Anticipations in Macro:

The Importance of Salience, Comprehensibility, and Actionability

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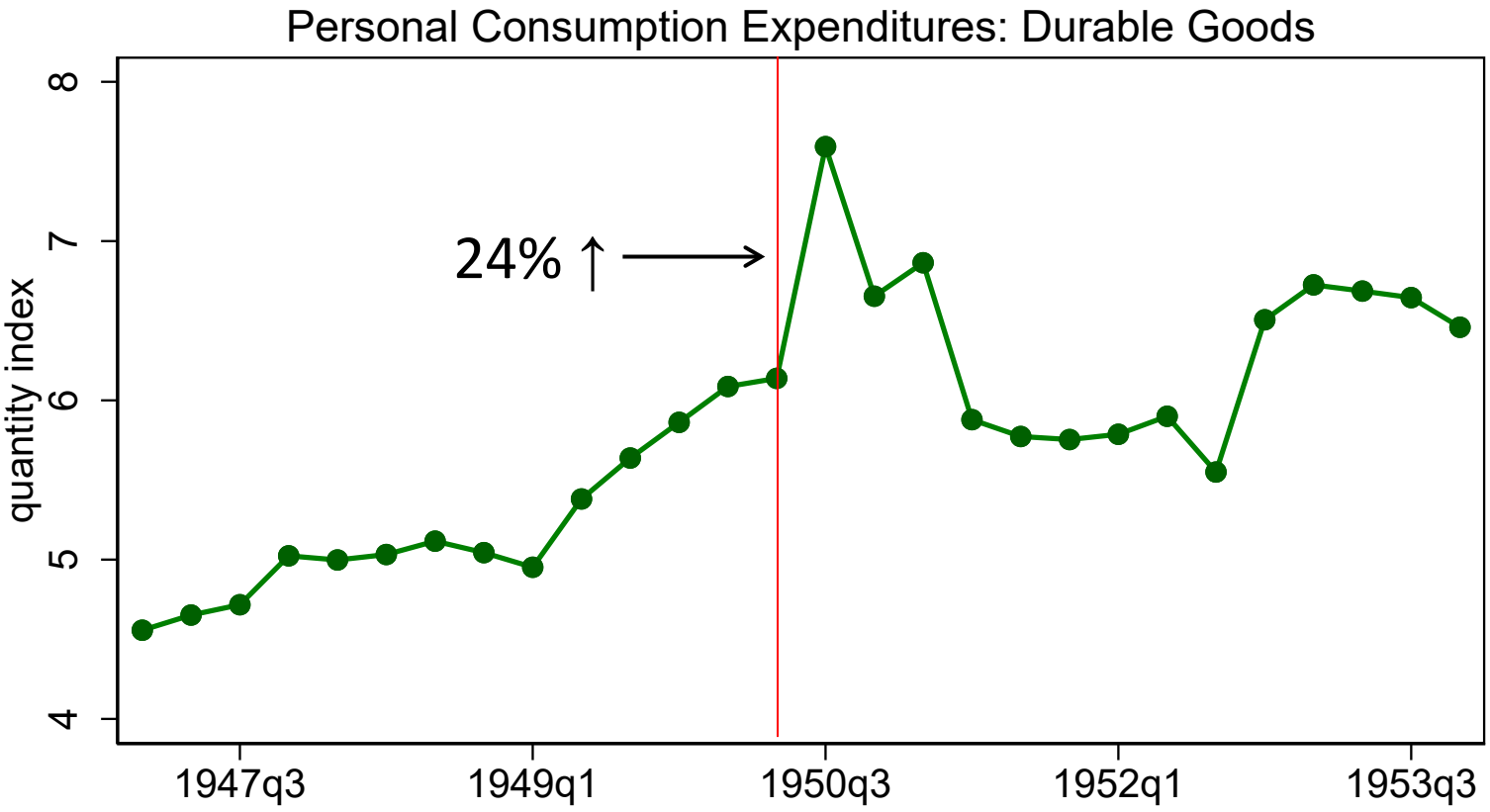
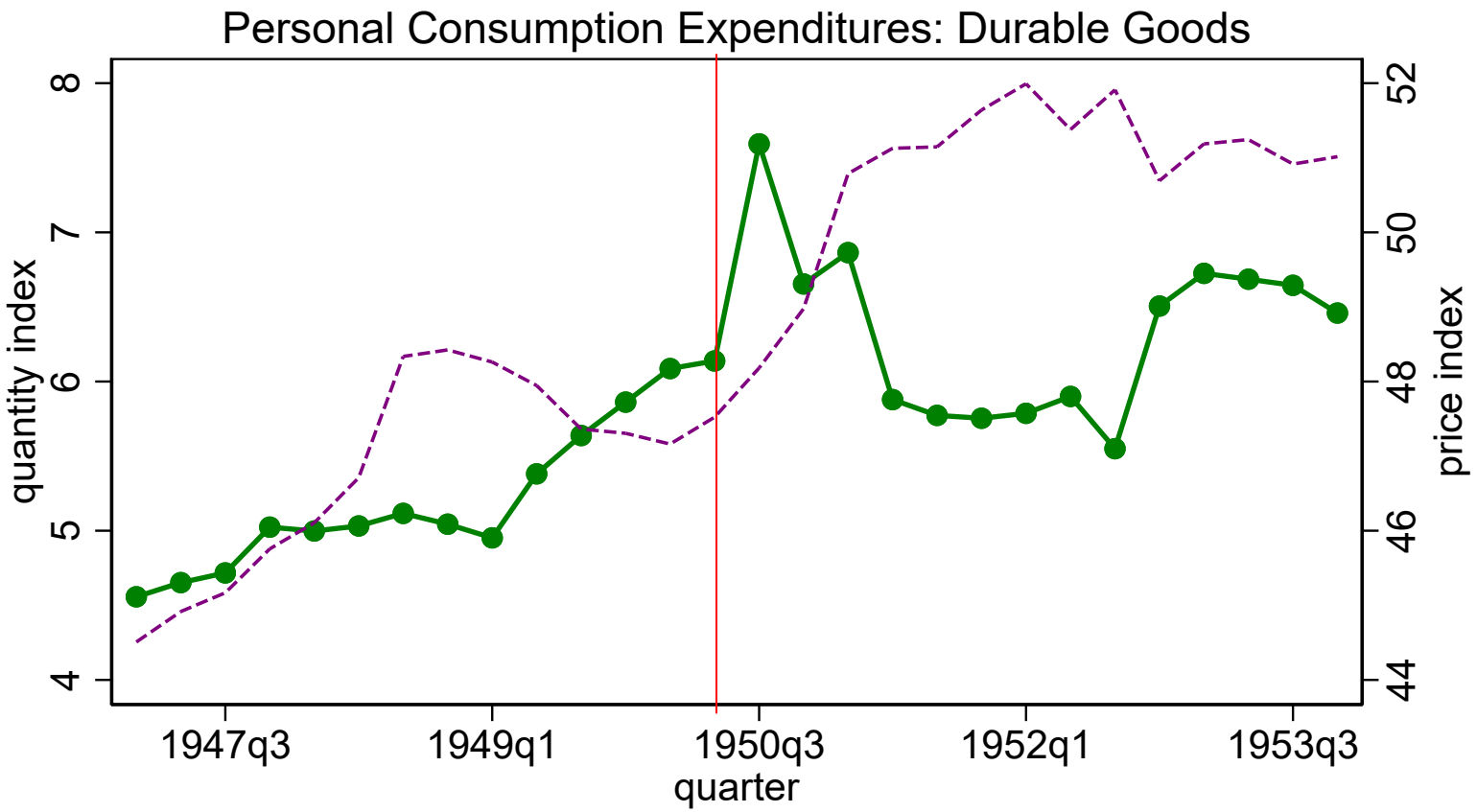
RIDGE Forum on International Macro

The strange behavior of U.S. consumer expenditures in 1950



Relevant information: In June 25, 1950, North Korea invaded South Korea; five days later the U.S. committed it forces.

