

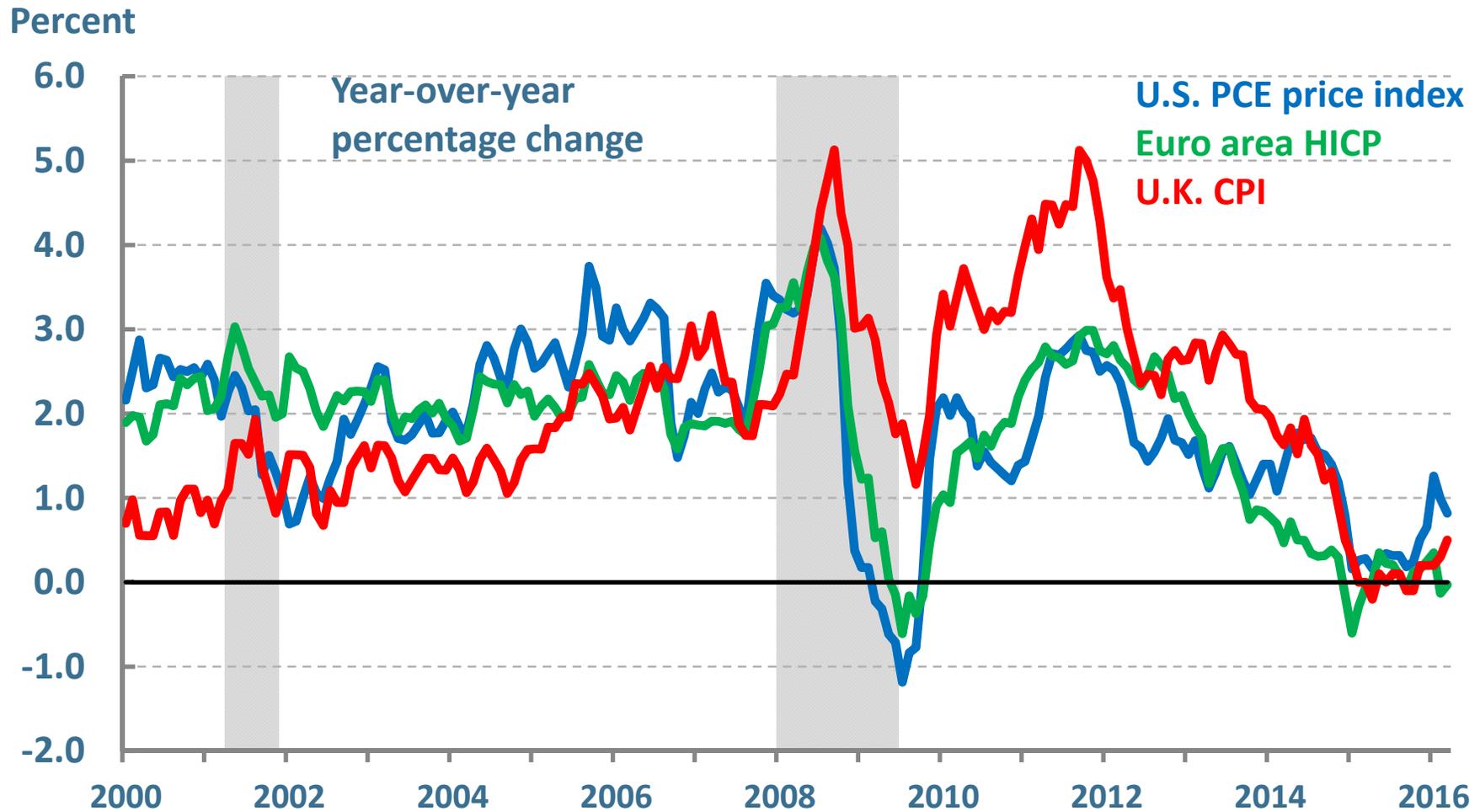
Recent Inflation Developments and Challenges for Research and Monetary Policymaking

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* The views expressed here are my own and not necessarily those of the Federal Reserve System or my colleagues on the Federal Open Market Committee.

