Assessing Potential Inflation Consequences of QE after Financial Crises

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International dimensions of conventional and unconventional monetary policy
ECB-IMF Conference, Frankfurt, April 2014

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Goal

Assess potential consequences of current QE policy and financial sector transmission for future inflation.

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Strategy (1)

- Use an equilibrium analysis based on broad monetary aggregates.

- This can complement standard macroeconomic models as financial sector is imperfectly modeled, thus making it difficult to assess potential effects of non-standard monetary policy tools after a financial crisis.

Strategy (2)

- Assess whether monetary aggregates developments can explain inflation outcomes during and after financial crises.

  - Assess whether the link between money and inflation is different after financial crises than in normal times (as analyzed in Reynard *JME* 2007).

- Consider broad monetary aggregates, i.e. money creation by the banking system reflecting monetary policy <u>and</u> financial sector transmission of monetary policy.

- Argentina (early 2000s), Japan (1990s and early 2000s), the US (1930s) and Switzerland (early 1990s).

Main findings (1)

- Different inflation outcomes after financial crises depend on banking sector transmission of monetary policy.

  - Substantial difference between current US situation and Japan in the 1990s and 2000s.

- Inflation perspectives:

  - Inflation should increase in the US and Japan over the next few years, substantially above inflation targets.

Main findings (2)

- Relationship is the same in financial crises and normal times.

- Stable relationship between money and subsequent price levels once long-run adjustments derived from the Quantity Theory are imposed.

  - Non-linearity after money levels decrease; needs to be accounted for to assess the effects of monetary policy at low inflation; issue for standard econometric modeling.

Definition of broad money

M2- in US, M2 in other countries

mostly banknotes, demand deposits & savings accounts

– In normal times, broad money is created by the banking sector, either via loans or asset purchases.

– With QE, central banks create broad money if counterparts are from the non-bank domestic private sector.

– Different from reserves, created & directly controlled by central banks, included only in M0, not in broad money.

Characterizing the money-price empirical relationship: Methodology (1)

- Impose long-run adjustments required by Quantity Theory, i.e. adjust M for changes in Y* and V*:   P = MV*/Y*.

  - Increases in M offsetting increases in potential output Y* are not inflationary.

  - Increases in M due to lower opportunity cost when shift to lower inflation environment are not inflationary, due to decrease of V*.

    - Neglecting V* changes leads to weak M growth-inflation link: Nelson (*JME* 03), Reynard (*JME* 07).

- Strategy: adjust M for changes in equilibrium V* and Y*, and analyze dynamics between adjusted money level M* and P.

Characterizing the money-price empirical relationship: Methodology (2)

- To compute long-run equilibrium changes in V*, regress PY/M on interest rate, i.e. estimate a long-run money demand.

- Compute adjusted money to be compared to the price level:
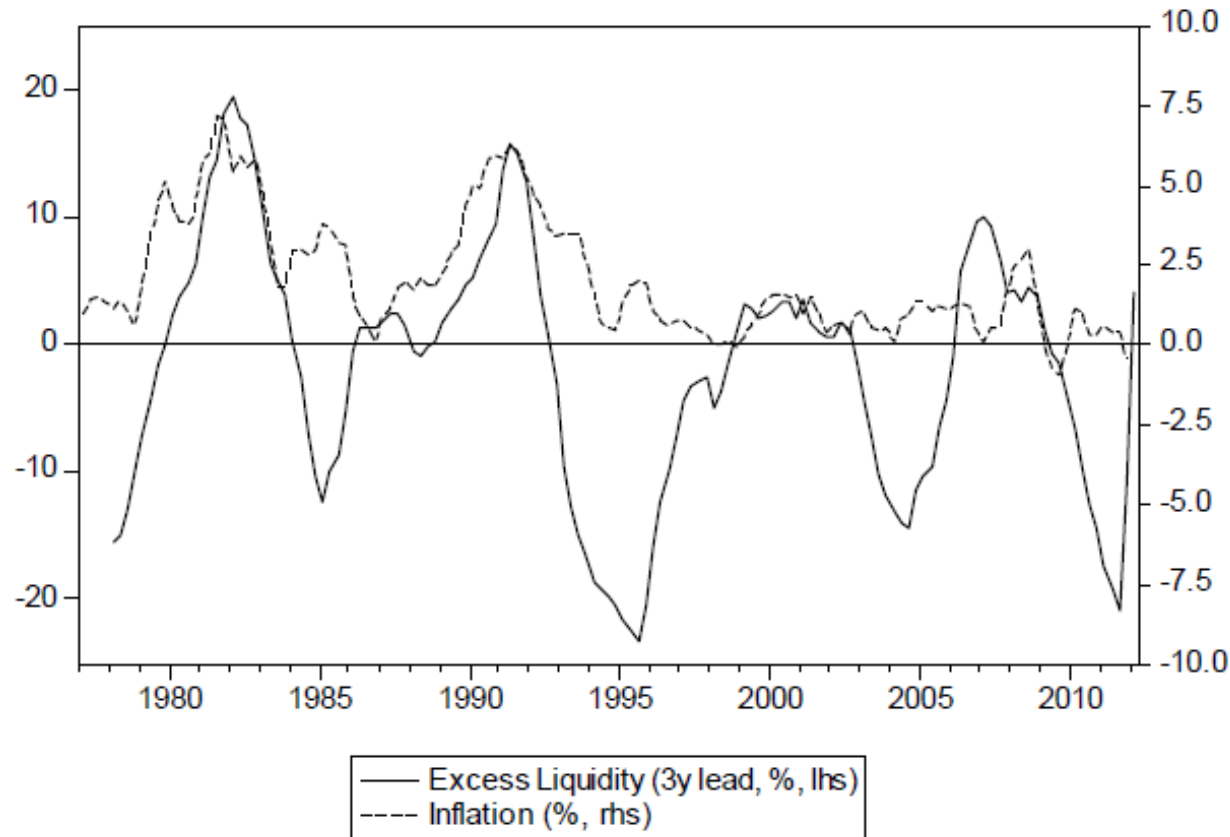
$$m_t^* \equiv m_t - y_t^* + \beta i_t^* + c$$

- c: regression constant, y*: potential output, beta: estimated interest rate semi-elasticity, i*: HP-filtered interest rate.

- Does m* contain information for subsequent price levels?

