Discussion of

Effective Monetary Policy Strategies

in New Keynesian Models: A Reconsideration

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This Paper

- Compares Sticky Information (SI) vs Sticky Price (SP) Phillips curves
  - Estimates DSGE model for each type
  - Compares alternative policy rules

This Paper (con't)

Conclusions:

1. SI Phillips curve has edge in empirical performance
   (a) Pre-2007: SI and SP Phillips curves fit data equally well
   (b) SP exhibits anomolous behavior over GR/ ZLB period. Less so for SI
2. Policy conclusions similar across models
   (a) Ranking of rules similar.
   (b) Nominal GDP or price level targeting.are "robust" rules

Some History of Thought

- SI belongs in class of Imperfect Information (II) based Phillips curves
  - Modern literature (based on micro-foundations) begins in late 1960s
    - Phelps/Friedman 1967, Lucas1969
  - Predates modern literature on SP Phillips curves
    - Taylor 1980, Calvo 1983

Some History of Thought (con't)

- SP gained traction in DSGE modeling, but not II (or SI)
  - Informational restrictions strong in II:
    - Key aggregates such as price level readily observable
    - Some pushback: e.g rational inattention
  - Micro-data suggests sticky prices
    - Prices fixed $\approx$ 7 to 9 months (Klenow/Krystov, Steinsson/Nakamura)
    - Ss models can explain most of the micro facts
    - Time-dep. SP models are "cousins" of state-dep. Ss models