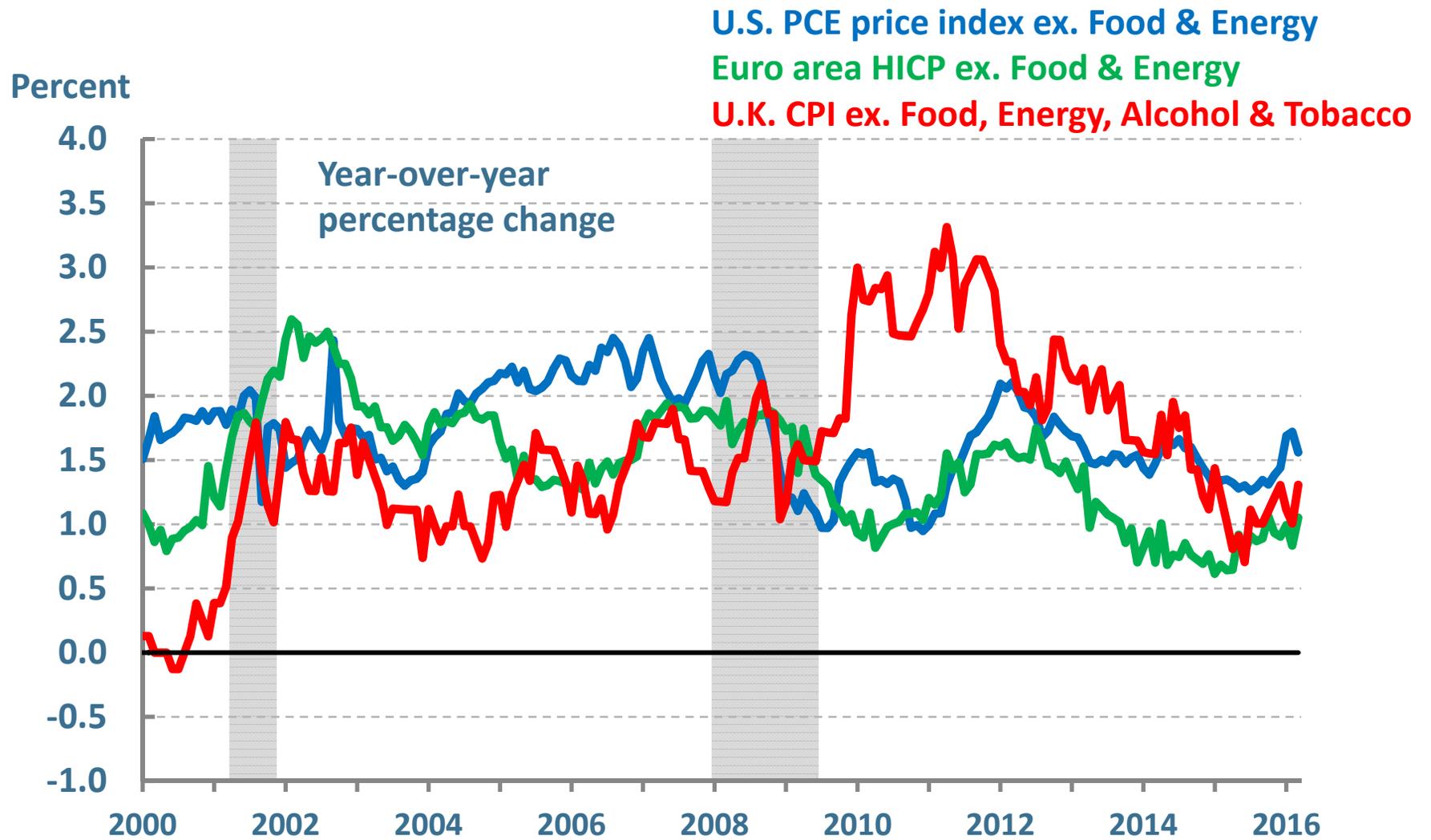
Figure 1. Headline inflation



Source: U.S. Bureau of Economic Analysis, ECB, Eurostat via Haver Analytics
Monthly data: Last obs. March 2016

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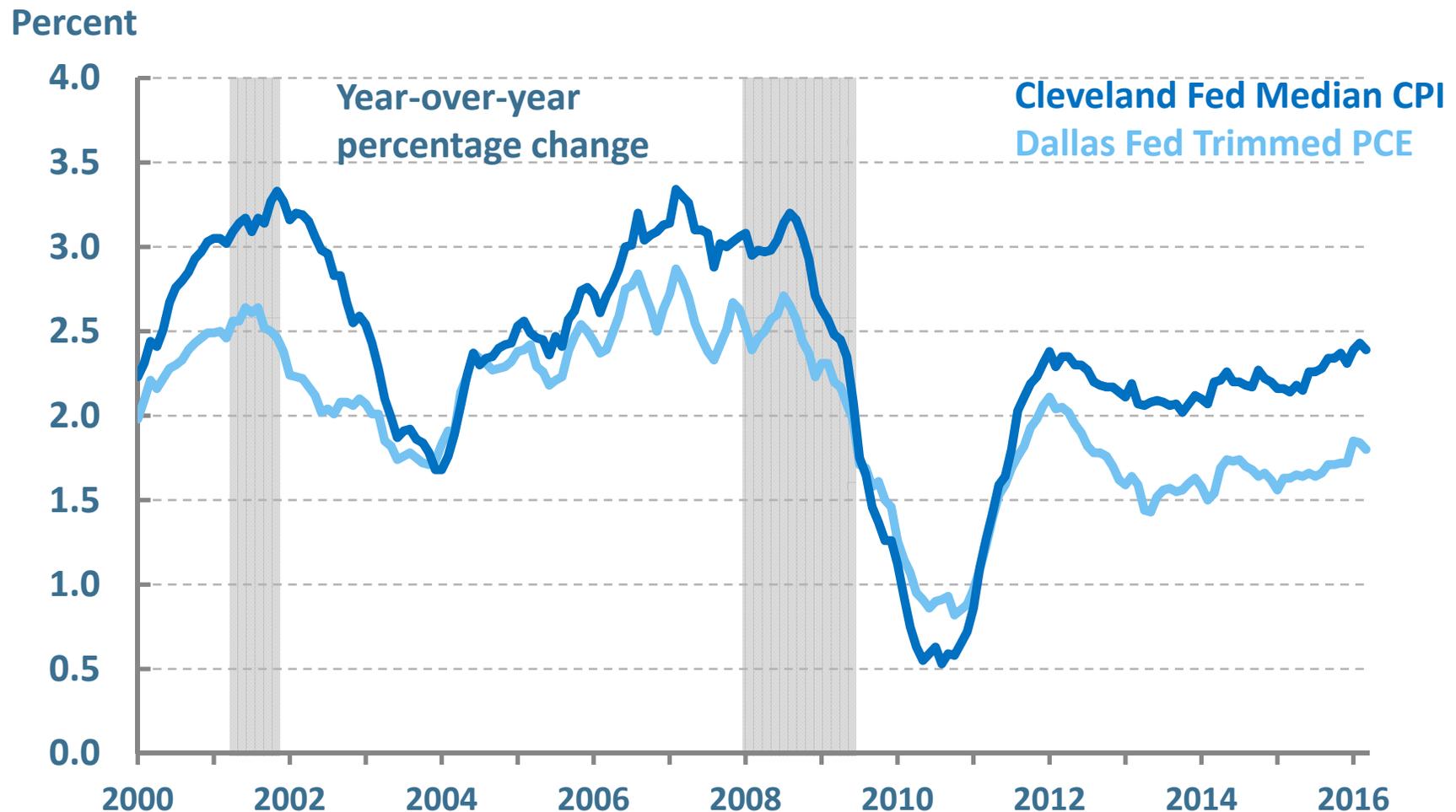
Figure 2. Core inflation



Source: U.S. Bureau of Economic Analysis, ECB, and Eurostat via Haver Analytics
Monthly data: Last obs. March 2016