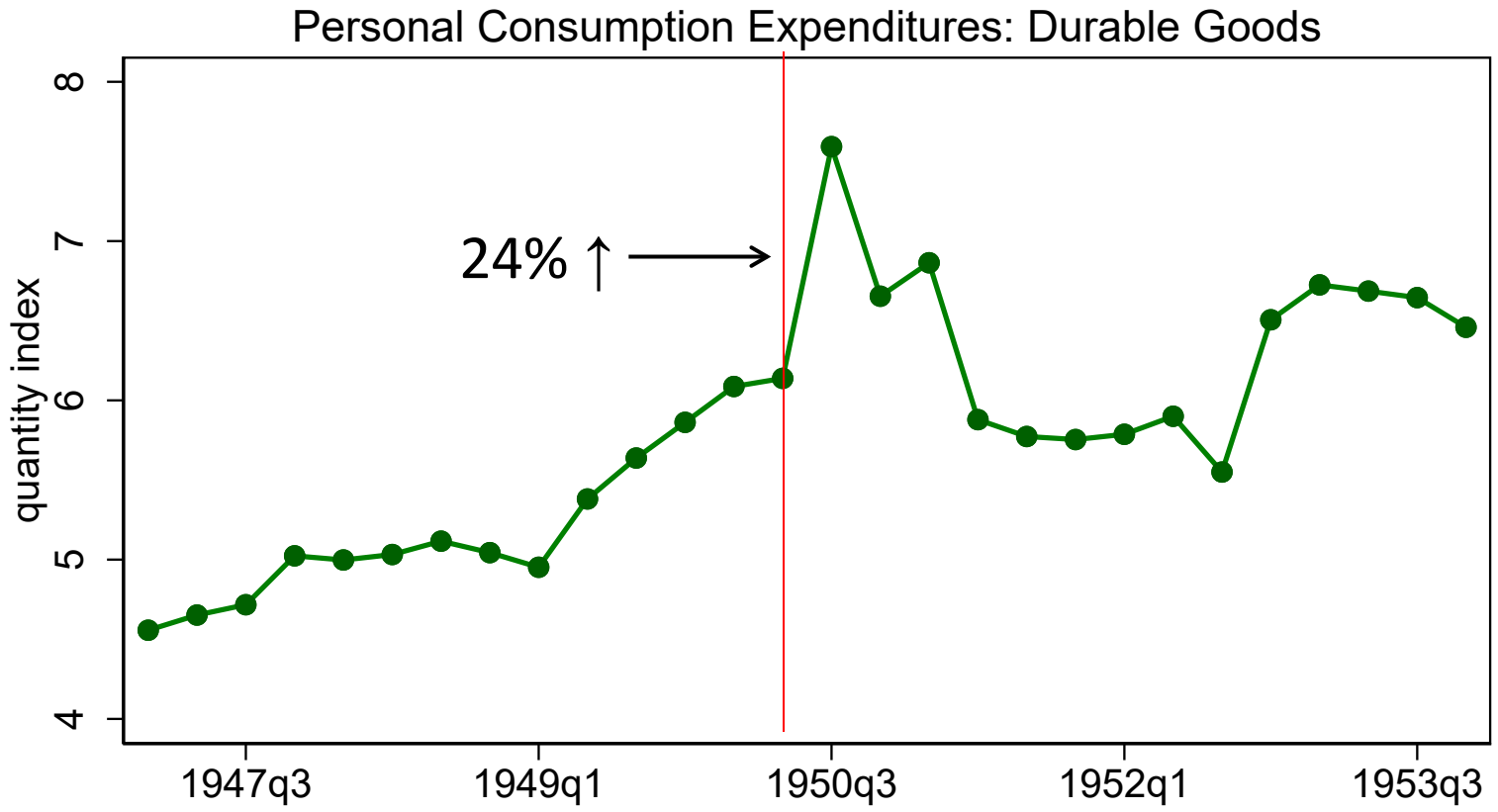
Why did durable goods purchases jump so much?



