Economics 210c/236a
Fall 2018

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LECTURE 7

Monetary Policy at the Zero Lower Bound: Expectations Effects

October 3, 2018

I. Overview

Cases of Countries Hitting the Zero Lower Bound

- US and UK in the 1930s.
- Japan starting in the late 1990s.
- US, Europe, and Japan starting in 2008.

Papers for Today

- Temin and Wigmore (U.S. in the 1930s)
- Eggertsson and Pugsley (U.S. in 1937)
- Wieland (Japan, mainly in the 1990s and 2000s)

How can monetary policy matter at the zero lower bound?

- Expectations effects.
    - Expectations of prices, growth, future interest rates.
- Quantitative easing and portfolio balance effects.
- Others?
    - Special case of the exchange rate.

II. Temin and Wigmore, "The End of One Big Deflation"

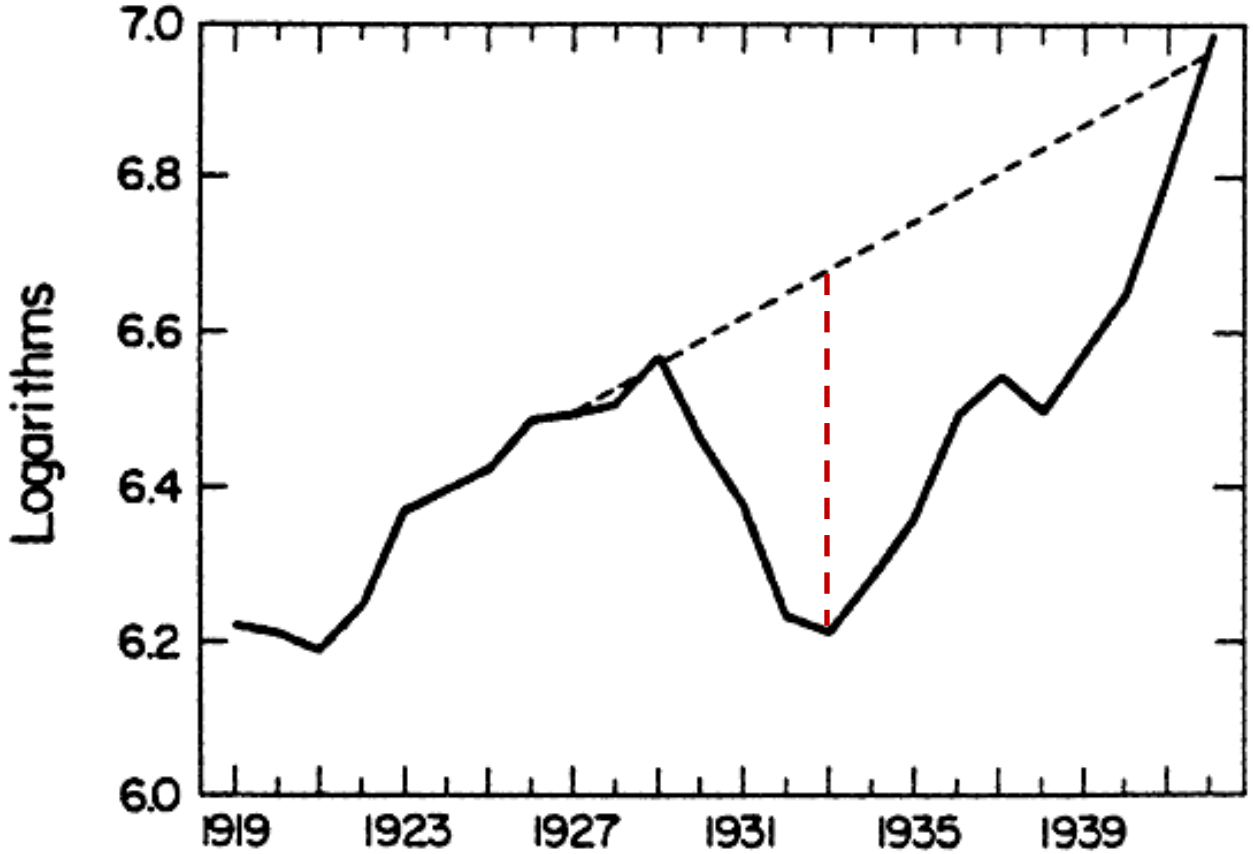
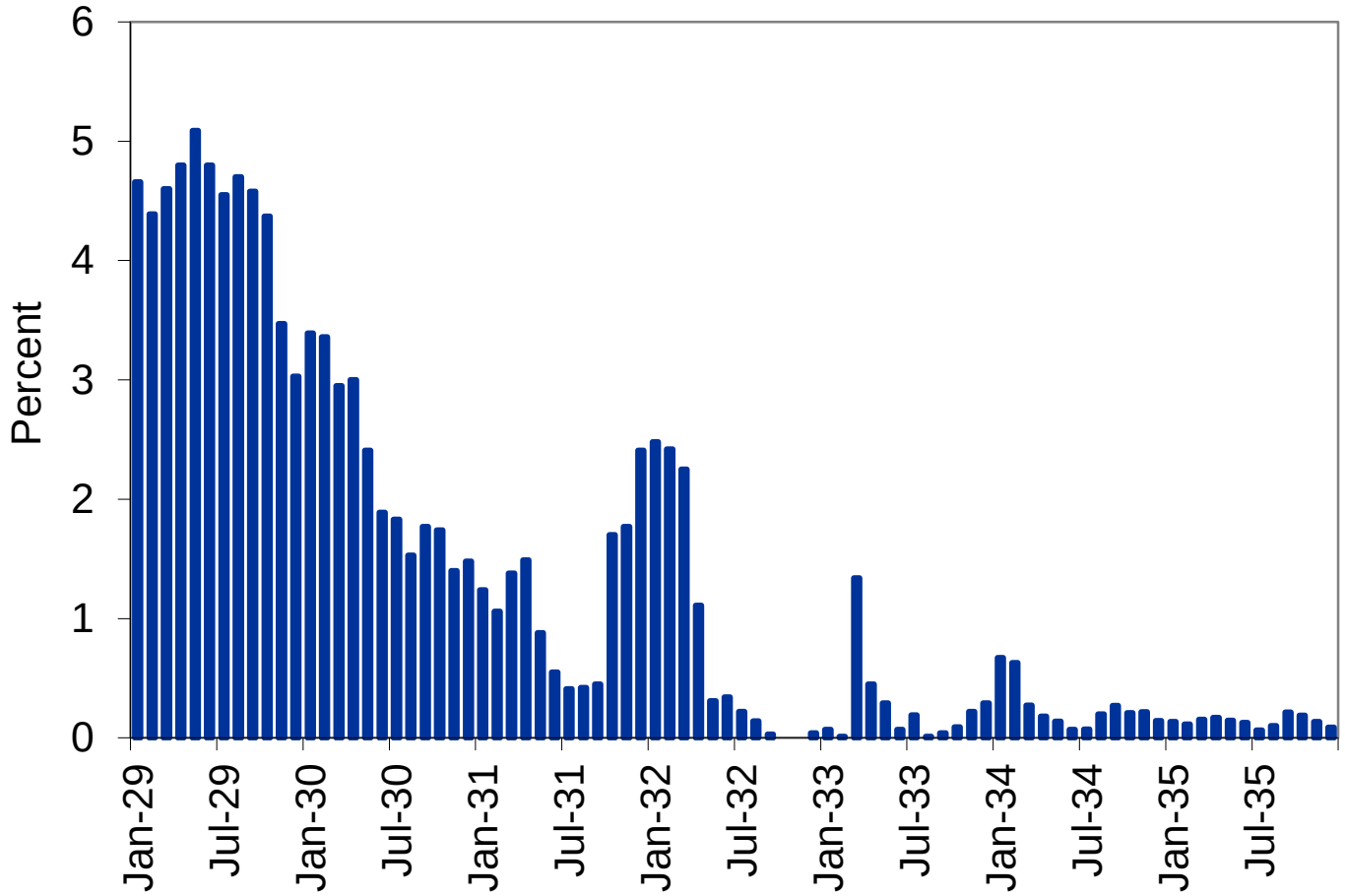


FIGURE 2

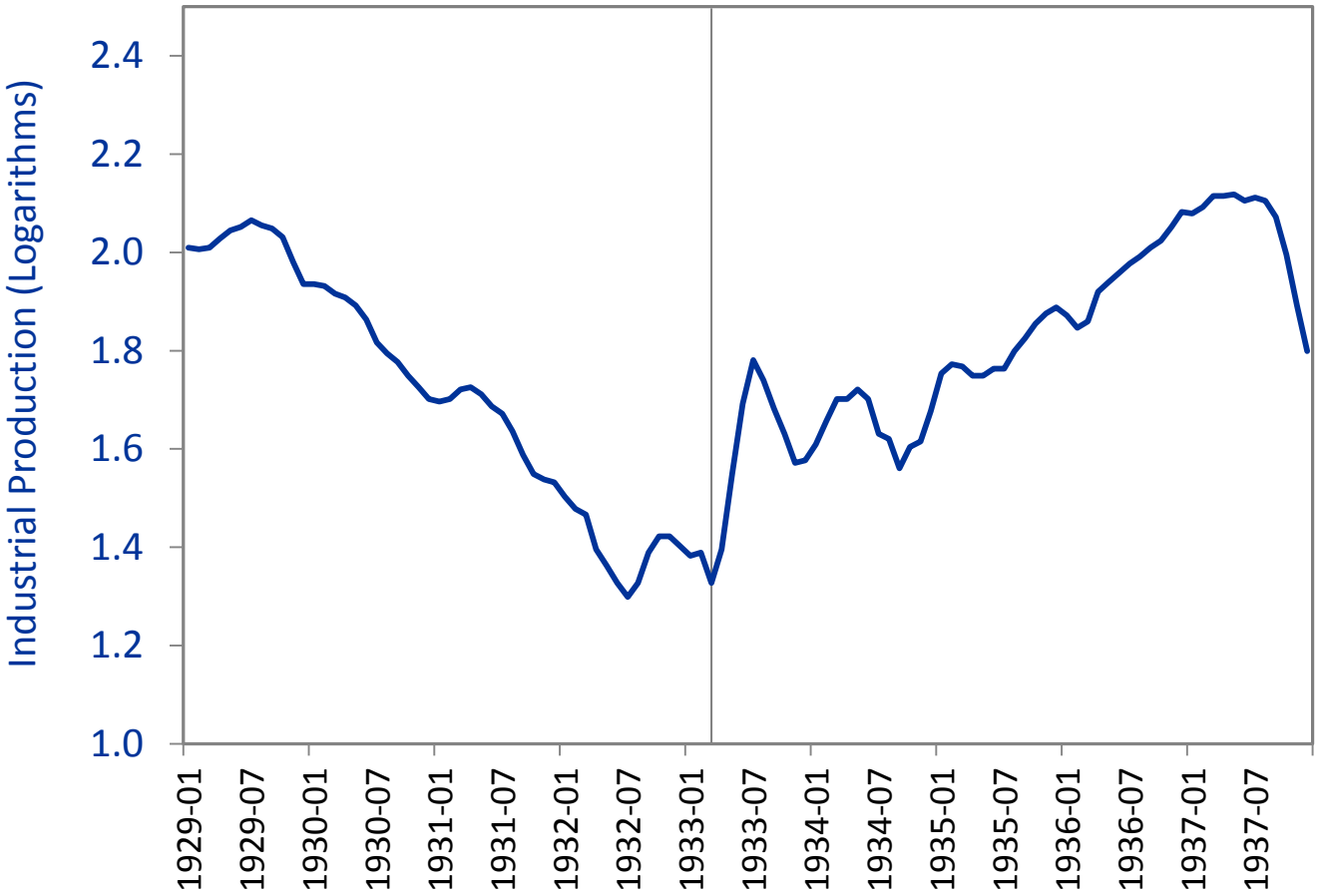
ACTUAL AND TREND REAL GROSS NATIONAL PRODUCT, 1919–1942

From: Romer, "What Ended the Great Depression?"

Nominal Interest Rate (3-6 mo. Treasury Notes)



Industrial Production



What is a regime shift?

- A dramatic change in the policy framework.
- Leads agents to expect long-lasting changes in policy.

Roosevelt's Regime Shift

- Hoover was committed to the gold standard, monetary inaction, and fiscal orthodoxy.
- Roosevelt devalued in April 1933. Temin and Wigmore believe devaluation was the key sign of the regime shift.
- Followed up with fiscal and monetary expansion.

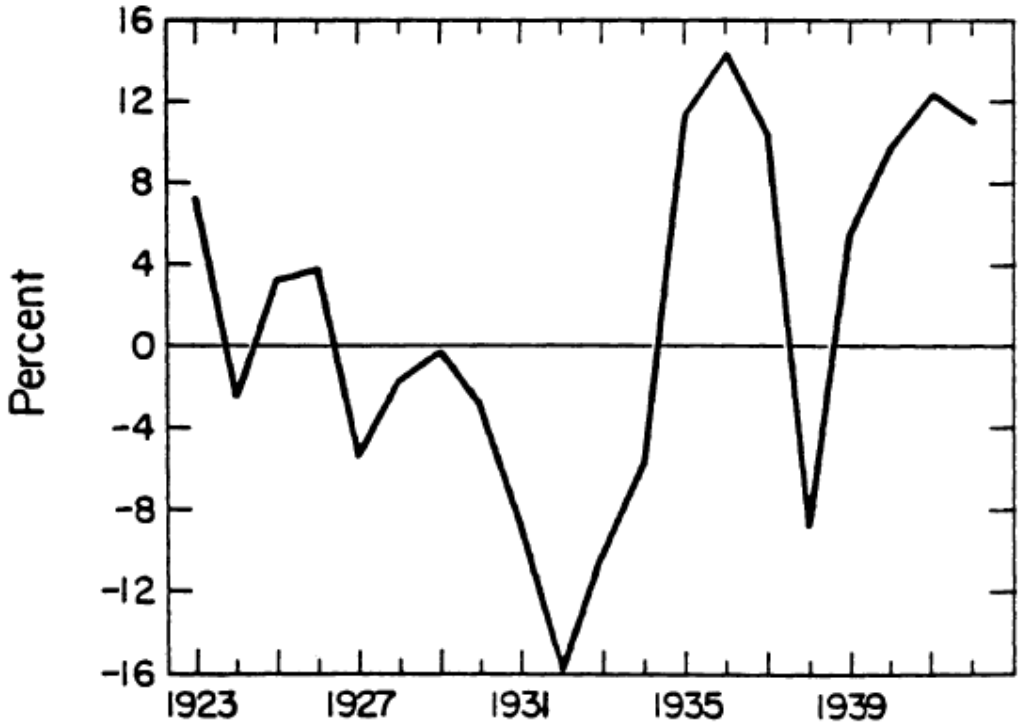


FIGURE 6

DEVIATIONS OF MONEY GROWTH RATE FROM NORMAL, 1923–1942

Notes: The normal money growth rate is defined as the average growth rate of M1 between 1923 and 1927. The deviations are shown lagged one year because this is the form in which they enter my calculation.