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Legend:
- M2 velocity (log, lhs)
- 10-year interest rate (%, rhs)
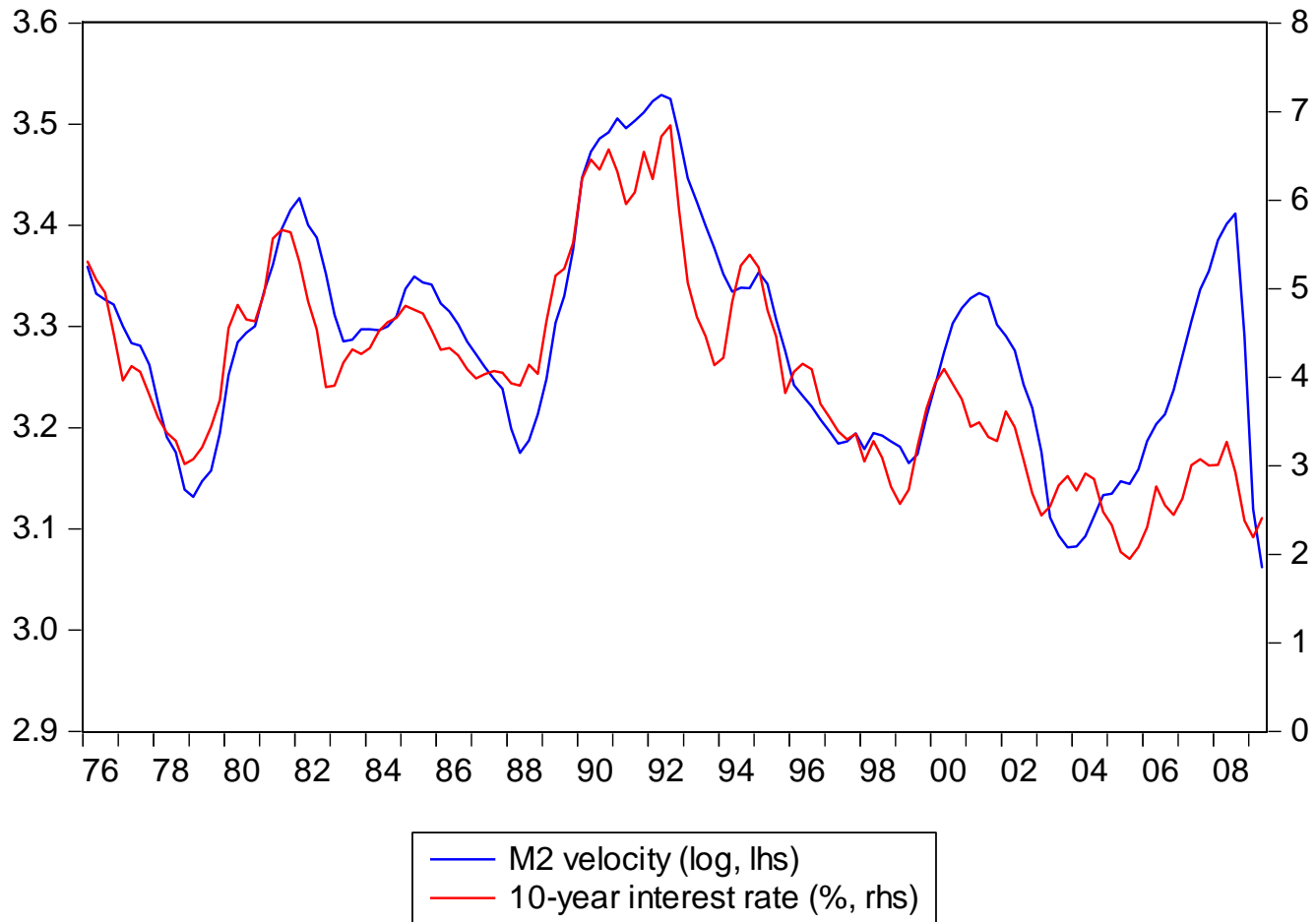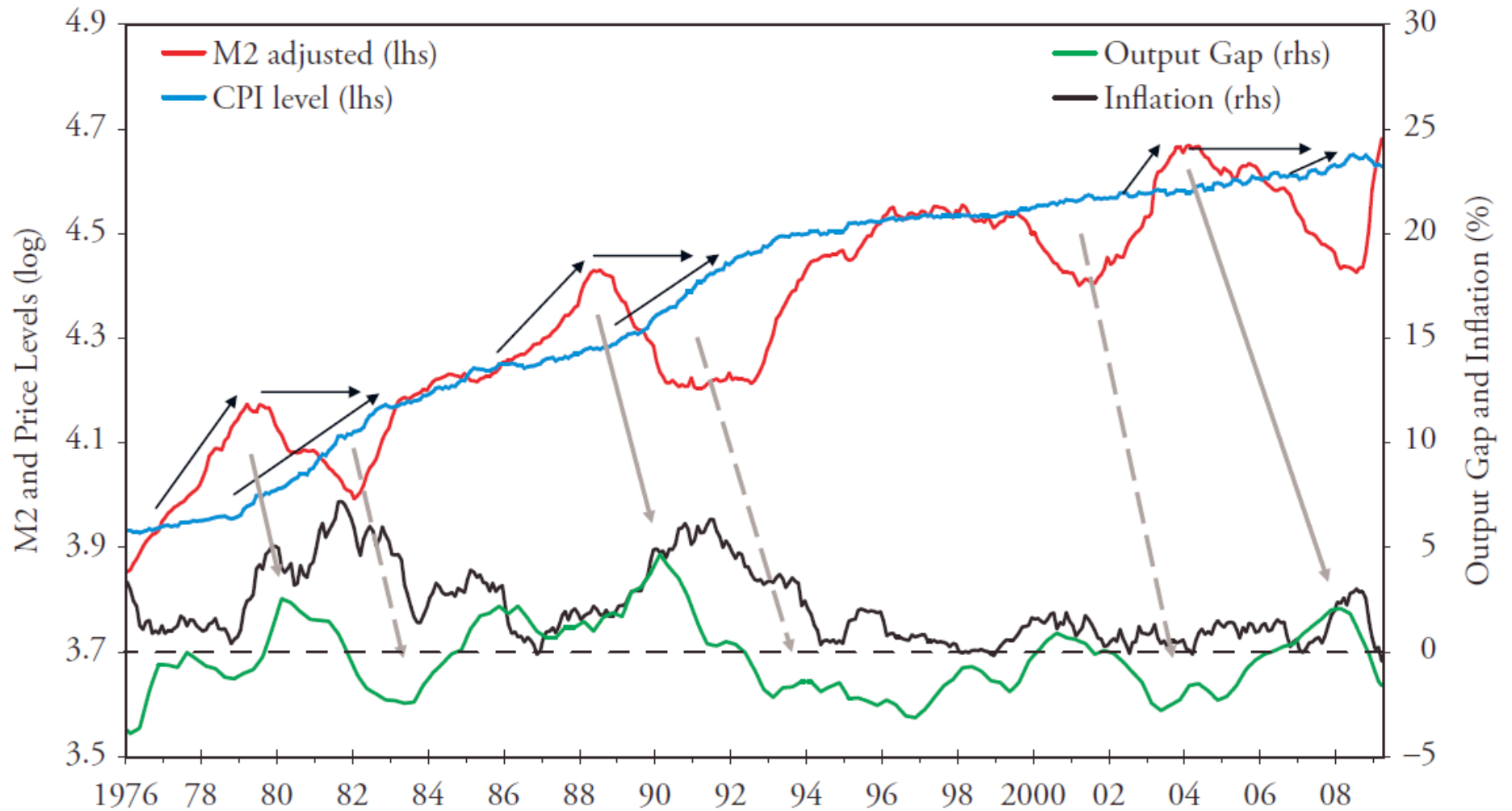
Characterizing the non-linearity

Legend:
—— Excess Liquidity (3y lead, %, lhs)
- - - Inflation (%, rhs)

$$\Delta p_t = \alpha \left(m^*_{t-k} - p_{t-k} \right) + \varepsilon_t, \text{ when } m^*_{t-k} > p_{t-k}$$