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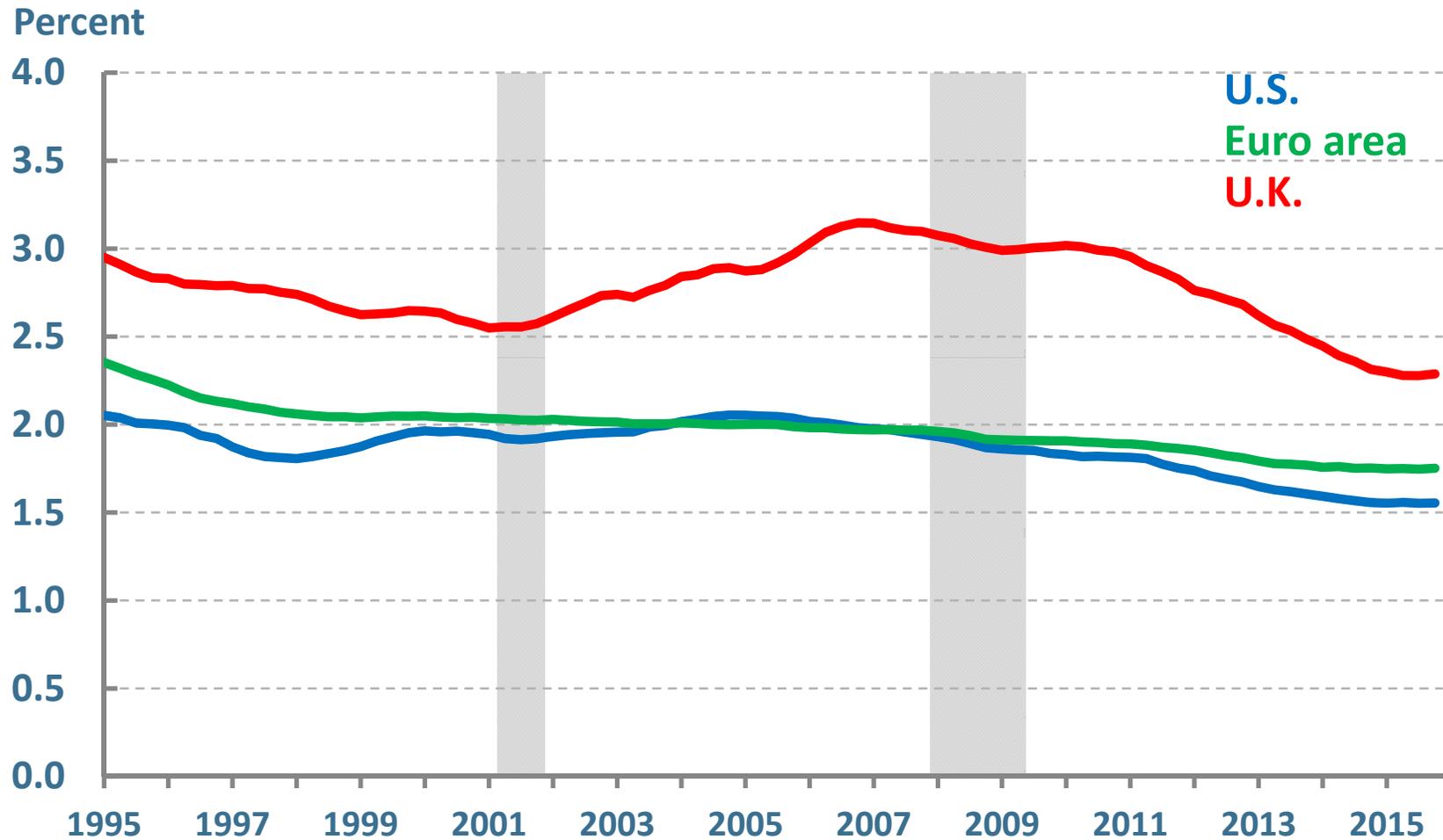
Figure 3. Other measures of underlying inflation in the U.S.



Source: Federal Reserve Bank of Cleveland and Federal Reserve Bank of Dallas via Haver Analytics
Monthly data: Last obs. March 2016

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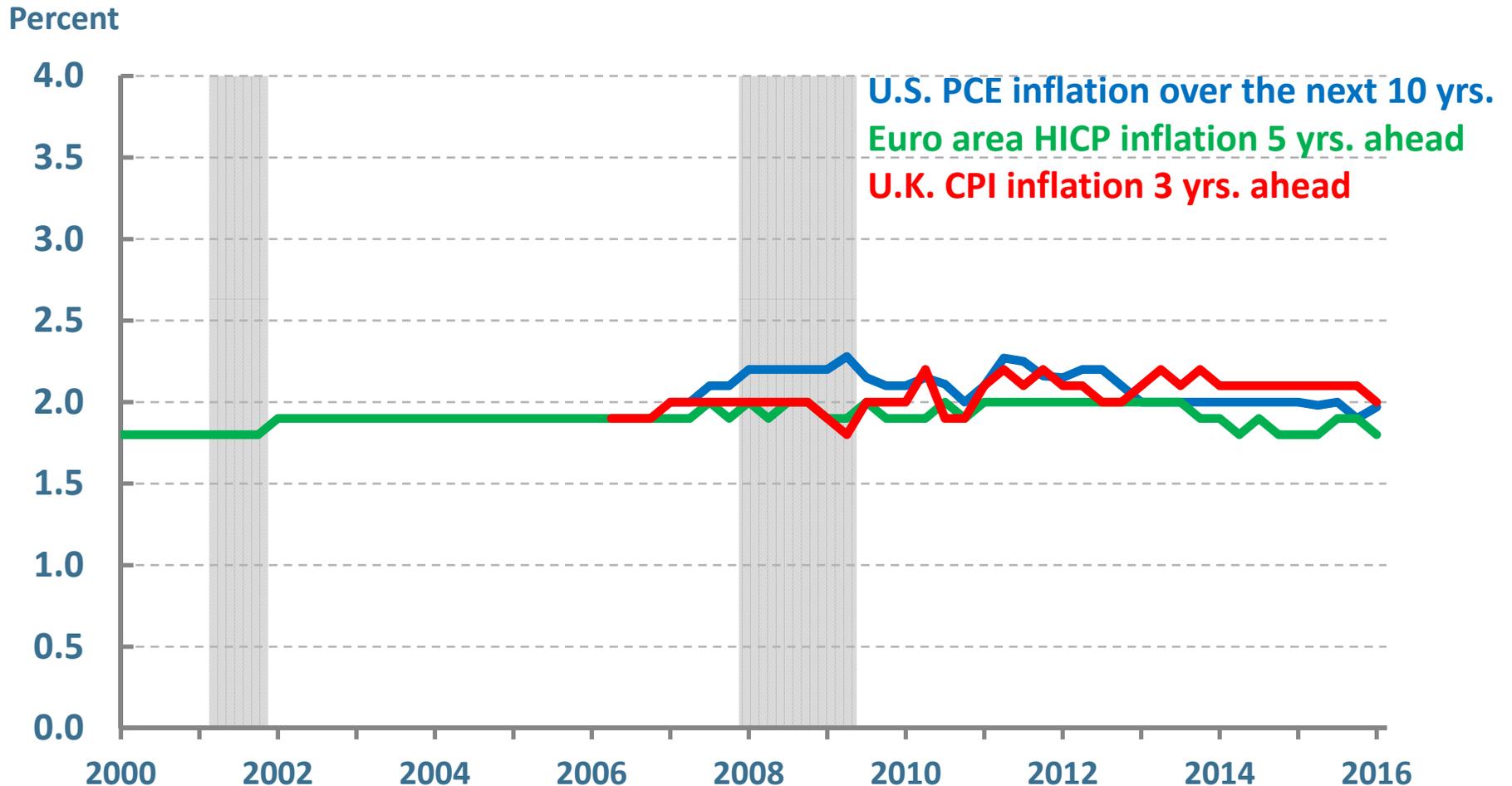
Figure 4. Trend inflation estimates