From: Christina Romer, "What Ended the Great Depression?"

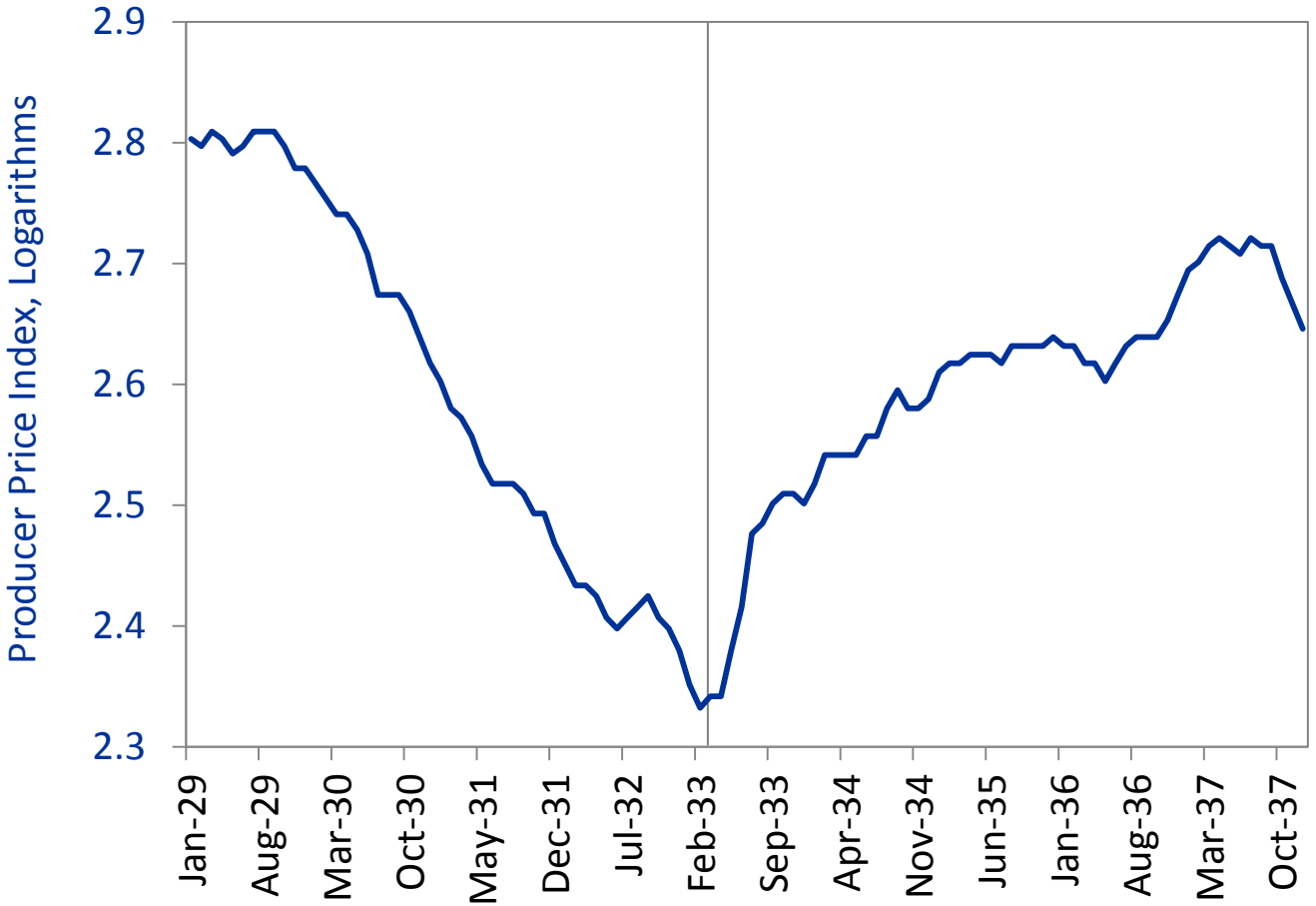
Roosevelt's Communications Policy

- Second Fireside Chat, May 7, 1933:

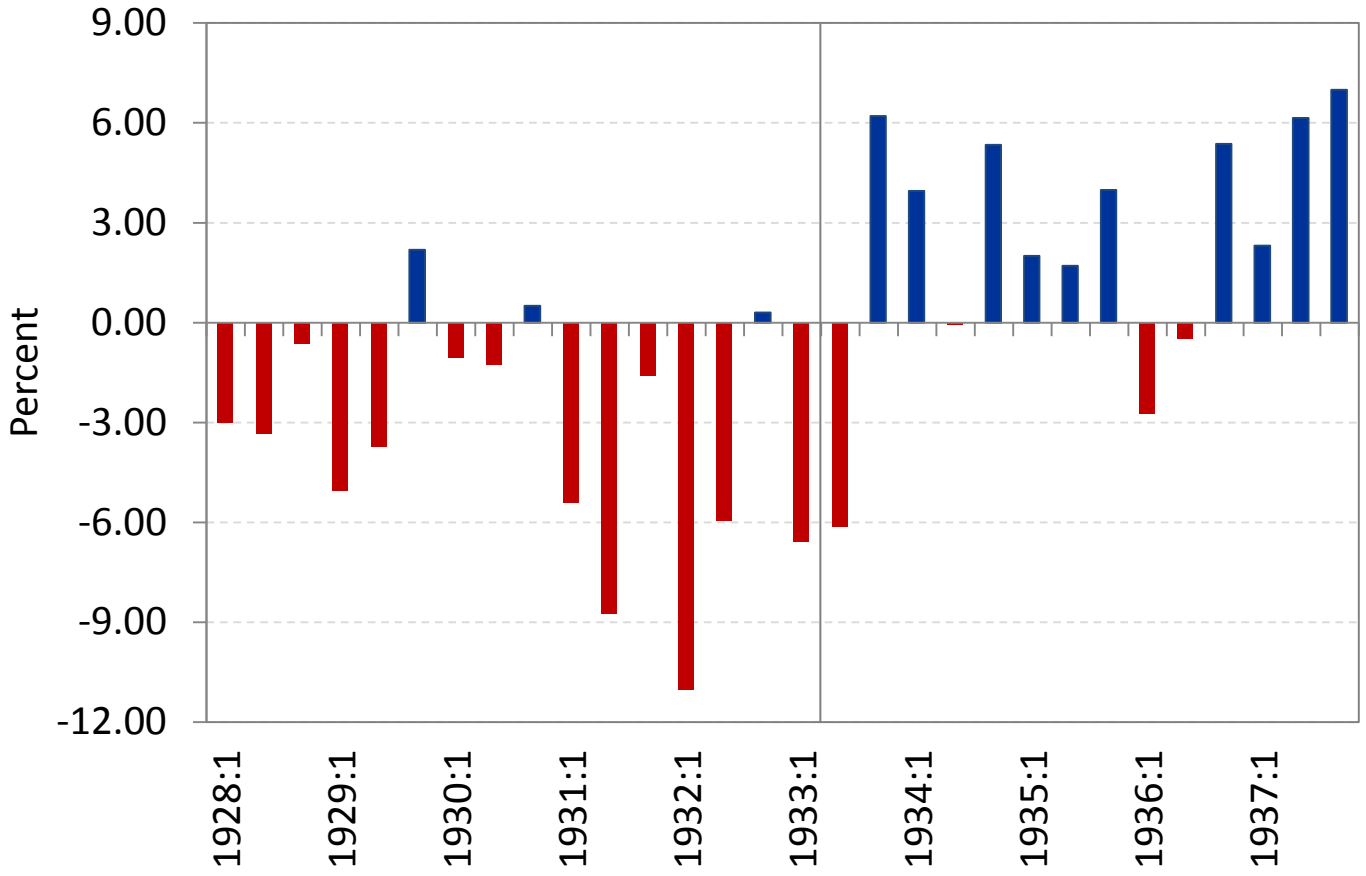
"The Administration has the definite objective of raising commodity prices to such an extent that those who have borrowed money will, on the average, be able to repay that money in the same kind of dollar which they borrowed. … That is why powers are being given to the Administration to provide, if necessary, for an enlargement of credit …"

Stock Prices

Producer Price Index, All Commodities

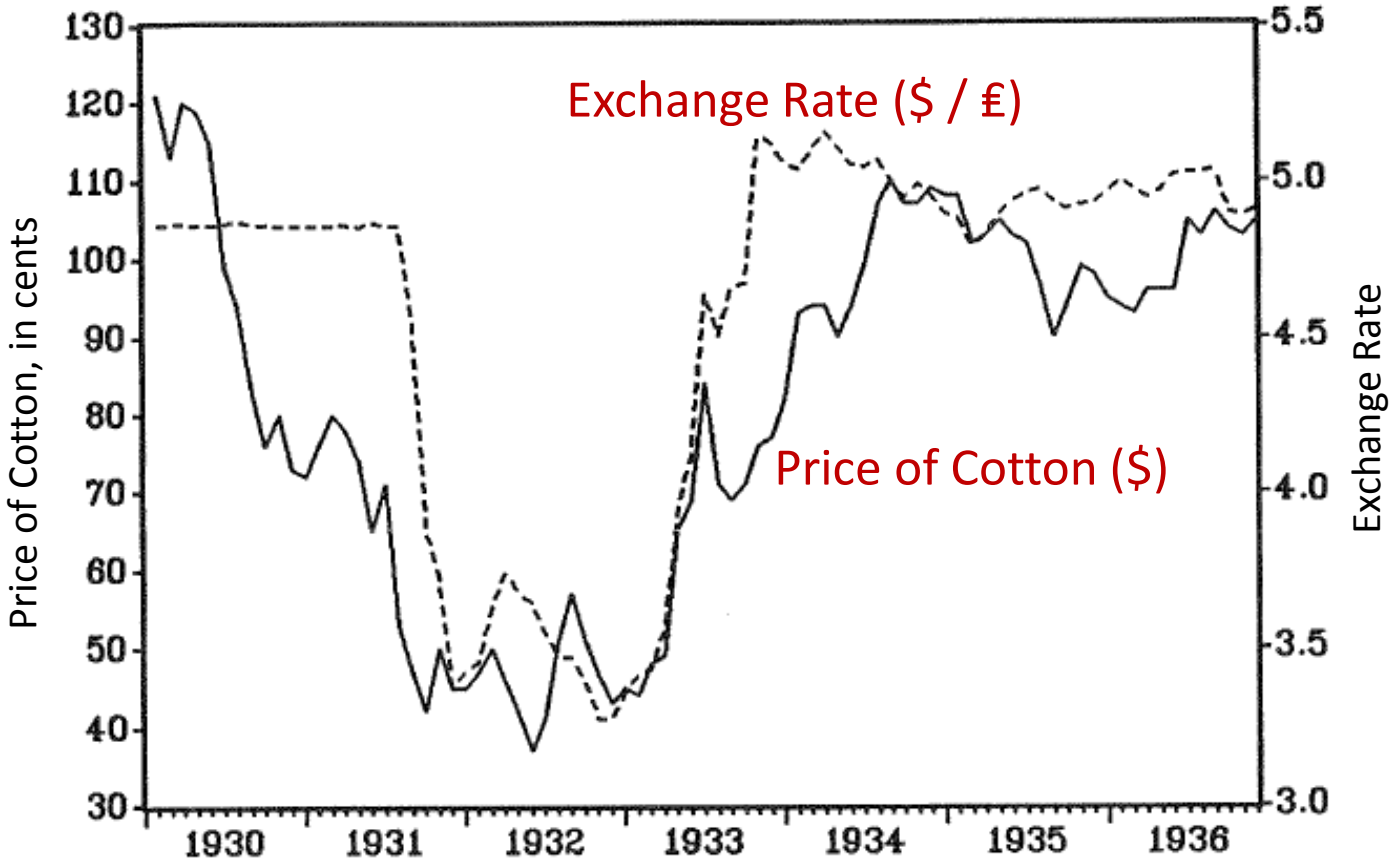


Expected Inflation as Measured Using Commodity Futures Prices



From: Hamilton, “Was the Deflation During the Great Depression Anticipated?”