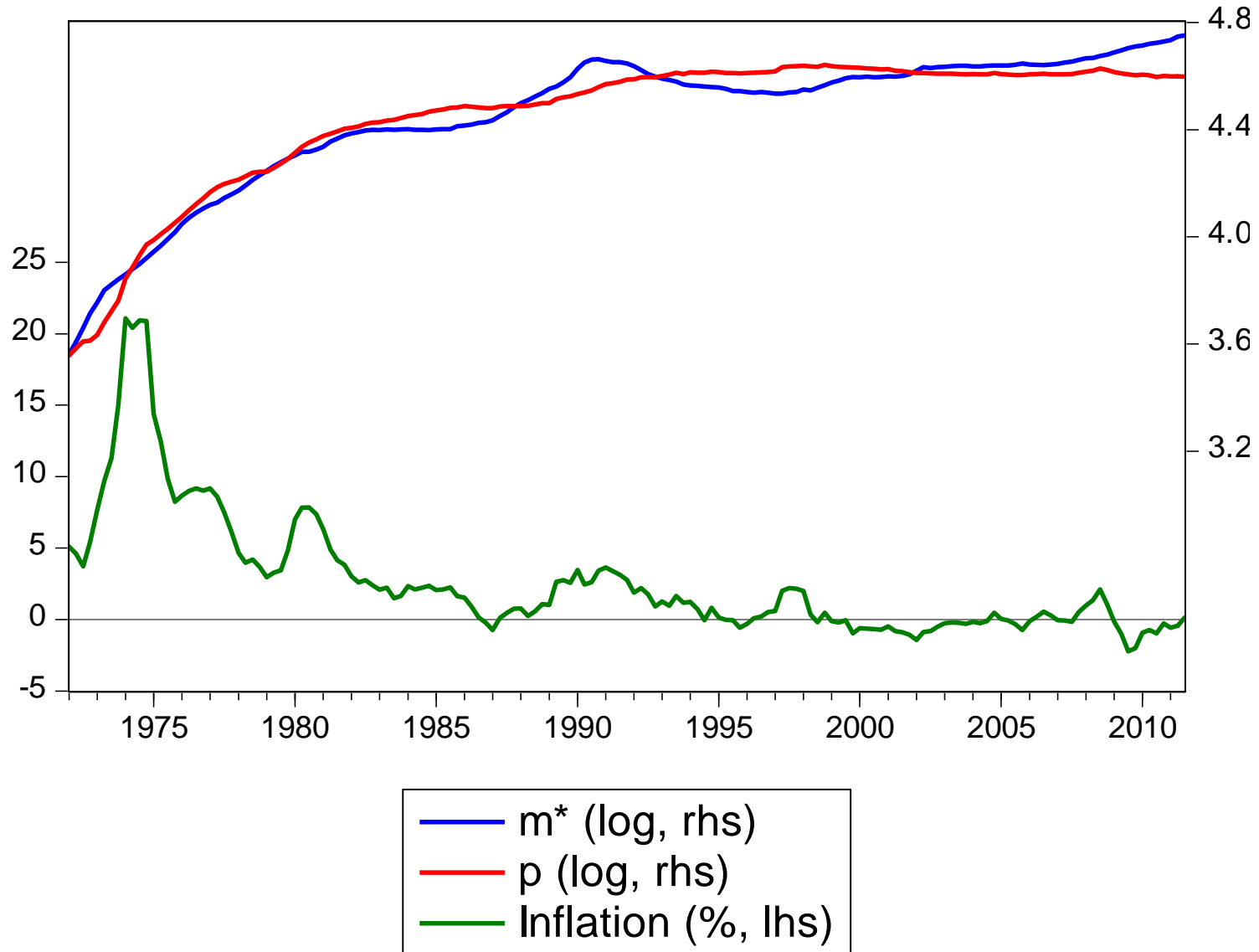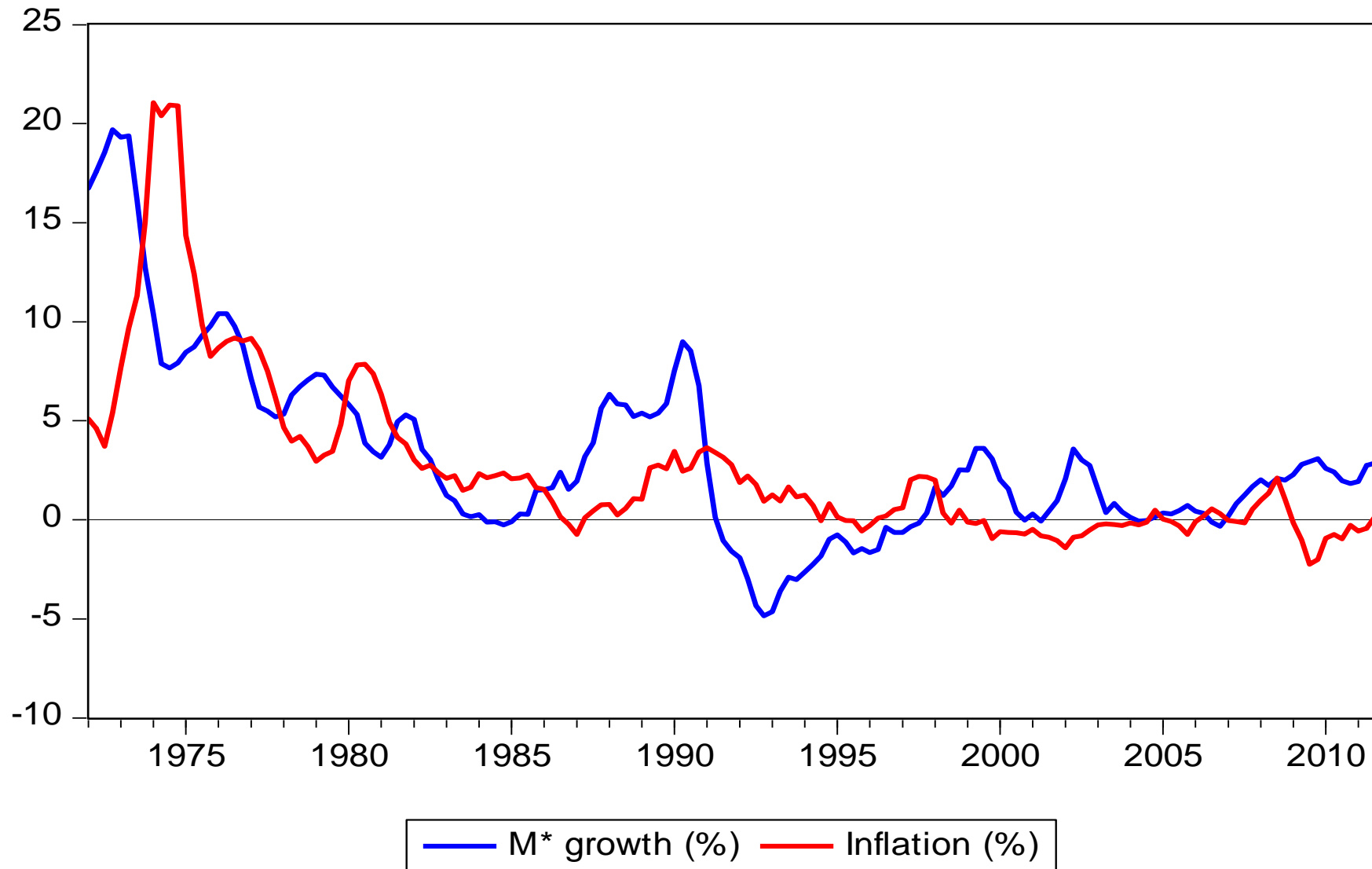$$\Delta p_t = \overline{\pi} + \varepsilon_t, \text{ when } m^*_{t-k} \leq p_{t-k}$$
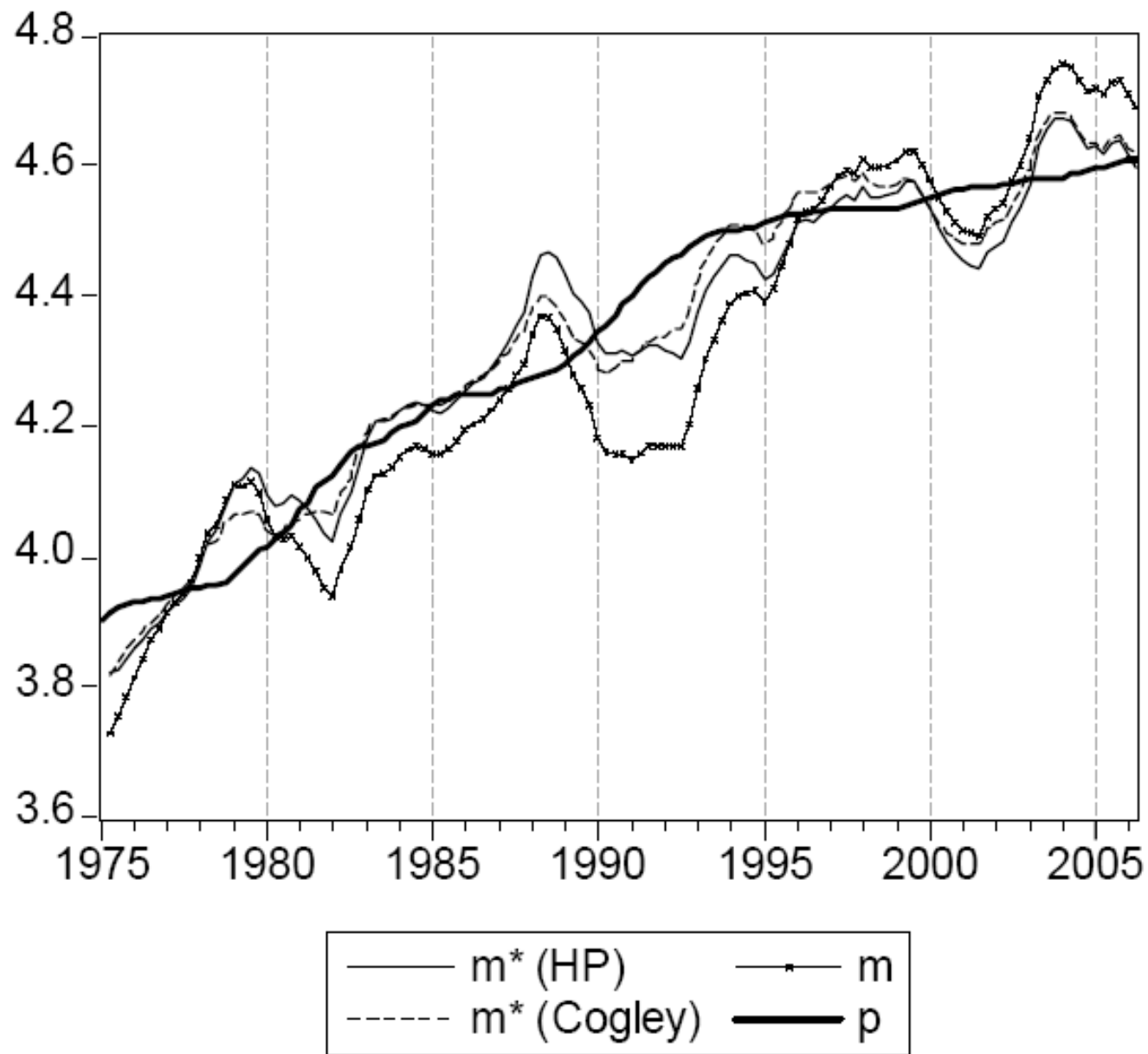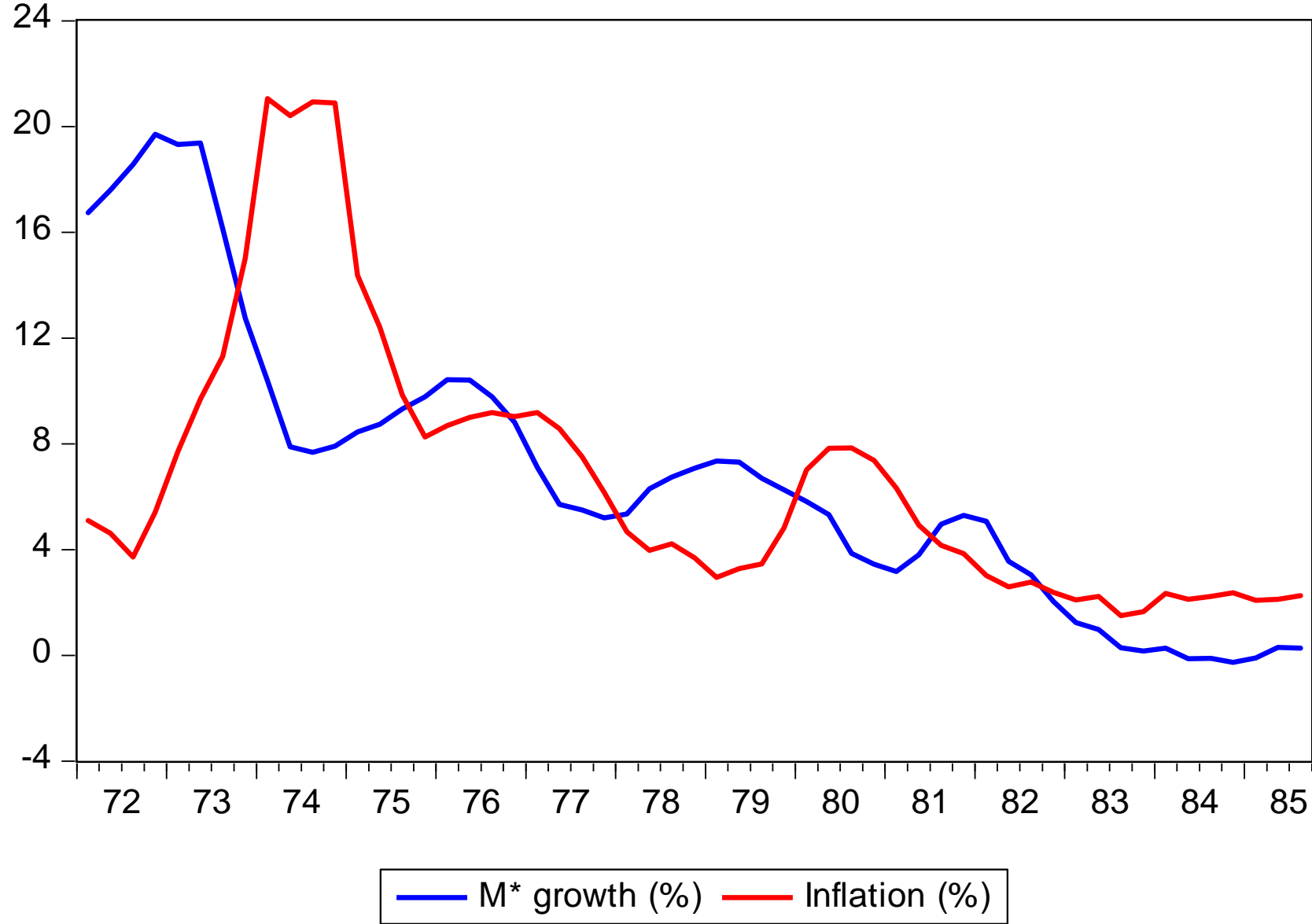
Japan
