Hysteresis and the European Unemployment Problem Revisited

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Figure 1. Unemployment Rate: United States vs. Euro Area

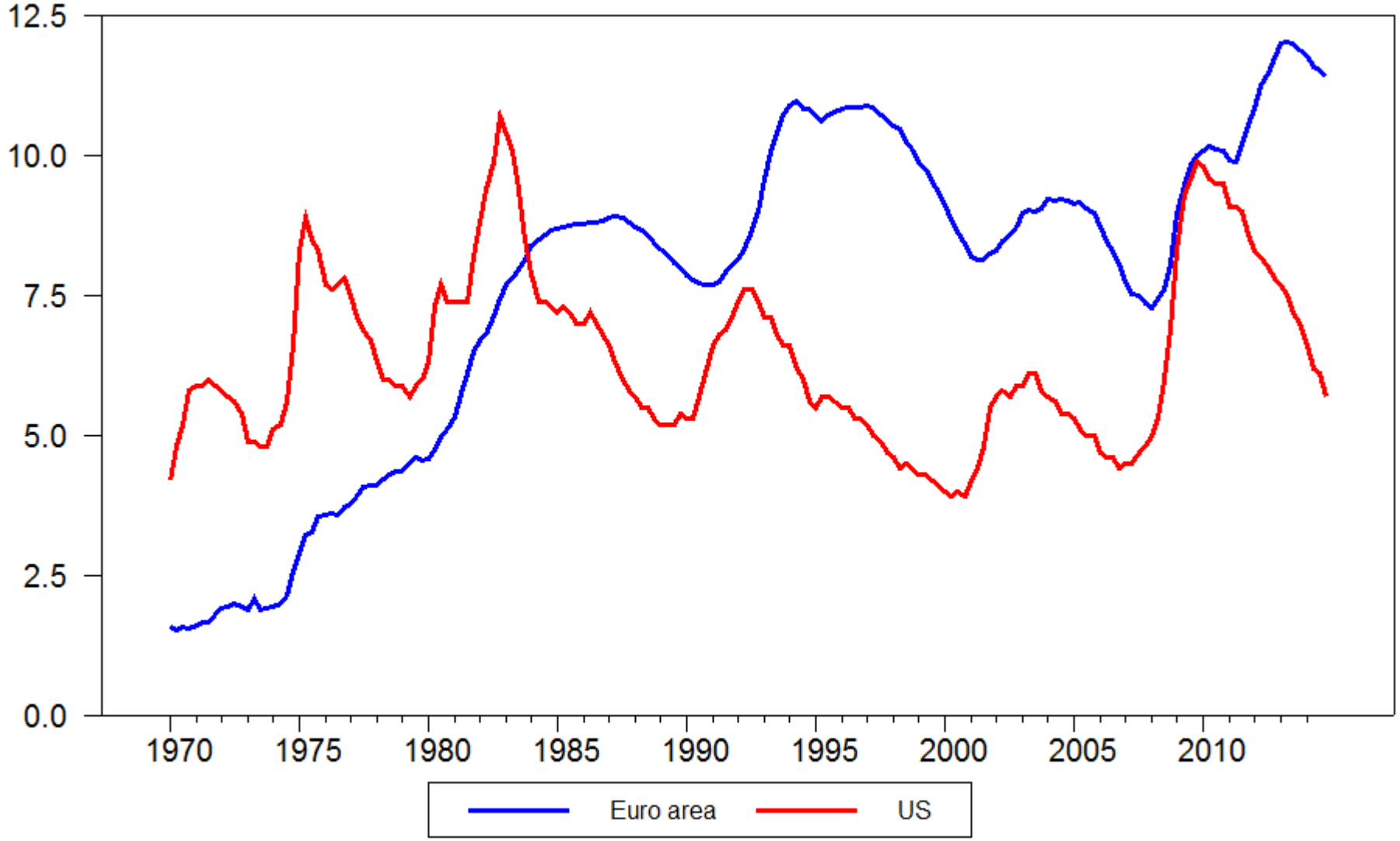
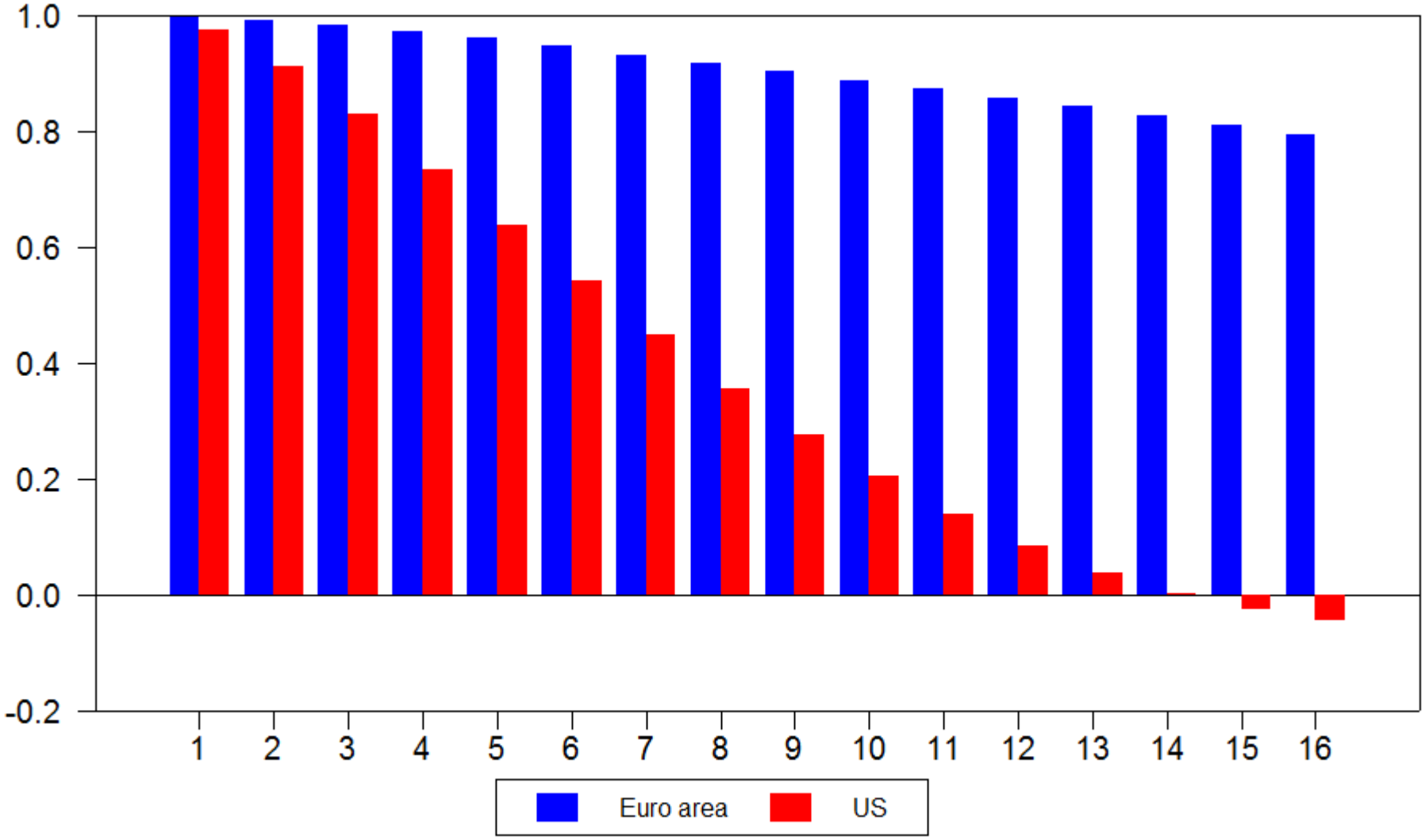


Figure 2. Unemployment Rate: Autocorrelations



Unemployment: Europe vs. United States

- Unit root tests:

  - U.S. unemployment rate $\Rightarrow$ stationary
  - Euro area unemployment rate $\Rightarrow$ nonstationary (unit root)

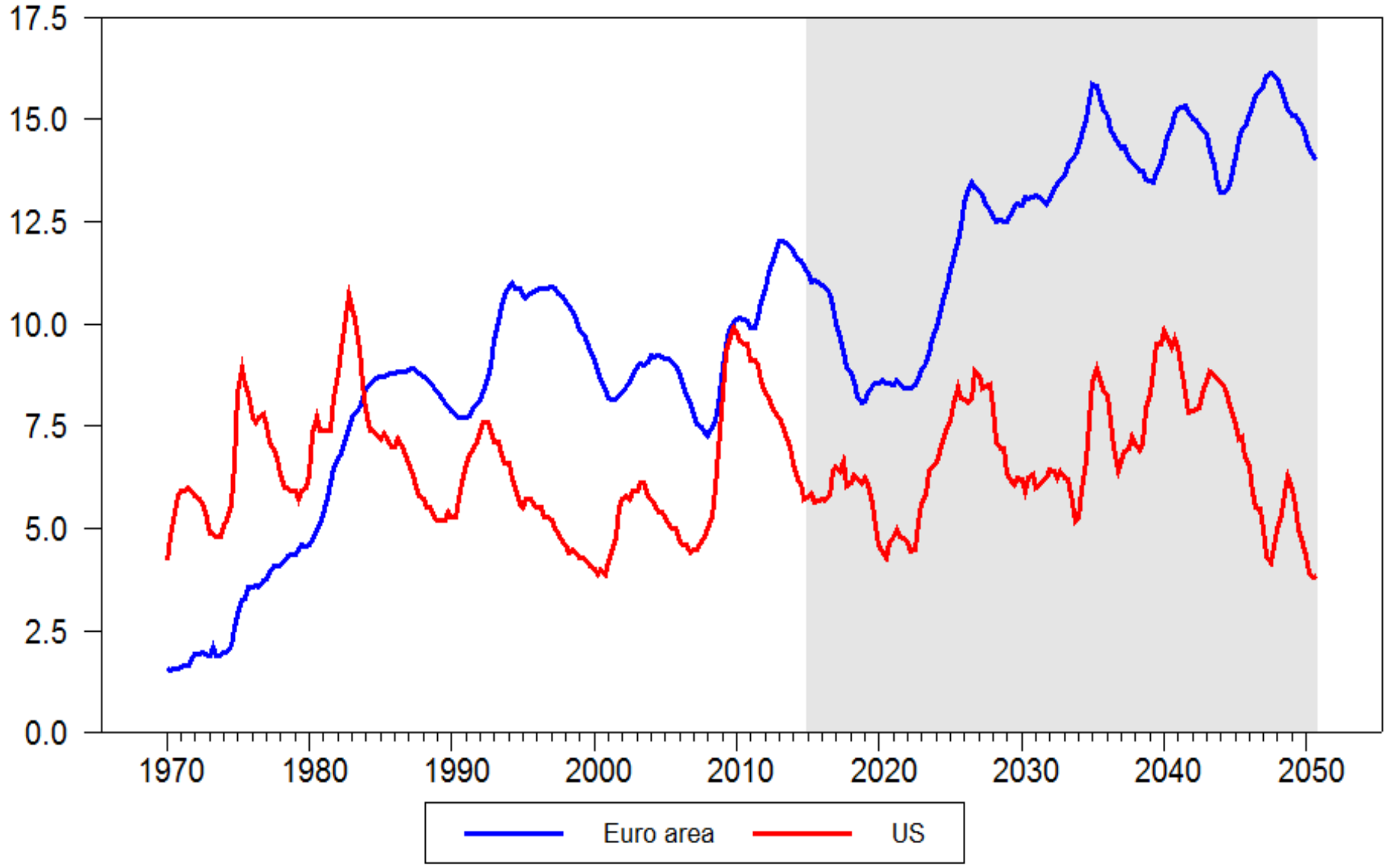
- Two parsimonious models:

$$u_t^{US} = \underset{(0.08)}{0.26} + \underset{(0.05)}{1.63}\, u_{t-1}^{US} - \underset{(0.05)}{0.68}\, u_{t-2}^{US} + \varepsilon_t^{US} \quad ; \quad \sigma(\varepsilon_t^{US}) = 0.25$$

$$\Delta u_t^{EA} = \underset{(0.04)}{0.80}\, \Delta u_{t-1}^{EA} + \varepsilon_t^{EA} \quad ; \quad \sigma(\varepsilon_t^{EA}) = 0.25$$