Devaluation in April 1933



From: Temin and Wigmore, “The End of One Big Deflation”

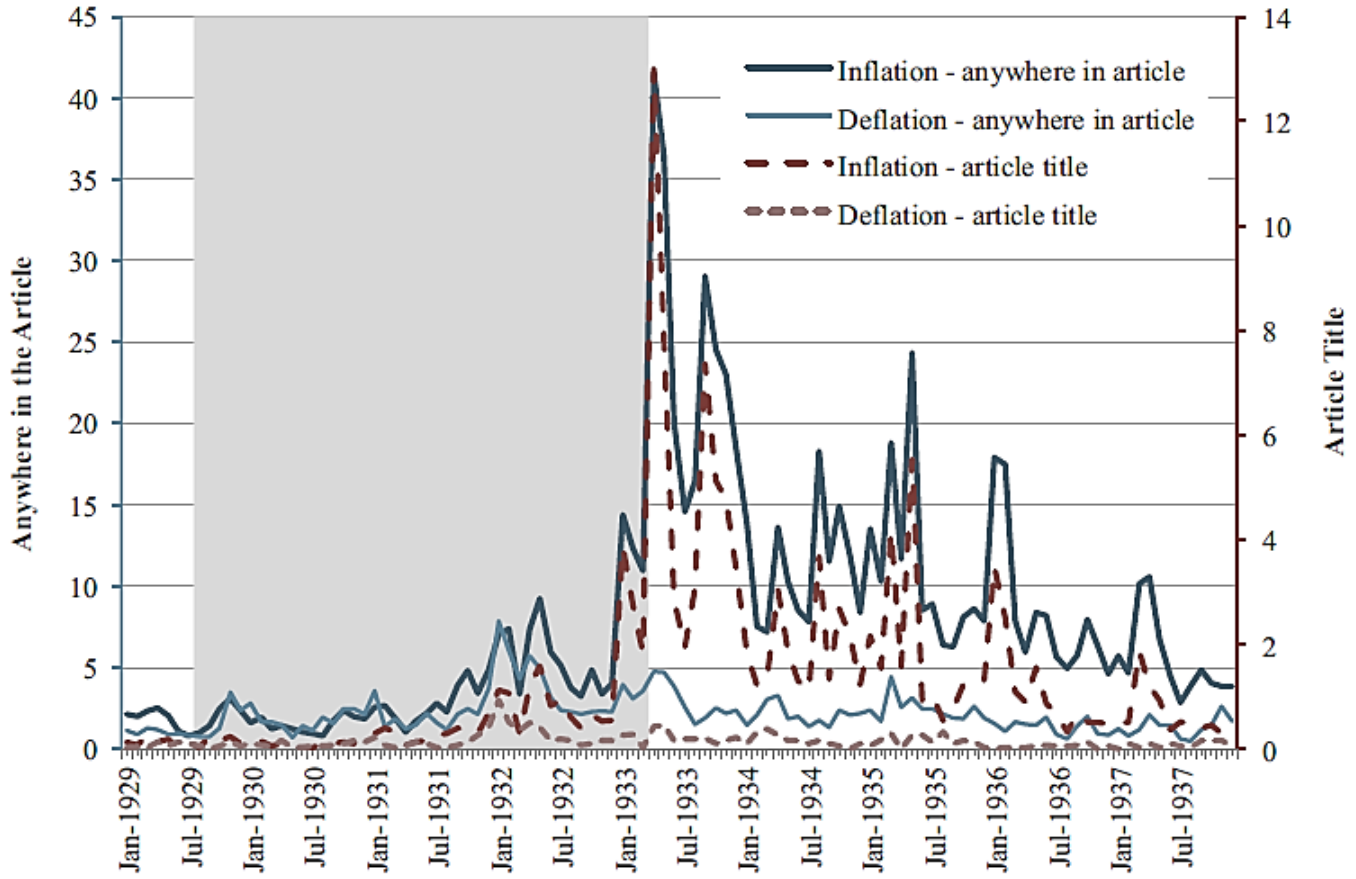


Fig. 3. Daily Average Frequency Over the Month of the Terms "Inflation" and "Deflation"
Note: The figure displays the daily average frequency over the month of the following terms: "inflation" or "inflationary" and "deflation" or "deflationary." For each term, one series considers only the article's title while the other series considers the entire article. The figure presents the aggregate results across five national daily news sources: the *New York Times*, the *Wall Street Journal*, the *Los Angeles Times*, the *Chicago Tribune*, and the *Washington Post*. These newspapers are available electronically via ProQuest.

From: Jalil and Rua, "Inflation Expectations and Recovery in Spring 1933"

Table 1
Inflation Forecasts during Second Quarter 1933.

Forecaster	Issue	Forecast
Business Week	Apr 19	Our forecast is an inflation which will almost precisely parallel the wartime inflation.
The Magazine of Wall Street	Apr 29	We move toward inflation.
Trade and Money Index	May 1	Reflation is begun.
Review of Economics and Statistics	May 15	It has rather suddenly become evident that some sort of inflation is to come.
Moody's Investment Survey	May 18	The feeling seems to be that higher prices and activity will in any event be forced by more direct methods.
Standard Trade and Securities	May 24	A policy of price stimulation will be carried out.

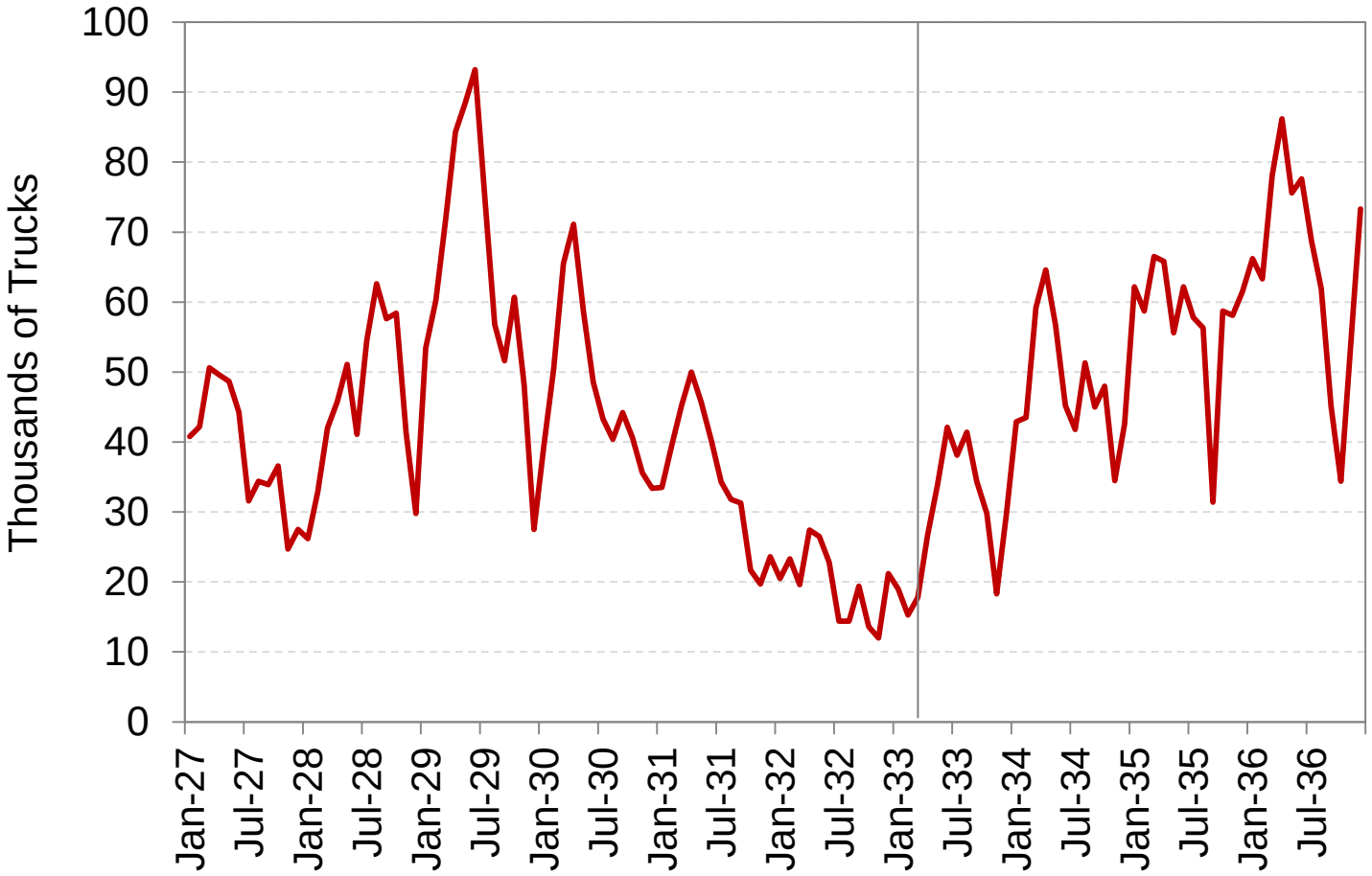
From: Jalil and Rua, “Inflation Expectations and Recovery in Spring 1933”

Table 2
Percentage Changes in Stock Prices on the Dates of Inflationary and Anti-Inflationary News Shocks Between April and July 1933.

	Percentage change in Stock index
Dates of inflationary news shocks	
April 19	7.18
April 28	6.11
May 24	1.97
May 26	2.91
June 19	7.21
Dates of anti-inflationary news shocks	
June 13	−2.89
June 15	−6.98
July 30	−4.59
Averages	
April–July	0.58

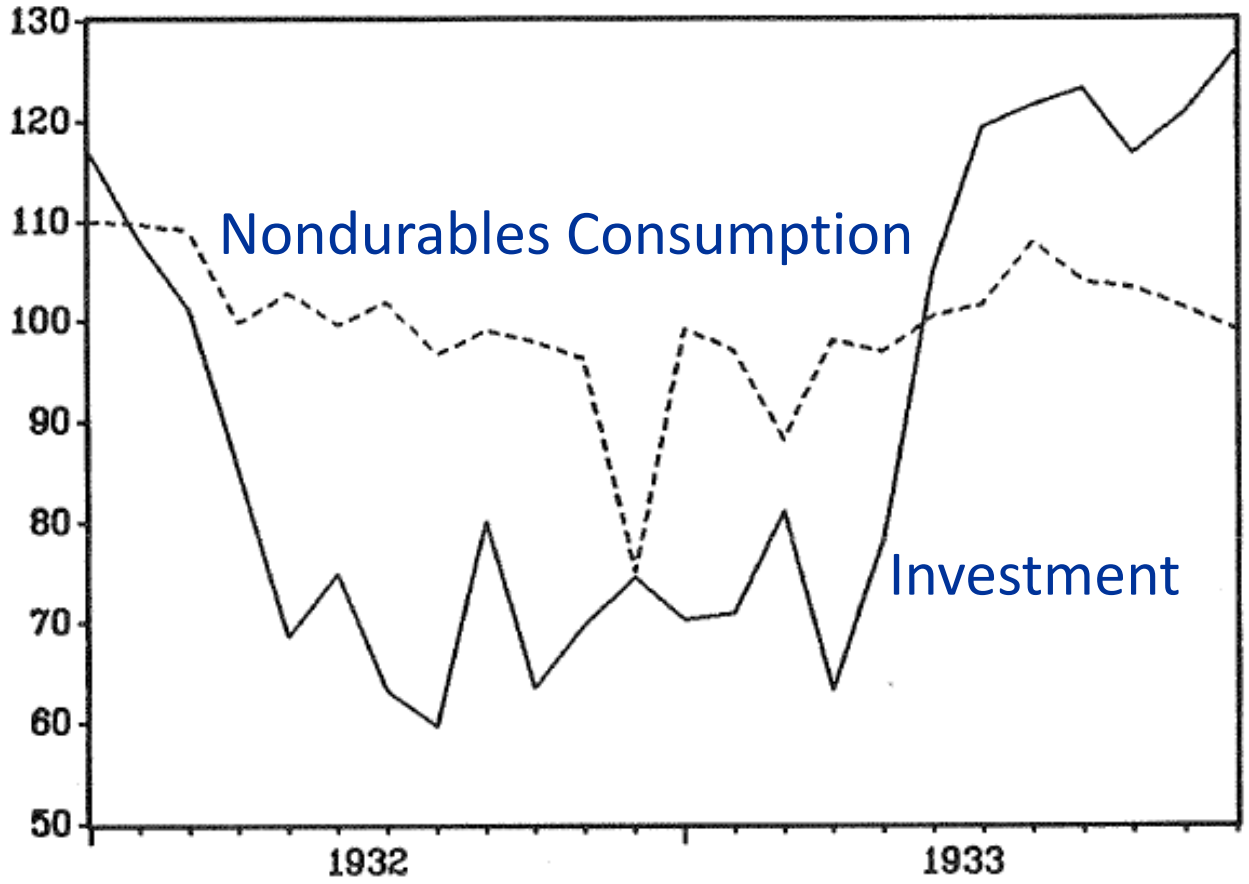
From: Jalil and Rua, “Inflation Expectations and Recovery in Spring 1933”

Truck Production, 1927-1936



From: FRED, Federal Reserve Bank of St. Louis

Investment and Consumption Spending, 1932-33



From: Temin and Wigmore, “The End of One Big Deflation”