Behavior of prices can't explain it.

↑ price in 1950 was no greater than in 1948, but we didn't see a jump in expenditures in 1948.

Why did durable goods purchases jump so much?



Answer: WWII rationing had ended just 5 years earlier and most people were anticipating that price controls and rationing would return.

What this example illustrates

- Consumers can respond quickly and strongly based on their anticipation of future events.

- The response was immediate and strong in this case because:

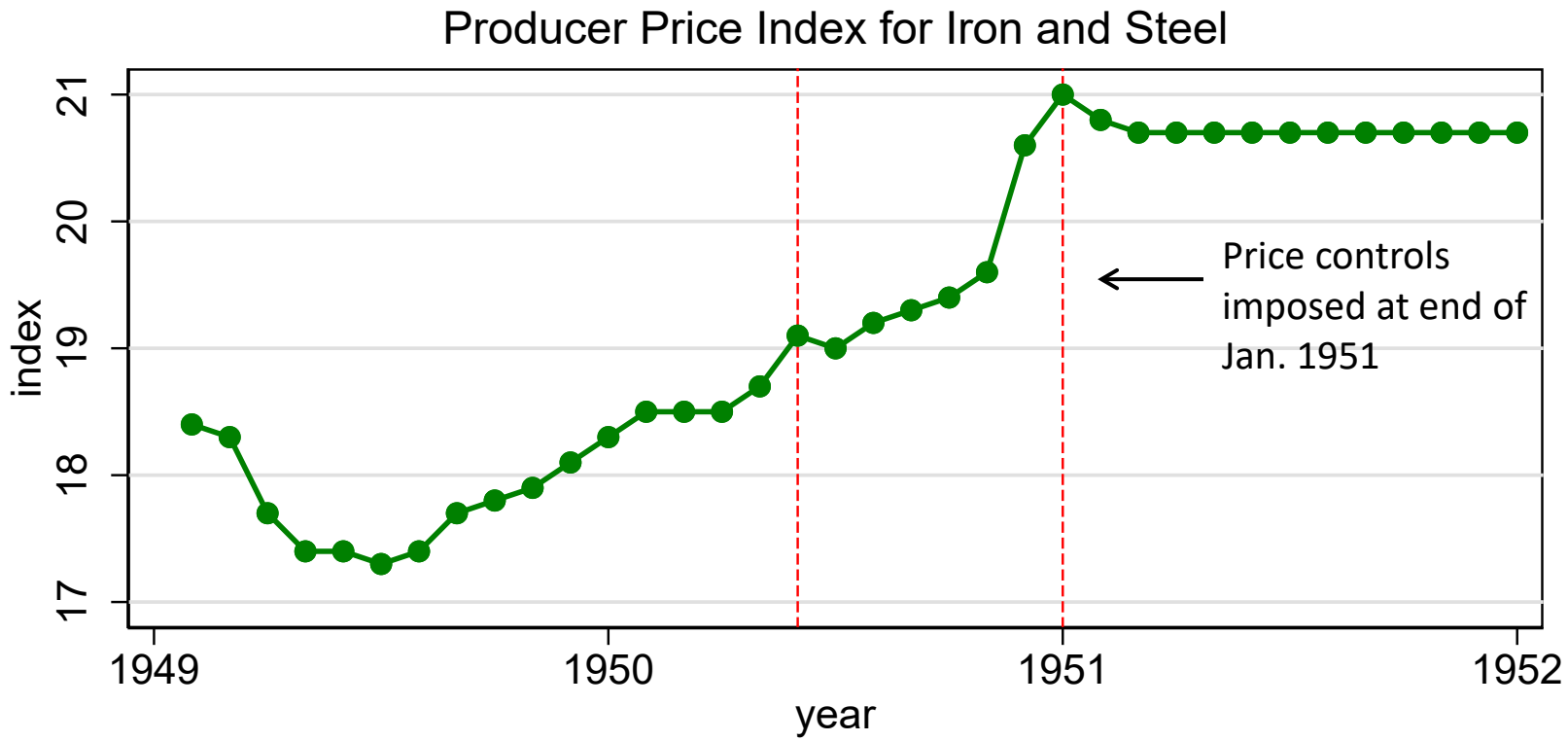
  - The event was **salient**.
  - The causal chain was **comprehensible**.
  - The event was **actionable**, i.e. there was an action that consumers could take that would benefit or protect them.