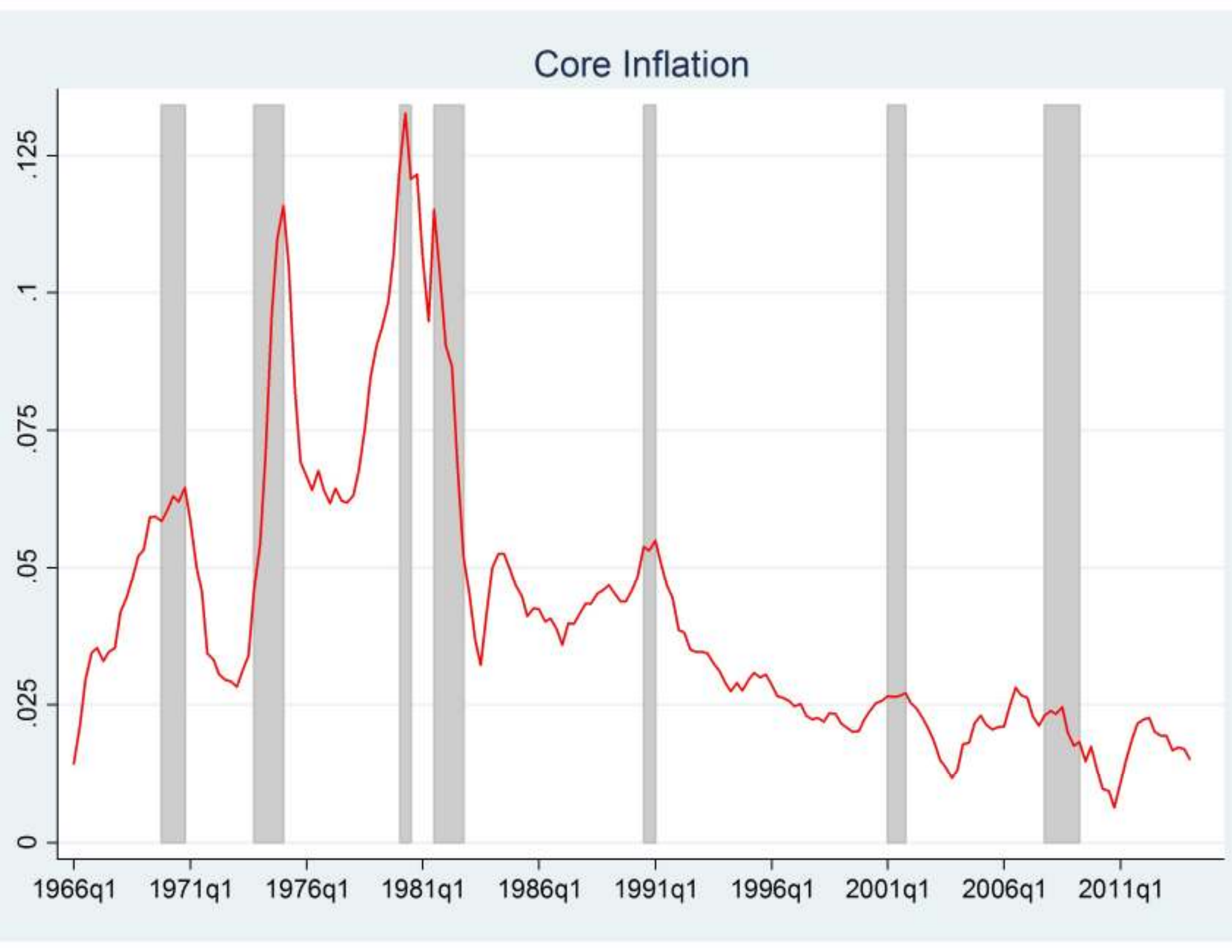
Moving Forward

- Papers that fit pricing models to micro facts ignore fit to aggregate data

- Model may explain micro facts (e.g. frequency, size of price adj., etc) but be off in explaining aggregate dynamics

  - Aggregate inflation dynamics depend on variety of factors, including
    - How expectations are formed
    - Information sets
    - Wage setting, etc

- This paper: ignore micro-data and explore fit of SI vs SP of aggregate data


Core Inflation
0
.025
.05
.075
.1
.125
1966q1
1971q1
1976q1
1981q1
1986q1
1991q1
1996q1
2001q1
2006q1
2011q1

Sticky Price Phillips Curve (Calvo)

Price index:

$$p_t = (1-\theta)p_t^o + \theta p_{t-1}$$

Reset price:

$$p_t^o = (1-\beta\theta)E_t \sum_{i=o}^{\infty} (\beta\theta)^i (\kappa \widehat{y}_{t+i} + p_{t+i})$$

$\longrightarrow$ NK phillips curve:

$$\begin{aligned} \pi_t &= E_t \sum_{i=o}^{\infty} \beta^i \lambda \widehat{y}_{t+i} \\ &= \lambda \widehat{y}_t + \beta E_t \pi_{t+1} \end{aligned}$$

$\lambda \equiv \alpha(\theta)\kappa$; $\alpha' < 0$

Sticky Information Phillips Curve (Mankiw/Reis)

Price index:

$$p_t = (1-\delta)\sum_{i=o}^{\infty}\delta^i p^o_{t,i}$$

Reset price:

$$p^o_{t,i} = E_{t-i}(\kappa\widehat{y}_t + p_t)$$

$\longrightarrow$ SI phillips curve

$$\pi_t = \eta\widehat{y}_t + (1-\delta)\sum_{i=0}^{\infty}\delta^i E_{t-1-i}(\kappa\Delta\widehat{y}_t + \pi_t)$$

$\eta = \frac{1-\delta}{\delta}\kappa$

SI vs SP Models

AD:

$$\widehat{y}_{tt} = -\sigma(i_t - E_t\pi_{t+1} - r_t^*) + E_t\widehat{y}_{t+1}$$

AS: SP:

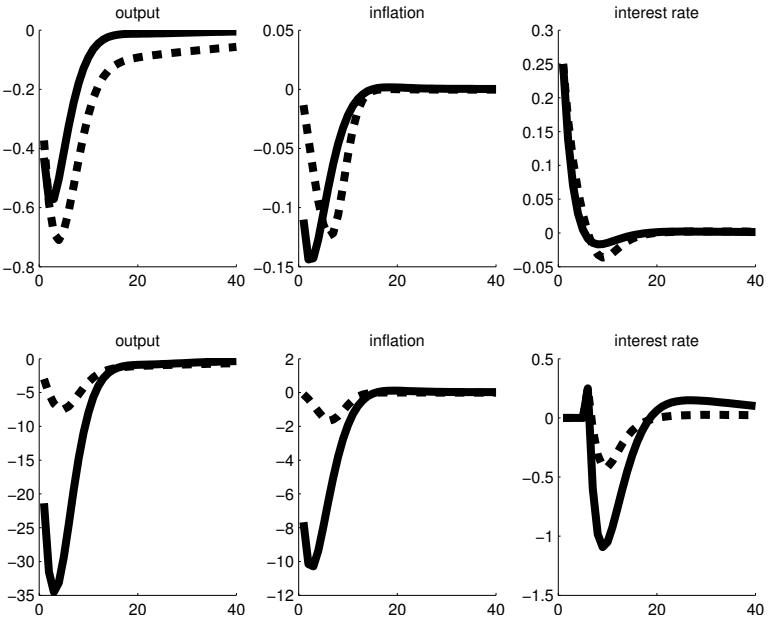
$$\pi_t = \lambda\widehat{y}_t + \beta E_t\pi_{t+1}$$