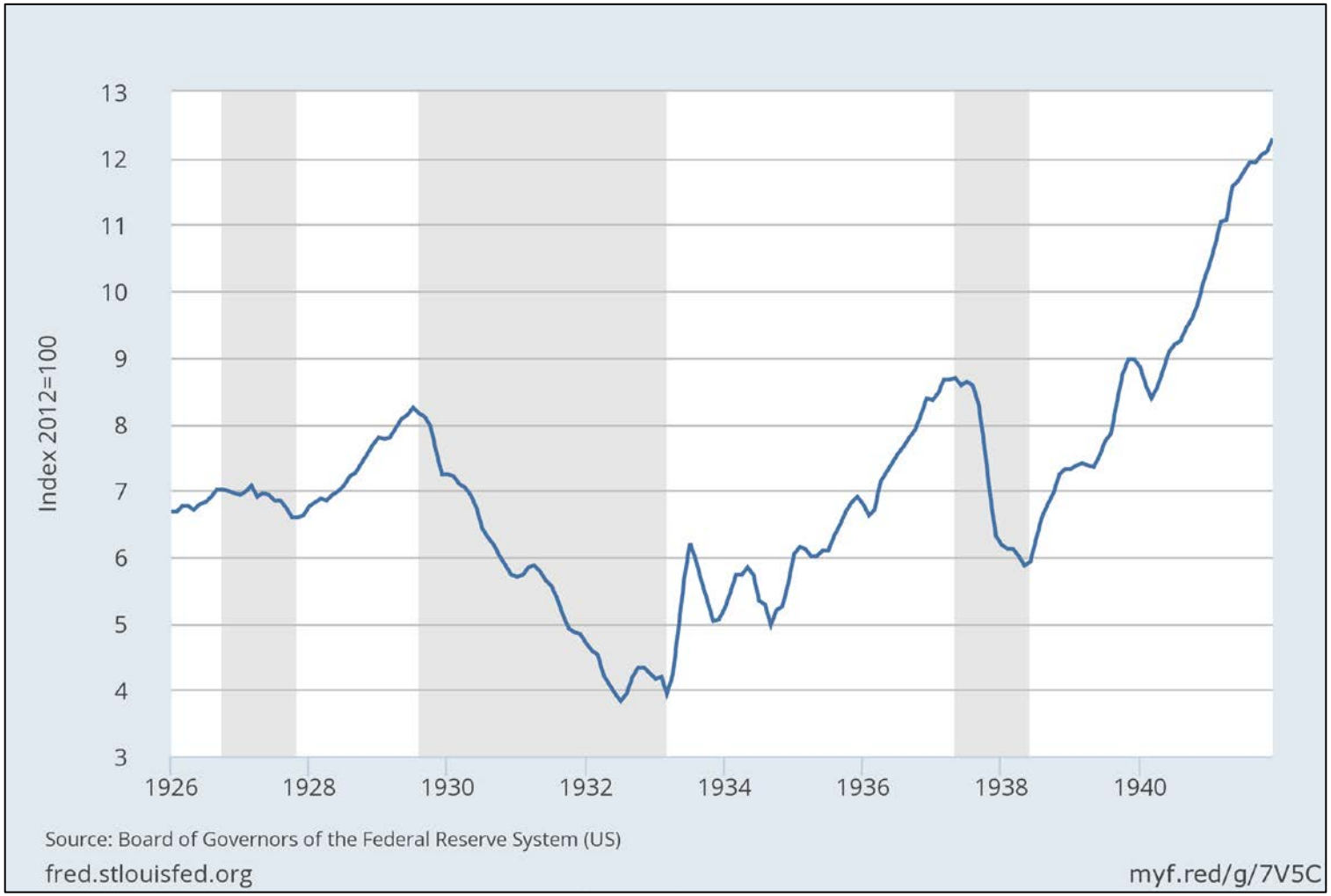
Evaluation

III. Eggertsson and Pugsley, "The Mistake of 1937"

How Eggertsson and Pugsley Fit Into the Lecture

- Temin and Wigmore say a switch to an inflationary regime can be helpful at the ZLB
    - Use April 1933 as an example.
- Eggertsson and Pugsley say a change in expectations of future policy away from reflation and expansion can be very damaging at the ZLB.
    - Use 1937–38 recession as an example.

Industrial Production, 1926–1941



Alternative Explanations for the 1937–38 Recession

- Increase in reserve requirements (Friedman and Schwartz, Calomiris, Mason, and Wheelock)
- Sterilization of gold inflows (Irwin)
- Fiscal contraction
- Supply shocks (Hausman)

Eggertsson and Pugsley's Explanation

- Policymakers started expressing concern about inflation and deficits.
- Caused a negative change in expectations of future policy.
- This had contractionary effects on real activity.

Eggertsson and Pugsley's Model

- DSGE model with binding zero lower bound due to real shocks.
- Calibrate model and find that inflation and output are extremely sensitive to changes in beliefs about future policy at ZLB. (Sensitivity is asymmetric.)
- Source of sensitivity is "contractionary spiral"—change in expectations in one instance affects expectations in other situations, and those expectations feed on each other (vicious feedback loop).

Eggertsson and Pugsley's Evidence

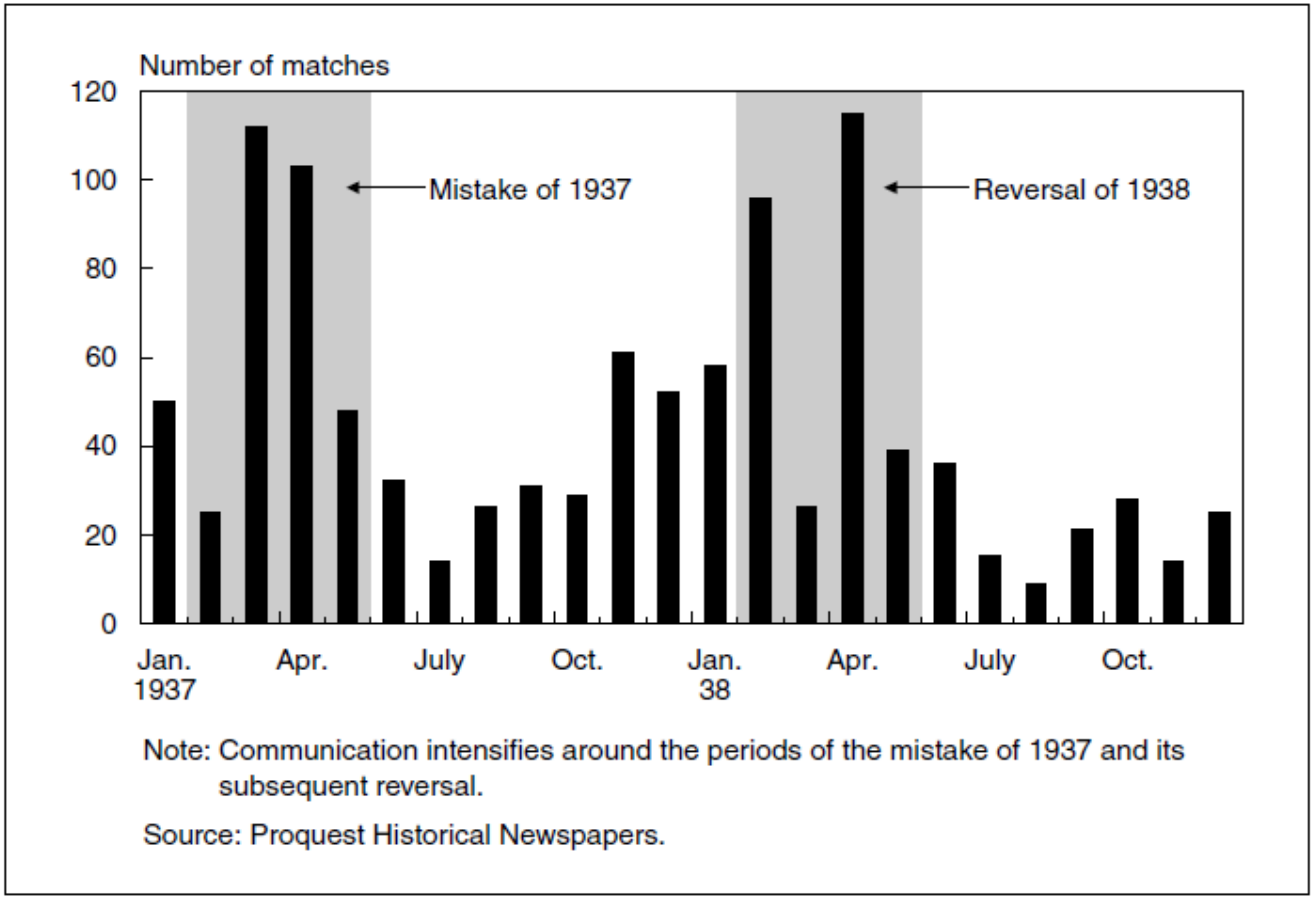
- Narrative evidence from statements and actions.
- Behavior of commodity prices.
- Behavior of long-rates relative to short rates.
- The behavior of the economy when statements and actions changed back.

Table 3 The Mistake of 1937: Anti-Inflationary Communications

1. July 14, 1936	The Fed announces the first reserve requirement increase, to become effective on August 15.
2. January 30, 1937	The Fed announces the second and third reserve requirement increases, to become effective on March 1 and May 1.
3. February 18, 1937	Marriner Eccles, Chairman of the Board of Governors of the Federal Reserve System, in Senate hearings: "The short-term rates are excessively low and there may be a tendency for rates near the vanishing point to increase." (*Wall Street Journal*, February 19, 1937, p. 1).
4. March 15, 1937	Marriner Eccles, Chairman of the Board of Governors of the Federal Reserve System, gives a statement: "The upward spiral of wages and prices into inflationary levels can be as disastrous as the downward spiral of deflation." (*Chicago Daily Tribune*, March 16, 1937, p. 1)
5. March 17, 1937	Commerce Secretary Daniel C. Roper and Secretary of Agriculture Henry A. Wallace hold press conferences: both Secretaries warn against excessive inflation. (*Wall Street Journal*, March 18, 1937, p. 8)
6. March 24, 1937	Marriner Eccles, Chairman of the Board of Governors, on inflation: "Chairman Eccles outlines five steps to avert 'dangerous inflation' in *Forbes* magazine, which are (i) reserve requirement increases 'to eliminate excess reserves,' (ii) fiscal policy that balances the budget, (iii) reduction in the gold price of the dollar, (iv) increase in the labor share of national income, and (v) antitrust legislation." (*The Christian Science Monitor*, March 25, 1937)
7. April 2, 1937	FDR holds a press conference: "I am concerned—we are all concerned—over the price rise in certain materials."
8. August 3, 1937	FDR's views on price level targeting are revealed: Senator Elmer Thomas publishes a letter from FDR to him rejecting his proposal that the Fed should formally target the 1926 price level. (*Wall Street Journal*, August 4, 1937, p. 6)

From: Eggertsson and Pugsley, "The Mistake of 1937"

Figure 12 Intensity of Policy Discussion: Mentions of Inflation by Eccles, Morgenthau, FDR, or His Cabinet

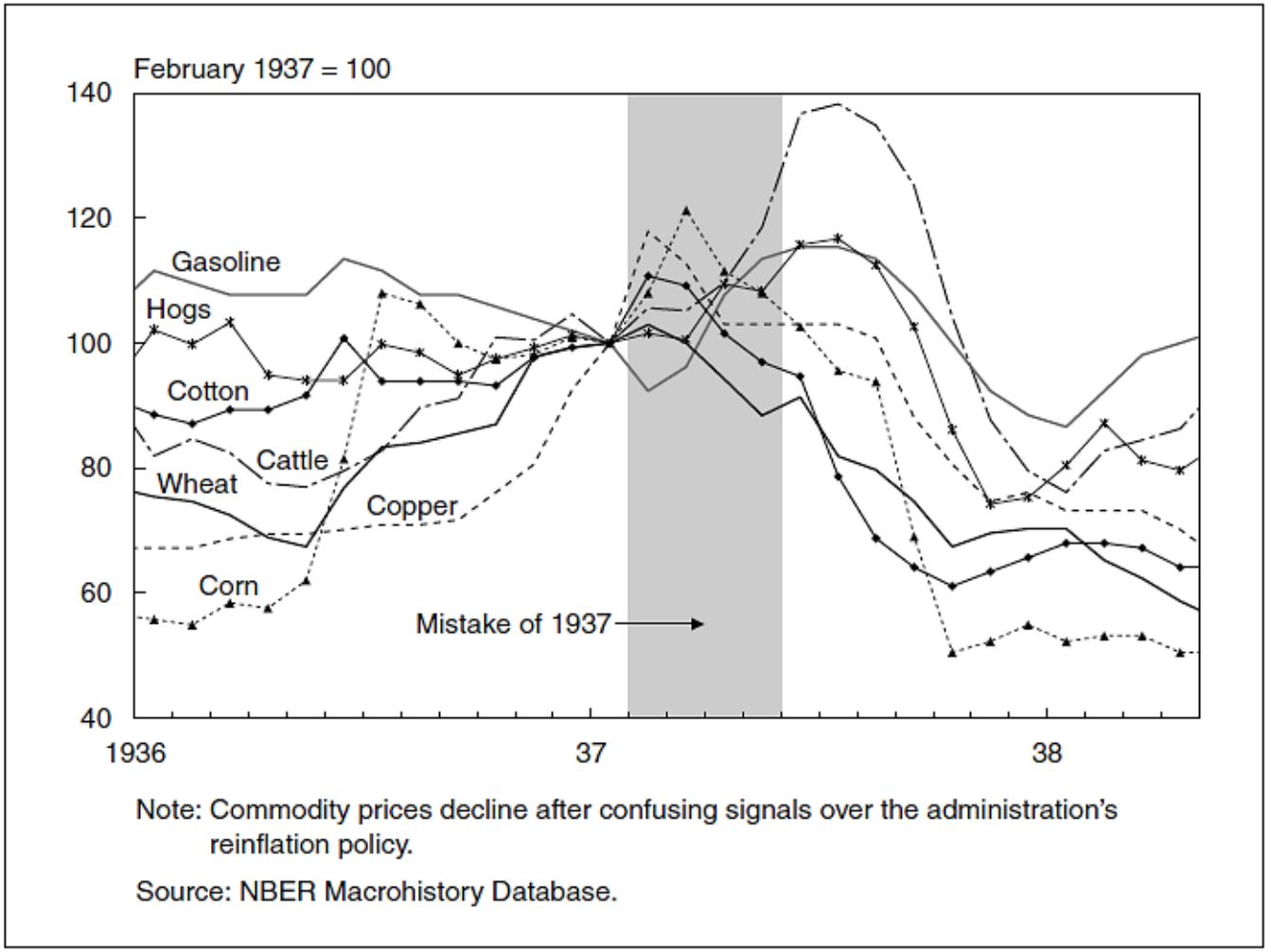


Note: Communication intensifies around the periods of the mistake of 1937 and its subsequent reversal.

Source: Proquest Historical Newspapers.

