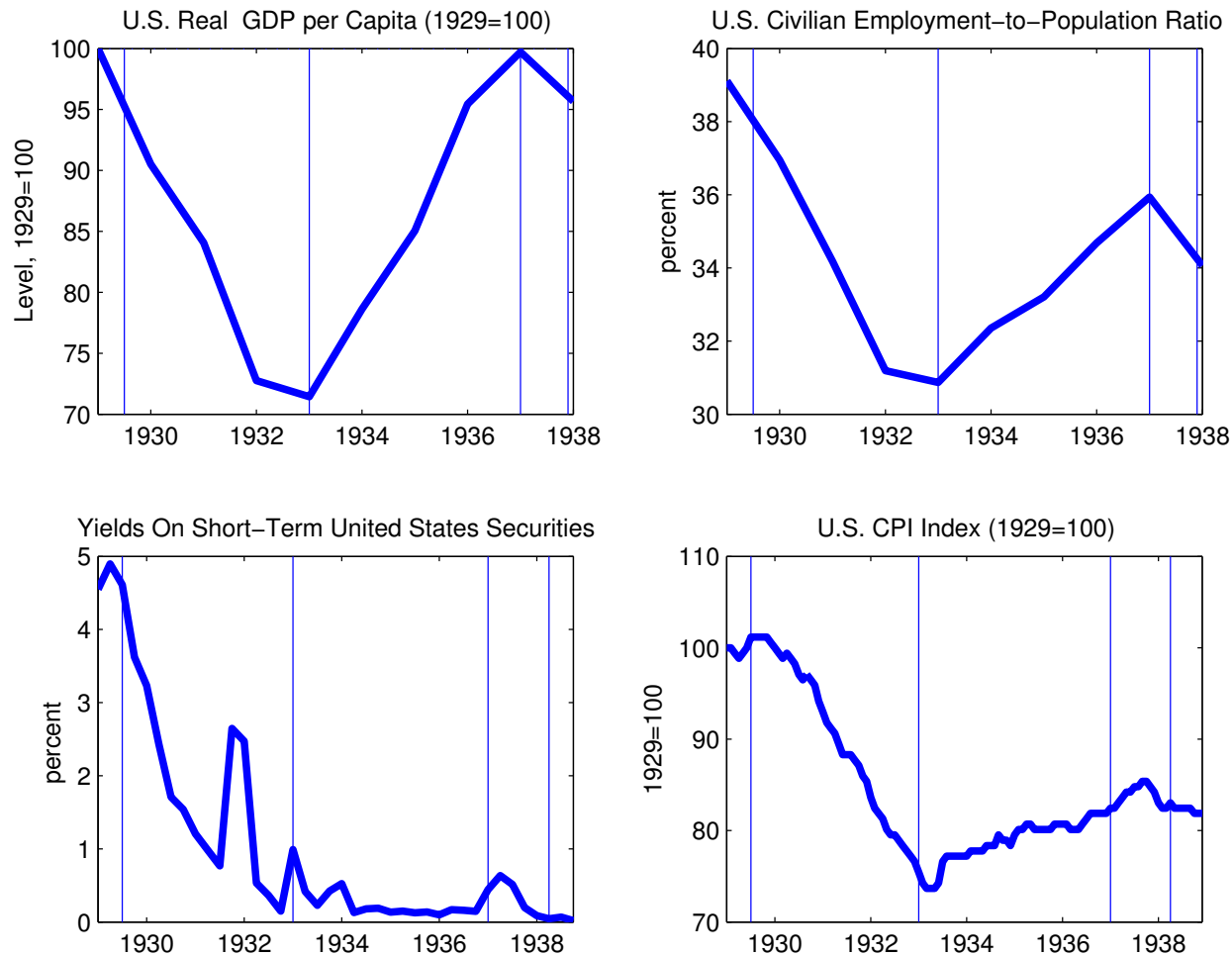


**Low inflation —  
Lessons from the past,  
Lessons for the future?**

Stephanie Schmitt-Grohé  
Columbia University

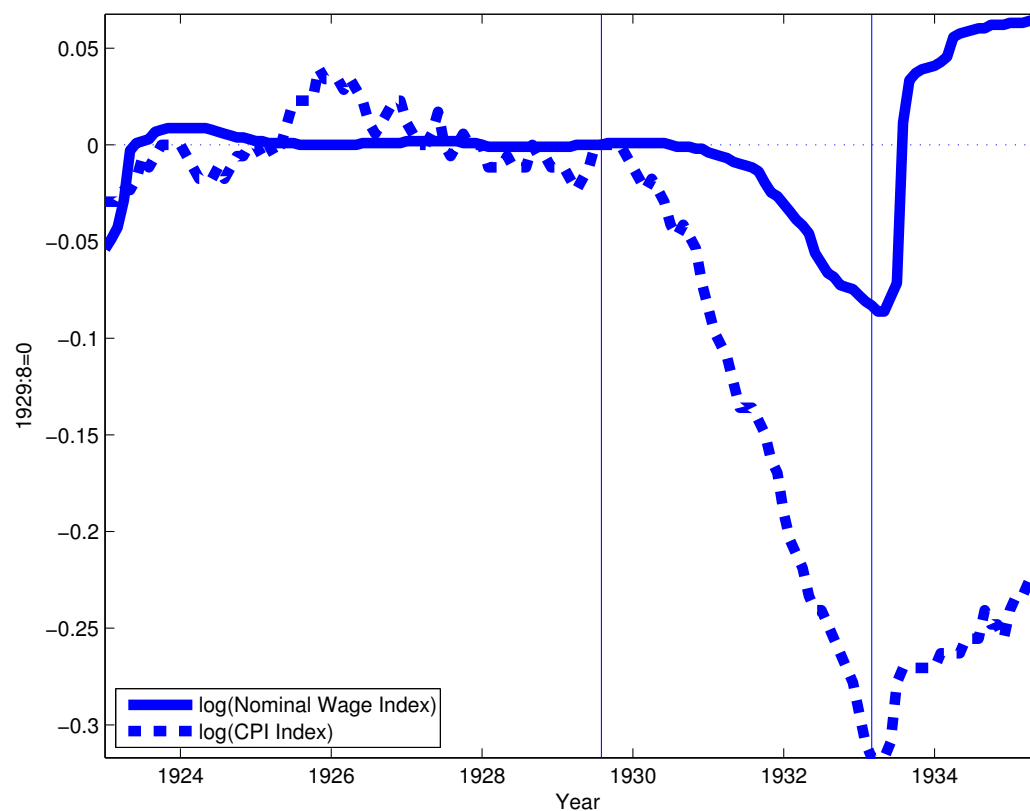
Policy Panel, September 21, 2017  
European Central Bank  
Frankfurt am Main

## Jobless Recovery with Liquidity Trap United States, 1929-1938



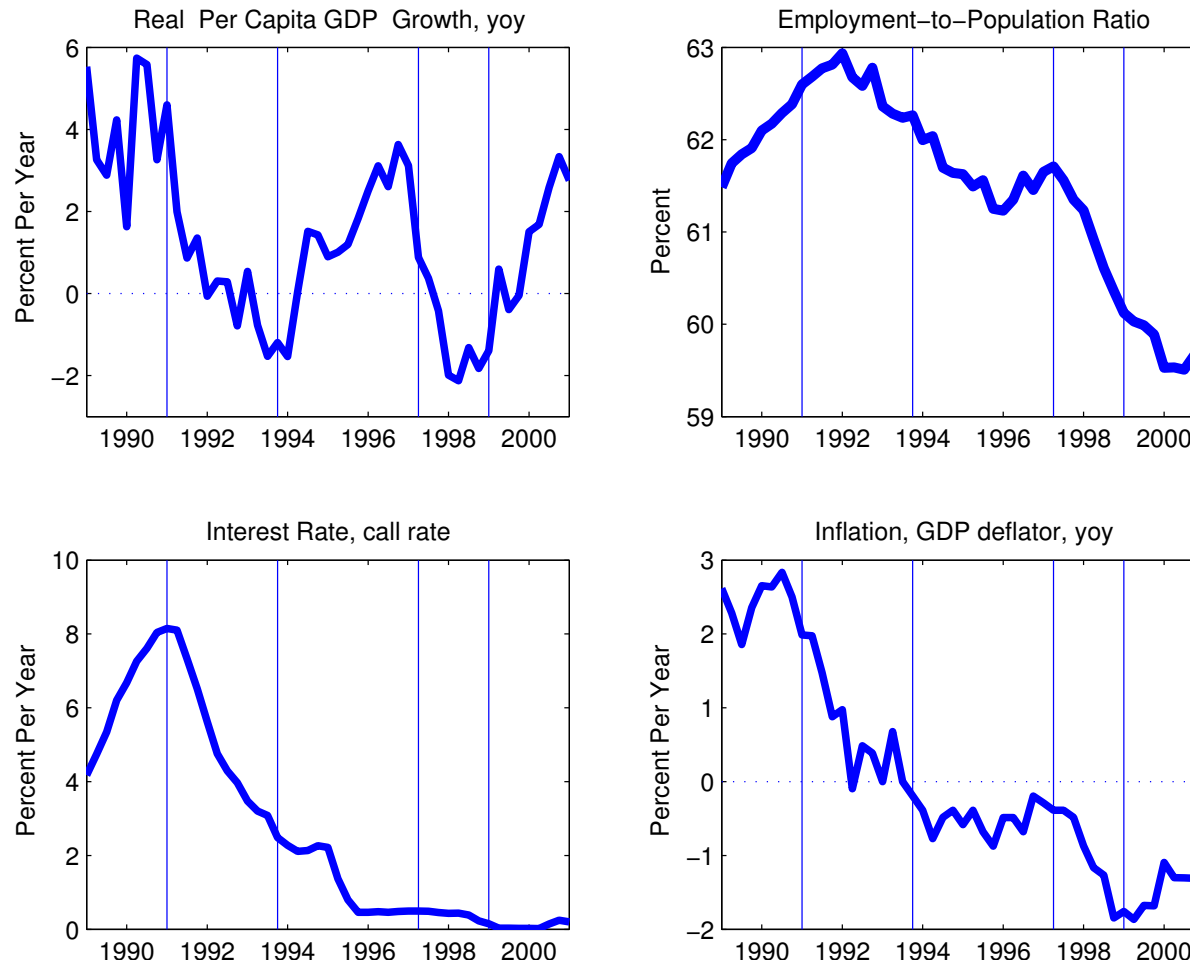
Vertical lines: NBER recession dates, 1929Q2, 1933Q1, 1937Q1, and 1938Q2.

