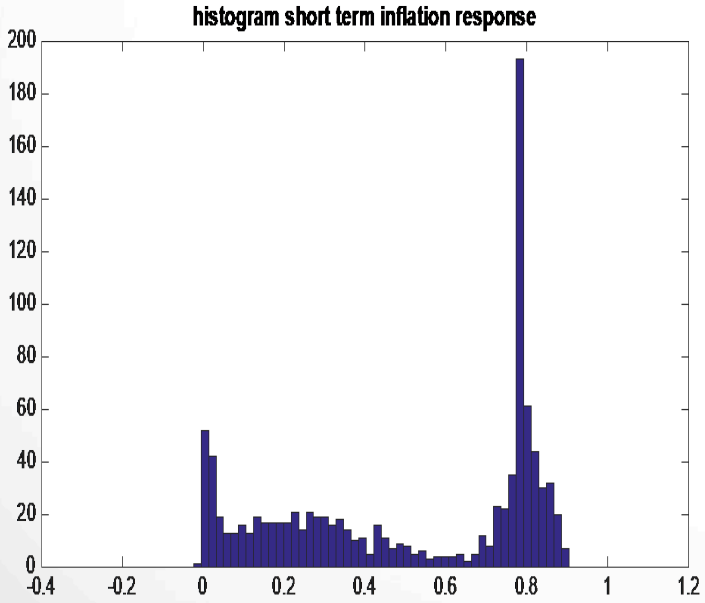




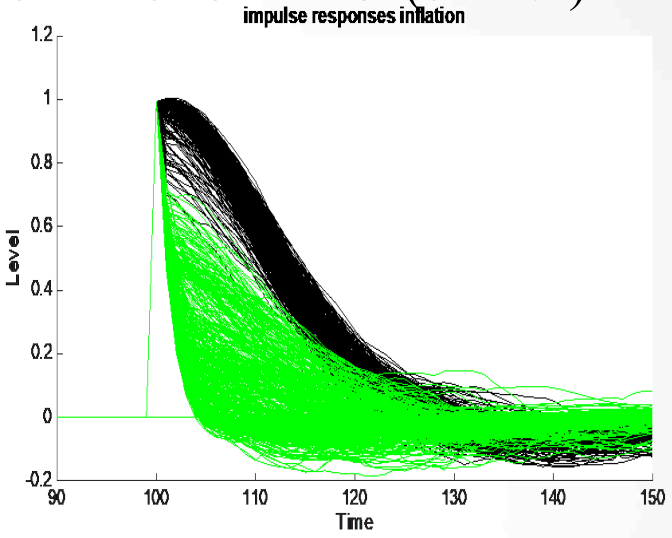
Price paid for strong output stabilization

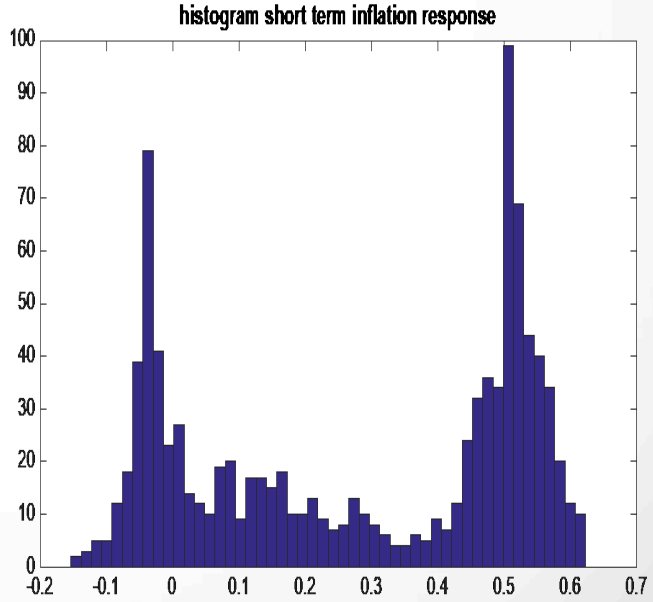
Strong stabilization (c2=2)





Normal stabilization(c2=0.5)