From: Eggertsson and Pugsley, "The Mistake of 1937"

Figure 7 Commodity Prices

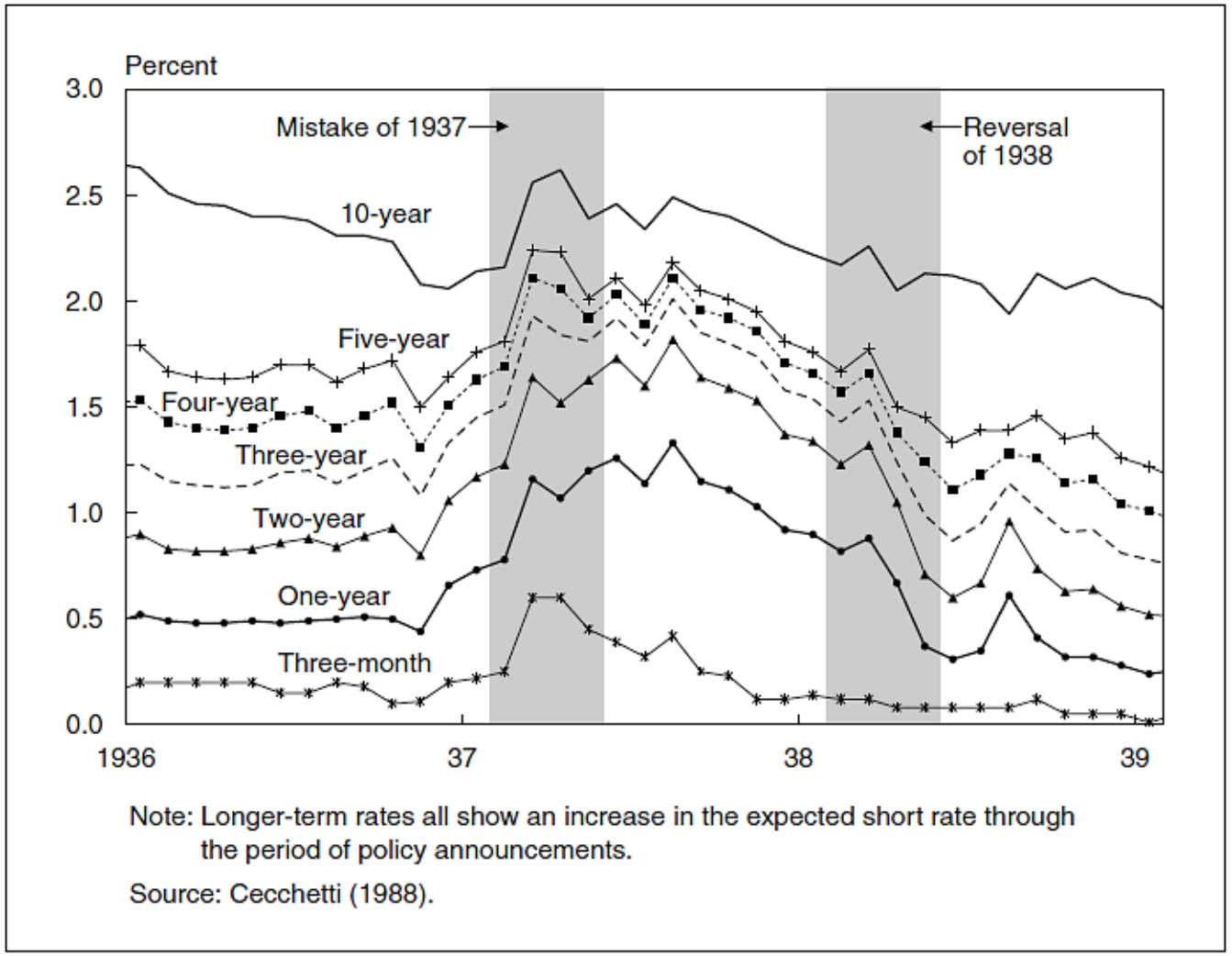


Note: Commodity prices decline after confusing signals over the administration's reinflation policy.

Source: NBER Macrohistory Database.

From: Eggertsson and Pugsley, "The Mistake of 1937"

Figure 10 Longer-Term Interest Rates, Estimated Constant Maturity Yield



Note: Longer-term rates all show an increase in the expected short rate through the period of policy announcements.

Source: Cecchetti (1988).

From: Eggertsson and Pugsley, "The Mistake of 1937"

Table 4 The Reversal of 1938: Pro-Inflation Communications

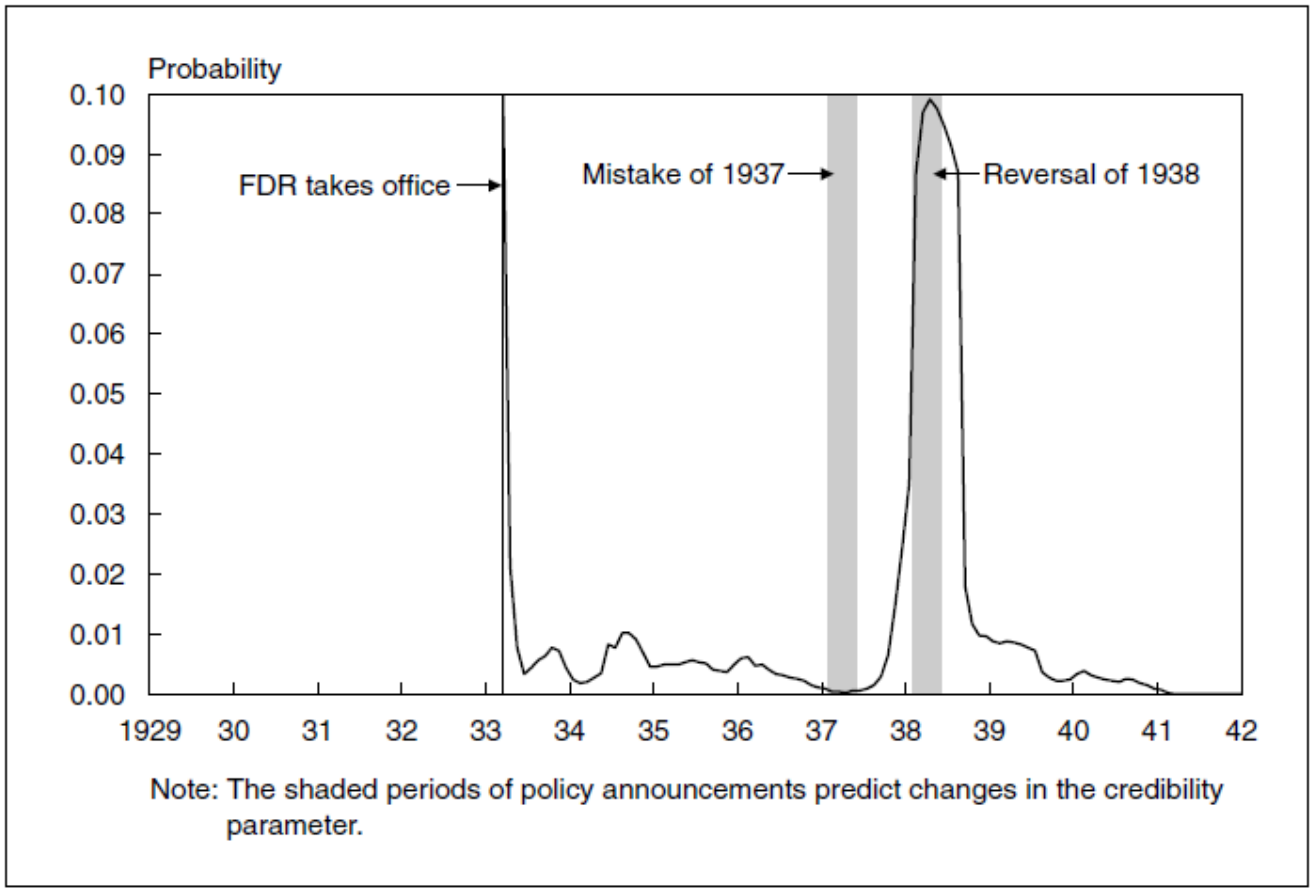
1. February 15, 1938	FDR holds a press conference: "At his press conference today, the President said that he believes now, as he did in 1933, that achievement of permanent prosperity depends on raising general price levels to those prevailing in 1926." (*Chicago Daily Tribune*, February 16, 1938, p. 1, "Hope Inflation Will Halt Depression")
2. February 18, 1938	FDR releases a written statement at a press conference that was prepared by Henry Morgenthau, Jr., Secretary of the Treasury; Henry A. Wallace, Secretary of Agriculture; Frances Perkins, Secretary of Labor; Marriner Eccles, Chairman of the Board of Governors of the Federal Reserve System; and economists of various executive departments: It is clear that in the present situation a moderate rise in the general price level is desirable . . . . Our program seeks a balanced system of prices such as will promote a balanced expansion in production. Our goal is a constantly increasing national income through increasing production and employment. This is the way to increase the real income of consumers.
3. April 14, 1938	FDR addresses Congress, announcing that the reserve requirement increases will be abandoned: "The measures for expanding excess reserves which were announced on Thursday by President Roosevelt will recreate the bases for a great credit inflation . . . . Monetary management, after having been directed for some time towards guarding against a possible inflationary boom, has turned, under the pressure of the business depression, toward the other extreme." (*The New York Times*, April 17, 1937)

From: Eggertsson and Pugsley, "The Mistake of 1937"

Matches Model to Data from the Depression

- Calibrates and makes assumptions to match the Depression experience.
- γ is expected probability of a switch from inflationary to deflationary regime.
- Estimates what series for γ would best match the actual behavior of inflation and output.

Figure 15 Probability of a Regime Change within Two Years



Note: The shaded periods of policy announcements predict changes in the credibility parameter.

From: Eggertsson and Pugsley, "The Mistake of 1937"

Evaluation

IV. Johannes Wieland, "Are Negative Supply Shocks Expansionary at the Zero Lower Bound?"

Motivation

- Standard models have counterintuitive implications at the zero lower bound (various “paradoxes”).
- A central implication of this type: An adverse supply shock, by raising expected inflation and so lowering the real interest rate, is expansionary at the zero lower bound.
- Wieland wants to test this prediction and investigate the implications of the results.

Key Questions

- Empirical: Are specific supply shocks (the Great Japan Earthquake, falls in oil supply) expansionary at the zero lower bound?

- Theoretical: If the answer is no, how broad are the implications? (For example, does it have implications for the fiscal multiplier at the zero lower bound? For measures to raise expected inflation through expectations of future monetary policy?)

Theory—Building Blocks

- New Keynesian IS curve:

$$\dot{c}(t) = i(t) - \pi(t) - \rho.$$

- New Keynesian Phillips curve:

$$\dot{\pi}(t) = \rho\pi(t) - \kappa^*[y(t) - \bar{y}(t)]$$
$$= \rho\pi(t) - \kappa^*[c(t) - a(t)],$$

where a is productivity.

Theory—Implications for Levels

- Assume that in the long run, $c = \pi = 0$.

- New Keynesian IS curve:

$$c(t) = \int_{\tau=0}^{\infty} [i(t+\tau) - \pi(t+\tau) - \rho] d\tau\,(t).$$

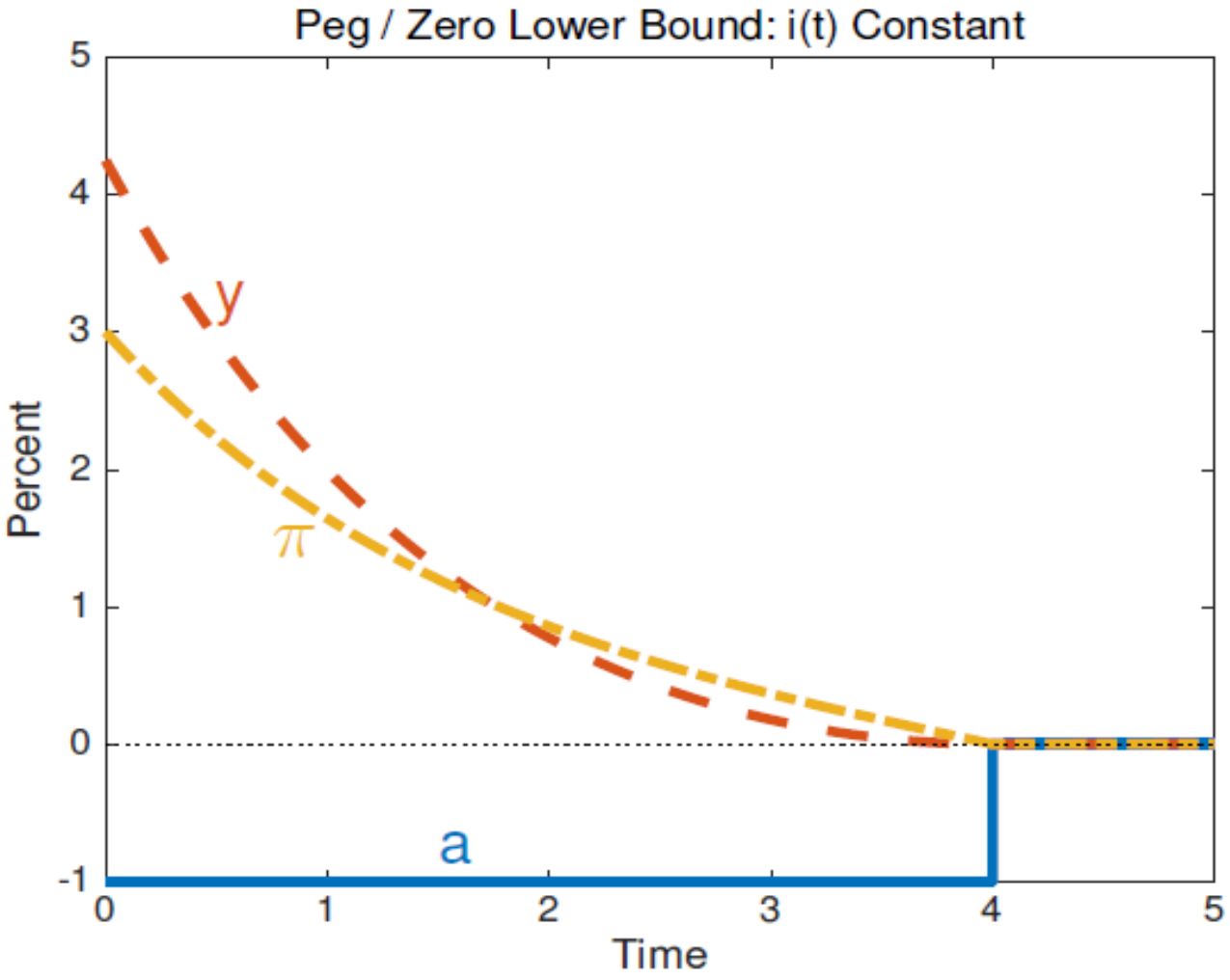
- New Keynesian Phillips curve:

$$\pi(t) = \kappa^* \int_{\tau=0}^{\infty} e^{-\rho\tau} [\, c(t+\tau) - a(t+\tau)] d\tau.$$

Theory—Effects of a Negative Productivity Shock at the Zero Lower Bound

- Assume:
  - $a(t) = \bar{a} < 0$ for $0 \leq t \leq T$, 0 otherwise.
  - For $t \geq T, \pi(t) = y(t) = 0$.
  - *i* doesn't respond to the shock. For simplicity, $i(t)$ equals ρ for all t. (Note that ρ is the steady state value of i.)