## Nominal Wage Rate and Consumer Prices, United States 1923:1-1935:7



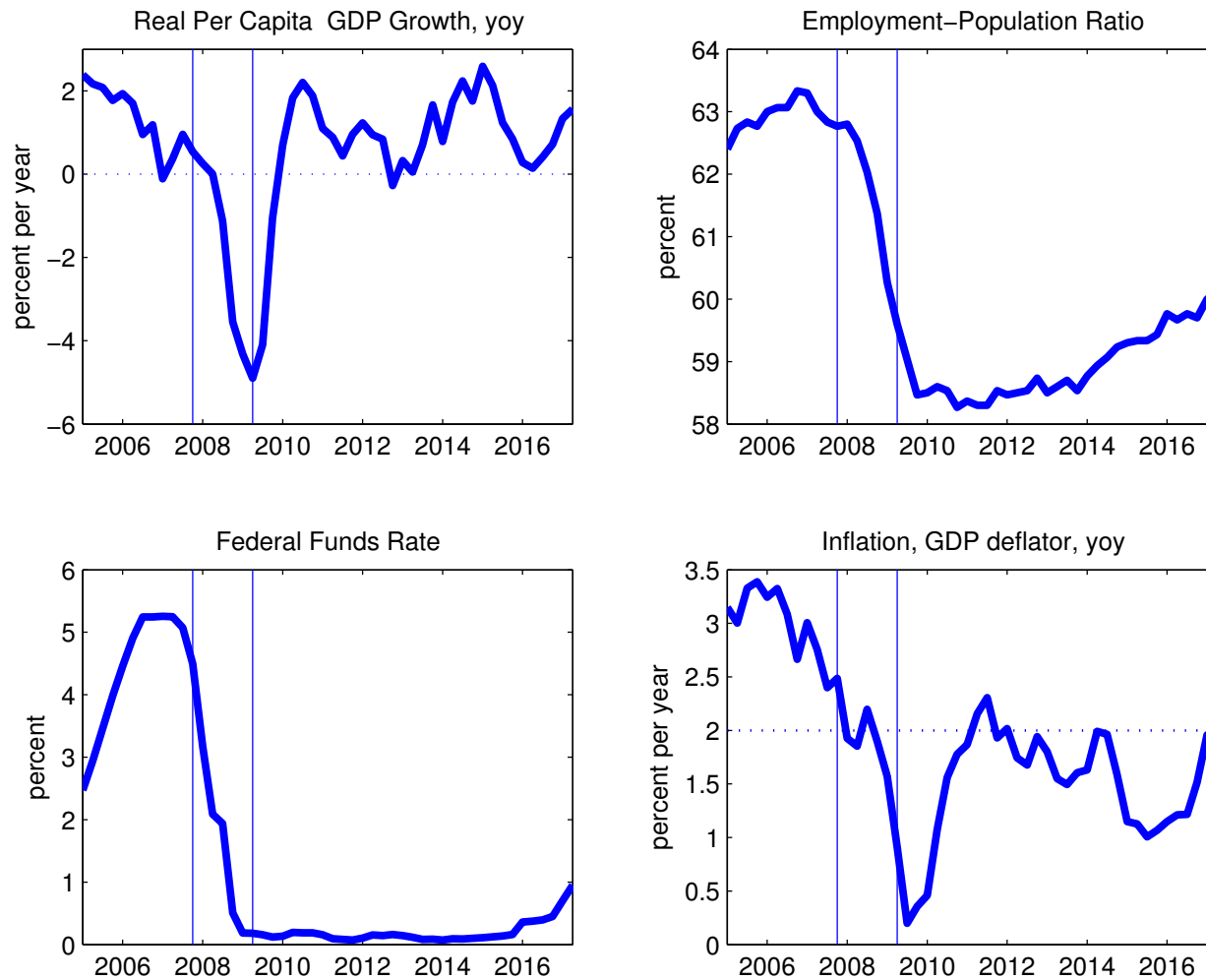
Source: Uribe and Schmitt-Grohé, 2017, Figure 9.8. Solid line: natural logarithm of an index of manufacturing money wage rates. Broken line: logarithm of the consumer price index. Vertical lines: NBER recession dates.

## Jobless Growth Recovery with Liquidity Trap Japan, 1989-2001

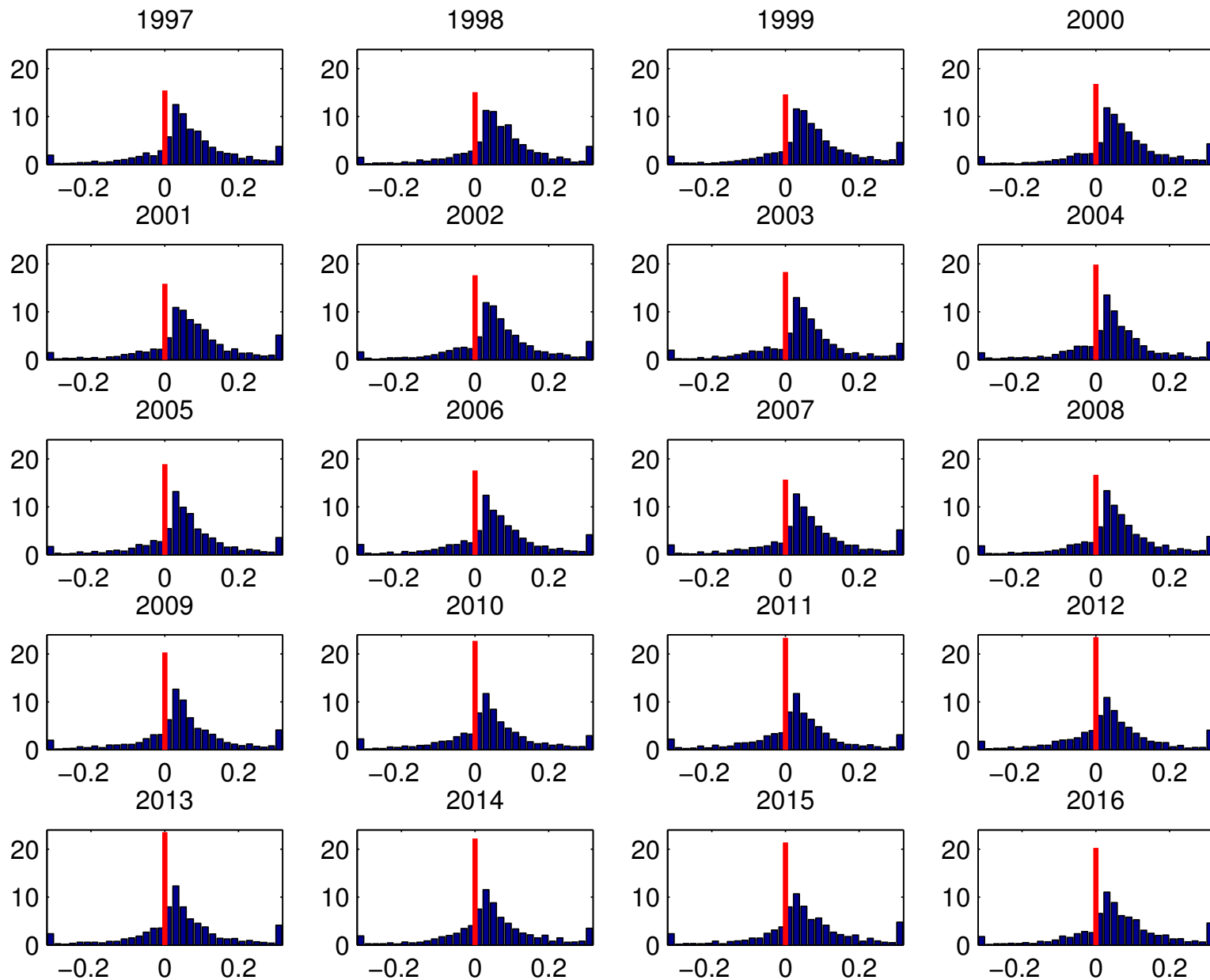


Vertical lines: Cabinet Office Recession dates, 1991Q1, 1993Q4, 1997Q2, 1999Q1.