- Out-of-sample simulations

Figure 3a. Unemployment Rate: Simulated Paths (2015-2050)



Understanding the Persistence in Euro Area Unemployment

- A New Keynesian model with unemployment
- Three hypothesis on the source of the unit root in unemployment:
  - the *natural rate* hypothesis
  - the *long run tradeoff* hypothesis
  - the *hysteresis* hypothesis
- Empirical assessment using euro area data
- Implications for monetary policy

A First Look at the Data

- Unemployment and wage inflation patterns in the euro area (1970-2014)

Figure 4. Wage inflation and Unemployment in the Euro Area

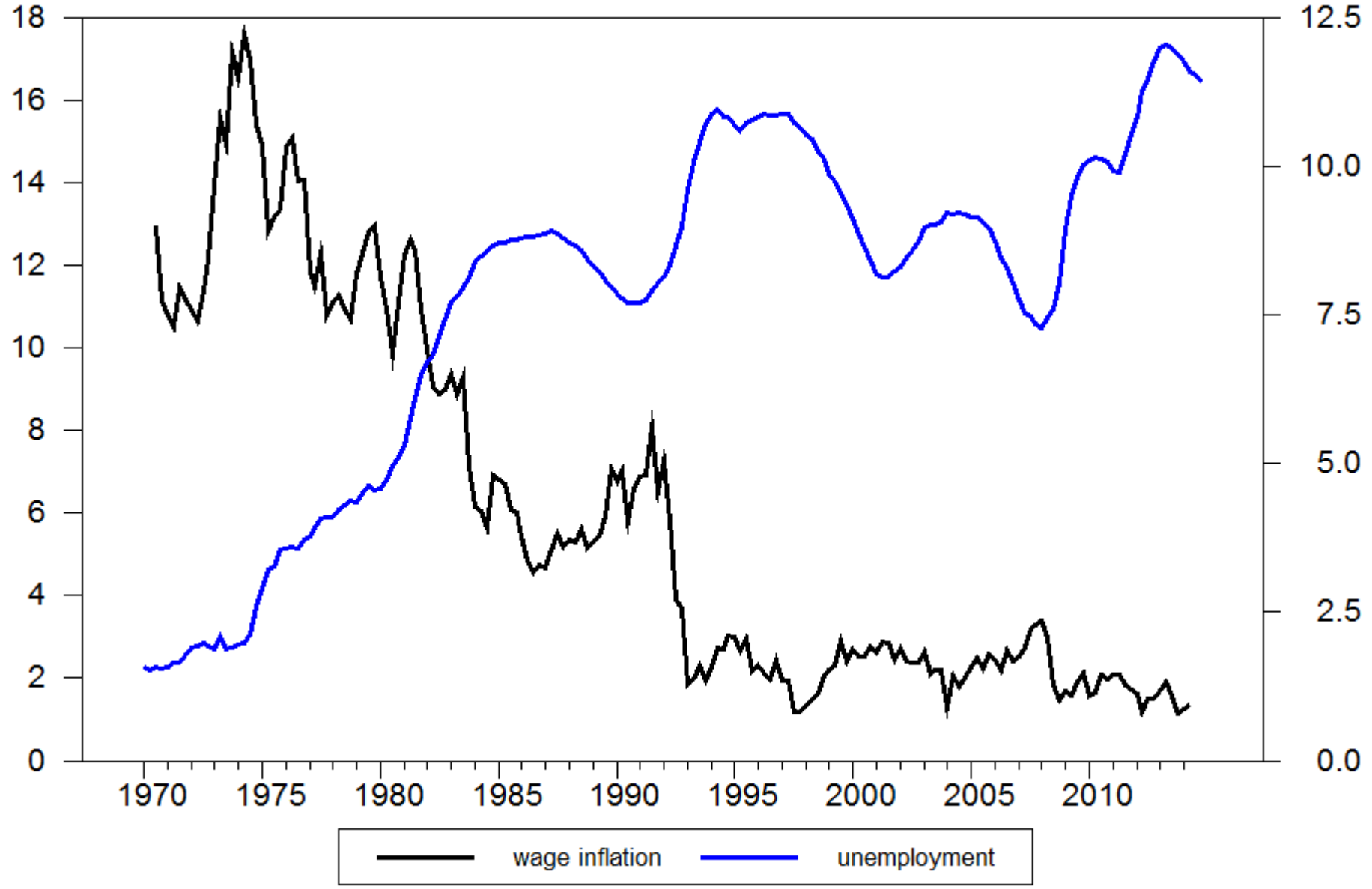


Figure 11. A Long Run Tradeoff between Wage Inflation and Unemployment?