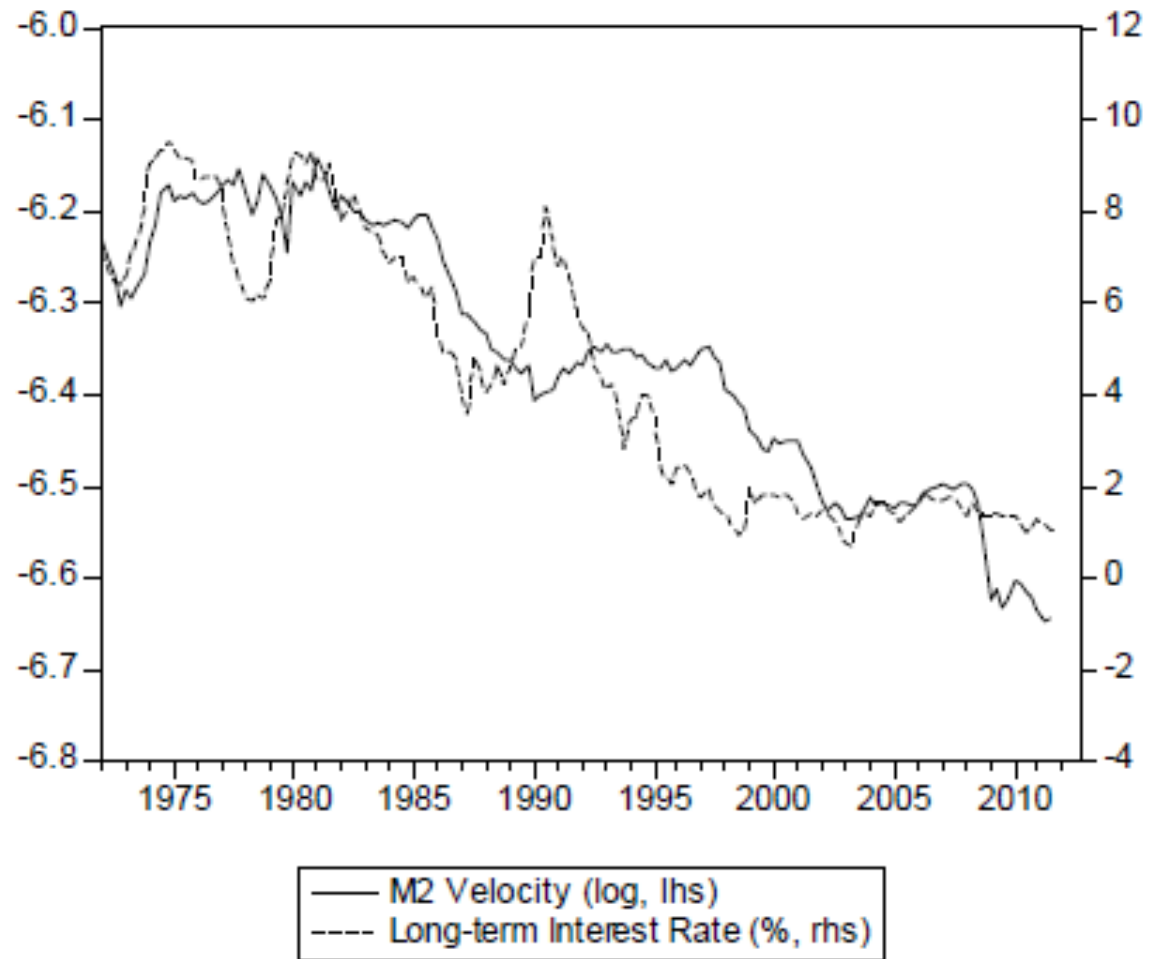
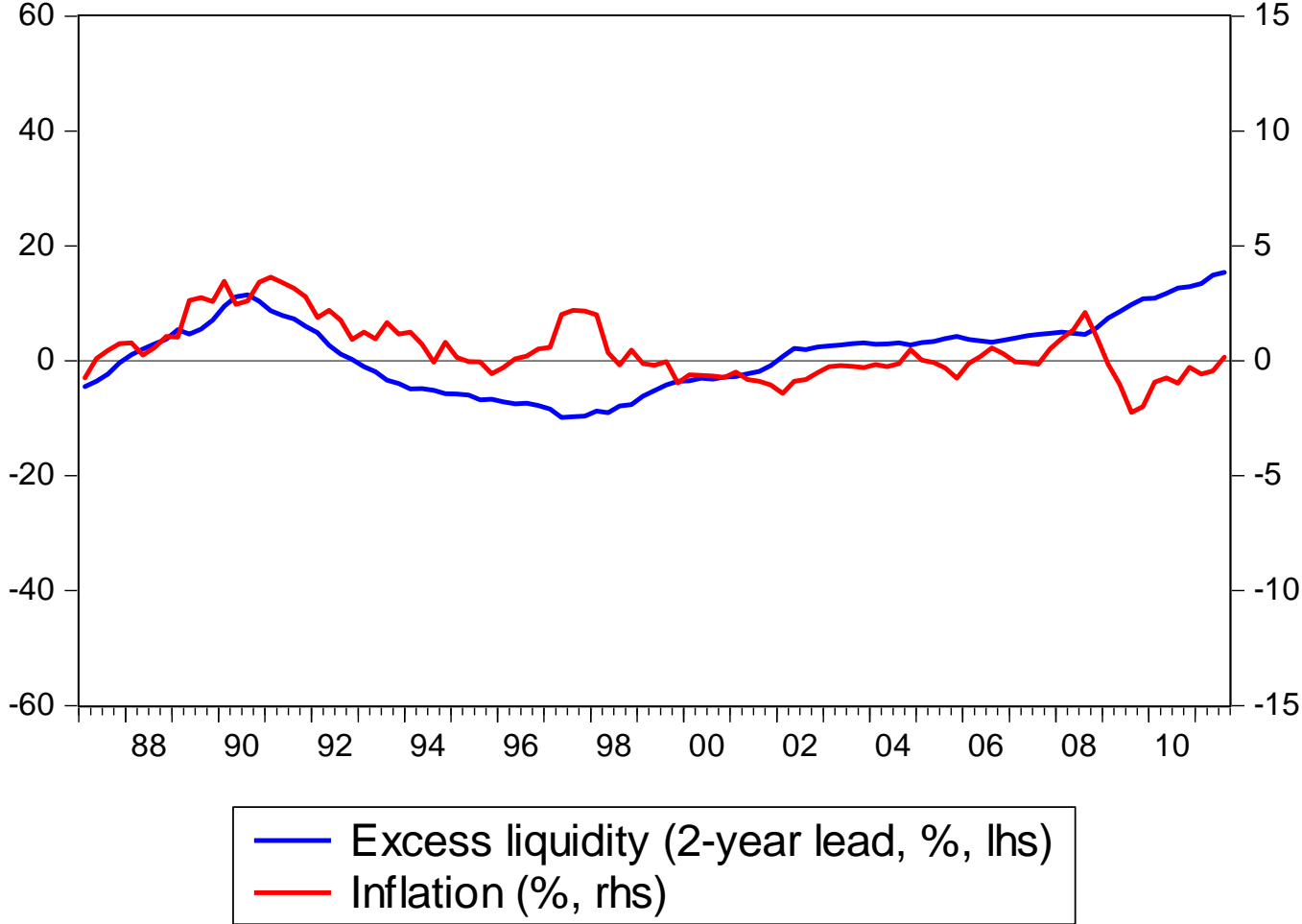FIG. 4. Velocity and Interest Rate - Japan