## Jobless Growth Recovery with Liquidity Trap United States, 2005Q1-2017Q2

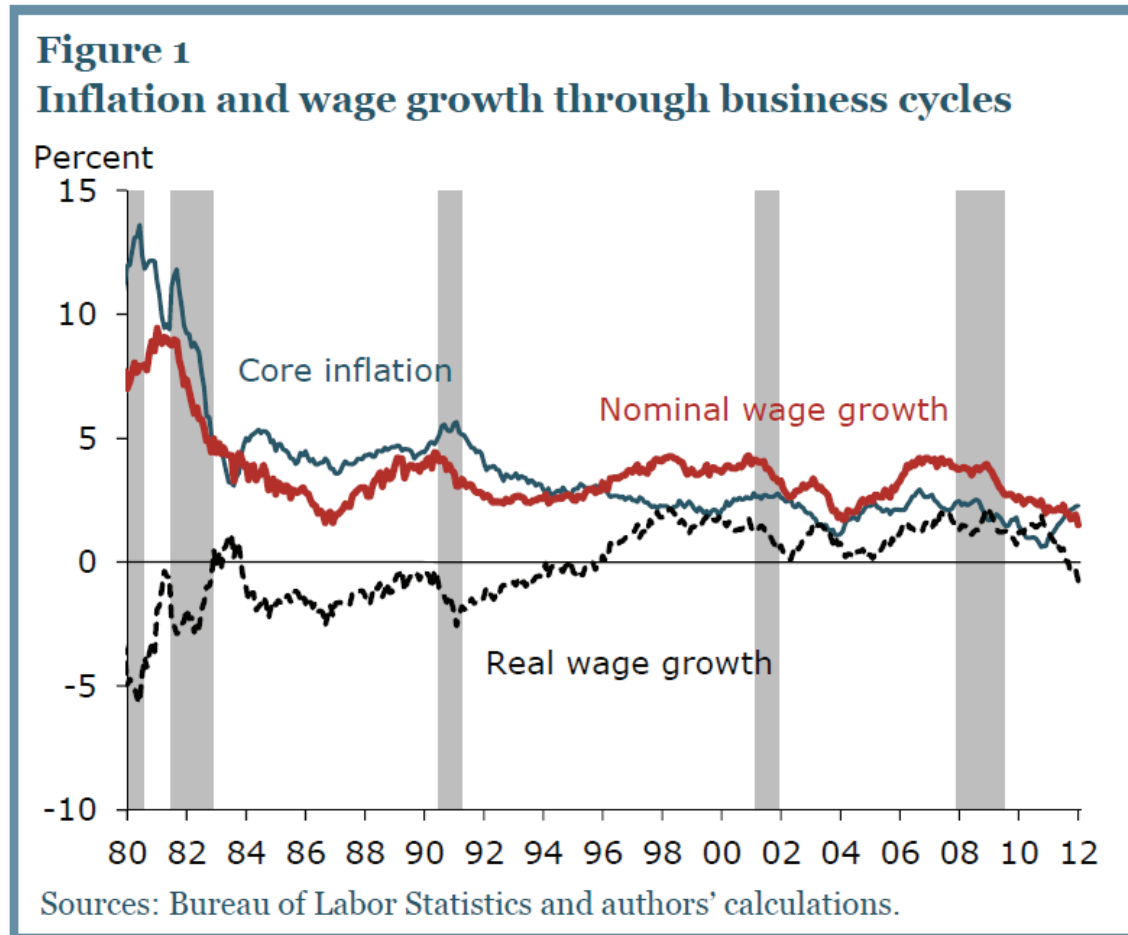


Vertical lines: NBER recession dates, 2007Q4 and 2009Q2



Source: Jo, Schmitt-Grohé, and Uribe (2017).

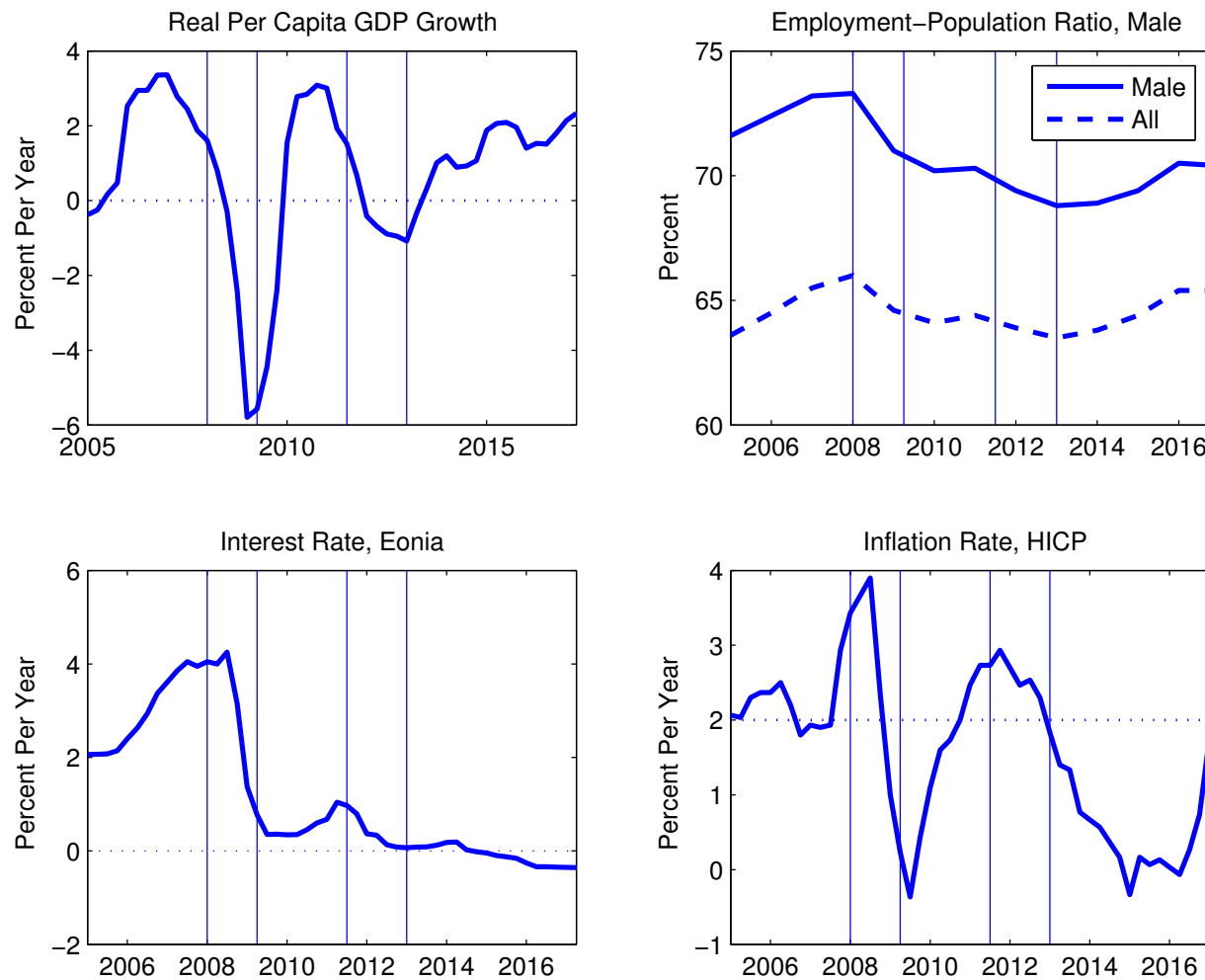
## Real Wage Growth Held up Relatively Well During the 2008 Recession



Source: Daly, Hobijn, and Lucking, 2012.

- real wages grew by **1.1 percent** per year on average between 2008 and 2011.

## Jobless Growth Recovery with Liquidity Trap Euro Area, 2005-2017



Vertical lines: CEPR business cycle dates, 2008Q1, 2009Q2, 2011Q3, 2013Q1.



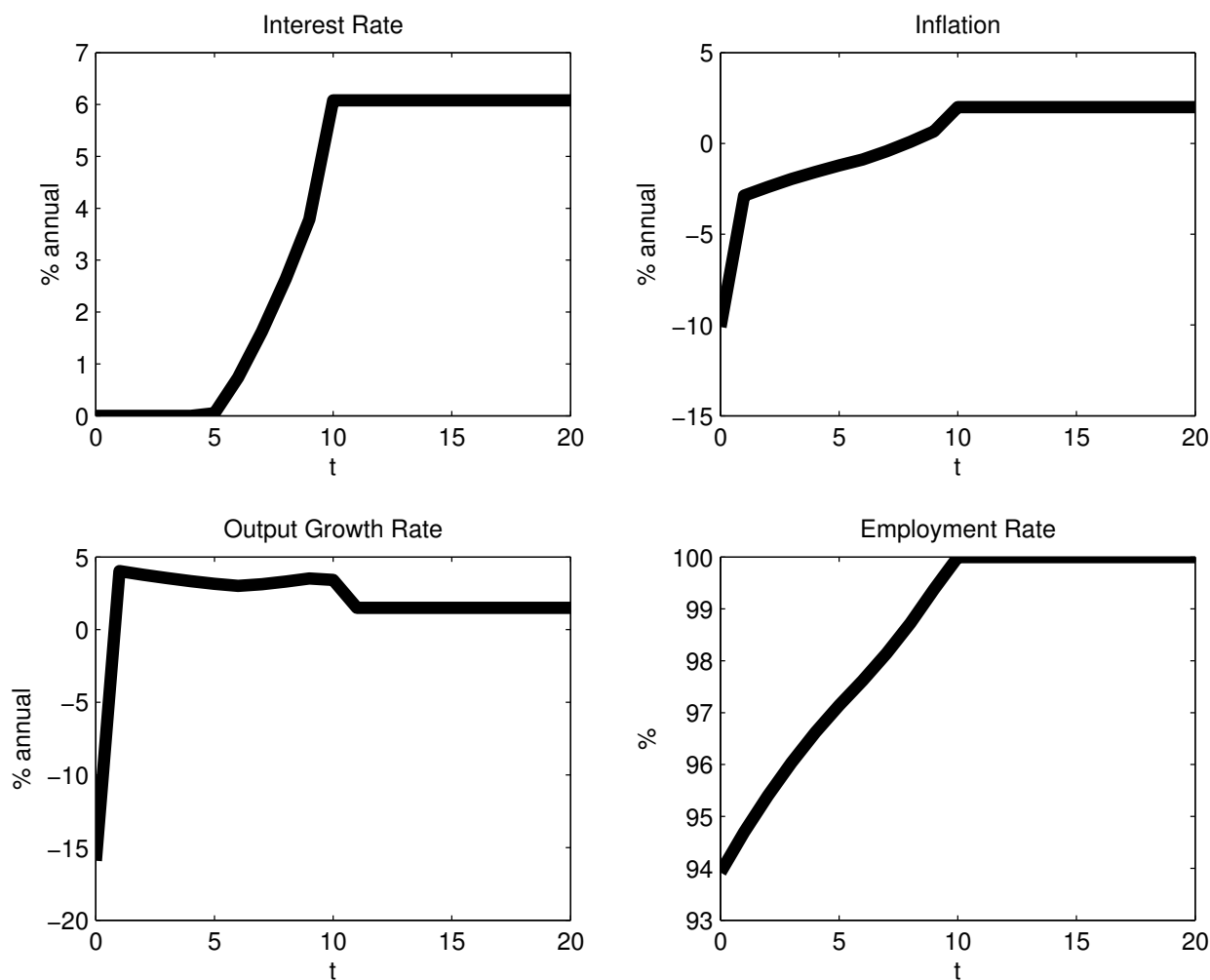
## Conventional View of Liquidity Trap:

**Inflationary expectations are well anchored** (i.e., inflation is expected to return to some target, say 2%) and liquidity trap is the consequence of negative shocks to the natural rate of interest.

**Exercise:** Assume that the natural rate falls from its steady-state value of 4 percent per year to -2 percent per year for 10 quarters and then returns to 4 percent forever.

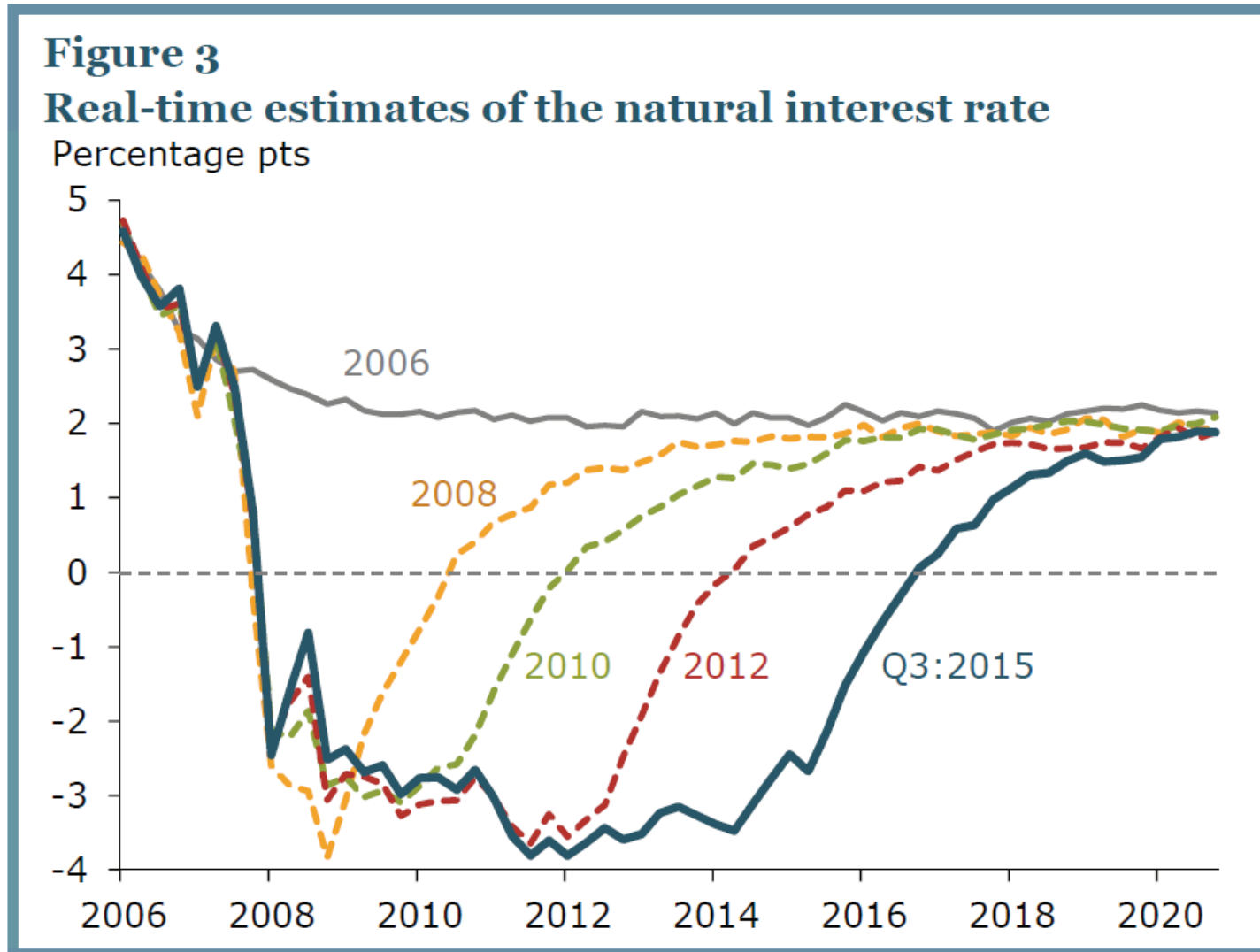
**Result in a model with nominal rigidities:** predicted recovery is job creating, inflation is monotonically increasing during the recovery, and output growth is above average during the recovery. All three predictions are counterfactual. (see for example Schmitt-Grohé and Uribe, 2017; Del Negro et al, or Curdia et al. 2015).

## A Contraction With A Job-Creating Recovery: Response to a Persistent Decline In The Natural Rate



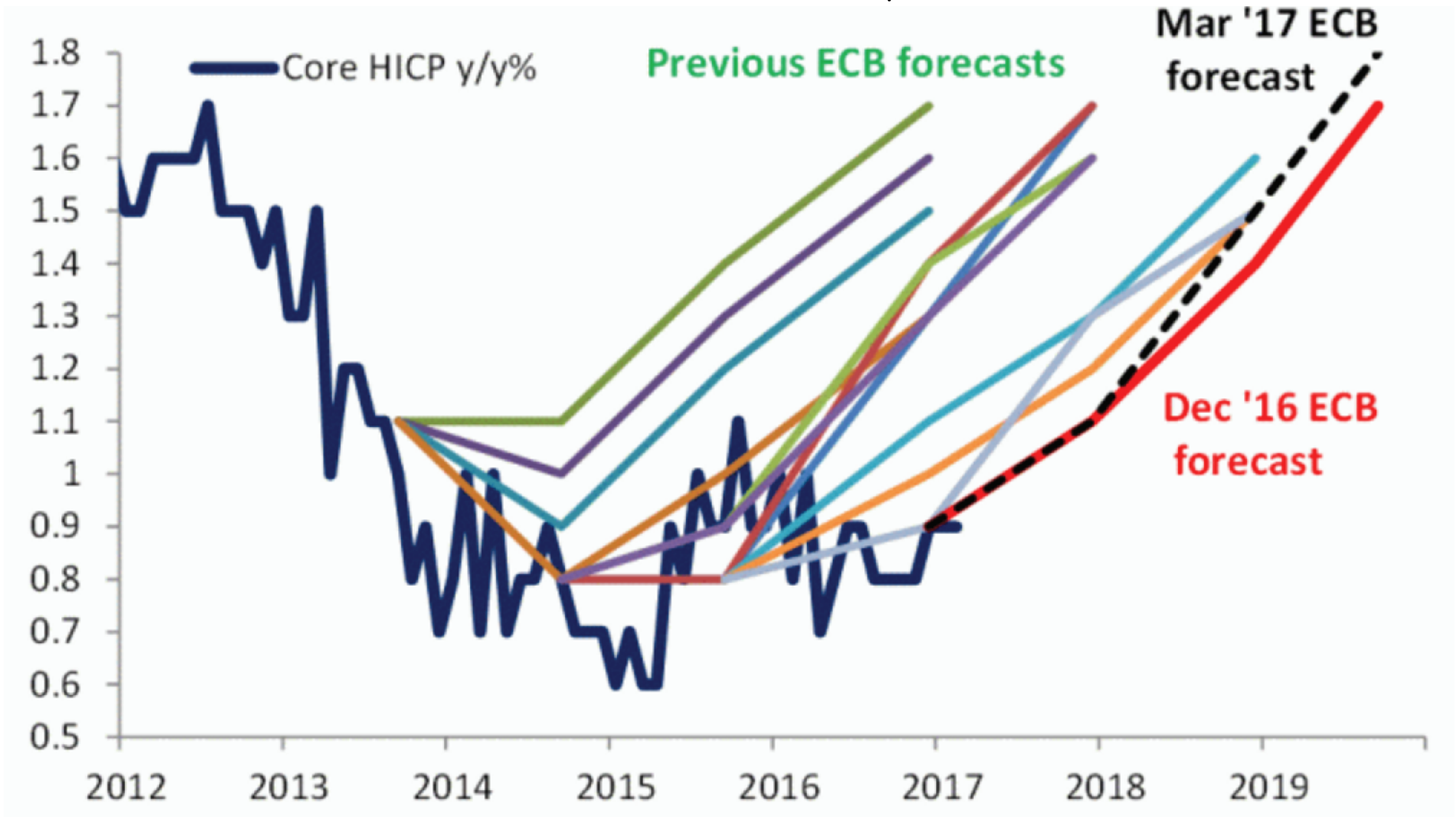
Source: Schmitt-Grohé and Uribe, 2017.