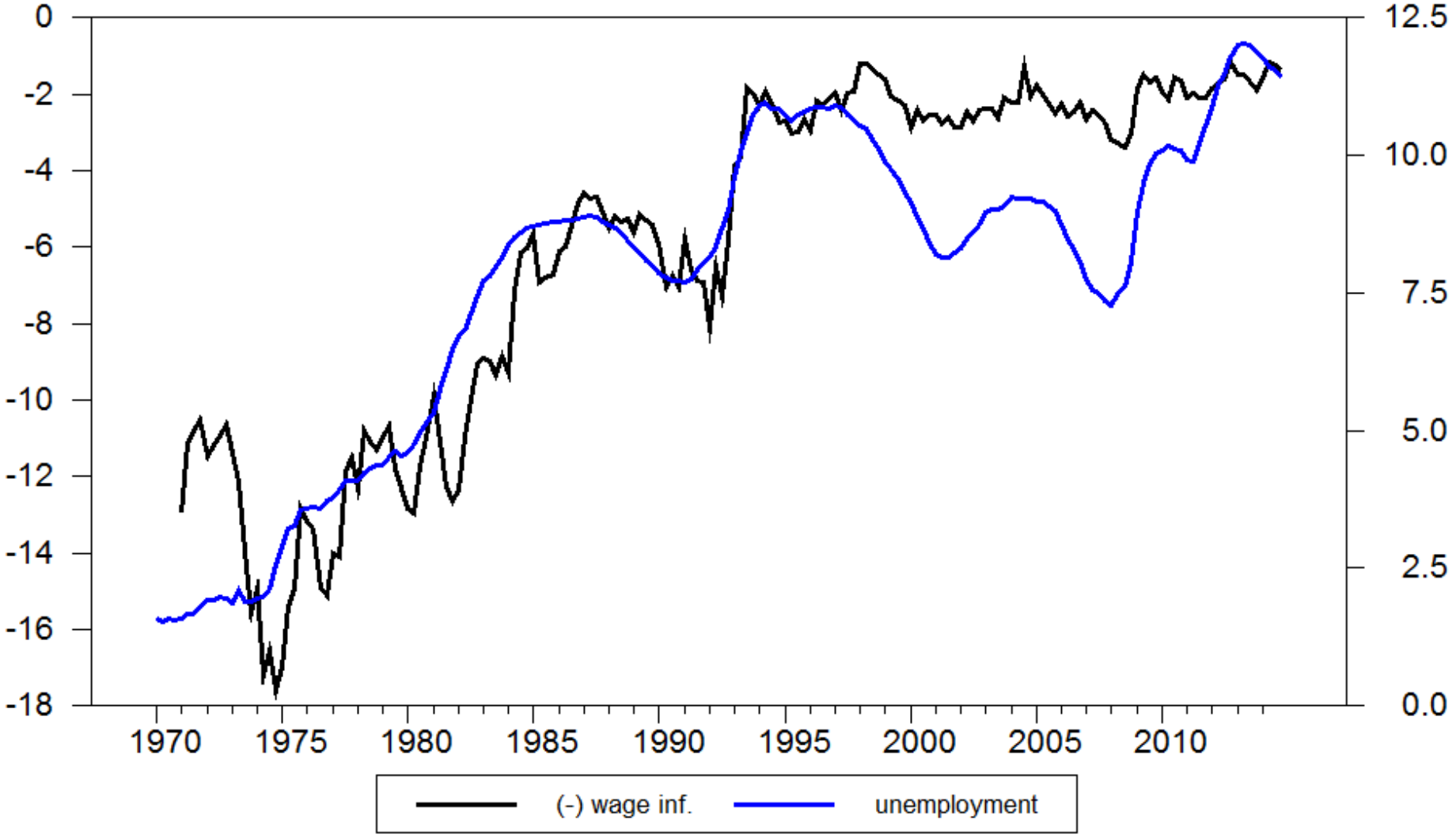


Figure 5. The Euro Area Wage Phillips Curve: 1970-2014

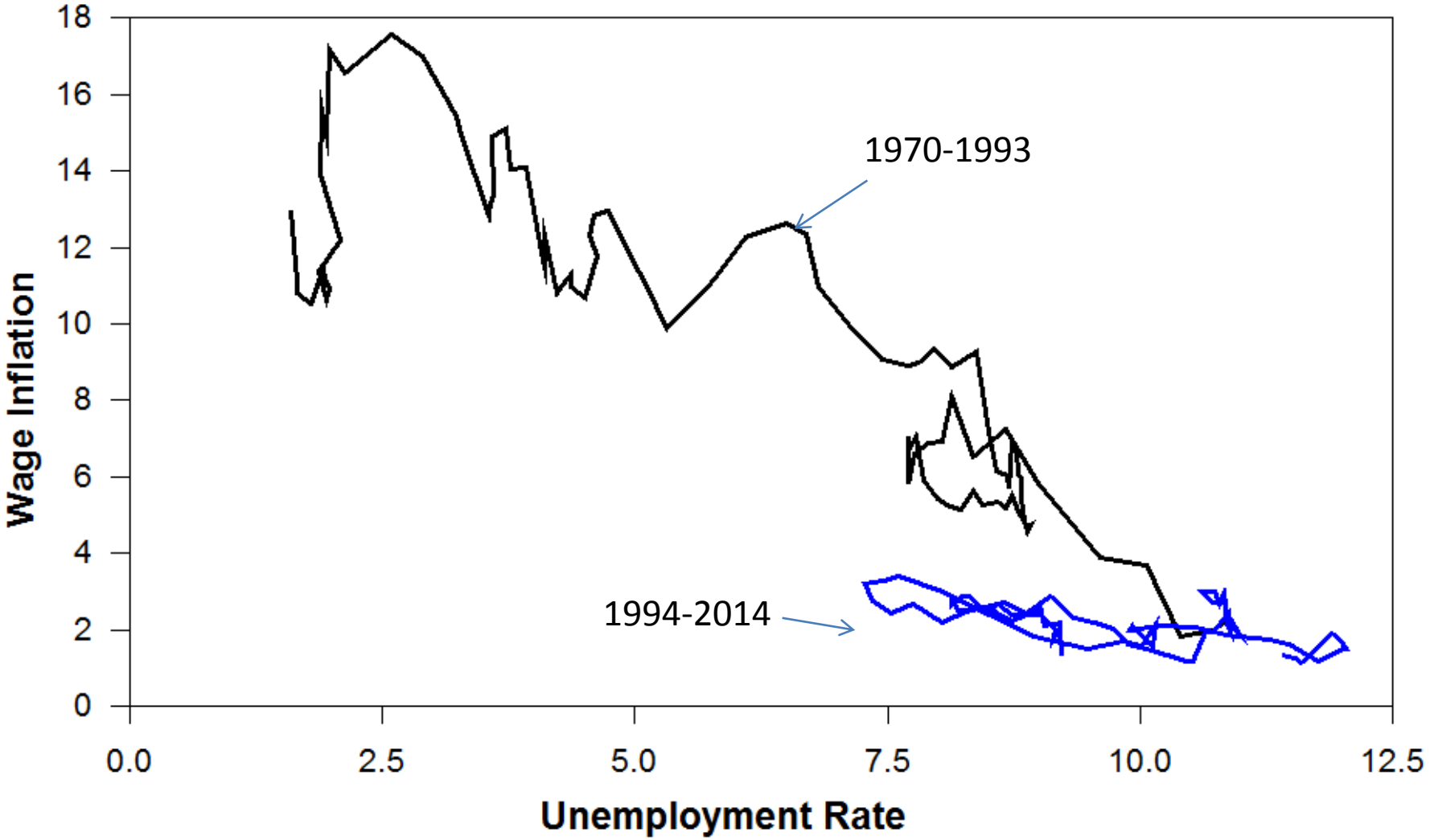
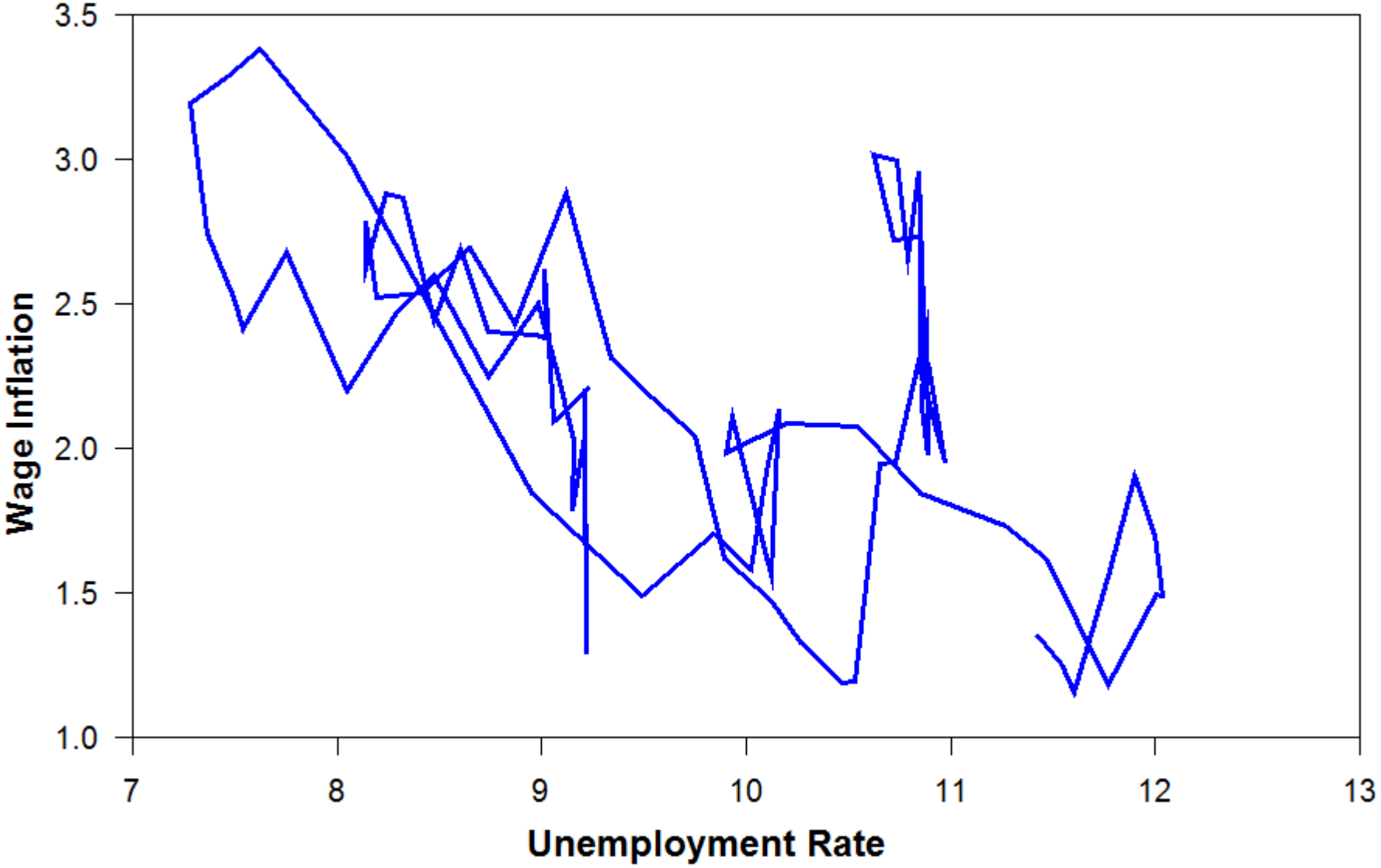


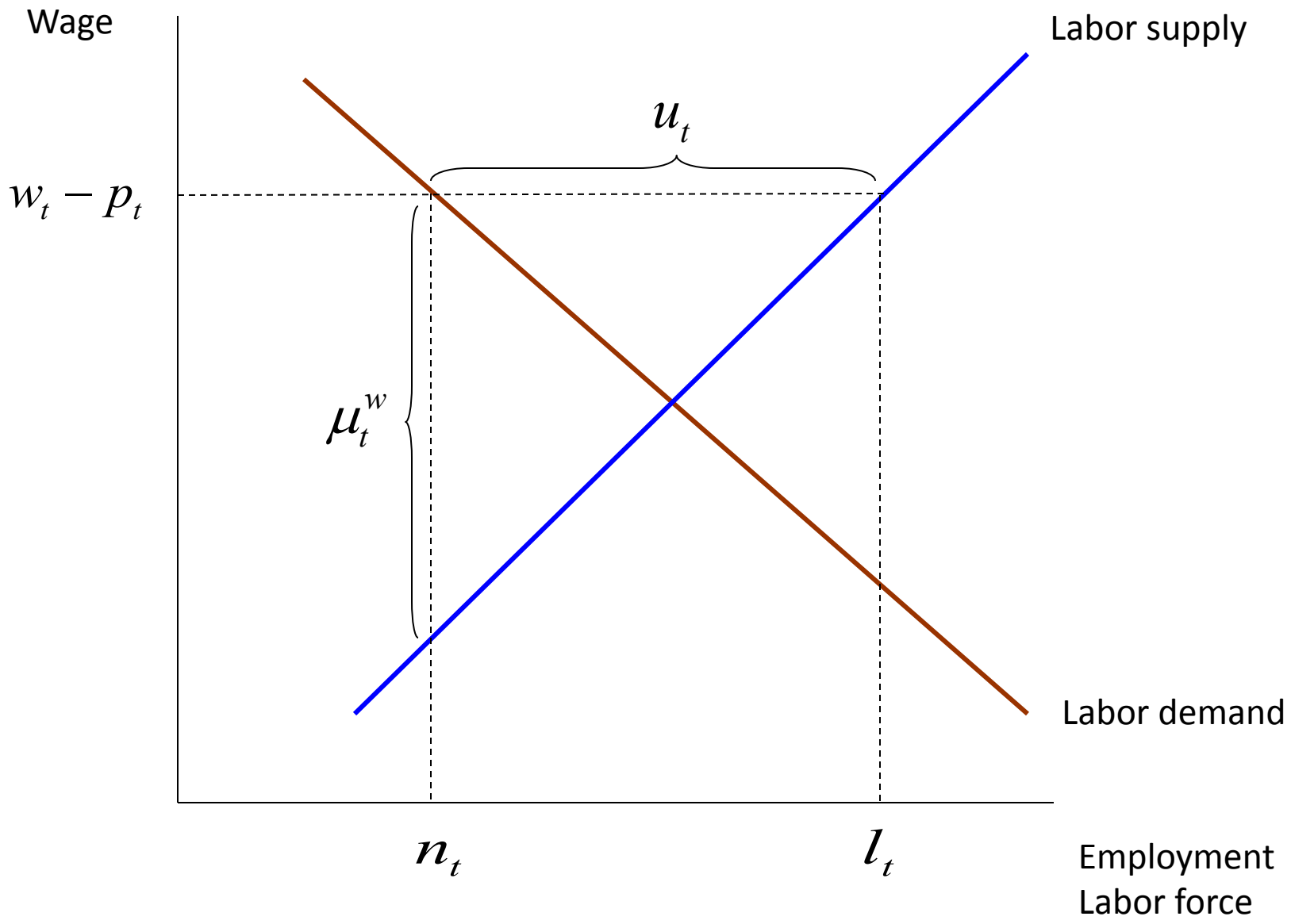
Figure 5b. The Euro Area Wage Phillips Curve: 1994-2014



A New Keynesian Model with Unemployment: Key Ingredients

- Based on Galí (2011) and Galí-Smets-Wouters (2012)
- Monopolistic competition in goods and labor markets
- Nominal rigidities: Staggered wage and price setting à la Calvo
- Representative household with large number of members
- Heterogeneity: different occupations, different disutility from work
- Three possible status: employed, unemployed, non-participant
- Wage for each occupation set by a union
- Key concepts: reservation wage, participation, wage markup (fig.)