Effects of a Negative Productivity Shock at the ZLB



From: Wieland, "Are Negative Supply Shocks Expansionary at the Zero Lower Bound?"

Test 1: The Japanese Great Earthquake of March 2011

- Nominal interest rates fell slightly.
- Industrial production: Fell 15.8% from March to April (rose 1.9% from April to May).
- Real GDP: fell at a 5.9% annual rate in 2011Q1, and at a 2.1% annual rate in 2011Q2.

Test 1: The Japanese Great Earthquake of March 2011

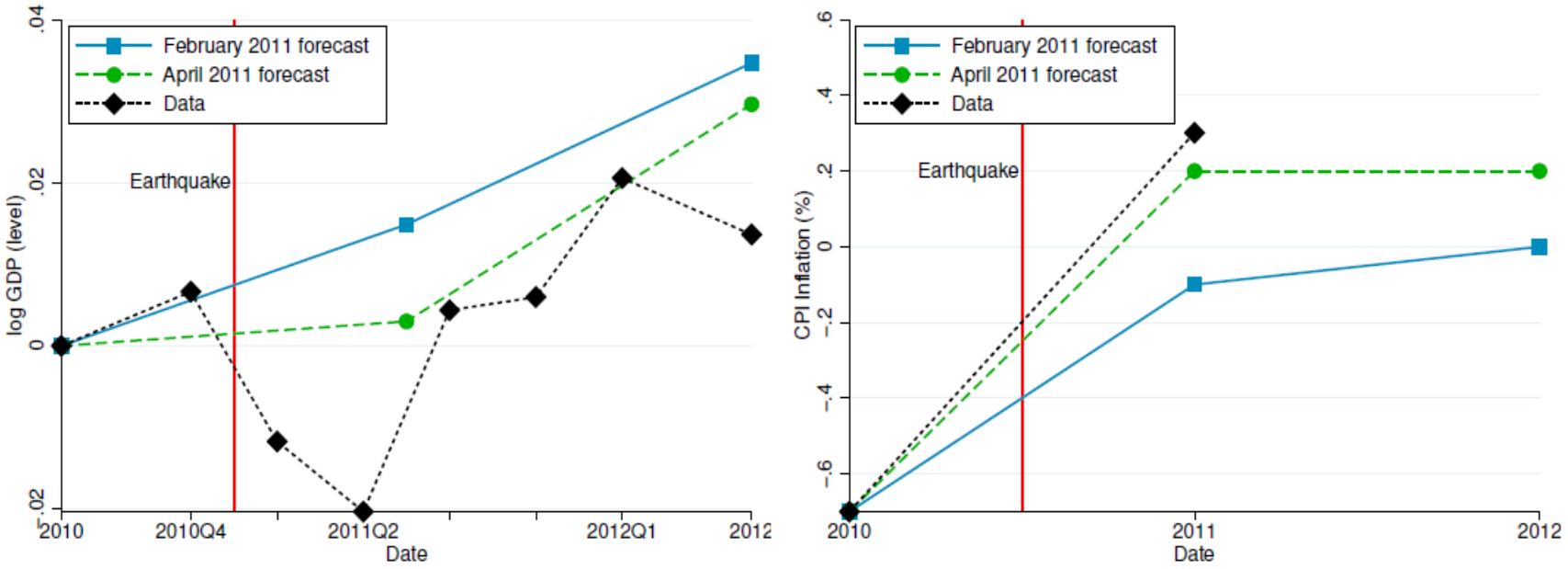


Figure 4 – Consensus Economics forecasts from before the Great East Japan Earthquake (February 2011) and after (April 2011). Forecasts are for annual GDP and year-on-year inflation. GDP data are annual for 2010 and 2012 and quarterly from 2010Q4 until 2012Q1. CPI data are annual year-on-year inflation. Red vertical lines indicate the earthquake date, March 11, 2011.

From: Wieland, "Are Negative Supply Shocks Expansionary at the Zero Lower Bound?"

What Do We Learn from:

- The behavior of forecasts of inflation?
- The behavior of forecasts of real GDP?
- The actual behavior of output and inflation?

Test #2: Adverse Oil Supply Shocks

1. Adding oil price shocks to the baseline new Keynesian model.

2. Identifying oil supply shocks.

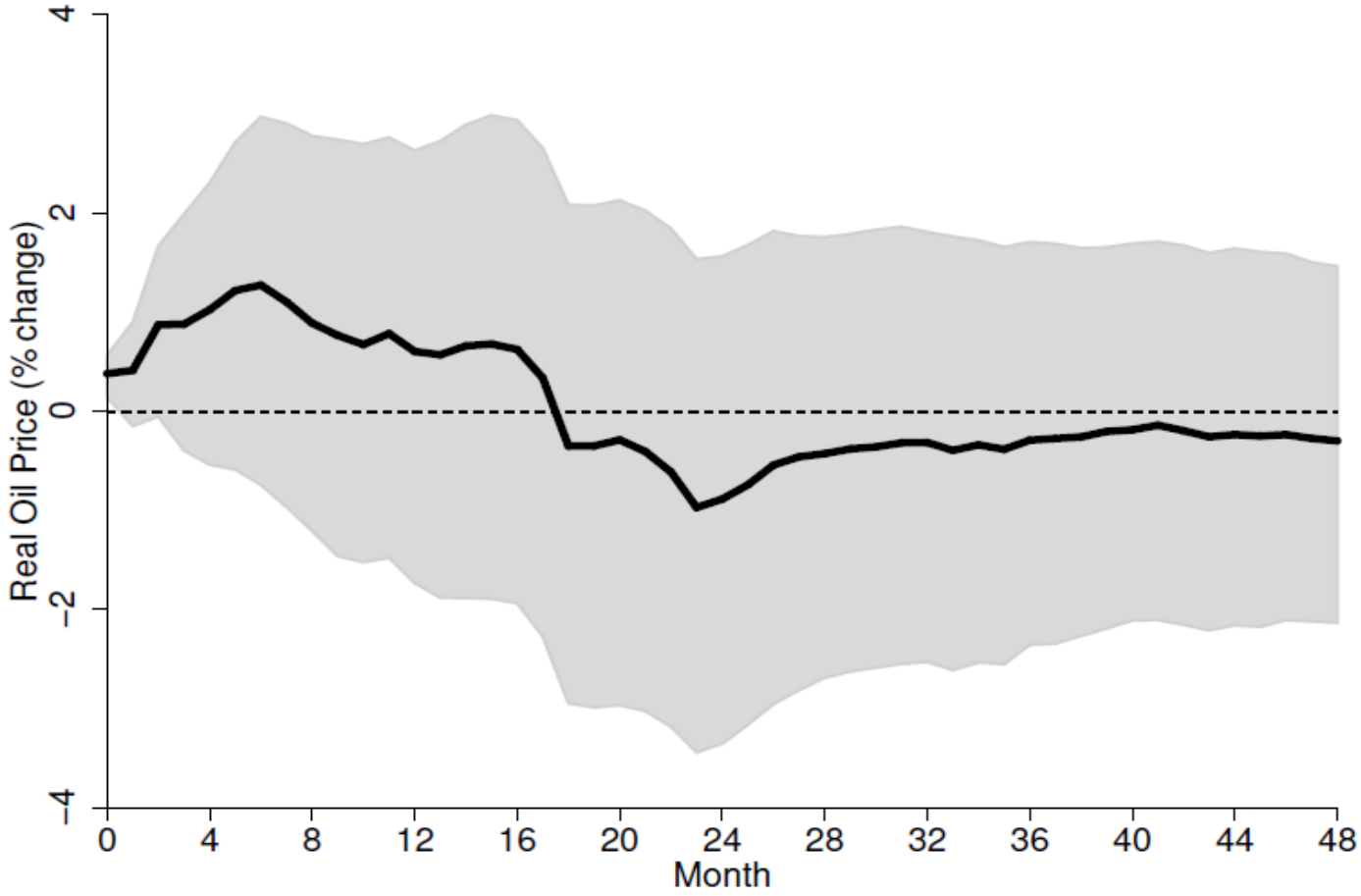
3. How oil prices and expected inflation behave following a shock.

4. Results.

Step 2: Identifying Oil Supply Shocks

- A VAR with a timing assumption: “I assume that oil production responds to other structural shocks (e.g., demand shocks) with at least a one-month delay.”

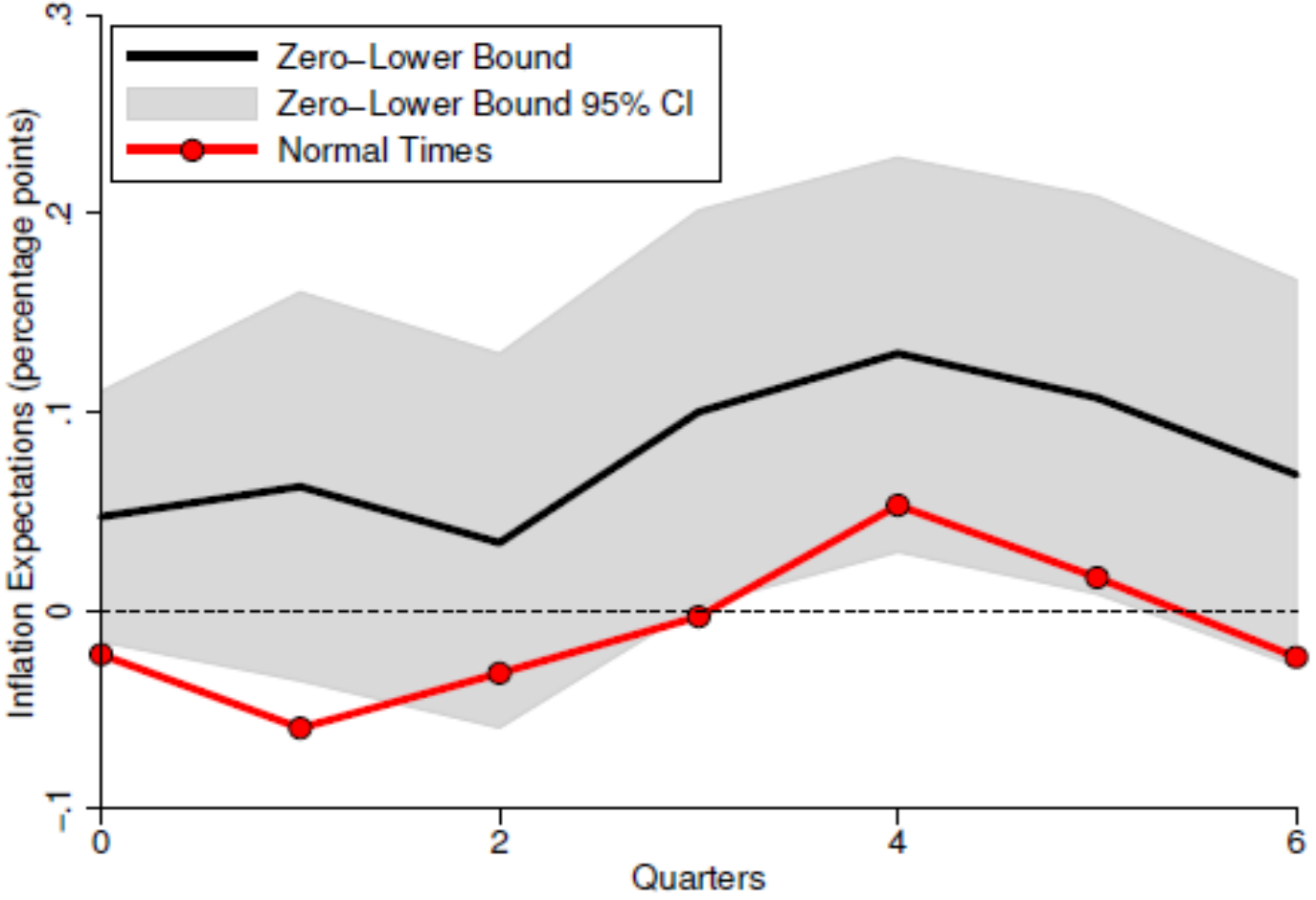
Step 3: How Oil Prices Behave Following a Shock



(b) Impulse response of real oil prices to a negative oil supply shock.