Curdia (2015) shows that conventional view requires that economy is continuously surprised by yet another negative natural rate shock:



Source: Curdia, FRBSF EL 2015.

ECB revisions to the core HICP inflation path:



## Alternative View: A Downward Revision in Inflation Expectations.

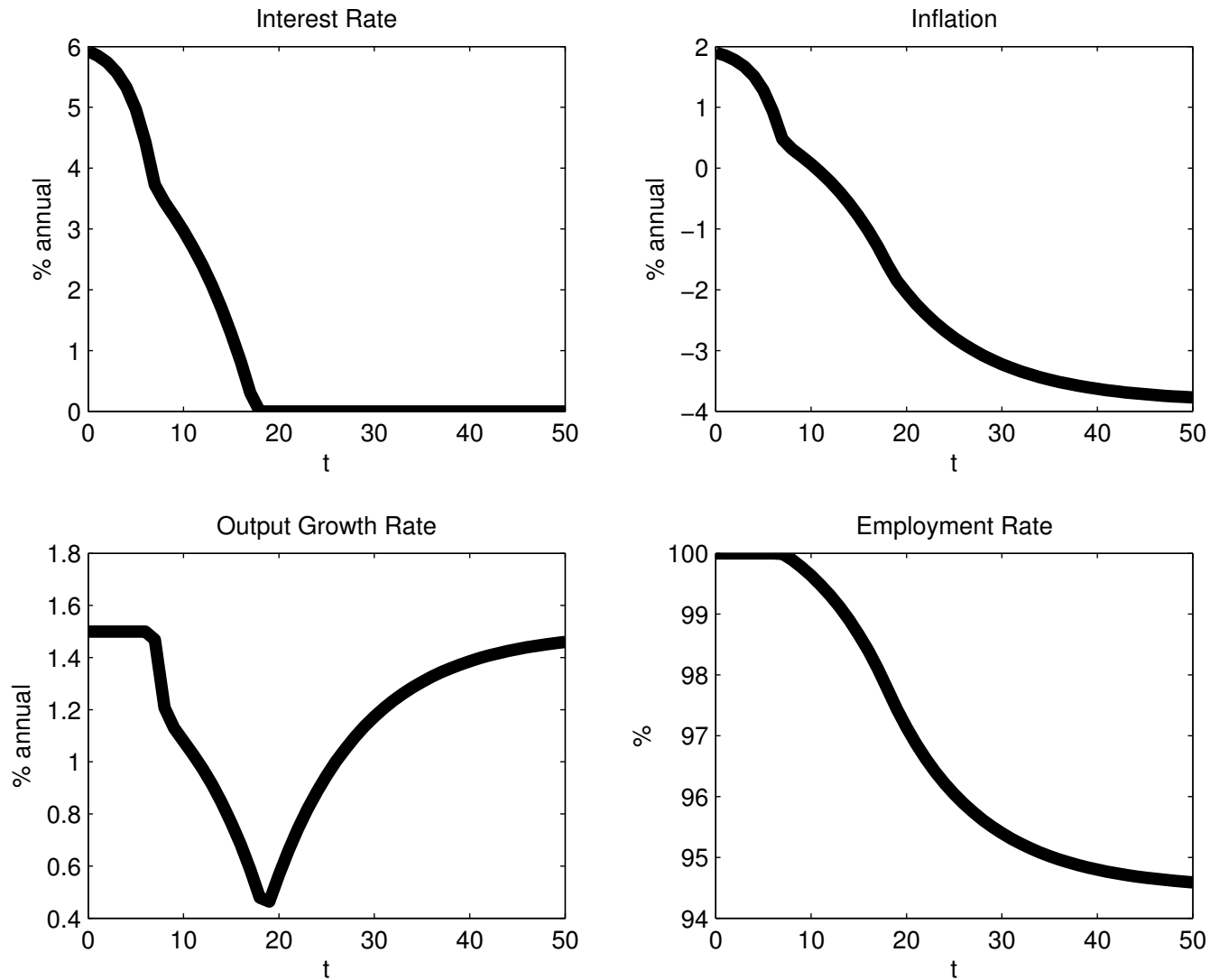
Agents stop believing that the central bank will be able to bring the economy back to the inflation target, say 2%. Instead agents assign positive probability to the event that inflation will settle at some  $\pi_L < 2\%$ .

*“Mr. Draghi and his peers are afraid that consumers and investors will increasingly see low inflation as the new normal, creating a self-fulfilling prophecy.”* NYT, page B7, November 22, 2014.

**Exercise:** Assume that in period 0 agents start believing that in the long run inflation is below target with probability one.

**Result:** Recovery is jobless, inflation is monotonically declining during the recovery, and output growth is below average during the recovery.

## Effects of A Downward Revision in Inflationary Expectations



Source: Schmitt-Grohé and Uribe, 2017.

## Any evidence in support of downward revisions of long-run inflation expectations in the U.S.?



Source: FRB Minneapolis, <https://www.minneapolisfed.org/banking/mpd>

## Conclusion

- Past recoveries from low-inflation, deep recessions have been jobless and were associated with zero nominal rates.
- During the recovery inflation was below target despite zero nominal rates.
- Standard theoretical models predict that when the liquidity trap is the consequence of negative shocks to the natural rate, then recovery is associated with rising inflation and job creation.
- At the same time such models predict that if the liquidity trap is the consequence of a downward revision to long-run inflation expectations, then recovery is associated with low inflation and jobless.



# Extras

## Unemployment and Growth in Nominal Hourly Wages Evidence from the Eurozone

Country	Unemployment Rate		Wage Growth
	2008Q1 (in percent)	2011Q2 (in percent)	$\frac{W_{2011Q2}}{W_{2008Q1}}$ (in percent)
Bulgaria	6.1	11.3	43.3
Cyprus	3.8	6.9	10.7
Estonia	4.1	12.8	2.5
Greece	7.8	16.7	-2.3
Ireland	4.9	14.3	0.5
Italy	6.4	8.2	10.0
Lithuania	4.1	15.6	-5.1
Latvia	6.1	16.2	-0.6
Portugal	8.3	12.5	1.91
Spain	9.2	20.8	8.0
Slovenia	4.7	7.9	12.5
Slovakia	10.2	13.3	13.4

Source: Schmitt-Grohé and Uribe (2017).

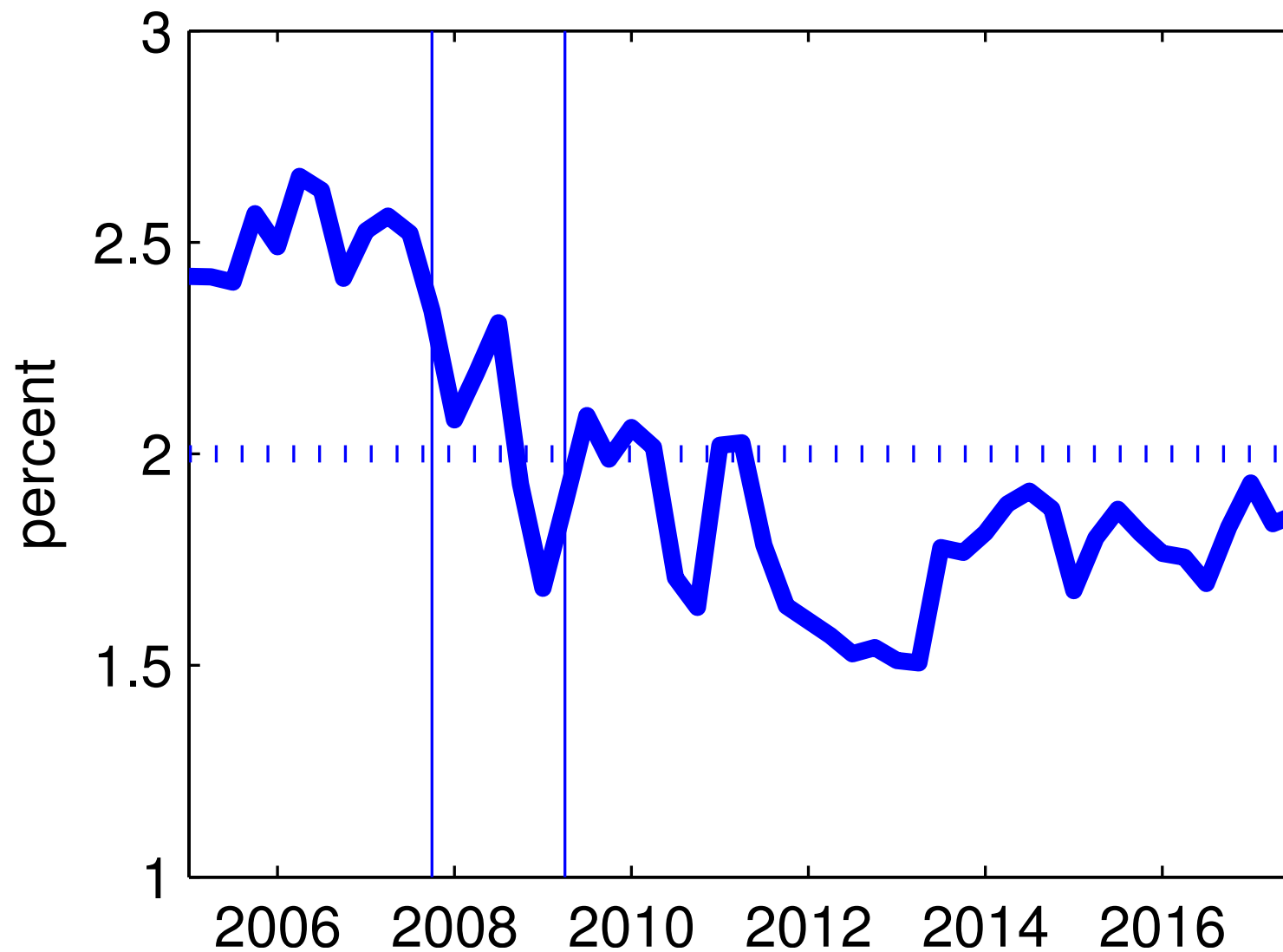
## Did Real Wage Growth Exceed TFP Growth in the Recovery in the U.S.?