Figure 6. The Wage Markup and the Unemployment Rate



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- Heterogeneity: different occupations, different disutility from work
- Three possible status: employed, unemployed, non-participant
- Wage for each occupation set by a union
- Key concepts: reservation wage, participation, wage markup (fig.)
- Fundamental relation

$$\mu_{w,t} = \varphi u_t$$

Wage Setting (I): Exogenous Natural Wage Markup

- Smets-Wouters, Galí-Smets-Wouters,...
- Implied (exogenous) natural rate of unemployment:

$$u_t^n \equiv \frac{\mu_{w,t}^n}{\varphi}$$

- Wage setting rule: "*set wage so that expected average wage markup over the duration of contract equals desired wage markup*"
- Rationale
- Implied wage equation (Galí (2011)):

$$\pi_t^w = \beta E_t\{\pi_{t+1}^w\} - \lambda_w \varphi(u_t - u_t^n)$$

- Implication: stationary unemployment gap, $u_t - u_t^n$

Wage Setting (II): Insider-Outsider Model

- Blanchard-Summers, Lindbeck-Snower
- Wage setting rule: "*set wage so that expected employment over duration of the contract equals current employment*"
- Rationale
- Implied wage equation:

$$\pi_t^w = \beta E_t\{\pi_{t+1}^w\} + \lambda_n \Delta n_t$$

Closing the Model: Monetary Policy

- A simple monetary policy rule

$$i_t = 0.9\ i_{t-1} + 0.1\ i_t^*$$

where

$$i_t^* = 1.5(\pi_t^p - \pi_t^*) + 0.5\Delta y_t$$

The Natural Rate Hypothesis

- Assumption:

$$\mu^n_{w,t} \Rightarrow \textit{ random walk}$$

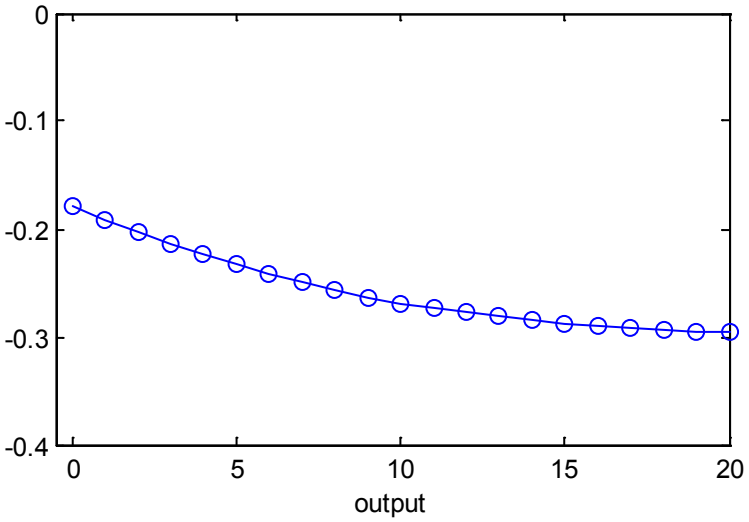
- Implications

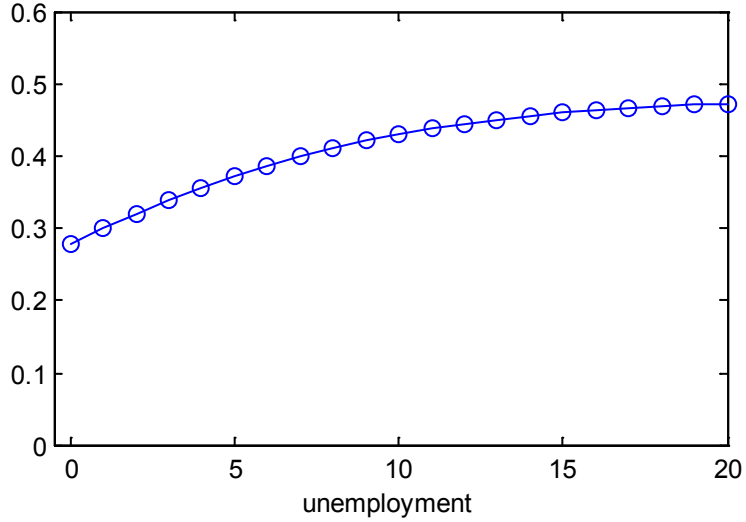
$$u^n_t \Rightarrow \textit{ random walk}$$

$$u_t \Rightarrow \textit{ nonstationary}$$

- Impulse responses
- Simulations

Figure 7. Wage Markup Shock: Dynamic Responses





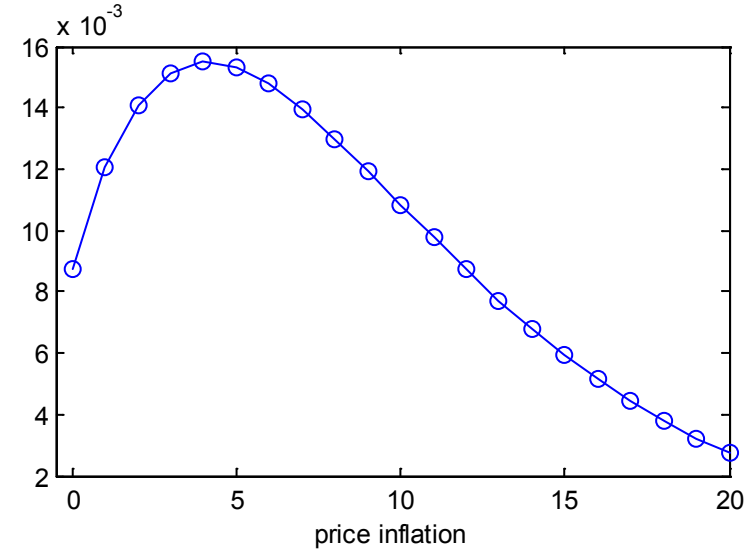


Figure 8. The Natural Rate of Unemployment and the Unemployment Gap under the Natural Rate Hypothesis

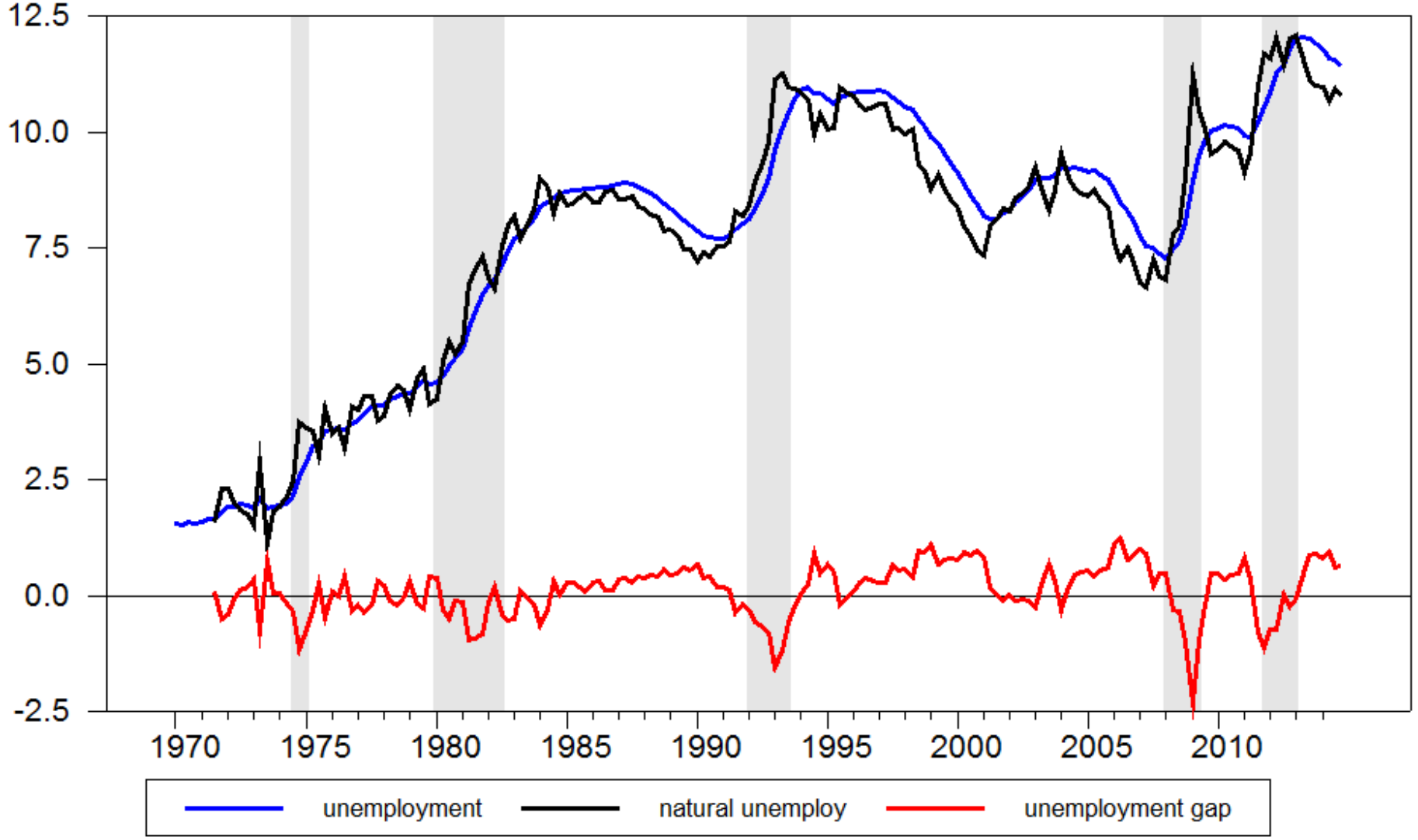


Figure 9a. Wage Inflation: Actual vs. Predicted under the Natural Rate Hypothesis (1970-2014)