Source: Federal Reserve Bank of Cleveland
Quarterly data: Last obs. 2015Q4

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Figure 5. Longer-term inflation expectations: Surveys of professional forecasters

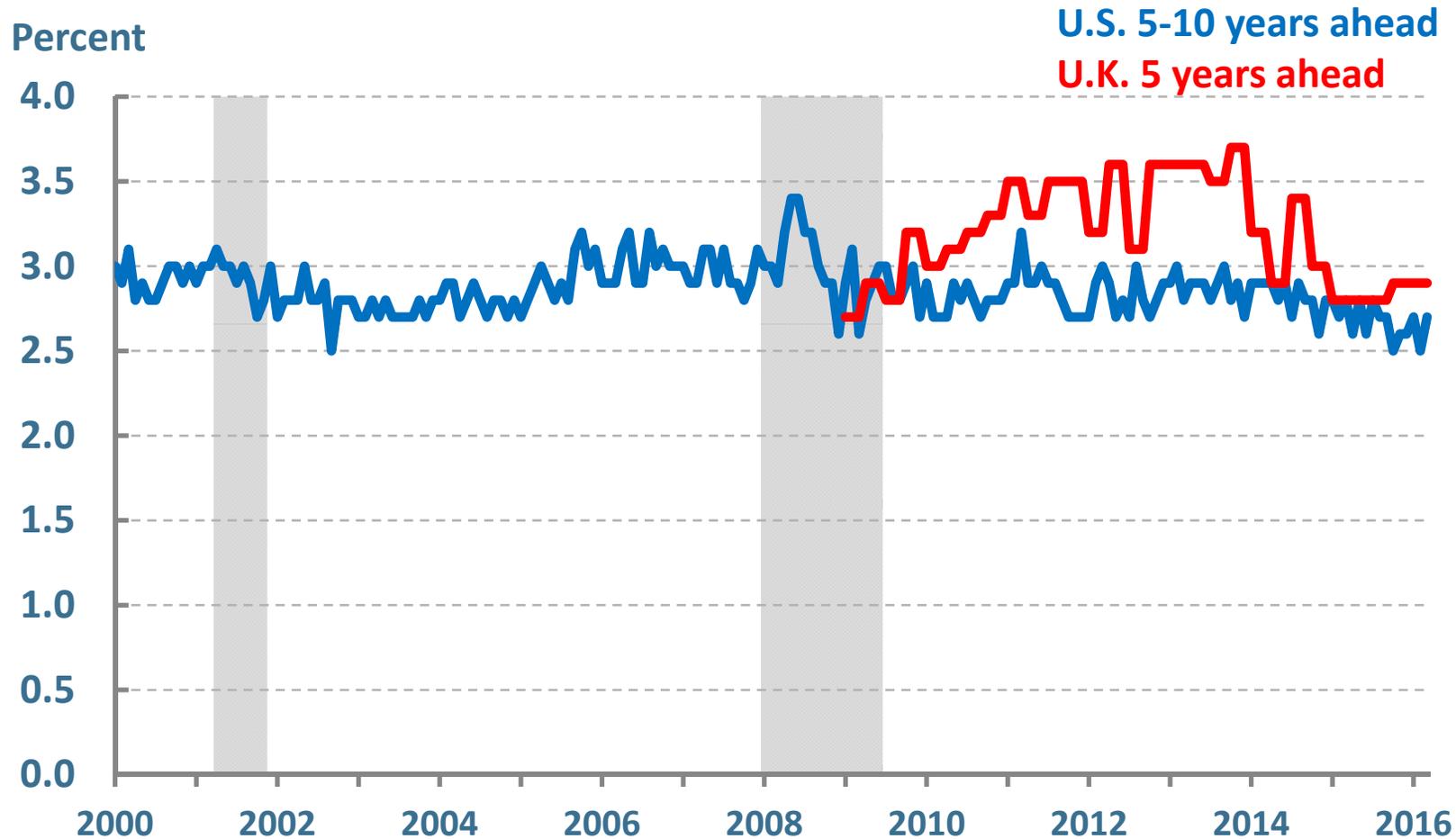


Source: Federal Reserve Bank of Philadelphia via Haver Analytics, ECB, Bank of England