AS: SI:

$$\pi_t = \eta\widehat{y}_t + (1-\delta)\sum_{i=0}^{\infty}\delta^i E_{t-1-i}(\kappa\Delta\widehat{y}_t + \pi_t)$$

- $\widehat{y}_t, \pi_t$ behavior and policy implications similar across models, but dynamics differ
  - "Immediate" response to news about future in SP model
  - "Pipeline" response in SI model

Figure 3: Responses to Monetary Policy Shocks



Notes: Figures show response of the sticky-price (solid line) and sticky-information (dashed line) models to an unanticipated (top row) and 6-quarter ahead anticipated (bottom show) monetary policy shock, computed at the respective posterior modes.

Two Criticisms of the SP Model at the ZLB

1. The missing deflation

   Standard SP model predicts much larger drop in inflation than occured

2. The Forward Guidance puzzle

   SP model predicts (counterfactually?) strong effects of forward guidance at ZLB

- Interelated phenonema
  - Due to forward looking nature of inflation in SP model

Deflation and Forward Guidance at the ZLB in SP Model

Let $r_t^* < 0$ for T periods and > 0 after

AD (given $i_t = 0$ when $r_t^* < 0$)

$$\widehat{y}_t = E_t \sum_{i=0}^{T-1} \sigma(\pi_{t+1+i} + r_{t+i}^*) + E_t \sum_{i=T}^{\infty} -\sigma(i_{t+i} - \pi_{t+1+i} - r_{t+i}^*)$$

AS

$$\pi_t = E_t \sum_{i=o}^{\infty} \beta^i \lambda \widehat{y}_{t+i}$$

- Large deflation: after T periods $i_t = r_t^*$ (time consistent solution).
- Large forward guidance mult: promise $i_{t+i} < r_{t+i}^*$ for a period once $r_{t+i}^* > 0$.

Possible solutions within SP framework

- "Flat" Phillips curve: (Del Negro/Giannoni/Schorfheide):
  - Low value of λ reduces inflation sensitivity