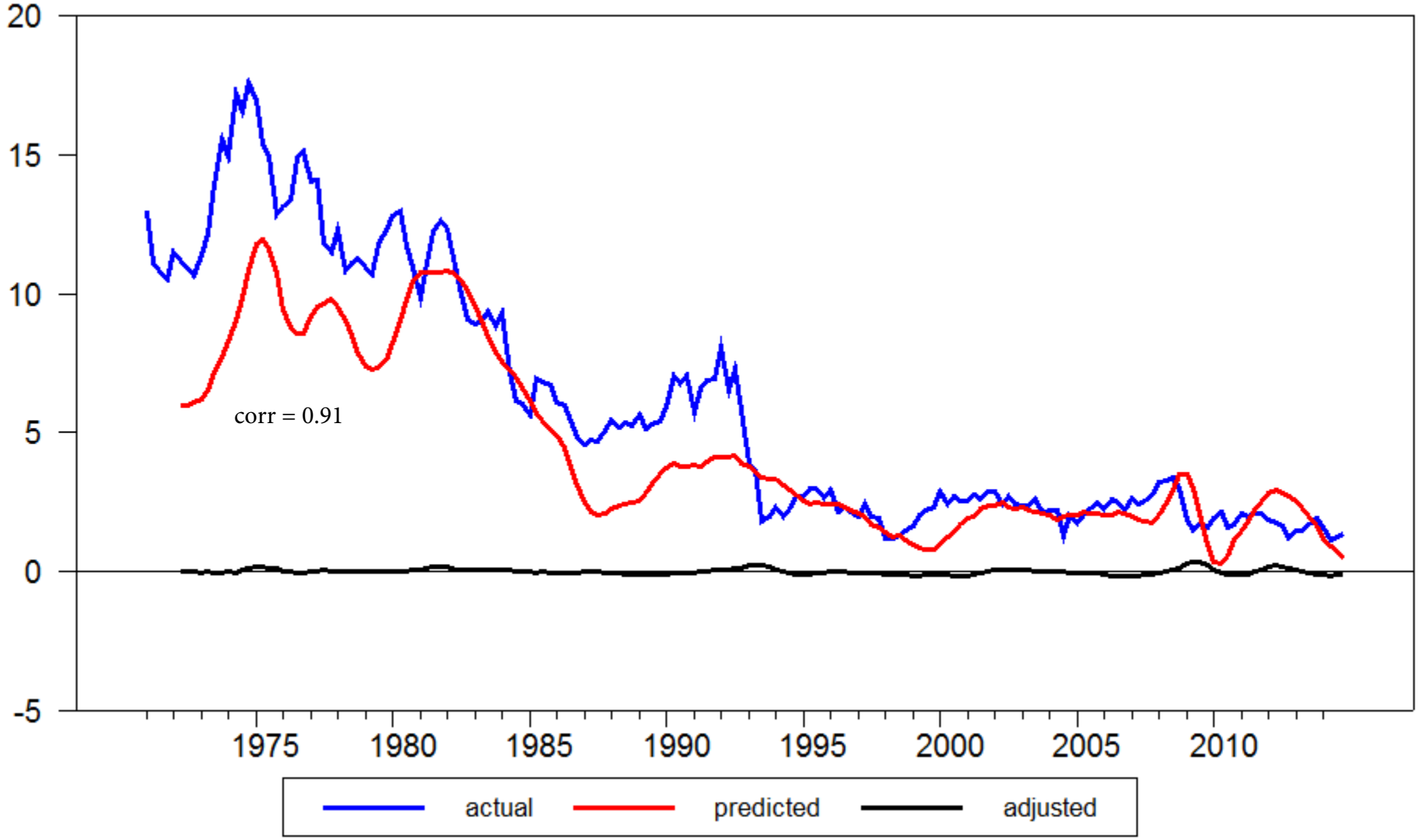
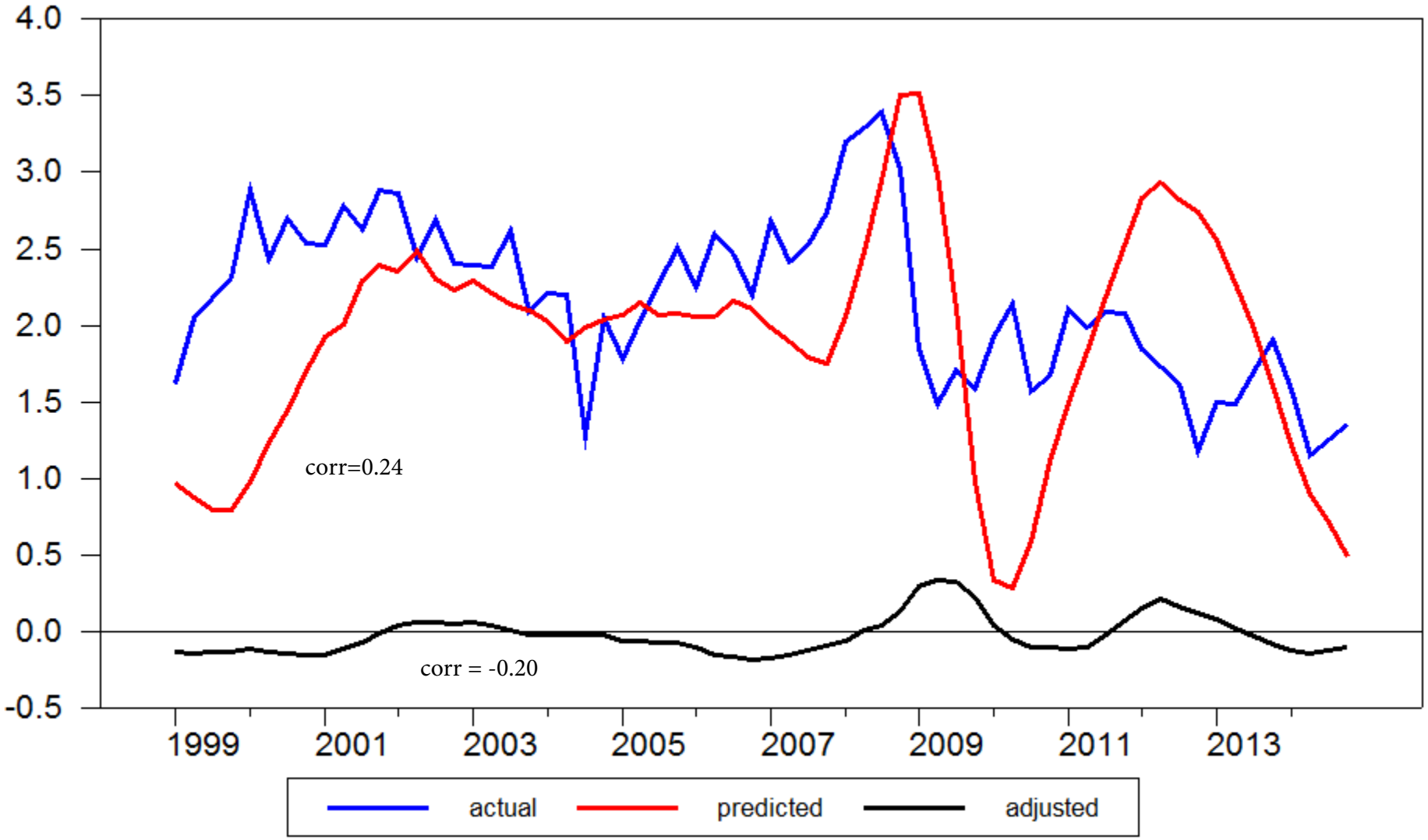


Figure 9b. Wage Inflation: Actual vs. Predicted under the Natural Rate Hypothesis (1999-2014)



The Long Run Tradeoff Hypothesis

- Assumption:

$$\pi_t^* \Rightarrow \textit{ random walk}$$

- Implications:

$$\pi_t^w \Rightarrow \textit{ nonstationary}$$

$$u_t \Rightarrow \textit{ nonstationary}$$

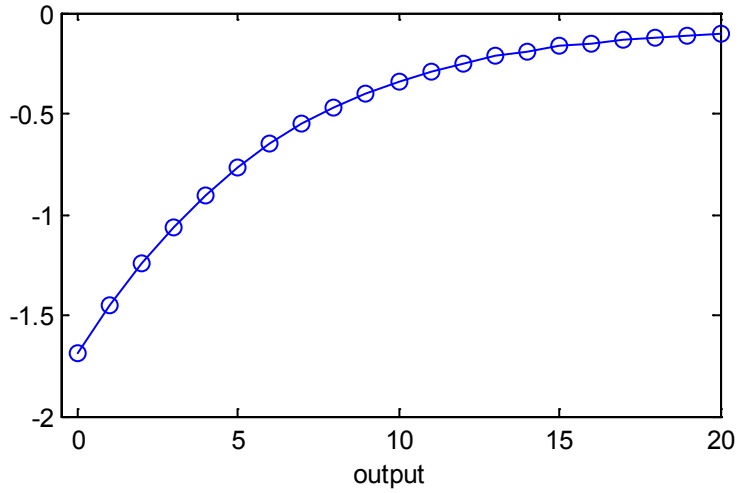
given the long run relation:

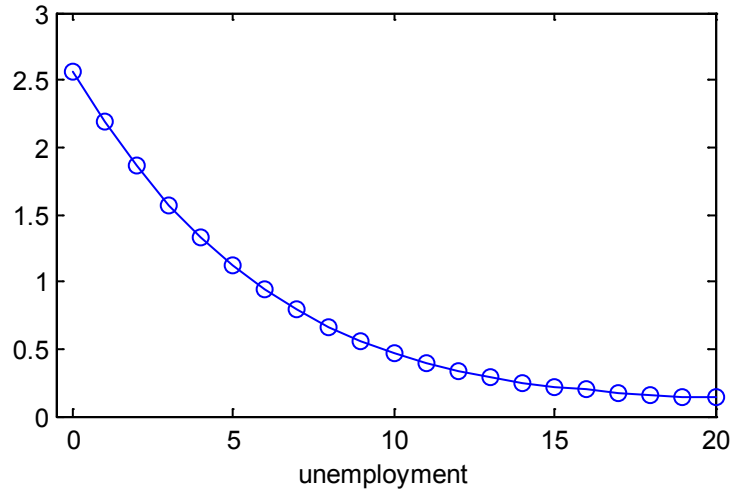
$$u_t = u^n - \frac{1-\beta}{\lambda_w \varphi} \pi_t^w$$

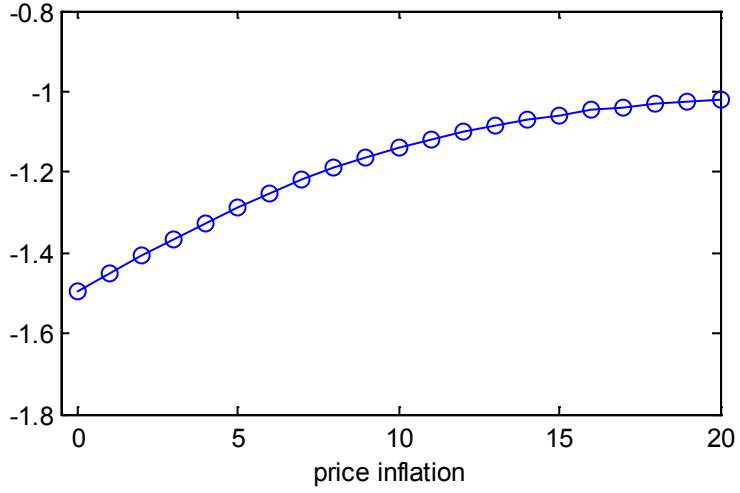
- Impulse responses
- Simulations

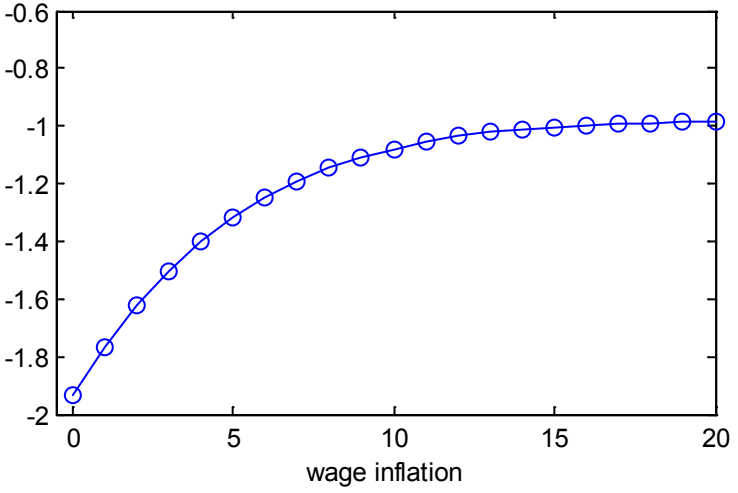
Figure 10. Inflation Target Shock: Dynamic Responses