Quarterly data: Last obs. 2016Q1

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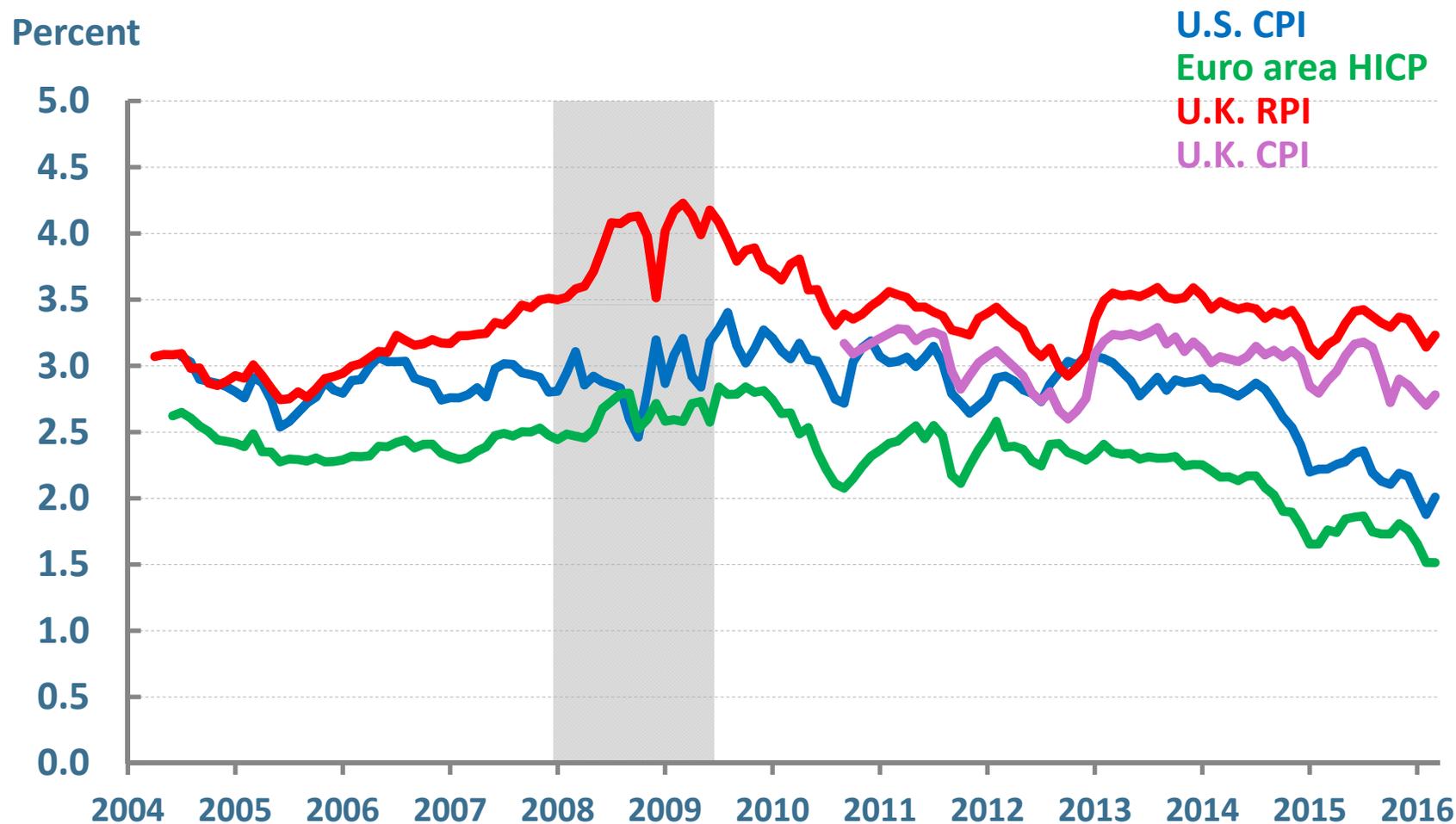
Figure 6. Longer-term inflation expectations: Surveys of households



Source: University of Michigan, Bank of England/GfK
Monthly data for U.S.: Last obs. March 2016
Quarterly data for U.K.: Last obs. 2016Q1

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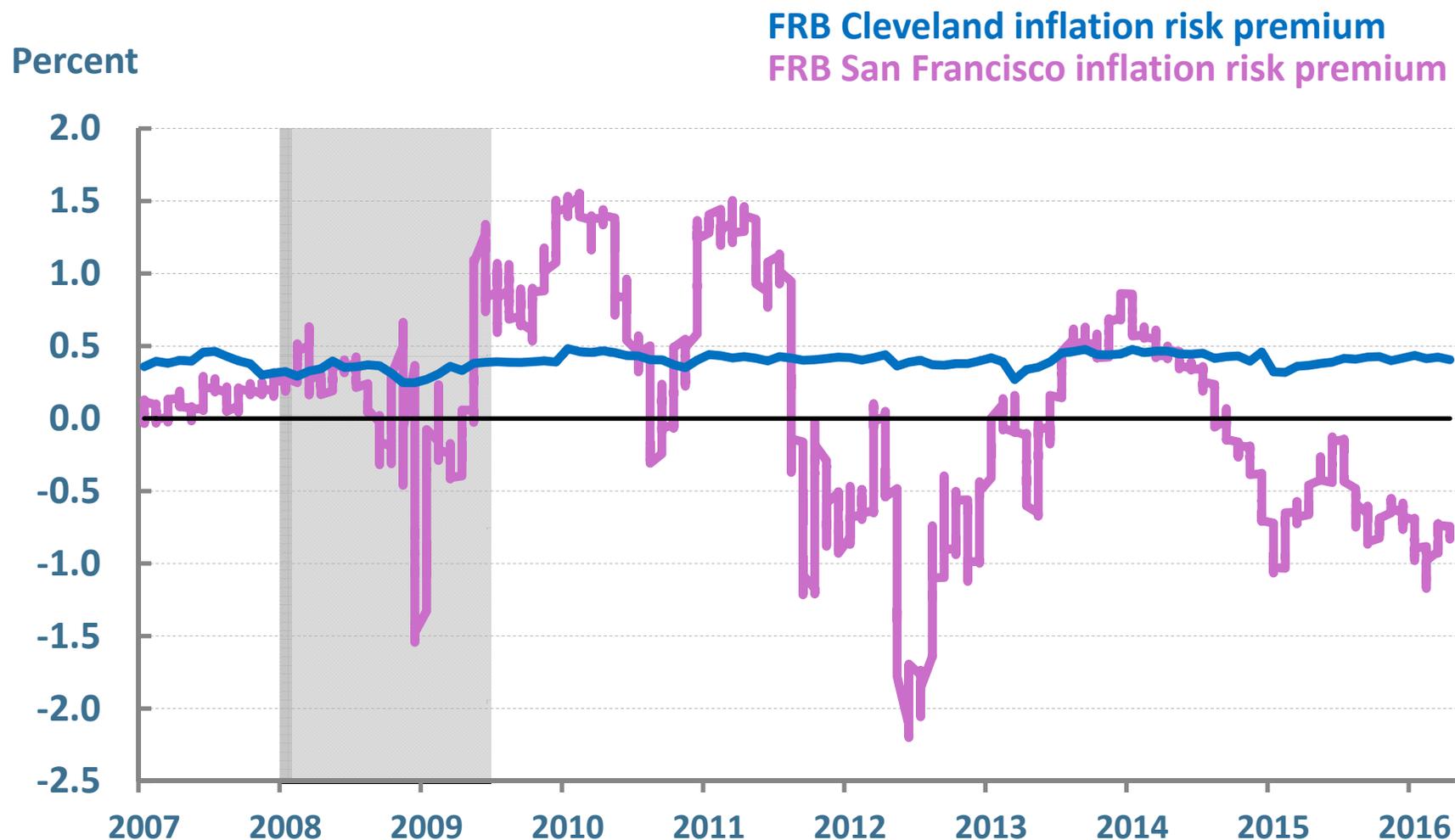
Figure 7. Five-year, five-year forward inflation compensation based on swaps