Money & Price Levels – Japan

Legend:
- m* (log, rhs)
- p (log, rhs)
- Inflation (%, lhs)

Money Growth & Inflation – Japan

Money Growth & Inflation – Japan

Legend: —— M* growth (%)   —— Inflation (%)

Excess Liquidity & Inflation – Japan

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Argentina

Legend:
- m* (log, rhs)
- p (log, rhs)
- Inflation (%, lhs)
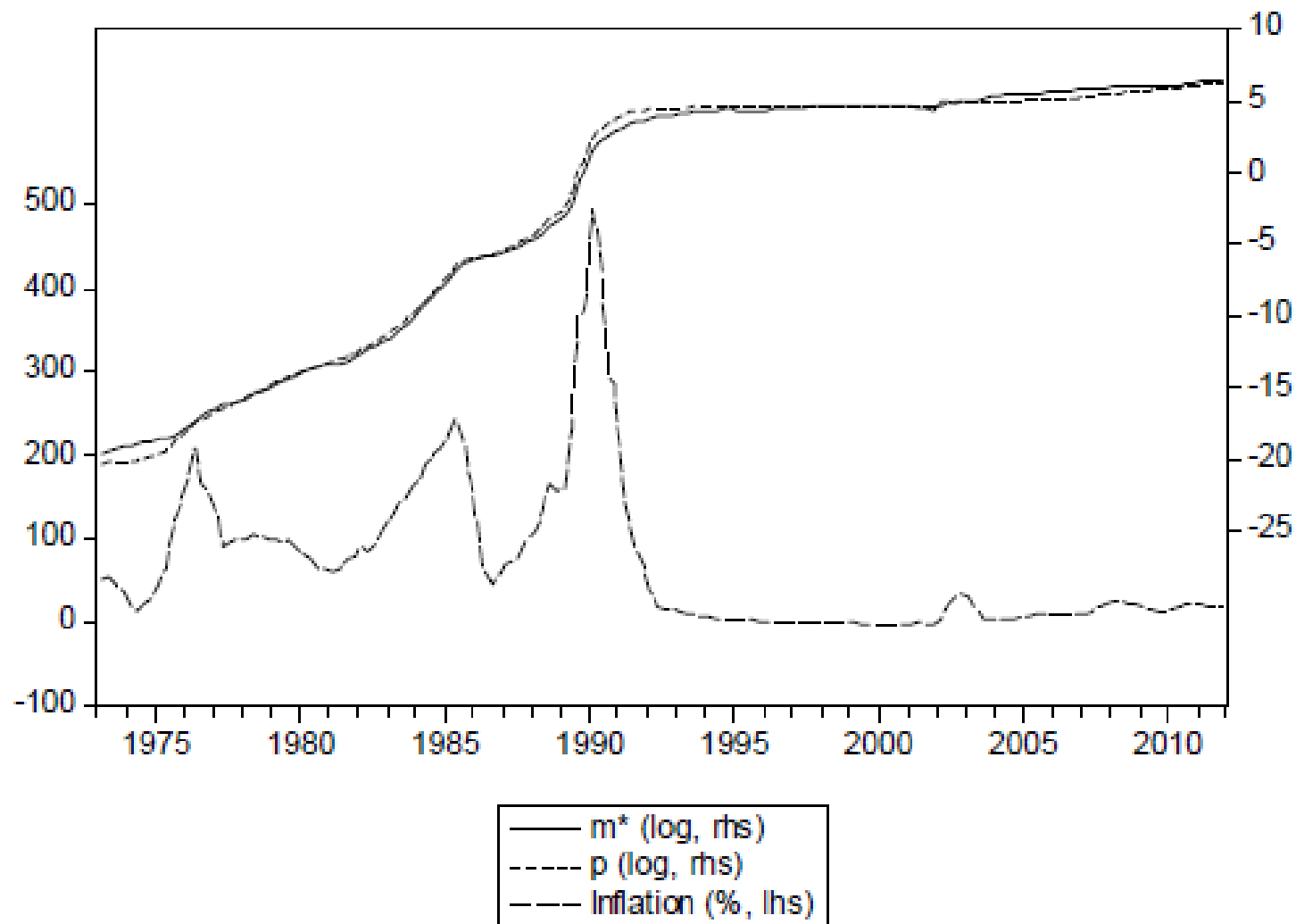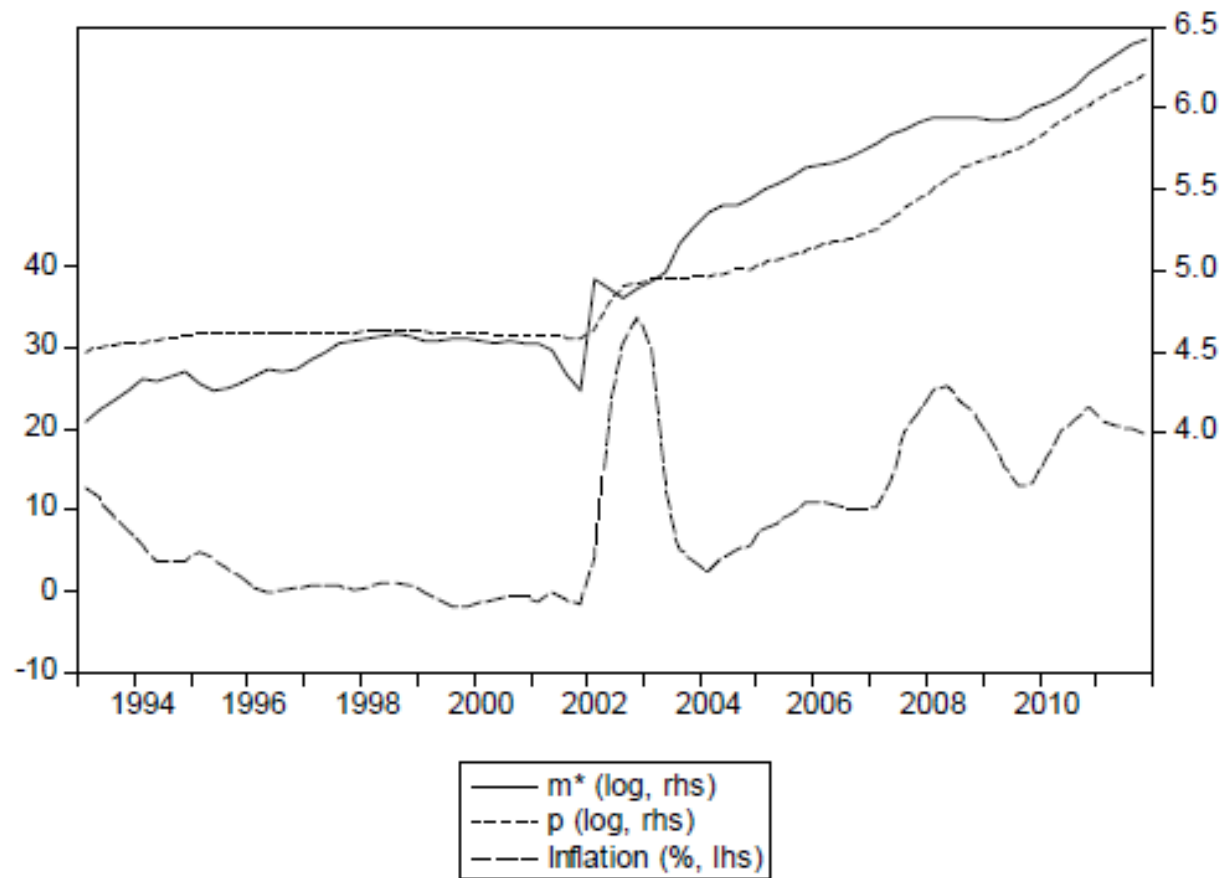
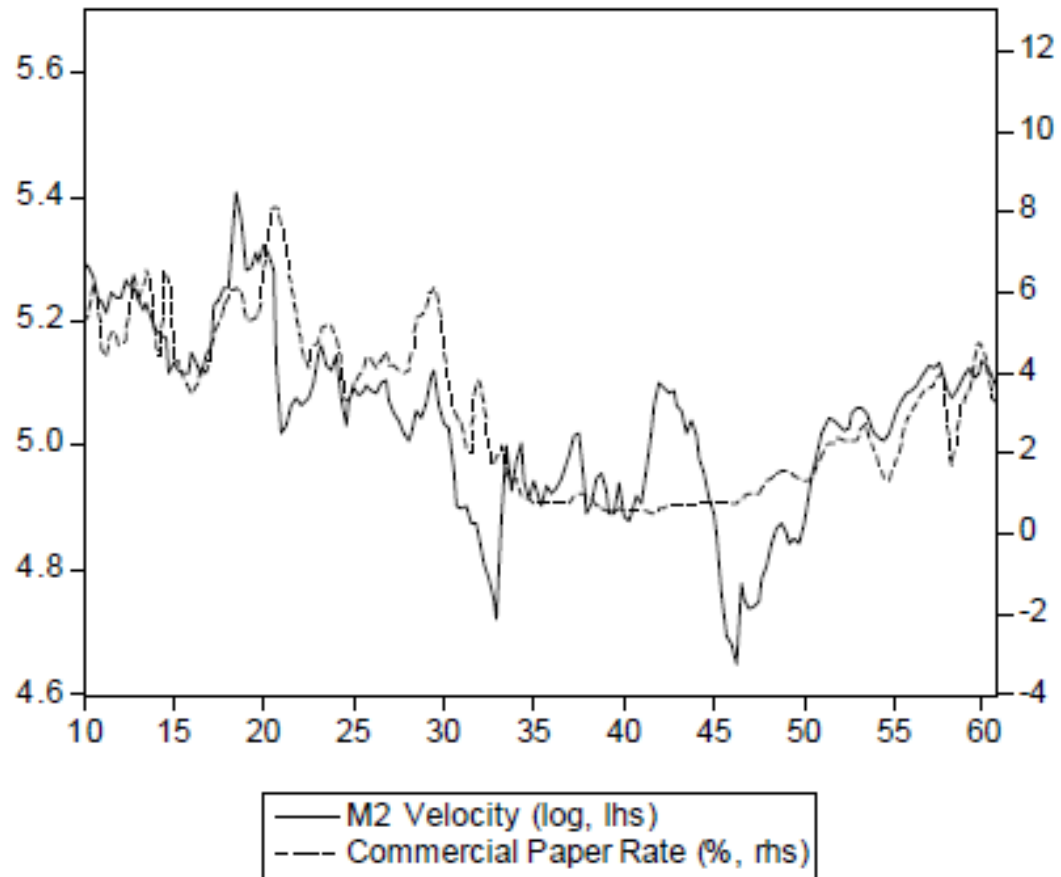FIG. 9. Money and Prices - Argentina (since 1990s)