Baseline calibration









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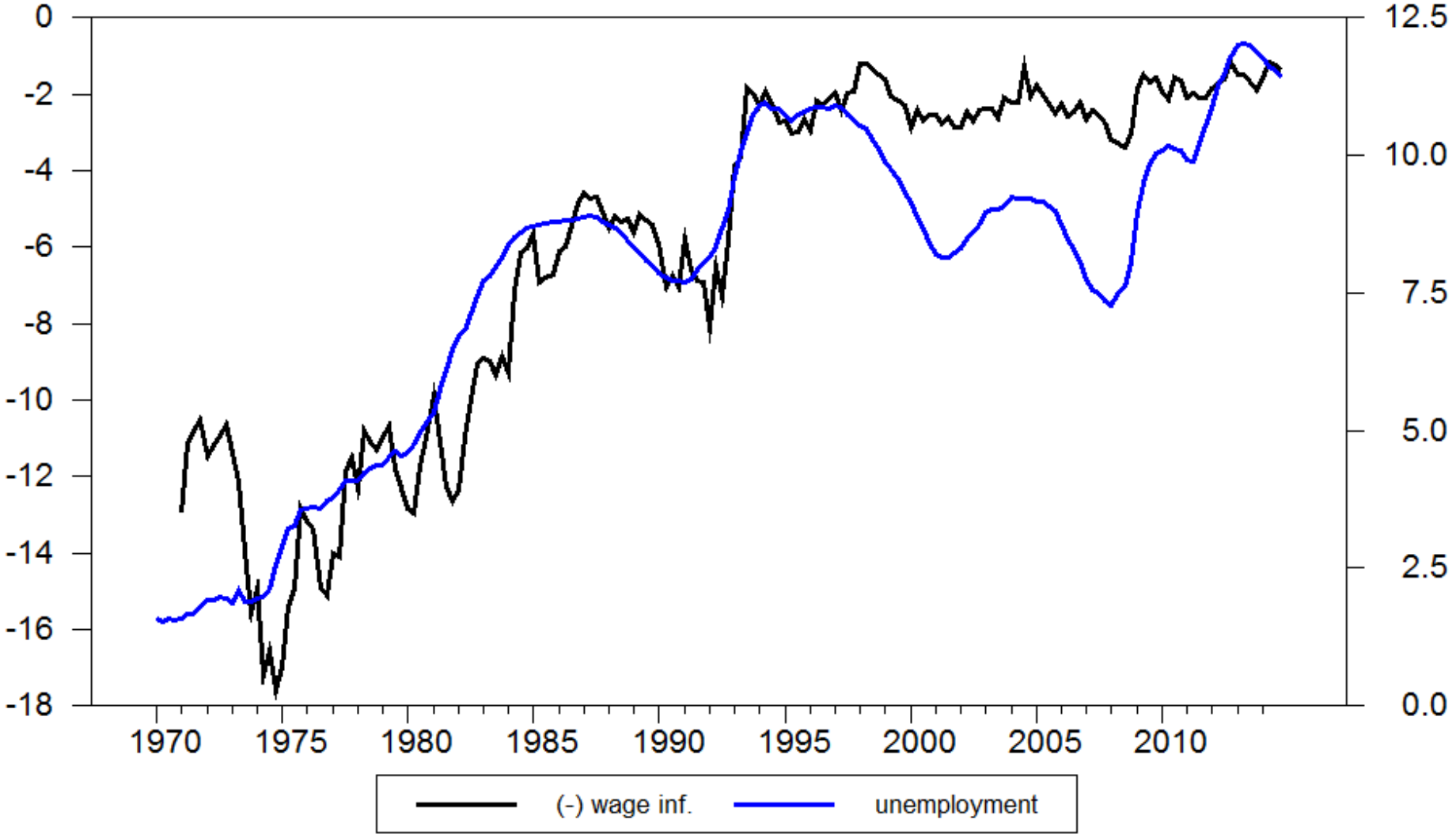


Figure 12a. Wage Inflation: Actual vs. Predicted under the Long Run Tradeoff Hypothesis

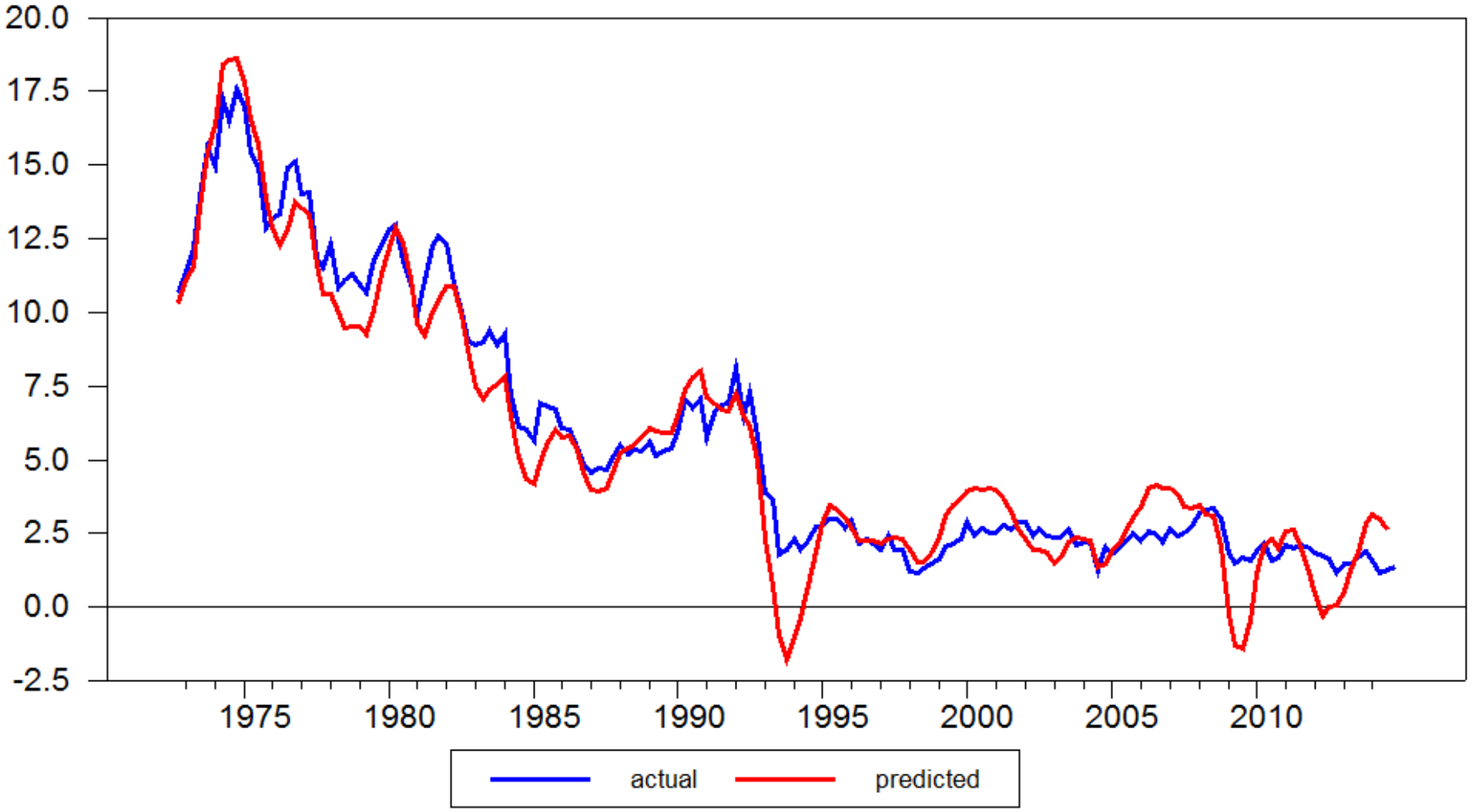
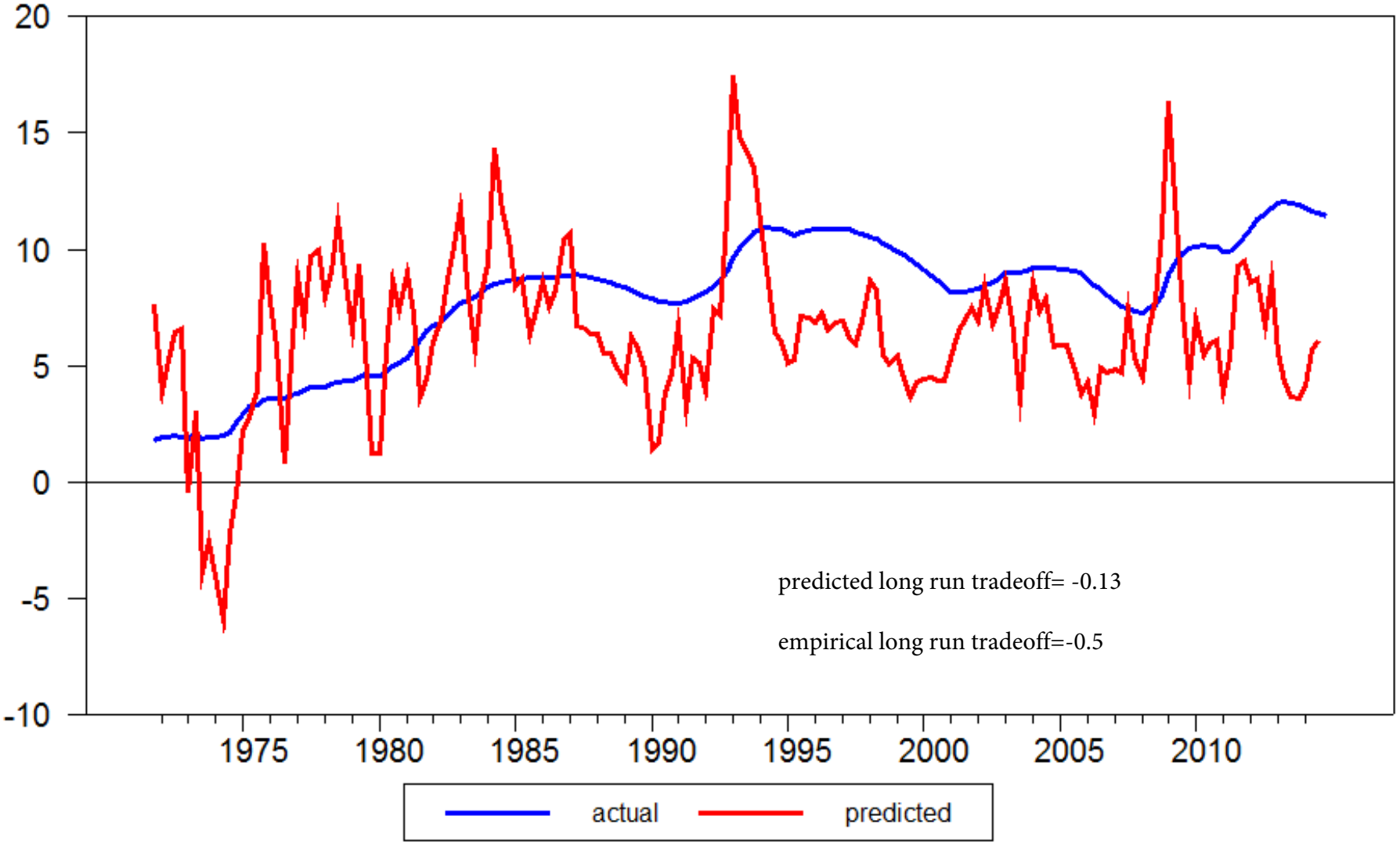


Figure 12b. Unemployment Rate: Actual vs. Predicted under the Long Run Tradeoff Hypothesis