Source: Bloomberg
Monthly data: Last obs. March 2016

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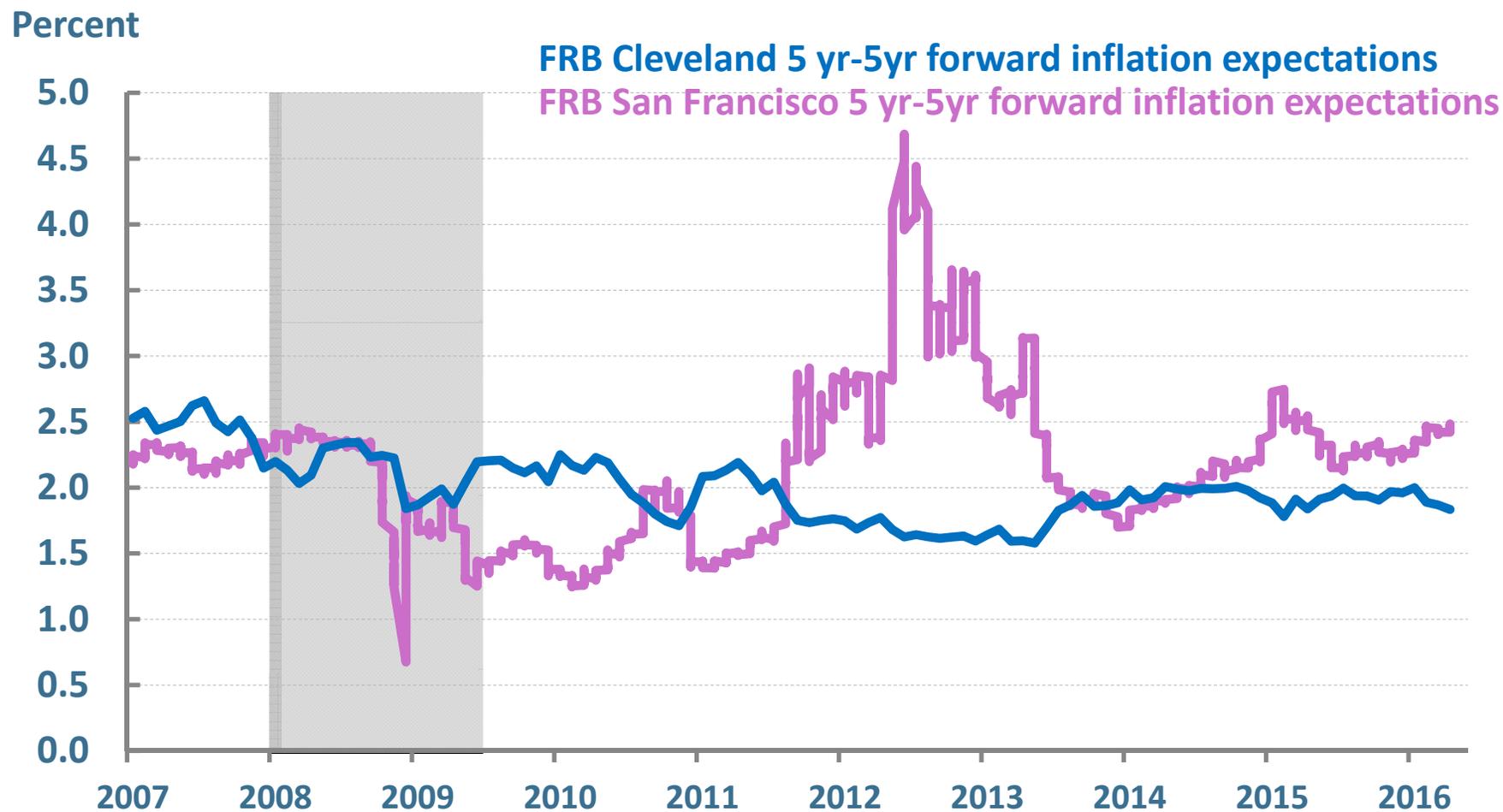
Figure 8. Ten-year inflation risk premia



Source: FRB Cleveland and FRB San Francisco
Monthly data for FRB Cleveland: Last obs. April 2016
Daily data for FRB San Francisco: Last obs. April 7, 2016

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Figure 9. Five-year, five-year forward inflation expectations



Source: FRB Cleveland and FRB San Francisco
Monthly data for FRB Cleveland: Last obs. April 2016
Daily data for FRB San Francisco: Last obs. April 19, 2016

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Figure 10. The Phillips curve models