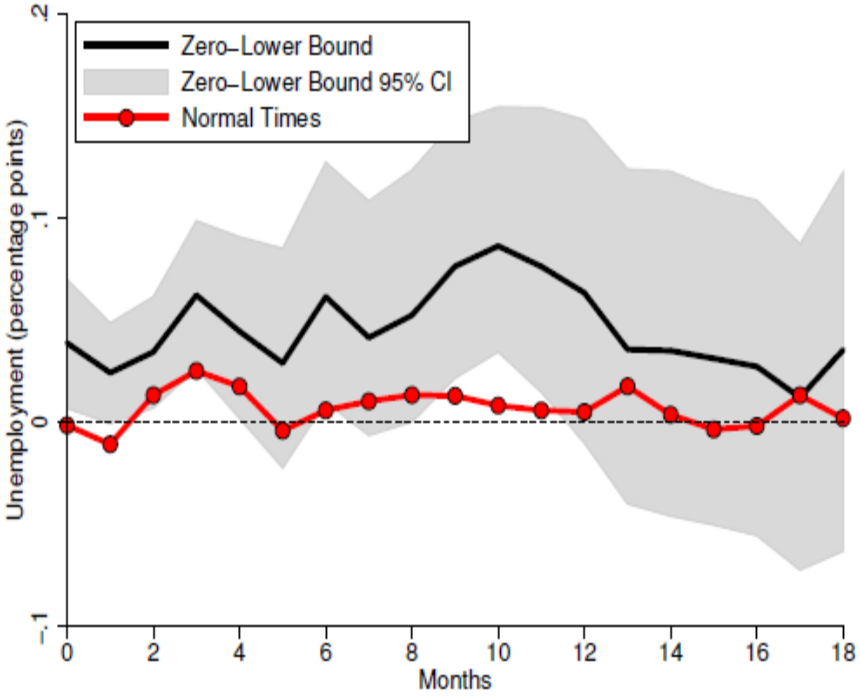
From: Wieland, "Are Negative Supply Shocks Expansionary at the Zero Lower Bound?"

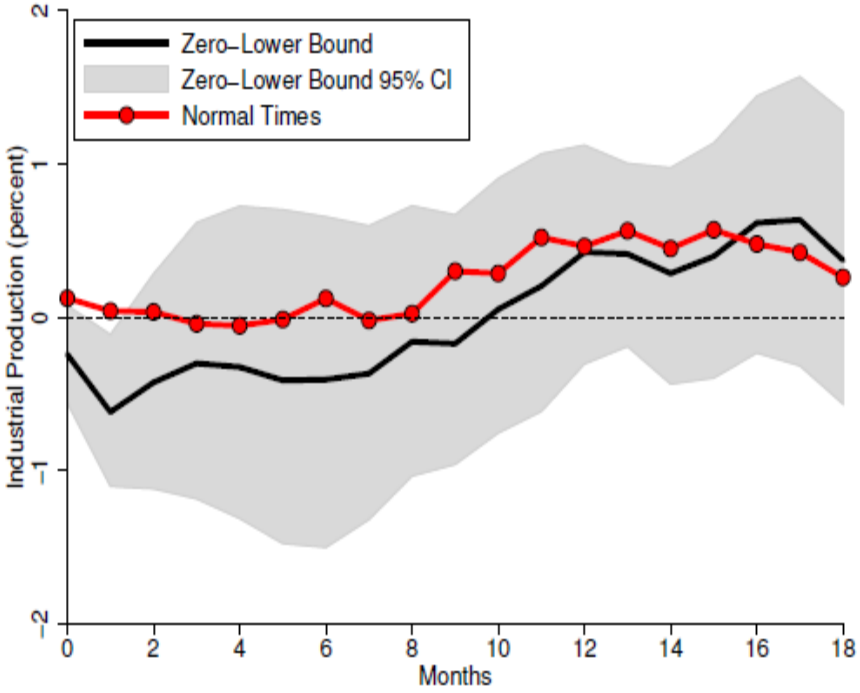
Step 3: How π^e Behaves Following a Shock



From: Wieland, "Are Negative Supply Shocks Expansionary at the Zero Lower Bound?"

Step 4: Results





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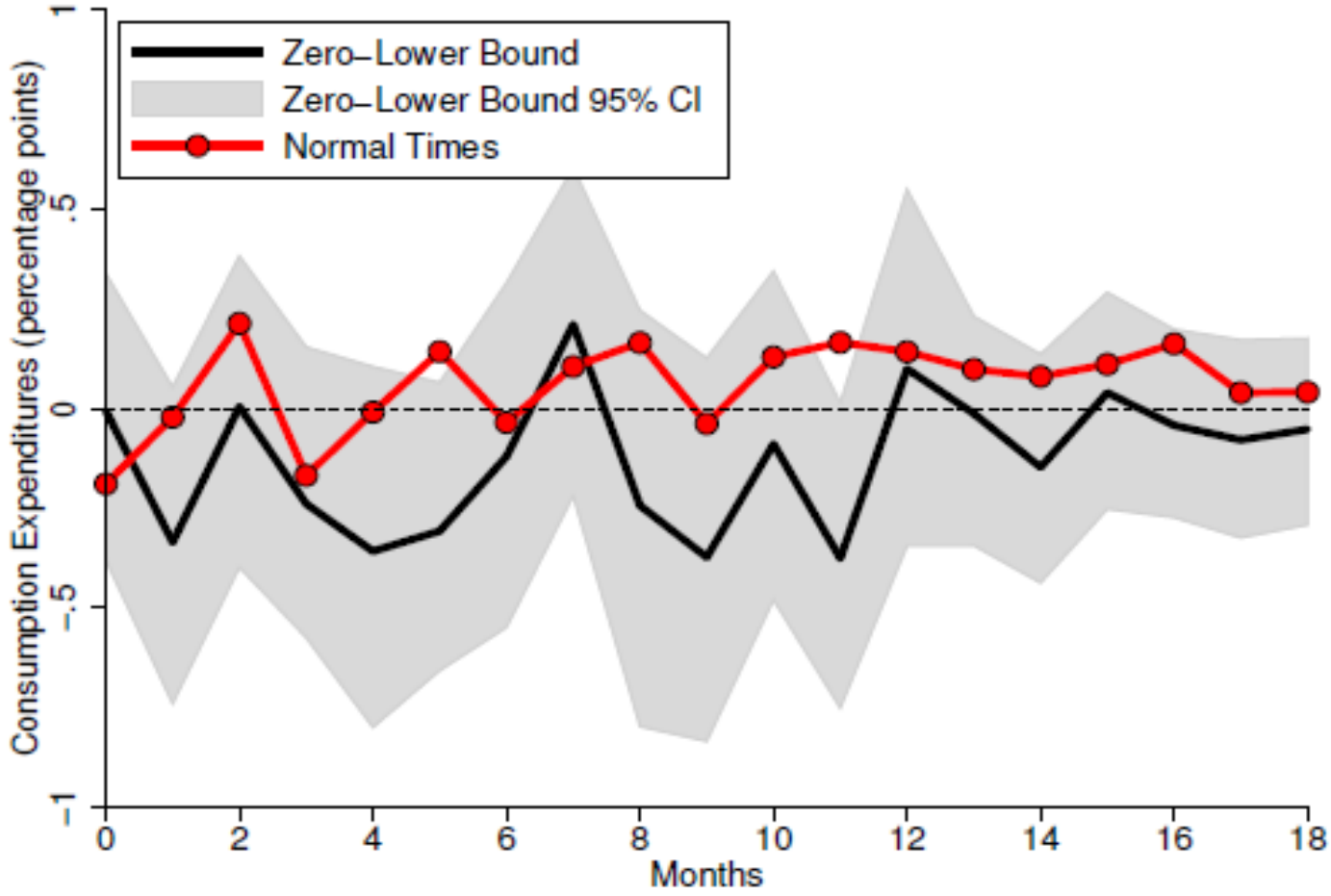
Step 4: Results



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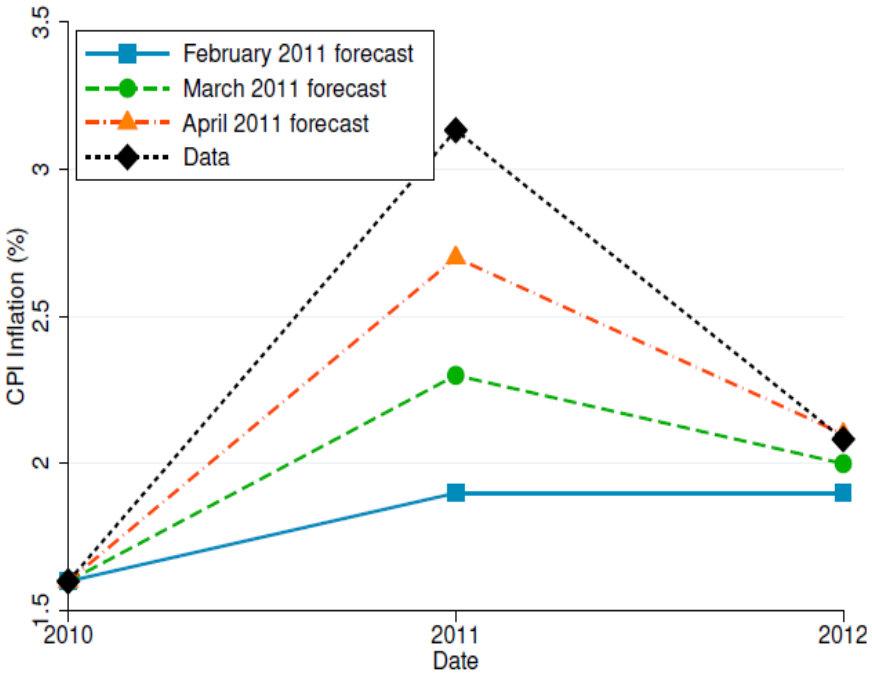
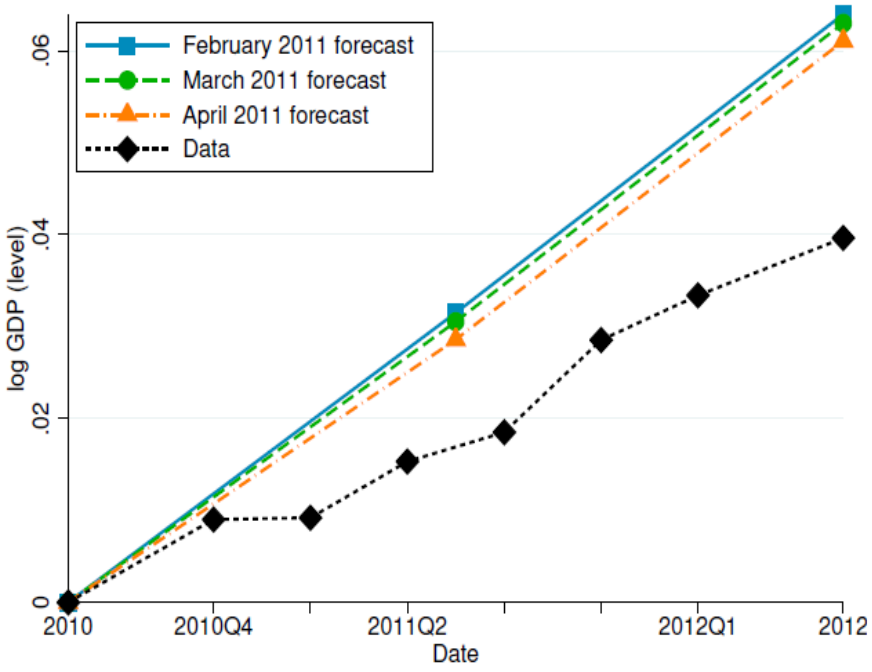
Extra Test: The Libyan Civil War and the U.S.



(b) U.S.: CPI



(a) U.S.: GDP

Figure 8 – Consensus Economics forecasts from before the Libyan uprising (February 14^{th}, 2011) and after (March 14^{th}, 2011, and April 4^{th}, 2011). Forecasts are for annual GDP and year-on-year inflation. GDP data is annual for 2010 and 2012 and quarterly from 2010Q4 until 2012Q1.

From: Wieland, "Are Negative Supply Shocks Expansionary at the Zero Lower Bound?"

Discussion

Interpretation

- Is he presenting evidence against a narrow or a broad class of models?
- Hard to know!
- Example: Fiscal policy.
    - Wieland argues that, “In the standard new Keynesian model testing for expansionary negative supply shocks is the same as testing for a large fiscal multiplier.”
    - But this doesn’t rule out large fiscal multipliers at the zero lower bound through a traditional Keynesian multiplier.

Other Possible Models

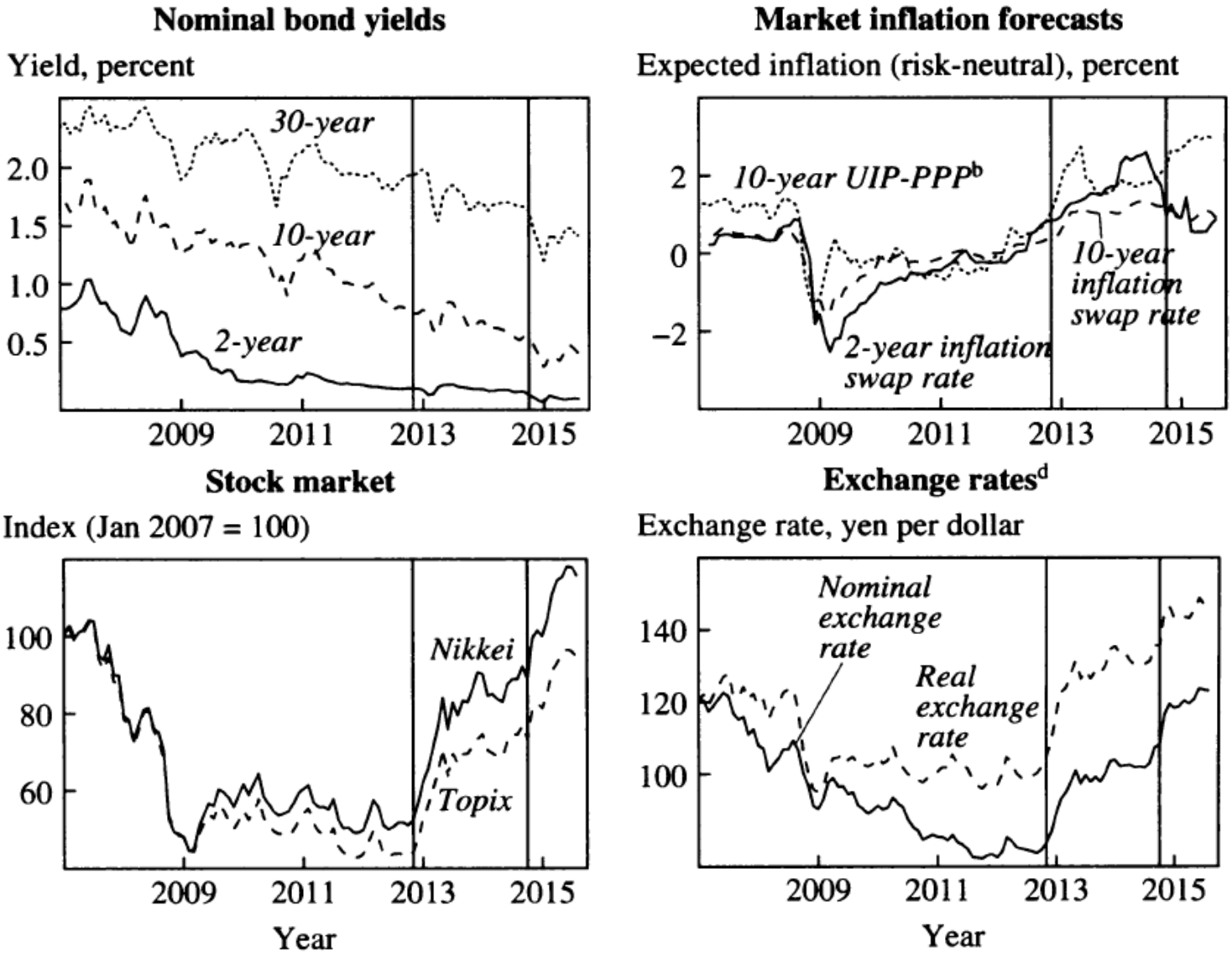
- Old Keynesian models?
- Models with credit constraints.
- Replacing the new Keynesian Philips curve with a sticky information Phillips curve.
- Other paths in the standard new Keynesian model.
- …?