$$\pi_t = E_t \sum_{i=o}^{\infty} \beta^i \lambda \widehat{y}_{t+i}$$

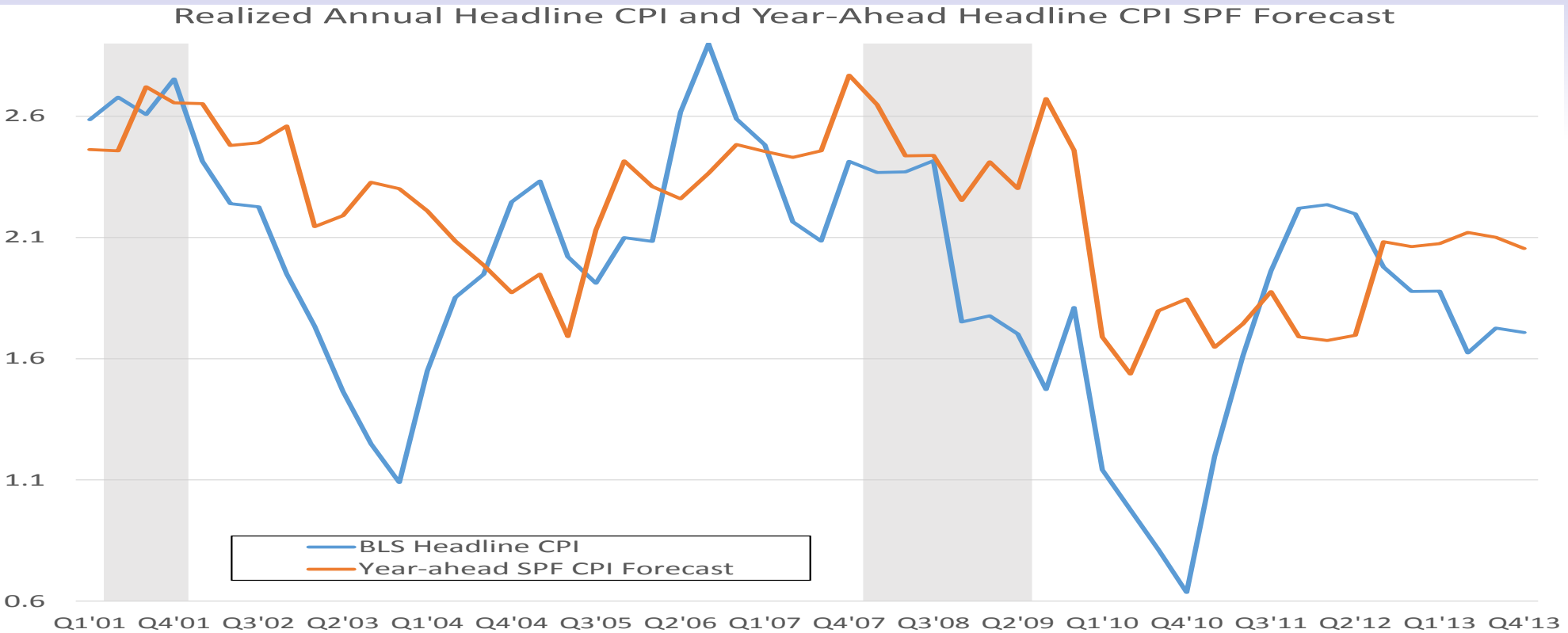
  - Consistent with recent est. but implies counterfactually high price rigidity.

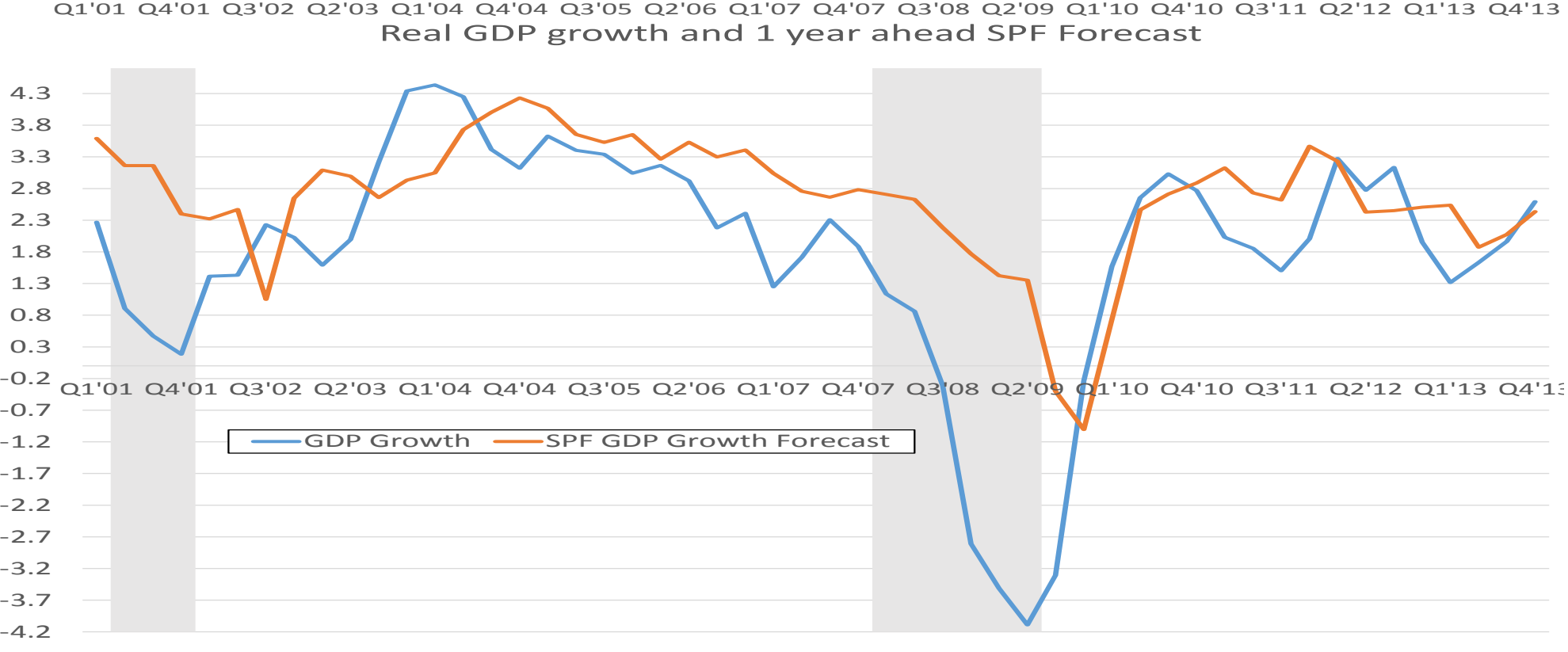
- Anticipated drop in trend productivity growth (Christiano/Eichenbaum/Trabandt)
  - Raises expected path of $\widehat{y}_t$ - can explain part of missing deflation.
  - Need learning about trend break to avoid jump in inflation.

