Comments on Marvin Goodfriend and Robert G. King, "The Great Inflation Drift"

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Introduction

- Explaining the Great Inflation
- Fed objectives: Stabilize the output gap and maintain "continuity [predictability] of the interest rate"
- Inflation becomes stochastic trend
- Inflation increases with fall in potential output growth
- Switches between "Business as usual" and "Inflation fighting"

Model: Basics

Phillips curve

$$\pi_t - \bar{\pi}_t = \beta \mathrm{E}_t(\pi_{t+1} - \bar{\pi}_{t+1}) + h(y_t - y_t^*) \qquad (2)$$

Inflation trend, random walk (martingale)

$$\bar{\pi}_t = \mathrm{E}_t \bar{\pi}_{t+1} \qquad (11)$$

Aggregate demand, output gap, real interest-rate gap

$$y_t - y_t^* = \mathrm{E}_t(y_{t+1} - y_{t+1}^*) - \frac{1}{\sigma}(r_t - r_t^*)$$

(σ reciprocal of intertemporal elasticity of substitution)

Model: Basics

Potential output growth

$$\Delta y_t^* = \rho \Delta y_{t-1}^* + \nu_t \tag{4}$$

Natural interest rate

$$r_t^* - r = \sigma \mathrm{E}_t \Delta y_{t+1}^* = \sigma \rho \Delta y_t^* = \rho (r_{t-1}^* - r) + \sigma \rho \nu_t \qquad (7), (8)$$

Fisher equation, nominal interest rate

$$R_t = r_t + \mathrm{E}_t \pi_{t+1} \tag{5}$$

Monetary policy

Assumtions

- Model known by Fed and private sector
- Monetary policy known by private sector and fully credible
- Rational-expections equilibria with fully credible policies

Monetary policy

- Output-gap stabilization and "continuity [predictability] of the short rate" ahead of low inflation
- Why not loss function and optimal policy?

$$L_t = (\pi_t - \pi_t^*)^2 + \lambda(y_t - y_t^*)^2 + \mu(R_t - \mathrm{E}_{t-1}R_t)^2$$

- Might the Great Inflation then be explained by high λ, μ and drifting π_t^*?

Monetary policy: Predictability?

- Why *predictability* $(R_t - \mathrm{E}_t R_{t-1})$ of the short rate rather than traditional interest-rate *smoothing* $(R_t - R_{t-1})$?

$$L_t = (\pi_t - \pi_t^*)^2 + \lambda(y_t - y_t^*)^2 + \mu(R_t - R_{t-1})^2$$

- Does it matter whether it is predictability or smooting?
  - Yes, smoothing will have to be state-dependent to be equivalent to predictability
  - Evidence in transcripts of distinction between predictability and smoothing?

Monetary policy: Equilibria with zero output gaps

- Focus on equilibria with zero output gaps, $y_t - y_t^* = 0$
- Inflation equal to trend

$$\pi_t = \bar{\pi}_t = \mathrm{E}_t \pi_{t+1} \tag{15}$$

- Real rate equal to natural

$$r_t = r_t^*$$

- Nominal rate

$$R_t = r_t^* + \bar{\pi}_t$$

Monetary policy: Equilibrium trend inflation?

- Innovations, use $E_{t-1}\bar{\pi}_t = \bar{\pi}_{t-1}$

$$R_t - E_{t-1}R_t = r_t^* - E_{t-1}r_t^* + \bar{\pi}_t - \bar{\pi}_{t-1}$$

- Assume given degree of predictability of the short rate ϕ, $0 \leq \phi \leq 1$

$$R_t - E_t R_{t-1} = (1-\phi)(r_t^* - E_{t-1}r_t^*) \qquad (17)$$

- Equilibrium innovation in trend inflation

$$\bar{\pi}_t - E_{t-1}\bar{\pi}_t = -\phi(r_t^* - E_{t-1}r_t^*) = -\phi\sigma\rho\nu_t \qquad (18)$$