V. A Little on Abenomics

Overview

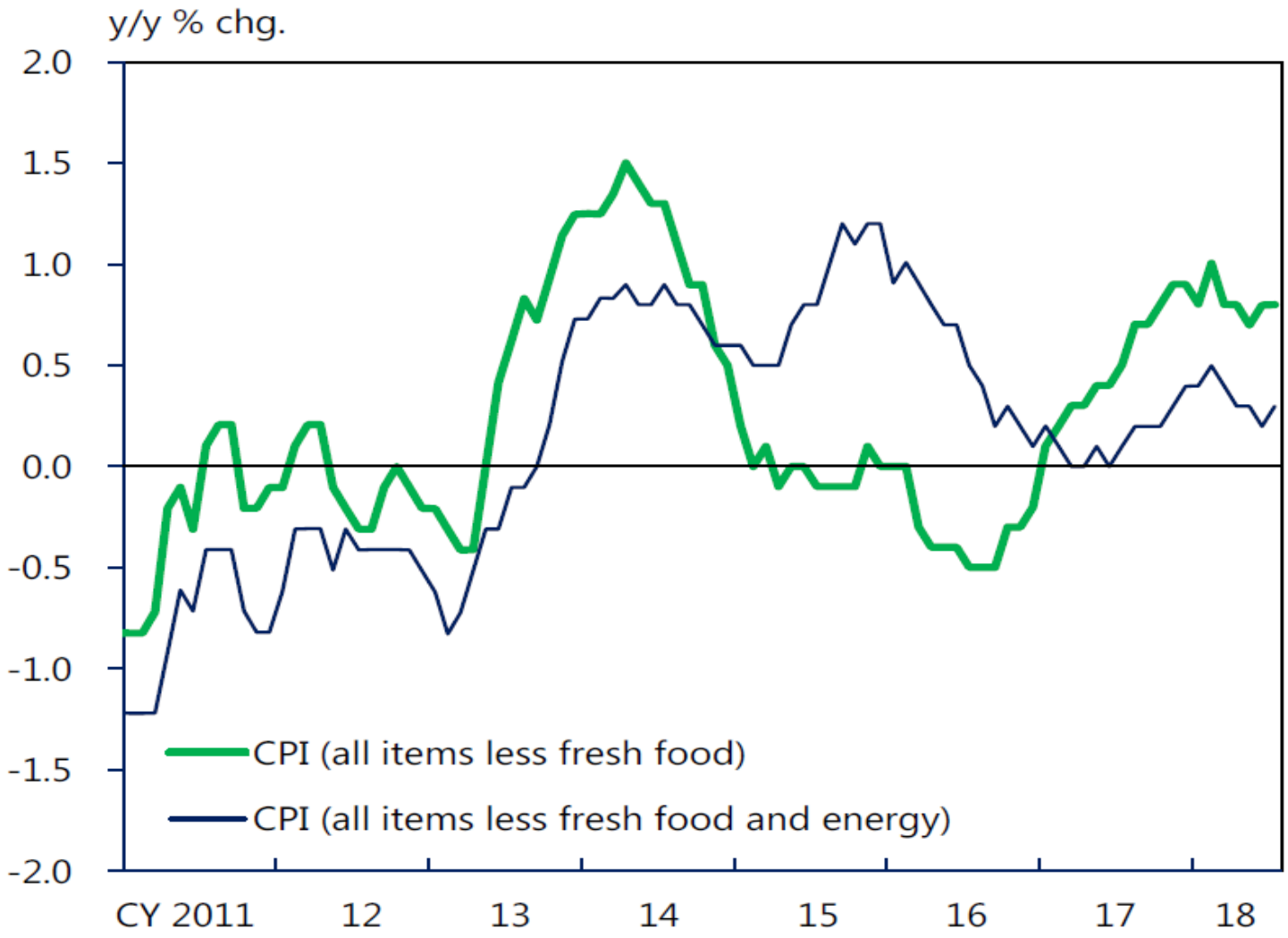
- Shinzō Abe became Prime Minister in December 2012.
- Initial measures:
  - Change in leadership at Bank of Japan.
  - Change in inflation target (from 1% to 2%).
  - Doubling of monetary base, massive QE.
  - Deliberate depreciation of the yen.
- Many subsequent measures.

Financial Market Variables



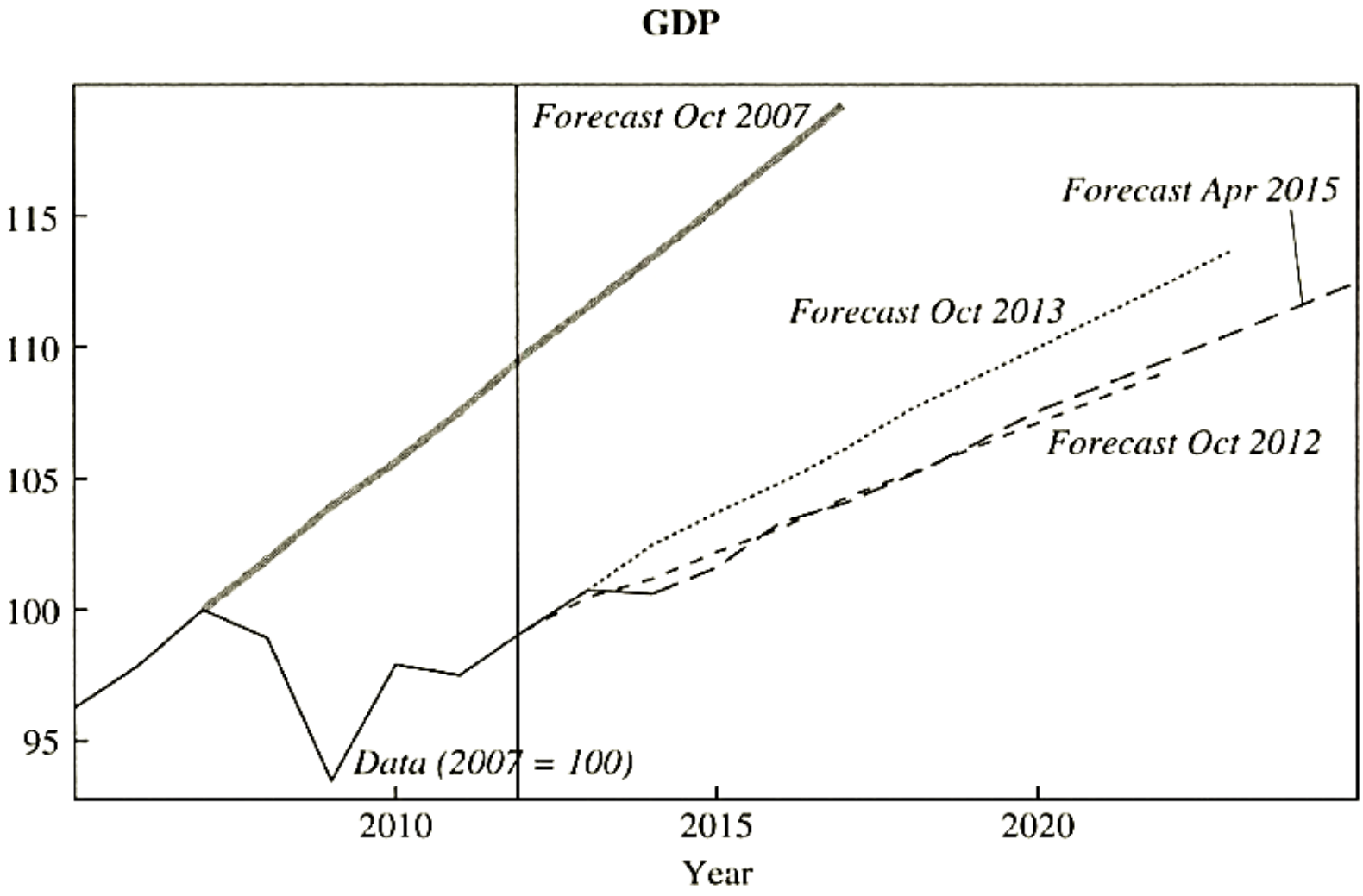
Source: Hausman and Wieland, “Overcoming the Lost Decades?”

Inflation



Source: Bank of Japan.

GDP Forecasts



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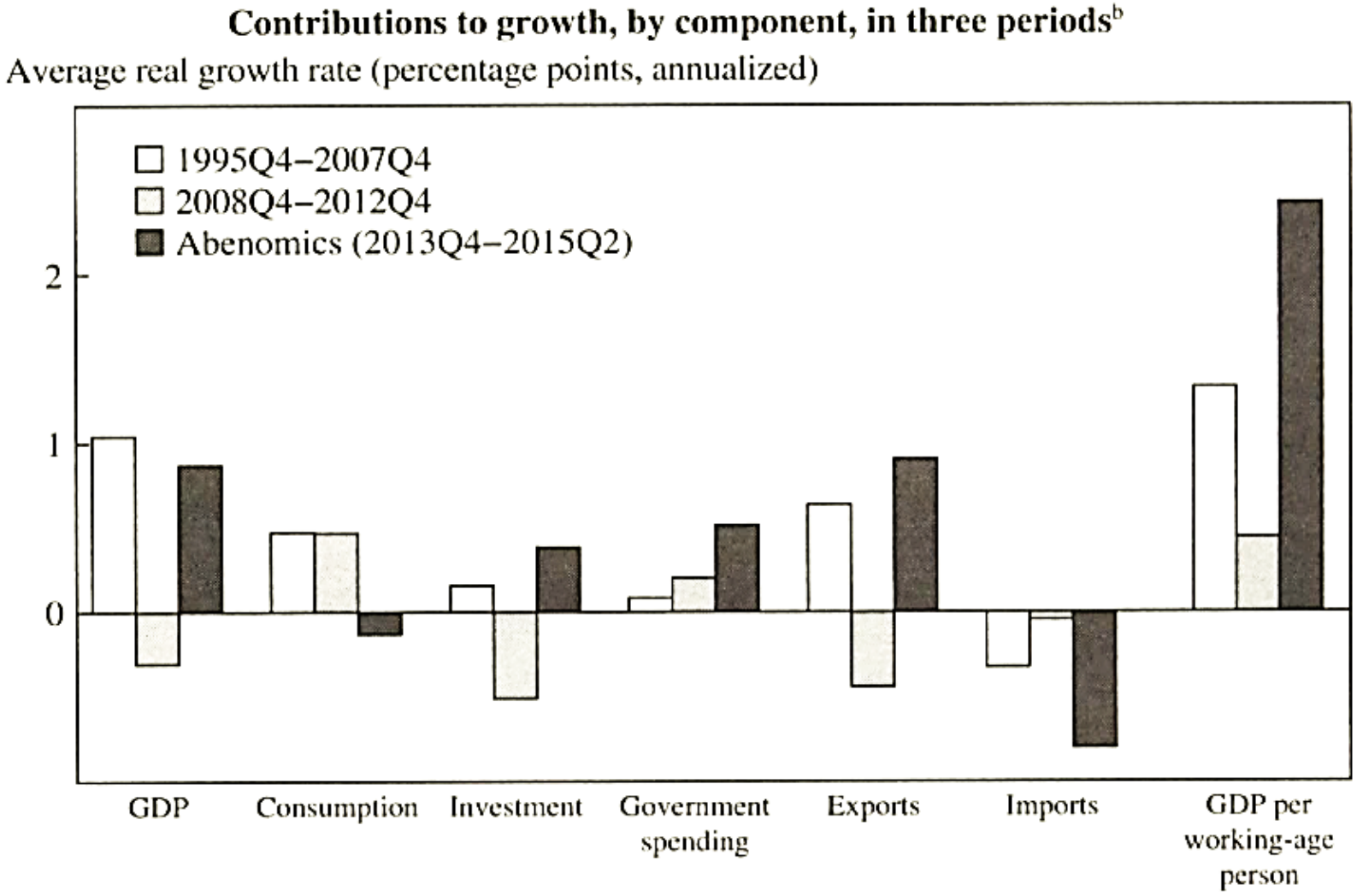
GDP



Source: Hausman and Wieland, “Overcoming the Lost Decades?”

Why Hasn't Inflation Risen to 2%?

- Lack of credibility?
- A "timidity trap"? (Krugman)
- Other?