

Monetary Economics

Exam

Two hours.

Course presentation slides allowed, in paper format, possibly with hand-written annotations (on the slides or on separate paper sheets).

No other document allowed, nor any electronic device (calculator, mobile phone...).

1 Exercise 1 (4 points)

The goal of this exercise is to study the determinacy properties of quantitative-easing policies in the basic New Keynesian model with money in the utility function. As a reminder, this model, in the absence of any shock, is characterized by the following log-linearized IS equation, Phillips curve, and money-market-clearing condition :

$$\begin{aligned}\tilde{y}_t &= \mathbb{E}_t \{\tilde{y}_{t+1}\} - \frac{1}{\sigma} (i_t - \mathbb{E}_t \{\pi_{t+1}\}), \\ \pi_t &= \beta \mathbb{E}_t \{\pi_{t+1}\} + \kappa \tilde{y}_t, \\ m_t^s - p_t &= \frac{\sigma}{\nu} \tilde{y}_t - \frac{1}{\nu} i_t,\end{aligned}$$

where the notations are the same as in the course (in particular, $\sigma > 0$ and $\nu > 0$). We suppose that the central bank's instrument is the money supply m_t^s .

Question 1 If the central bank sets m_t^s exogenously, is there local-equilibrium determinacy? (Answering this question does not require any computation.) Briefly interpret with the Taylor principle.

Question 2 If the central bank sets m_t^s according to the money rule $m_t^s = \phi_p p_t + \phi_y \tilde{y}_t$, where $\phi_p < 0$ and $\phi_y < 0$, is there local-equilibrium determinacy? (Answering this question does not require any computation.) Briefly interpret again with the Taylor principle.

2 Exercise 2 (6 points)

The goal of this exercise is to study optimal monetary policy and its implementation when transaction frictions are introduced into the basic New Keynesian model without

cost-push shocks. We admit that the presence of such frictions does not affect the log-linearized IS equation and Phillips curve, which remain

$$\begin{aligned}\tilde{y}_t &= \mathbb{E}_t \{\tilde{y}_{t+1}\} - \frac{1}{\sigma} (i_t - \mathbb{E}_t \{\pi_{t+1}\} - r_t^n), \\ \pi_t &= \beta \mathbb{E}_t \{\pi_{t+1}\} + \kappa \tilde{y}_t,\end{aligned}$$

but affects the welfare-loss function, which becomes

$$L_t = \mathbb{E}_t \left\{ \sum_{k=0}^{+\infty} (\pi_{t+k}^2 + \lambda_y \tilde{y}_{t+k}^2 + \lambda_i i_{t+k}^2) \right\},$$

where $\lambda_y > 0$ and $\lambda_i > 0$, and where all the other notations are the same as in the course. We assume that the natural rate of interest r_t^n is i.i.d.

Question 1 Show that

$$\kappa \pi_t + \lambda_y \tilde{y}_t - \sigma \lambda_i i_t = 0 \tag{1}$$

under optimal discretionary monetary policy.

Question 2 If the central bank adopts (1) as its interest-rate rule, what is the necessary and sufficient condition for local-equilibrium determinacy? (Answering this question does not require a lot of computations.)

Question 3 If the condition found in the previous question is not satisfied, can the central bank implement the optimal discretionary equilibrium as the unique local equilibrium?

3 Commentary (10 points)

Comment, in the light of the course, upon the following excerpt from the speech entitled “Committee Decisions and Monetary Policy Rules” made by Stanley Fischer – vice-chairman of the Federal Open Market Committee (FOMC) of the Federal Reserve – on May 5, 2017, and, in so doing, explain in particular your own view about : (i) the advantages and drawbacks of interest-rate rules for the conduct of monetary policy ; (ii) the relative merits of different types of interest-rate rules ; and (iii) the reasons why central banks may want to deviate from a given interest-rate rule (especially, but not only, over the past few years).

“Since May 2014, I have considered monetary policy rules from the vantage point of a member of the FOMC. But my interest in them began many years ago and was reflected in some of my earliest publications. At that time, the literature on monetary policy rules, especially in the United States, remained predominantly concerned with the money stock or total bank reserves rather than the short-term interest rate. Seen with the benefit of hindsight, that emphasis probably derived from (...) a concern that interest rate rules might lead to price-level indeterminacy – an issue disposed of by Bennett McCallum and others.

Subsequently, John Taylor’s research, especially his celebrated 1993 paper, was a catalyst in changing the focus toward rules for the short-term interest rate. Taylor’s work thus helped shift the terms of the discussion in favor of rules for the instrument that central banks prefer to use. His 1993 study also highlighted the practical relevance of monetary policy rules, as he showed that a particular simple rule – the rule that now bears his name – provided a

good approximation to the behavior of the federal funds rate during the early Greenspan years. (...)

Donald Kohn, at a landmark conference organized by John Taylor in January 1998, described the role played by monetary policy rules in the FOMC briefing process. (...) Kohn noted that policy rule prescriptions served two functions : as a 'benchmark for the stance of policy' and 'to structure thinking about the implications of incoming information for the direction of policy action.' These two functions continue to be important : Policy rule prescriptions provide a useful starting point for FOMC deliberations and a convenient way of organizing alternative arguments about the appropriate policy decision. Policy rule prescriptions, particularly prescriptions that are obtained from a dynamic model simulation, also help policymakers take to heart a key message of the literature on policy rules — namely, that monetary policy decisions should concern the appropriate path for the policy instrument and not merely the current setting of that instrument. (...)

Consideration of interest rate rules has (...) come to have a prominent role in FOMC discussions, with the Taylor rule being one benchmark that we regularly consult. (...) The other set of rules mentioned frequently in FOMC discussions are Wicksellian, for there is often a discussion of r^ [the 'neutral rate' or the 'natural rate of interest'], which in some formulations of the Taylor rule is also the constant term.*

The period since 2008 bears testimony to central bankers' willingness to depart from the prescriptions of a pre-specified rule. In the wake of the financial crisis, policymakers found it necessary to follow a more accommodative monetary policy that was appropriate for the new economic conditions. In addition, structural changes in the U.S. economy have apparently lowered the value of the interest rate — that is, r^ — consistent with neutral policy.”*