US around the 1930s

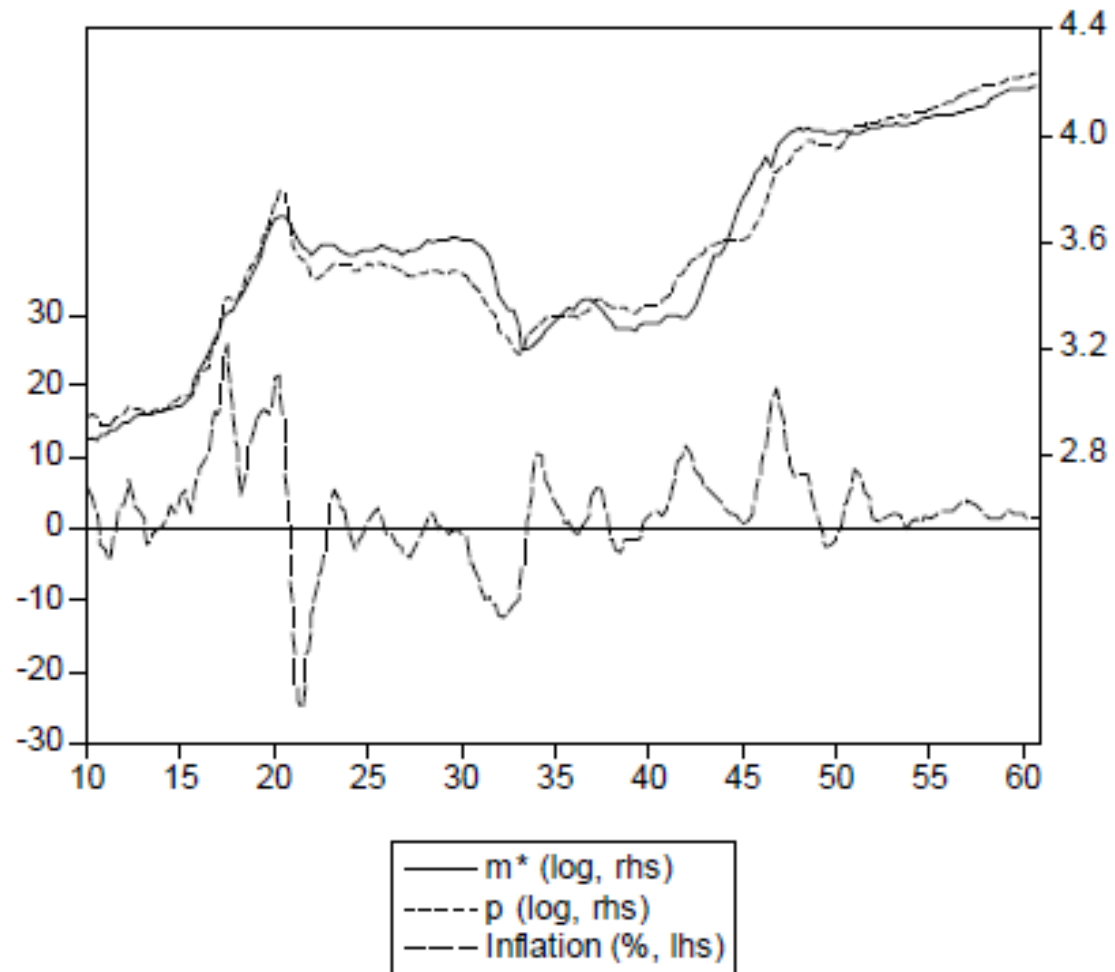FIG. 10. Velocity and Interest Rate - US in the 1930s