Daly et al. report that real wages grew by **1.1 percent** per year on average between 2008 and 2011.

Fernald, FRBSF Productivity Data Base, report that adjusted TFP grew by **0.75 percent** per year on average between 2008 and 2011.

Hence real hourly wage growth **exceeded** TFP growth by 0.35 percent per year over the period 2008-2011.

### U.S. 10-Year Expected Inflation: 2005Q1-2017Q3



Source: Federal Reserve Bank of Cleveland.

## **Micro Evidence On Downward Nominal Wage Rigidity From Other Developed Countries**

- Canada: Fortin (1996).
- Japan: Kuroda and Yamamoto (2003).
- Switzerland: Fehr and Goette (2005).
- Industry-Level Data: Holden and Wulfsberg (2008), 19 OECD countries from 1973 to 1999.

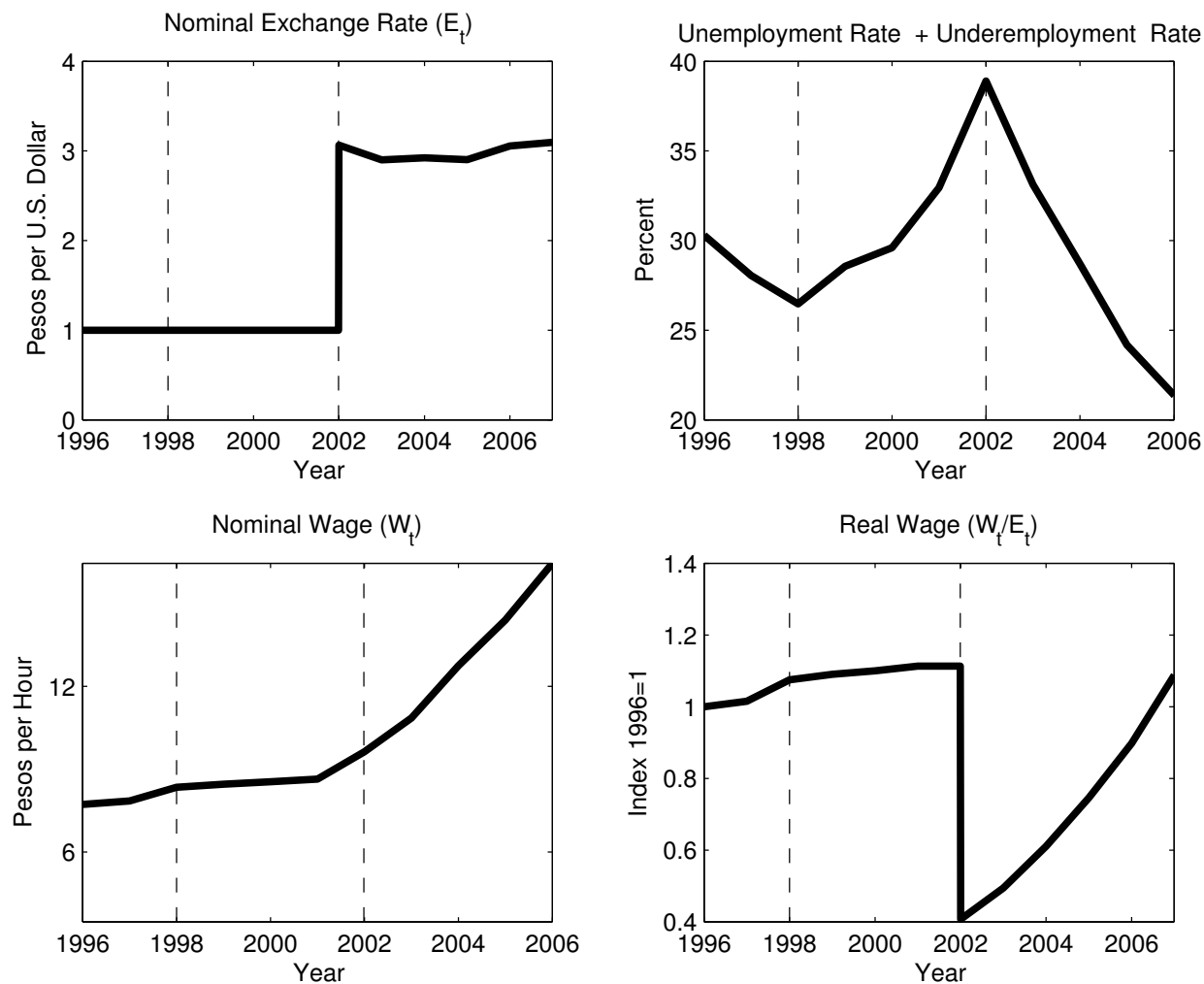
## Evidence From Informal Labor Markets

- Kaur (2012) examines the behavior of nominal wages, employment, and rainfall in casual daily agricultural labor markets in rural India (500 districts from 1956 to 2008).
- Finds asymmetric nominal wage adjustment:
  - $W_t$  increases in response to positive rainfall shocks
  - $W_t$  fails to fall, labor rationing, and unemployment are observed in response to negative rain shocks.
- Inflation (uncorrelated with local rain shocks) tends to moderate rationing and unemployment during negative rain shocks, suggesting downward rigidity in nominal rather than real wages.

## Evidence From Emerging Countries

- Argentina: pegged the peso at a 1-to-1 rate with the dollar between 1991 and 2001.
- Starting in 1998, the economy was buffeted by a number of large negative shocks (weak commodity prices, large devaluation in Brazil, large increase in country premium, etc.).
- Not surprisingly, between 1998 and 2001, unemployment rose sharply.
- Nonetheless, nominal wages remained remarkably flat.
- This evidence suggests that nominal wages are downwardly rigid.

# Argentina 1996-2006



Source: Schmitt-Grohé and Uribe, *JPE* forthcoming.



**EPOP**

**Vs.**

**Unemployment**

## **EPOP vs. Unemployment Rate**

Take a look at the next slide. In Japan and Europe the employment-to-population ratio (EPOP) and the unemployment rate both indicate that labor market conditions have not improved much since the beginning of the recovery. Thus, one could use either labor market indicator to make the point that the recoveries have been jobless. However, in the United States, the unemployment rate suggests steady improvement of labor conditions since 2010, whereas the EPOP ratio suggests no such improvement. Why?

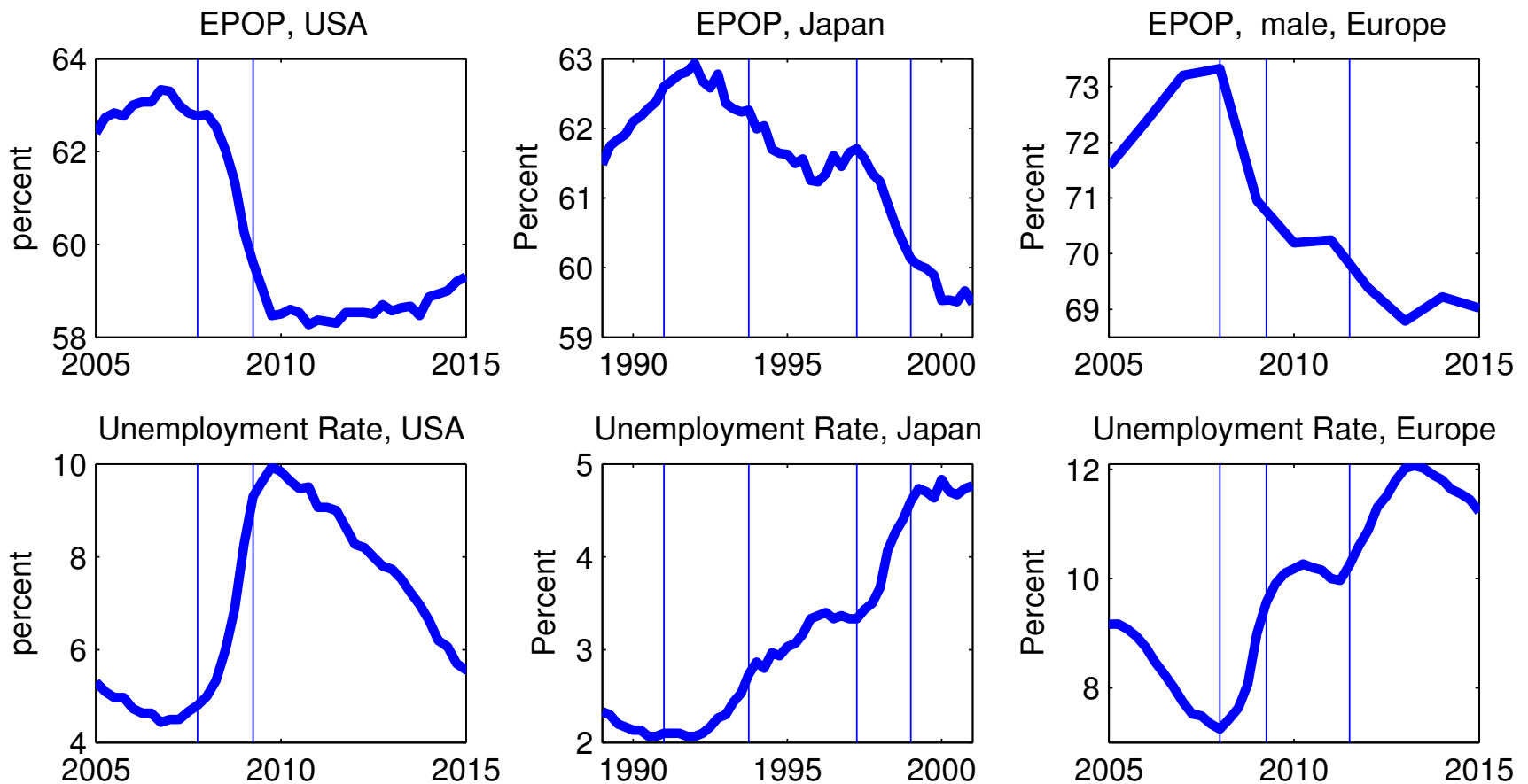
Because labor force participation rate declined by 2.5 percent during the recovery in the U.S..