- Equilibrium trend inflation determined

$$\bar{\pi}_t = \bar{\pi}_{t-1} - \phi\sigma\rho\nu_t \qquad (16), (19)$$

Monetary policy: Equilibrium trend inflation

- Equilibrium trend inflation

$$\bar{\pi}_t = \bar{\pi}_{t-1} - \phi\sigma\rho\nu_t \qquad (16), (19)$$

- Innovation in potential-output growth (productivity) and natural interest rate

$$r_t^* - \mathrm{E}_{t-1} r_t^* = \sigma\rho(\Delta y_t^* - \mathrm{E}_{t-1}\Delta y_t^*) = \sigma\rho\nu_t \qquad (7), (8)$$

- Trend inflation increases with negative productivity innovation, more when high predictability of short rate (ϕ)
- See directly from equilibrium nominal rate, $R_t = r_t^* + \bar{\pi}_t$
- Main result, basis for interpretation of Great Inflation

Monetary policy: Implementation?

1. Set and announce inflation target (becomes predetermined variable)

$$\bar{\pi}_t = \bar{\pi}_{t-1} - \phi\sigma\rho\nu_t \qquad (16), (19)$$

Follow interest-rate rule

$$R_t = \bar{\pi}_t + r_t^* + \Omega(\pi_t - \bar{\pi}_t), \;\; \Omega > 0 \qquad (23)$$

- Above equilibrium unique
- But, how exactly to implement this?
- "Explicit instrument rule":
  R_t function of predetermined variables
- "Implicit instrument rule":
  R_t function of forward-looking variables
- Simultaneity. Iteration during day of decision? Not in real world

Monetary policy: Implementation?

1. Set and announce inflation target

$$\bar{\pi}_t = \bar{\pi}_{t-1} - \phi\sigma\rho\nu_t \qquad (16), (19)$$

Follow interest-rate rule

$$R_t = \bar{\pi}_t + r_t^* + \Omega(\pi_t - \bar{\pi}_t), \quad \Omega > 0 \qquad (23)$$

- But, how exactly to implement this?
- One way: Predict equilibrium π_t, set R_t accordingly

$$\pi_t = g_1 r_t^* + g_2 \bar{\pi}_t = \bar{\pi}_t$$

$$R_t = \bar{\pi}_t + r_t^* + \Omega(g_1 r_t^* + g_2 \bar{\pi}_t - \bar{\pi}_t) = \bar{\pi}_t + r_t^*$$

- But then different, explicit reaction function
- Determinacy properties different! Here, indeterminacy!

Monetary policy: Implementation

2. Assume money demand

$$\Delta m_t = \alpha \Delta y_t + \pi_t$$

Follow money-supply rule

$$\Delta m_t = \alpha \Delta y_t^* - \phi\sigma\rho\nu_t + \alpha\rho\Delta y_{t-1}^* + \pi_{t-1}$$

- Implies

$$\alpha\Delta(y_t - y_t^*) + \Delta\pi_t = -\phi\sigma\rho\nu_t$$

- Unique equilibrium?
- Is $\bar{\pi}_t$ still determined by Fed and predetermined?

Monetary policy: Implementation

3. "5.3 How 'Business as Usual' Creates Inflation Drift"

- Implementation without central bank explicitly setting $\bar{\pi}_t$?
- $\bar{\pi}_t$ determined/inferred by private sector?
- $\bar{\pi}_t$ forward-looking variable?
- $\bar{\pi}_t = \mathrm{E}_t \bar{\pi}_{t+1}$
- Unique equilibrium?
- Generally, for determinacy, "out-of-equilibrium" behavior by policymaker must be specified (Svensson-Woodford 2005, "Implementing Optimal Policy through Inflation-Forecast Targeting")

Concluding comments

- If specified Fed objectives,
  why not loss function and optimal policy?
  (Under commitment or discretion)
- Strong assumptions for the Great Inflation:
  Known model, credible policies, rational expectations
- Explanation for the Great Inflation in other words:
  Small weight on inflation stabilization;
  drifting and opaque inflation target

Concluding comments

- Is trend inflation a predetermined inflation target determined by the Fed or a forward-looking variable determined by the private sector?
- Uniqueness not clear (to me) when trend inflation not predetermined variable
- Generally: Explicit out-of-equilibrium behavior needed. Examine eigenvalue configuration
- Unit root OK for predetermined variable, but non-uniqueness for forward-looking variable
- Exact implementation of equlibria here problematic