- The traditional Phillips curve

$$\pi_t = -\gamma u_t + \varepsilon_t$$

- The expectations-augmented Phillips curve

$$\pi_t = \beta E_t(\pi_{t+1}) - \gamma(u_t - u^*) + \varepsilon_t$$

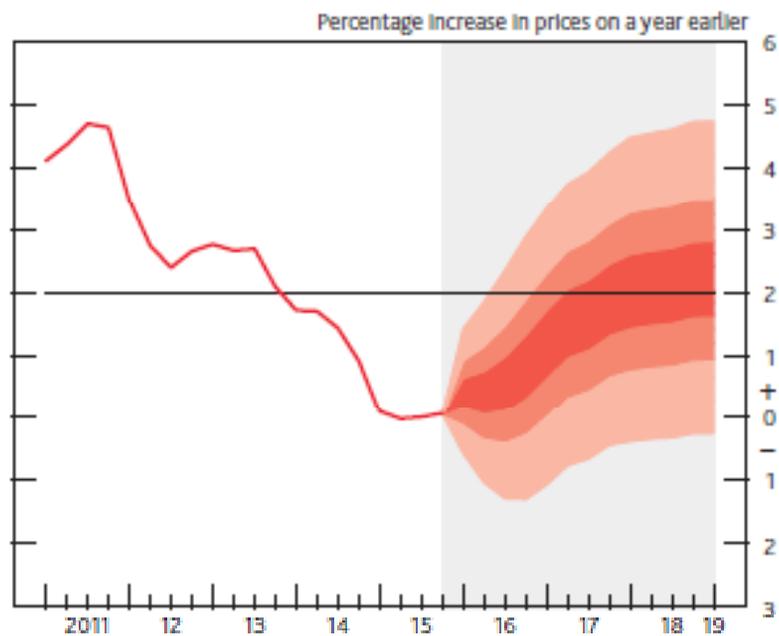
- The New Keynesian Phillips curve

$$\begin{aligned}\pi_t &= \beta E_t(\pi_{t+1}) + \lambda mc_t + \varepsilon_t \\ &= \beta E_t(\pi_{t+1}) + \kappa(y_t - y_t^{\text{efficient}}) + \varepsilon_t\end{aligned}$$

Figure 11. Confidence intervals around inflation forecasts

Bank of England, Inflation Report,
February 2016

Chart 5.2 CPI inflation projection based on market interest rate expectations and £375 billion purchased assets



ECB Staff Projection,
March 2016

Euro area HICP
(year-on-year percentage changes)

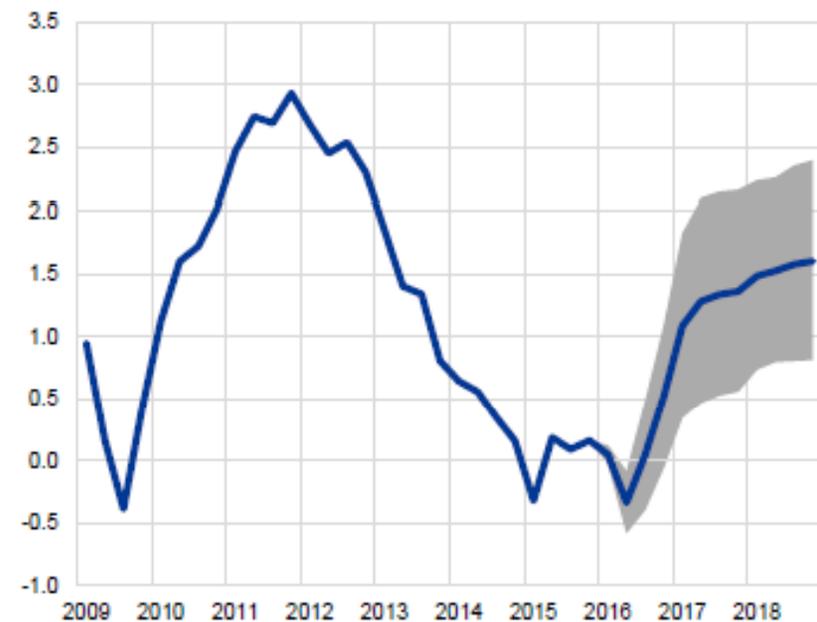
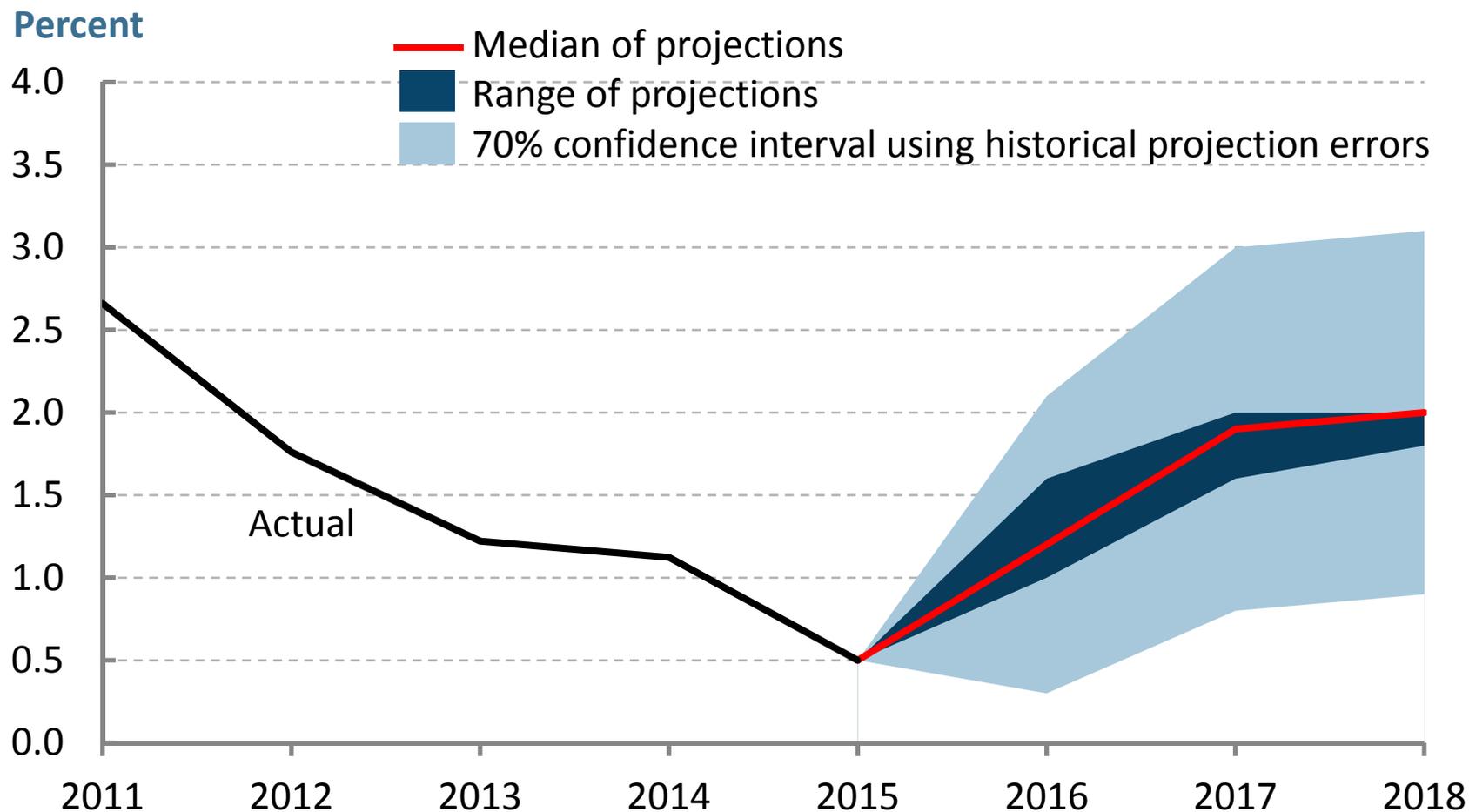