The Hysteresis Hypothesis

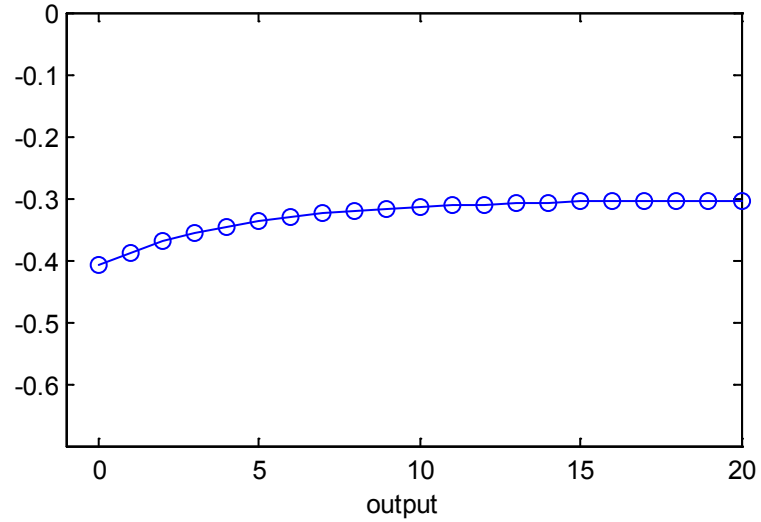
- Assumption: insider-outsider model of wage setting
- Implications:

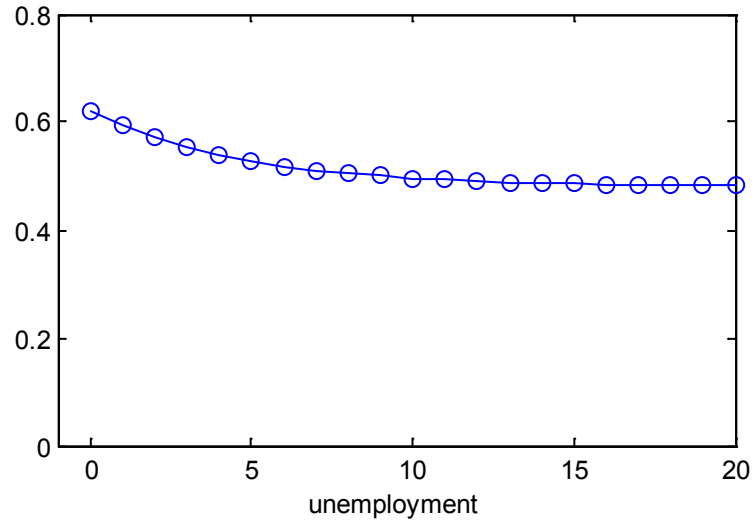
$$n_t \Rightarrow \textit{nonstationary}$$

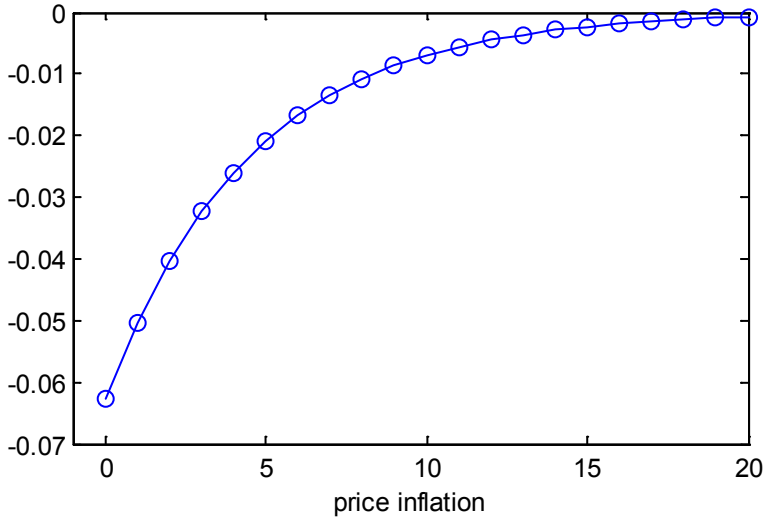
$$u_t \Rightarrow \textit{nonstationary}$$

- Impulse responses to a (transitory) demand shock
- Simulations

Figure 13. The Insider-Outsider NK Model: Dynamic Responses to a Demand Shock







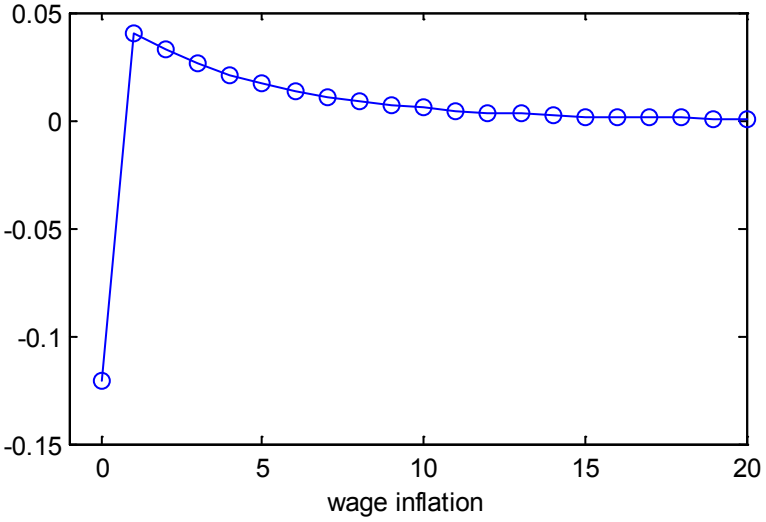


Figure 14a. Wage Inflation: Actual vs. Predicted under the Hysteresis Hypothesis (1970-2014)

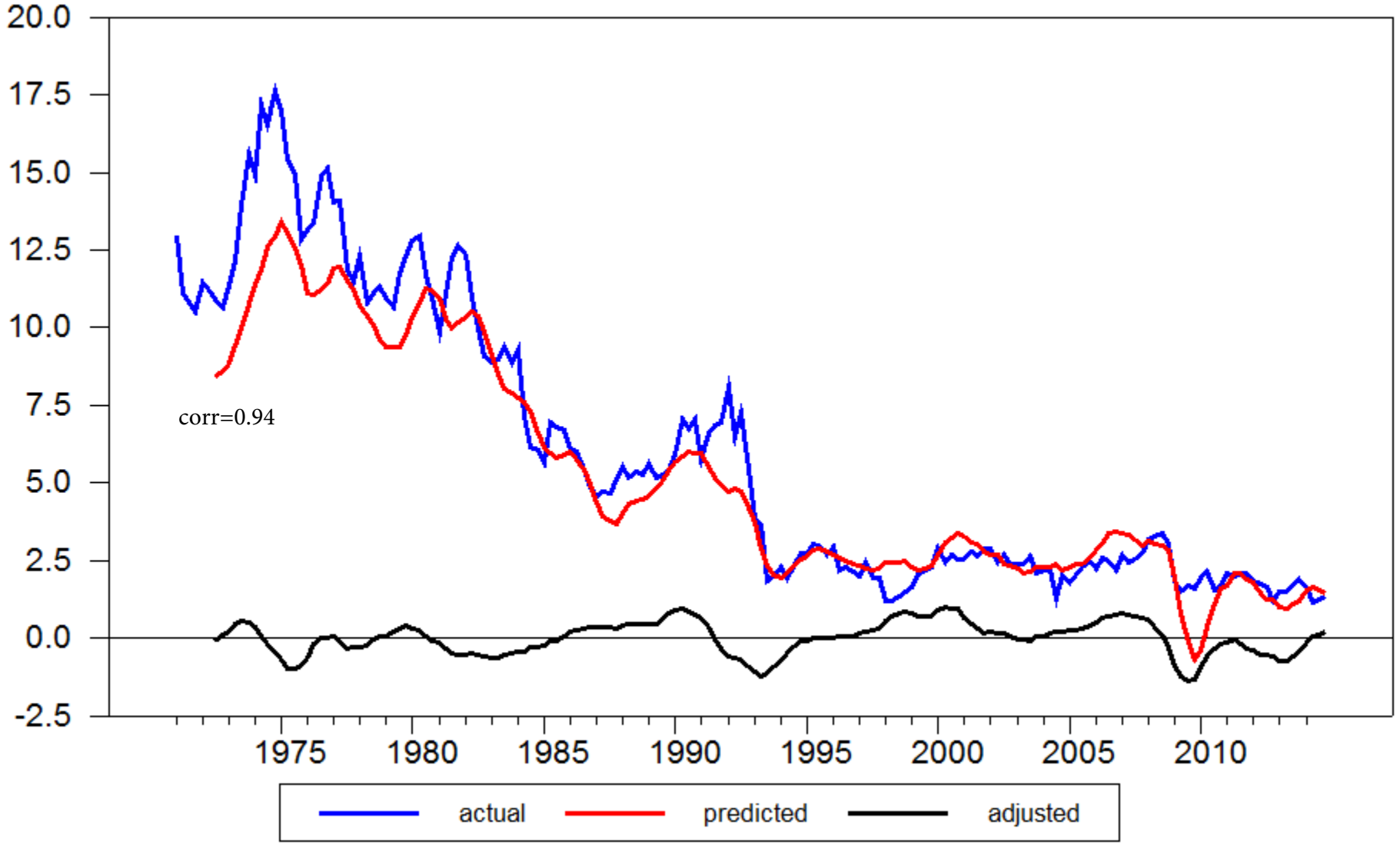
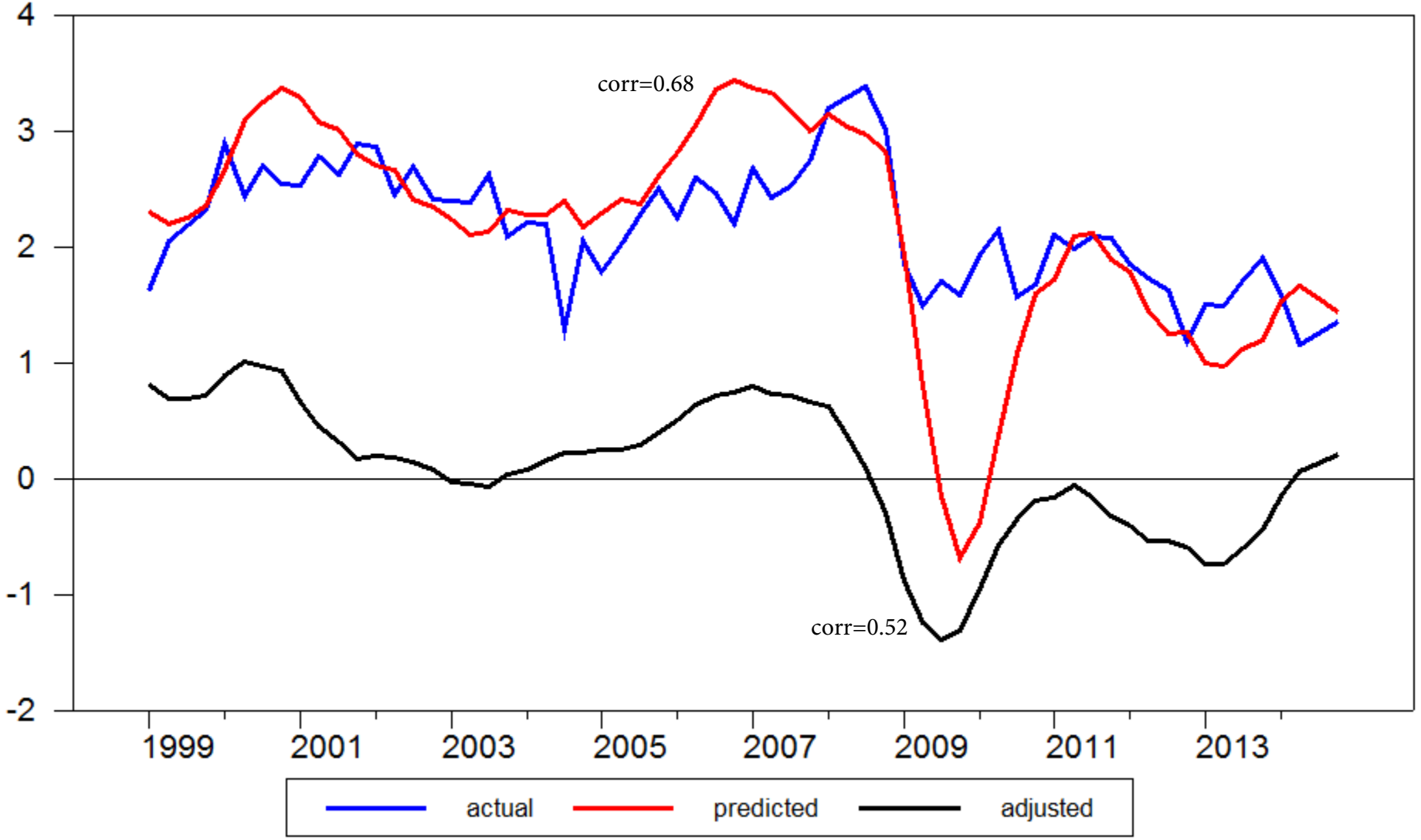