Is the observed decline in the labor force participation ratio cyclical or not (i.e., due to demographic factors)?

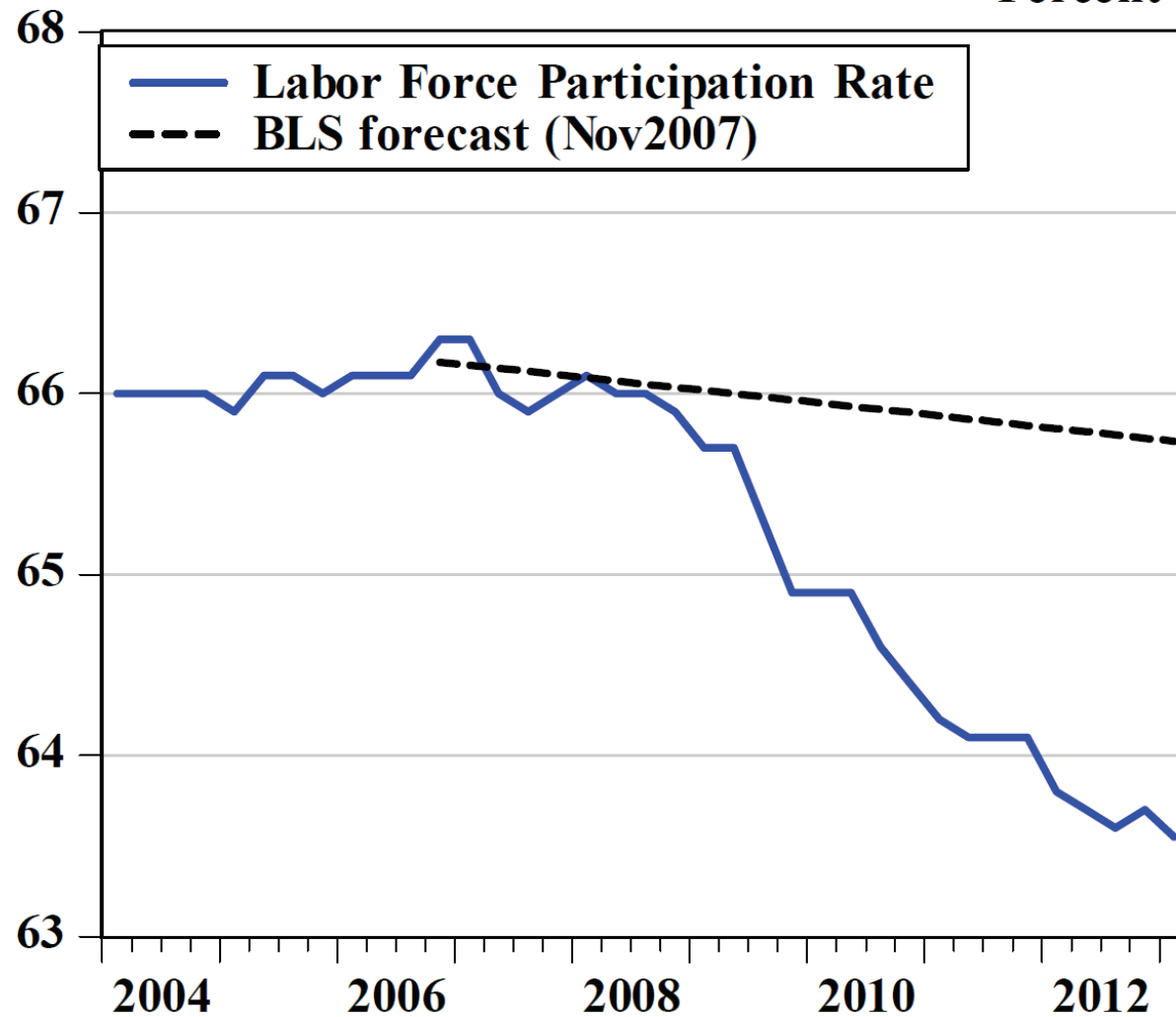
Erceg and Levin (2013) cite several studies and also present original evidence that it is mainly cyclical.

Erceg and Levin also show that the decline in LFPR was largest for young people, 16 to 24 years of age, 2nd largest for 25 to 54 years of age. So this is not old people retiring because of age or taking early retirement because the job market looks bad.

## Employment-to-Population Ratio versus Unemployment Rate: USA, Japan, Euro Area



## U.S. Labor Force Participation Percent



Source: Erceg and Levin (2013)

**Table 1: Demographic Factors and the Recent Evolution of the LFPR**

<b>Demographic Group</b>	<b>Population Share</b>			<b>Labor Force Participation Rate</b>		
	2007	Change (2007 to 2012)		2007	Change (2007 to 2012)	
	<i>Actual</i>	<i>Projection</i>	<i>Actual</i>	<i>Actual</i>	<i>Projection</i>	<i>Actual</i>
<i>16 to 24 yrs</i>	16.1	-0.9	-0.2	59.4	-0.9	-4.5
<i>25 to 54 yrs</i>	54.2	-2.0	-3.1	83.0	0.3	-1.5
<i>55 to 64 yrs</i>	14.0	1.3	1.8	64.0	1.5	0.5
<i>65 and older</i>	15.6	1.7	1.6	15.4	2.6	3.1
<i>Total</i>	100	0	0	66.1	-0.3	-2.4

Note: The columns labelled "Projection" refer to the BLS labor force projections published in November 2007.

Source: Erceg and Levin (2013)

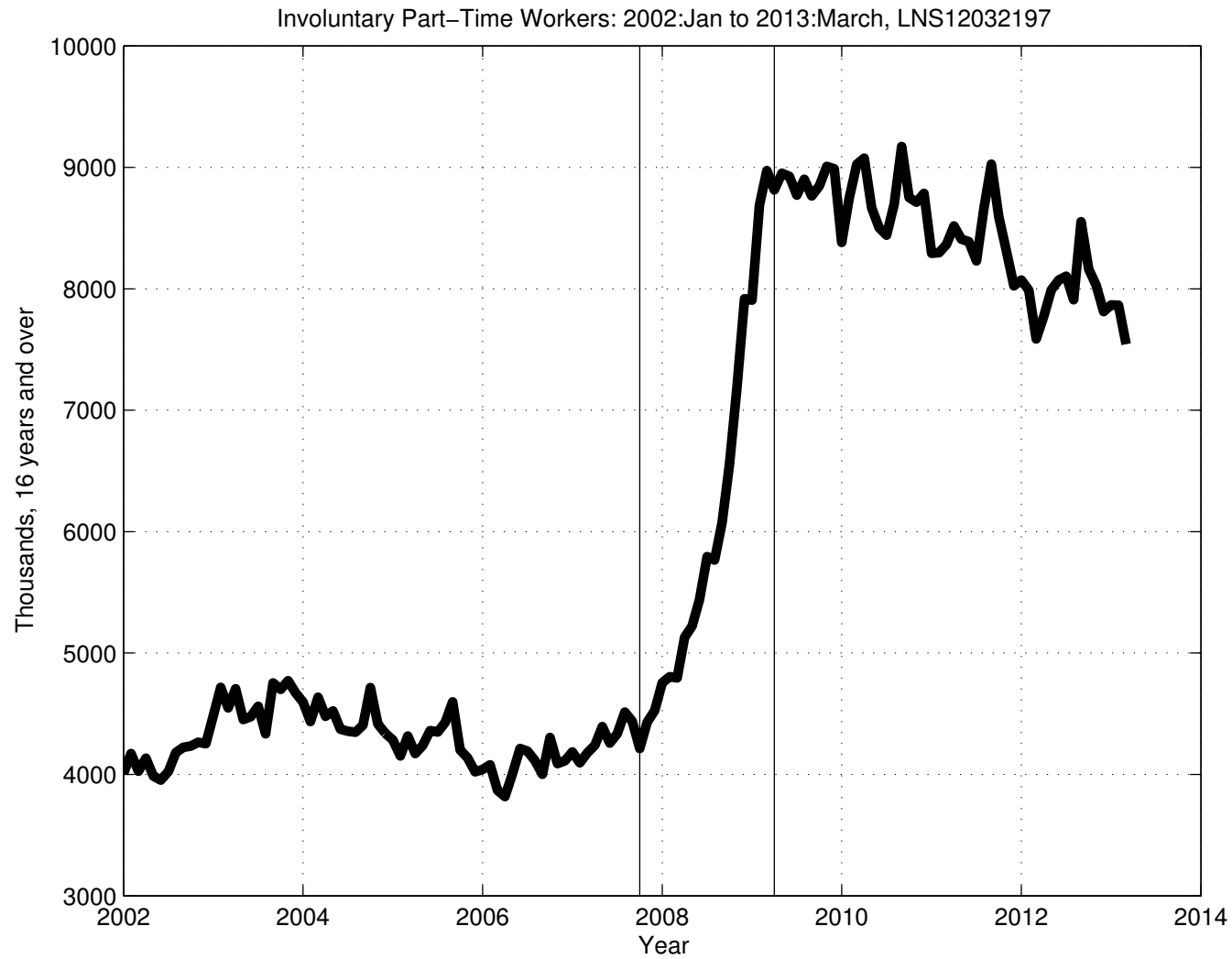
Other evidence in support of the claim that the U.S. recovery was jobless: no recovery in involuntary part-time work