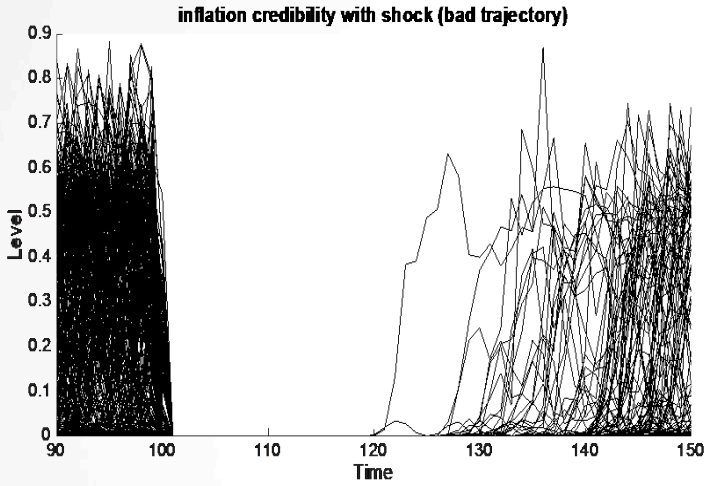


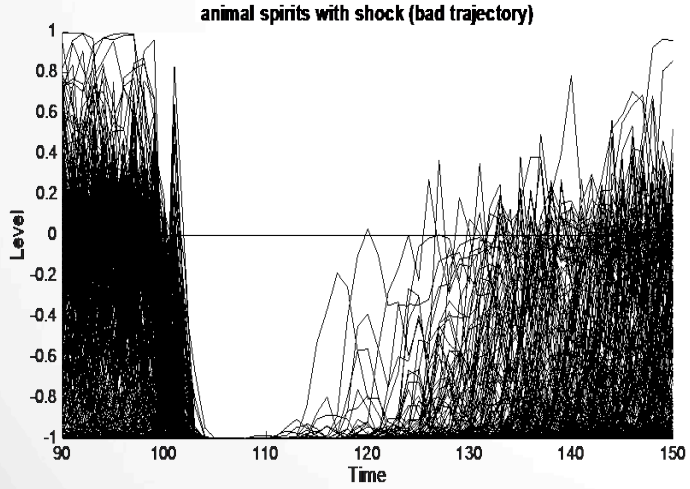
Output stabilization and trust

- How does output stabilization by the central bank affect trust after large shocks?

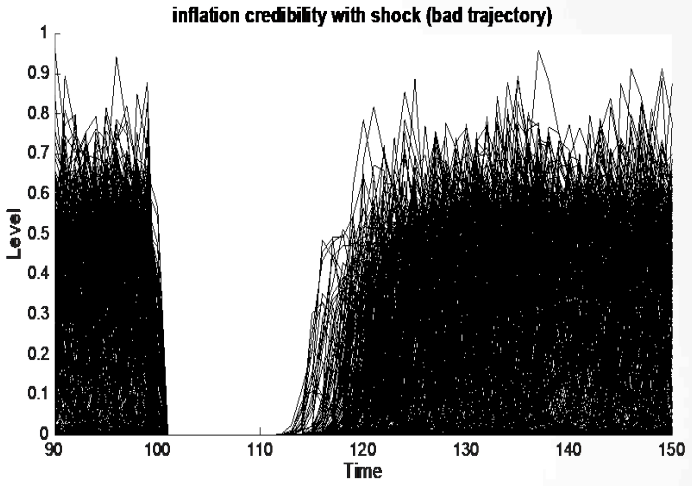
Trust under strong and normal stabilization (large supply shock)

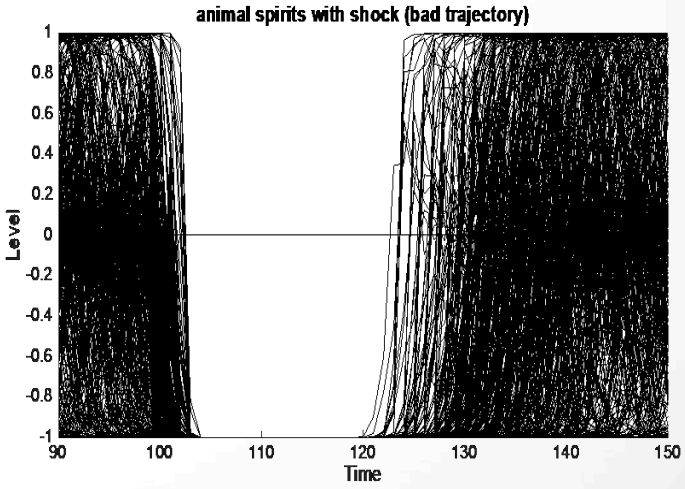
Strong stabilization (c2=2)





Normal stabilization (c2=0.5)





Conclusion

- We conclude that negative supply shocks create important threats to trust in the central bank and in the economy,
- all the more so when central banks pursue aggressive policies of output stabilization.
- This is much less the case with demand shocks
  - Negative demand shocks are a much weaker threat to trust.

- This is due to the fact that when a negative demand shock hits, the central bank can reduce both the negative effects on output and inflation
- and therefore is perceived as being successful,
- while with a supply shock central banks are in a dilemma situation that prevents them from successfully stabilizing the economy.
- Trying harder only makes matters worse.

- Our results have some relevance to understand the experience of the 1970s with the large supply shocks and the recent covid supply shock.
- Preceding the supply shocks of the 1970s there had been a buildup of inflation and inflationary expectations.
- Our model predicts that with these initial conditions, the recovery would take a long time.
  - This is also what happened for many countries with a prior history of significant inflation,
  - especially after the second oil shock of 1979.
  - It took a long time for the world economy to recover

- The Covid supply shock of 2020 was preceded by a period of low inflation and low inflationary expectations.
- Our model predicts that
  - this should make a quick recovery possible,
  - mainly because the central banks did not worry about the inflationary consequences
  - and therefore could actually follow expansionary monetary policies to fight decline in output.
- It appears today that a relatively quick recovery occurred during 2021.
- Unfortunately, a new shock occurred in 2022… Ukraine

- Initial conditions when Ukraine shock occurred were much less favourable.
- This creates risk that we are hitting a bad trajectory with:
  - a strong decline in trust
  - high and long-lasting inflation
  - a deep recession
  - very high interest rates.