Figure 14b. Wage Inflation: Actual vs. Predicted under the Hysteresis Hypothesis (1999-2014)



Summary and Concluding Remarks

- What have we learned?
- Implications of hysteresis for monetary policy (work in progress)

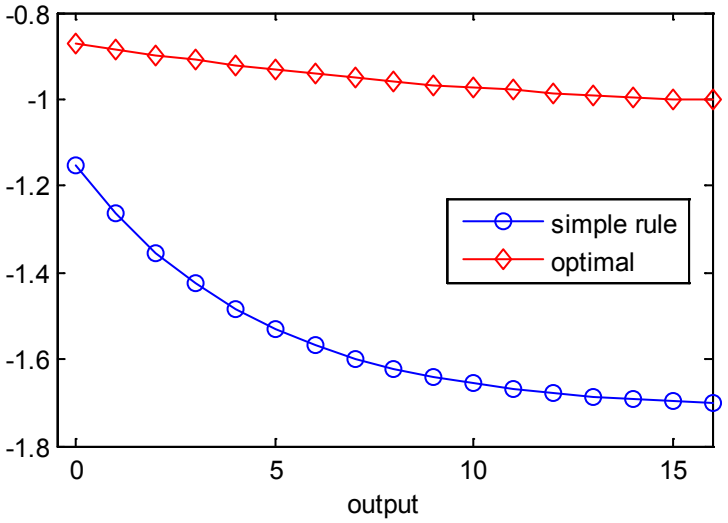
  - Optimal policy vs. simple rule

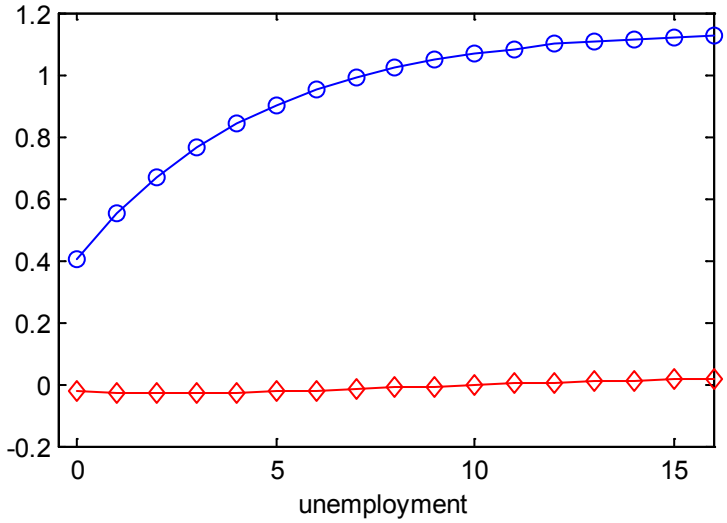
  $\Rightarrow$ greater weight to (un)employment stability, less to inflation

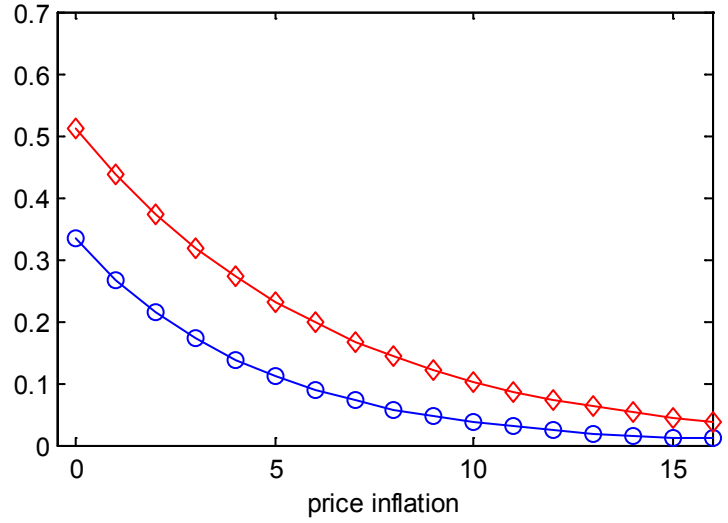
- Further research

  - insider-outsider setup in a medium scale DSGE model

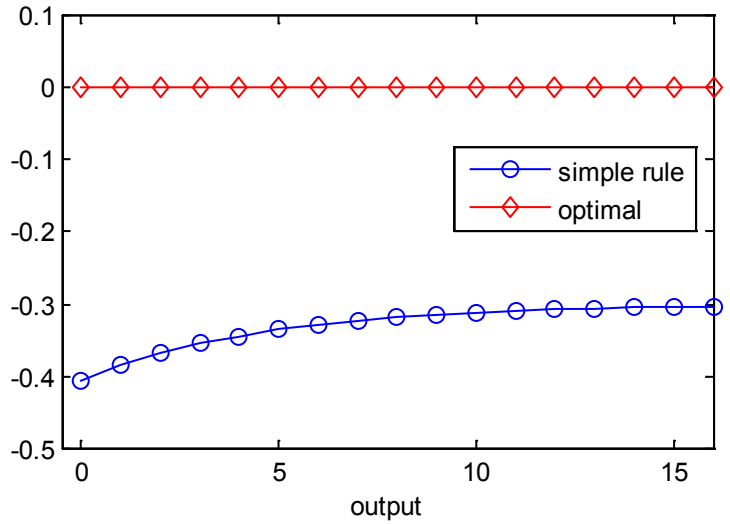
Dynamic Responses to a Technology Shock: Optimal Policy vs. Simple Rule

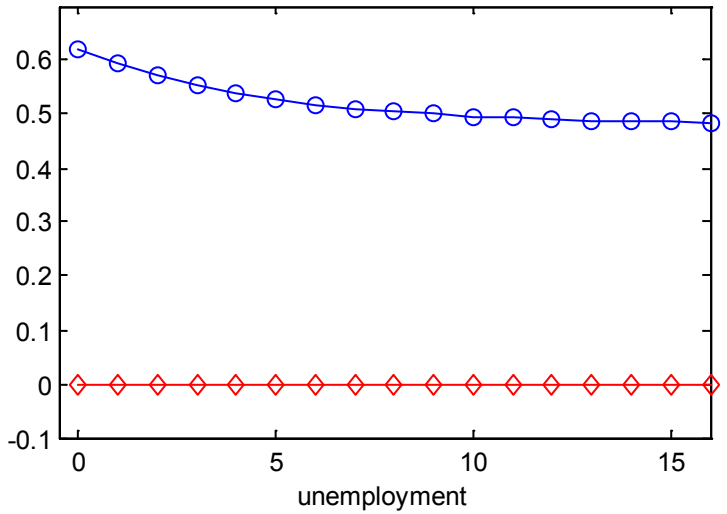


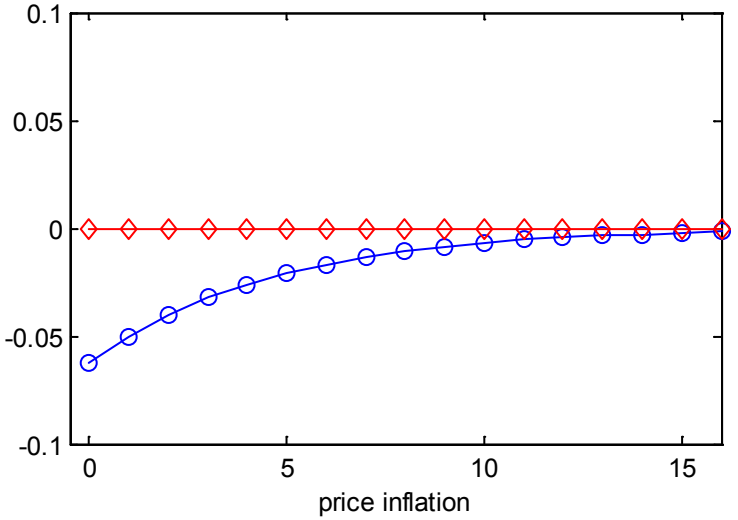


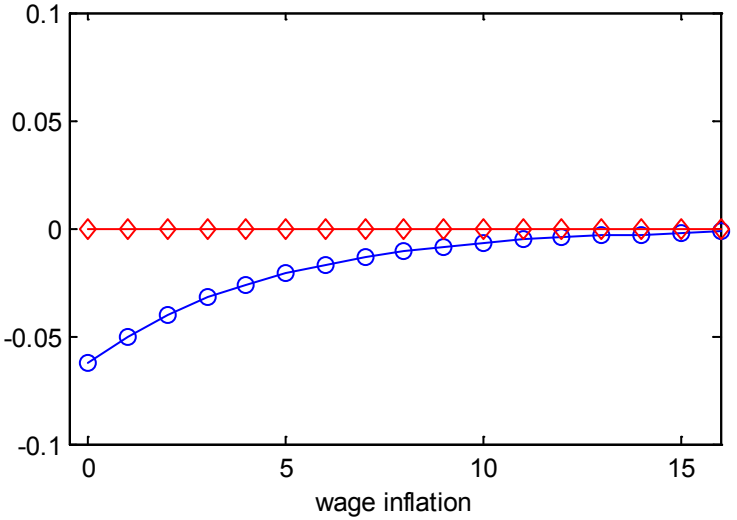


Dynamic Responses to a Demand Shock: Optimal Policy vs. Simple Rule









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