- Financial market frictions influencing pricing (CET and Gilchrist et. al))
  - Promising, but need more direct evidence.

Evidence for Imperfect Information (II)?

- Litte direct evidence for SI, but evidence for II more generally
- Evidence from survey data of strong serial correlation in forecast errors
  - e.g, Coibion/Gorodnichenko 2012
- During Great Recession, SPF forecasts of inflation and output exhibit:
  - Persistent over-optimism
  - Relatively anchored behavior
    - Contributes stable inflation (within both SI and SP models)


Realized Annual Headline CPI and Year-Ahead Headline CPI SPF Forecast
2.6
2.1
1.6
1.1
0.6
BLS Headline CPI
Year-ahead SPF CPI Forecast
Q1'01 Q4'01 Q3'02 Q2'03 Q1'04 Q4'04 Q3'05 Q2'06 Q1'07 Q4'07 Q3'08 Q2'09 Q1'10 Q4'10 Q3'11 Q2'12 Q1'13 Q4'13


Real GDP growth and 1 year ahead SPF Forecast
4.3
3.8
3.3
2.8
2.3
1.8
1.3
0.8
0.3
-0.2
-0.7
-1.2
-1.7
-2.2
-2.7
-3.2
-3.7
-4.2
GDP Growth
SPF GDP Growth Forecast
Q1'01 Q4'01 Q3'02 Q2'03 Q1'04 Q4'04 Q3'05 Q2'06 Q1'07 Q4'07 Q3'08 Q2'09 Q1'10 Q4'10 Q3'11 Q2'12 Q1'13 Q4'13

Brief Comments on Policy Rules

1. Normal times (ZLB not binding)
   (a) Absent supply shocks, set i_t s.t. $i_t - E_t\pi_{t+1} - r_t^* = 0$.
   i. $\rightarrow \widehat{y}_t$, $\pi_t = 0$
   (b) With supply shocks, allow for short run tradeoff between $\widehat{y}_t$ and π_t
   (c) Taylor rule based on output growth has these properties.

2. ZLB binding
   (a) Promise future accommodation (i.e. $i_t - E_t\pi_{t+1} - r_t^* < 0$ outside ZLB)
   (b) Taylor rule cannot do this.
   (c) Price level targeting can. Also works well outside ZLB.

- Contingent policy?
  - Taylor rule in normal times, Price Level Targeting at the ZLB?

Conclusions

- Interesting paper
- Makes case for paying more attention to imperfect information in DSGE modeling
  - Though need more work on modeling forward guidance in SI or II framework!
- My hunch: given micro price data and survey expectations data $\longrightarrow$

  "True model" contains both sticky prices and imperfection information
  - Examples exist: Lorenzoni (2009), Dupor (2010), L'aO/Angeletos (2009)
  - Perhaps we need to see more!