NYTimes, April 19, 2013

“It was a relief just to find something,” said Amie Crawford, 56, of Chicago. After four months looking for a new job as an interior designer, which she had been for 30 years before the recession, she accepted a position as a part-time cashier at a quick-service health-food cafe called Protein Bar.

She keeps asking for more hours, but her manager’s response is always the same.

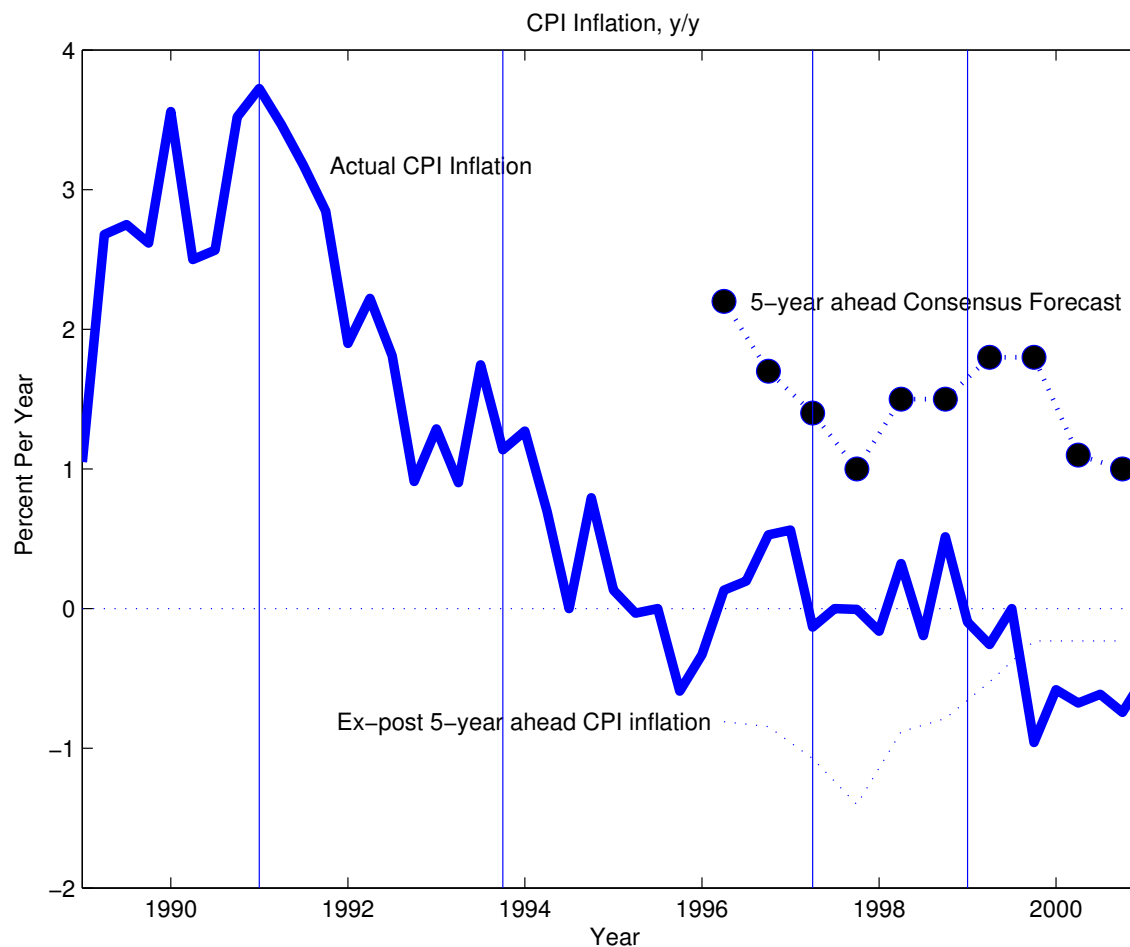
“He tells me, ‘I try to give you as many hours as I can, but everybody wants as many hours as they can,’ ” Ms. Crawford said.



Data Source: Bureau of Labor Statistics.



## Actual and Expected CPI Inflation, Japan, 1989-2001



Data Sources. CPI: <http://www.stat.go.jp/english/data/cpi/index.htm>. Expected CPI Inflation from April and October survey of Consensus Forecast.

## Did Real Wage Growth Exceed TFP Growth in the Recovery?

Real Wage Growth relative to TFP Growth between 2008 and 2011 in the United States

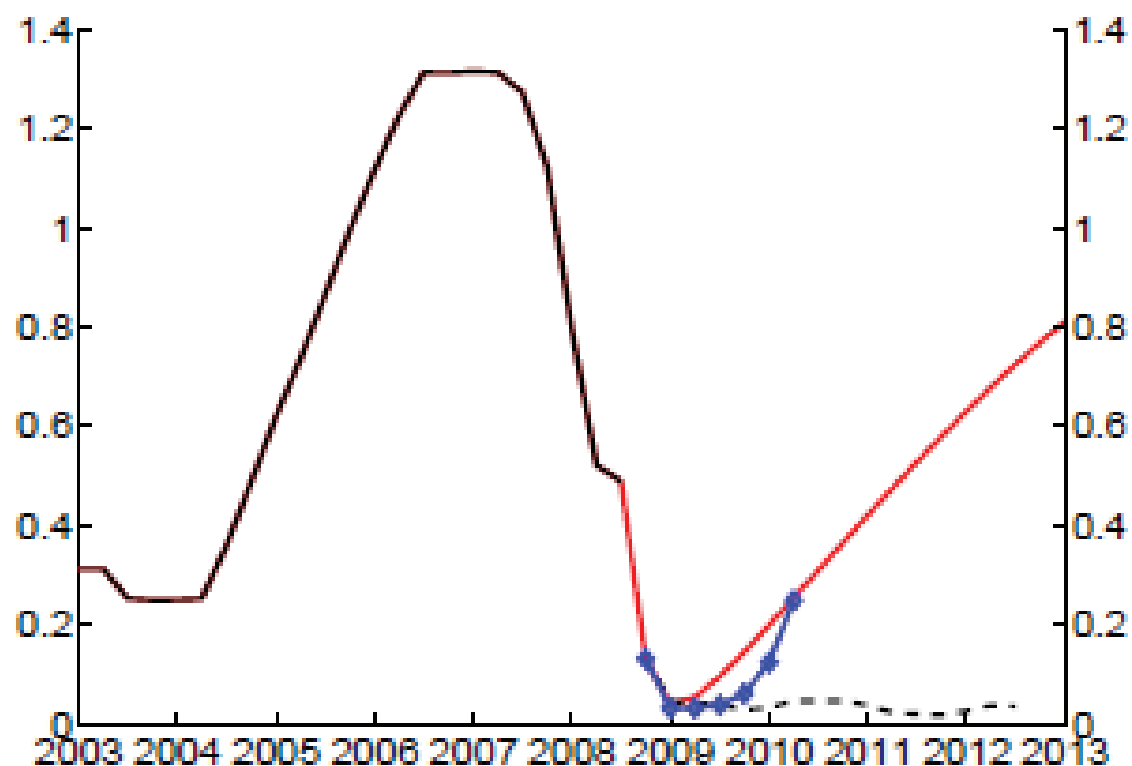
Fernald, FRBSF Productivity Data Base: Average Annual TFP Growth from 2008 to 2011 was 0.75 percent

Year	2009	2010	2011
% $\Delta$ TFP	3.32	-0.39	-0.69

Daly et al. report that real wages grew by 1.1 percent per year on average between 2008 and 2011.

Hence real wage growth exceeded TFP growth by 0.35 percent per year, for a total of 1.05 percent over the period 2008-2011.

Figure 3: Forecasts of the Federal Funds Rate



Notes: Actual FFR data until 2008Q3 (solid black); FFR forecast path (solid red); actual FFR data starting in 2008Q4 (dashed black); Blue Chip forecasts (solid blue with diamonds).

Source: Del Negro, Giannoni, and Schorfheide, 2013. "INFLATION IN THE GREAT RECESSION AND NEW KEYNESIAN MODELS"