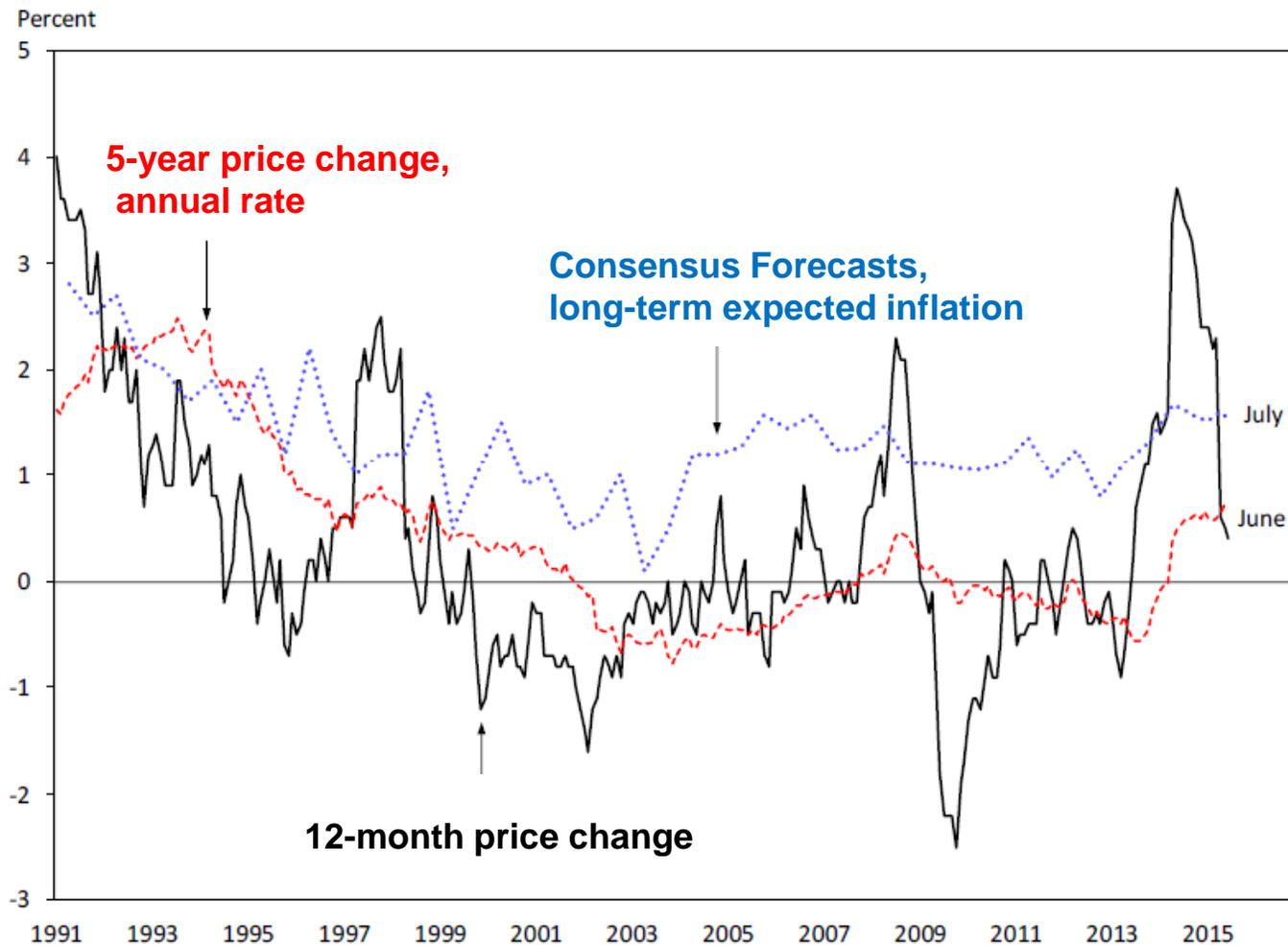
Figure 12. FOMC's Summary of Economic Projections: PCE Inflation



Source: FOMC Summary of Economic Projections, March 2016

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Figure 13. Actual and expected inflation in Japan



Note: The data for the 5-year price change and for the 12-month price change are monthly; the Consensus Forecasts data, which are plotted starting in April 1991, are semiannual through April 2014 and quarterly thereafter.

Source: Ministry of Internal Affairs and Communications (Japan); Consensus Economics (London); Haver Analytics.

Source: Janet L. Yellen, "Inflation Dynamics and Monetary Policy," The Philip Gamble Memorial Lecture, University of Massachusetts, Amherst, MA, September 24, 2015

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Figure 14. Research on inflation expectations

- Inflation expectations formation
 - Do inflation expectations lead or lag inflation?
 - Inflation expectations of firms vs. households, vs. professional forecasters
- Firms' pricing behavior
 - Micro data
 - Financial constraints
- Multiple equilibria
- Learning models