FIG. 11. Money and Prices - US in the 1930s

Potential Consequences of QE for Inflation:
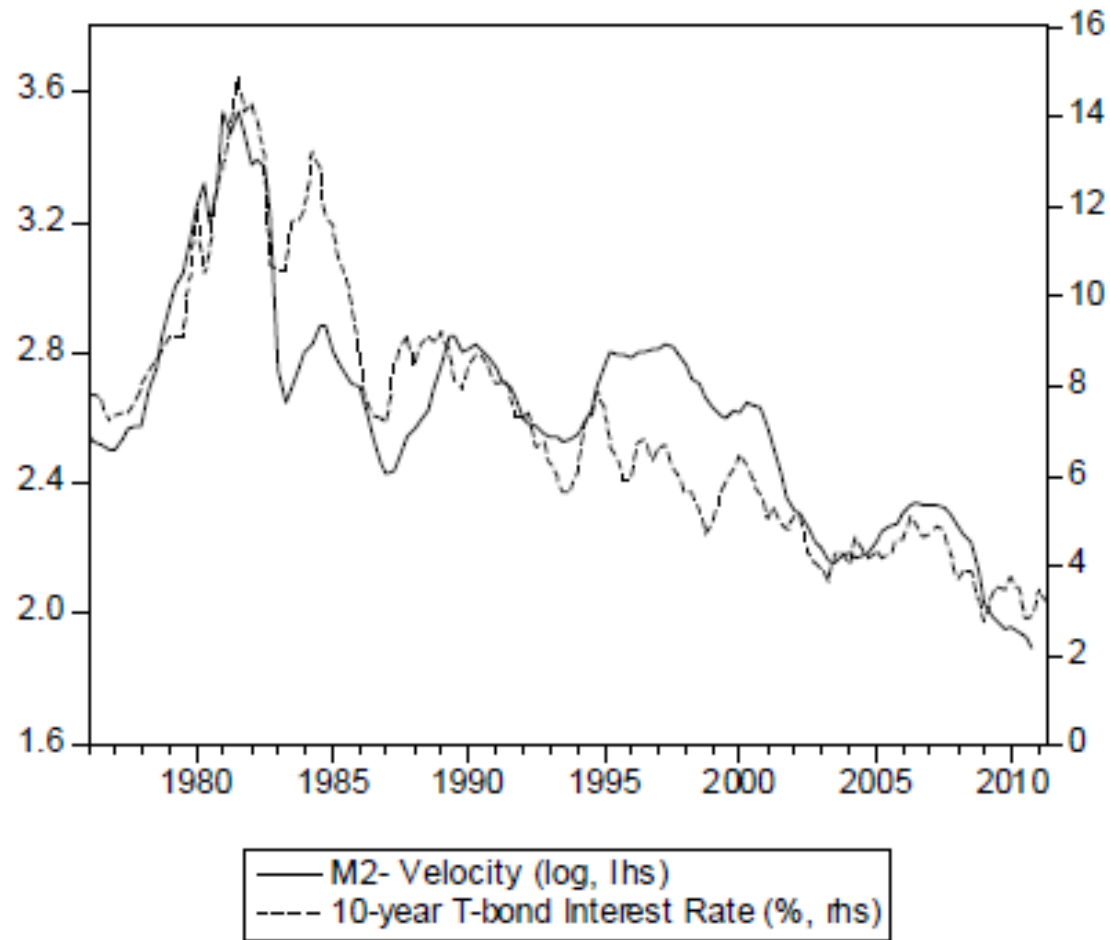
The US in the Current Period
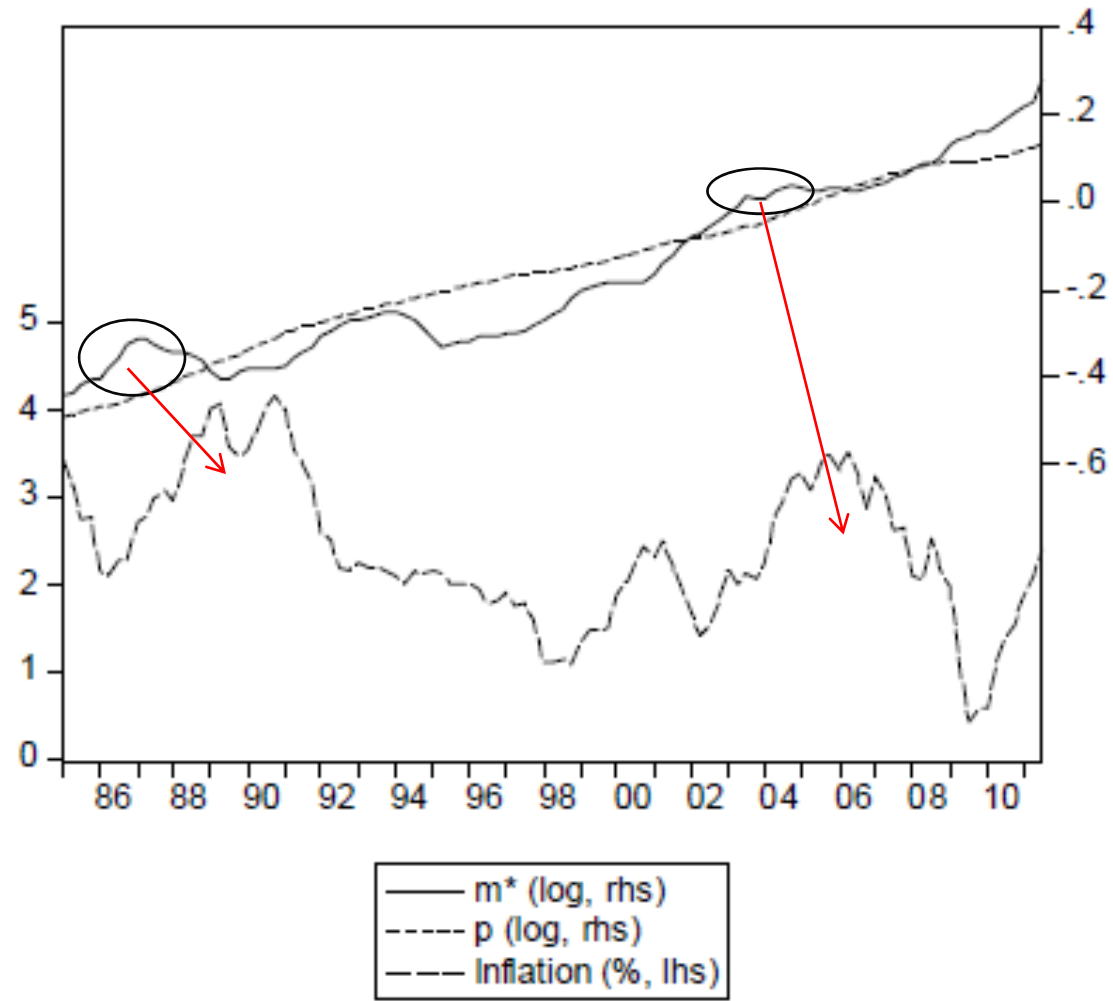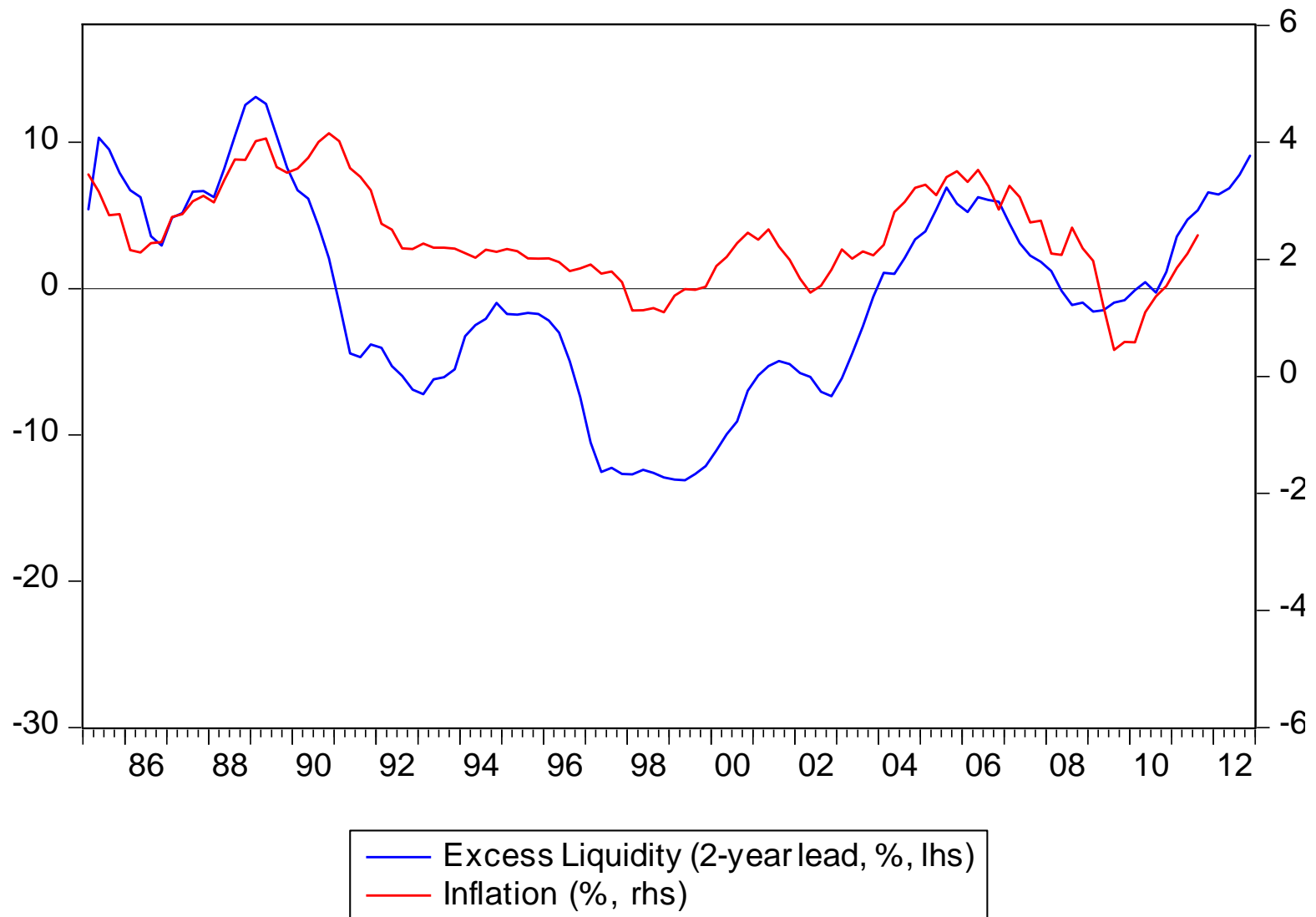
FIG. 12. Velocity and Interest Rate - US

FIG. 13. Money and Prices - US

Legend:
- Excess Liquidity (2-year lead, %, lhs)
- Inflation (%, rhs)

Conclusions

- Different inflation outcomes after financial crises, depending on banking sector transmission of monetary policy.

  - Inflation should increase in the US and Japan over the next few years.

Thank you for your attention!

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