- Consumers had experienced WWII just five years earlier so they comprehended the "model" and could make a "best response":

  Model: war production competes with consumer goods → shortages if price controls imposed.

  Best response: buy now while you can!

Firms also responded: ↑ price before controls are imposed



- 9/8/50: Authority granted to president to impose wage and price controls.
- By Oct. 1950, inflation was abating.
- But China's entry into the war on Oct. 19, 1950 changed things.
- Firms started ↑ prices because they thought controls were imminent.
- Price & wage controls were imposed at the end of January 1951.

Outline of my talk

1. **News shocks and anticipations as drivers of fluctuations.**

   - Examples of news that can matter for macro
   - The challenge of anticipation for identification in estimation
   - Case studies of 3 well-identified news shocks

     oil discoveries, military news, tax news

2. **The problem for monetary policy**

   In most instances, inflation is not salient, comprehensible, or actionable.

Note: for the purpose of this talk, I will use anticipation, foresight, and expectations interchangeably.

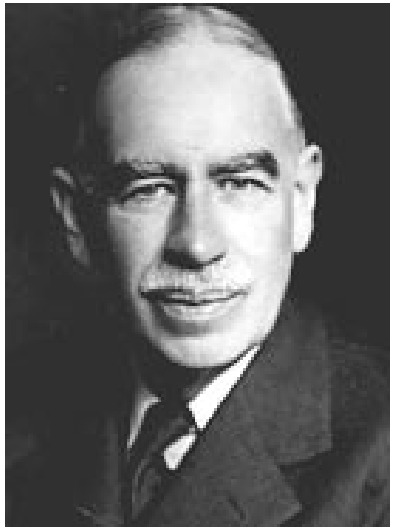
1. News Shocks as Drivers of Fluctuations

Do anticipations about the future lead to macroeconomic fluctuations?

- Pigou (1927) and Keynes (1936): Anticipation effects may be important drivers of business cycles.

Psychological causes!

Animal spirits!



Examples of news that can drive macro fluctuations

- News shocks about future TFP

  Cochrane (1994), Beaudry-Portier (2004, 2006), Jaimovich-Rebelo (2009)

- Changing expectations about future growth can lead to current account fluctuations.

  Obstfeld-Rogoff (1995)

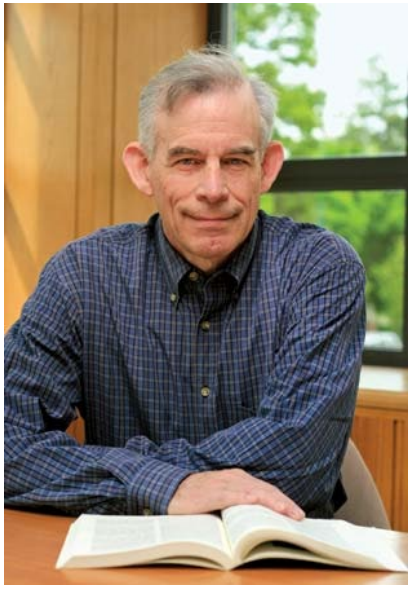
- Expected changes in government spending or taxes – Leeper et al., Mertens-Ravn, House-Shapiro, Ramey et al.

- Expected inflation and forward guidance – New Keynesian models

Challenges of anticipations for econometrics

From Sims (1980) "Macroeconomics and Reality":

"It used to be that when expected future values of a variable were thought to be important in a behavioral equation, they were replaced by a distributed lag on that same variable. Whatever else may be said for or against it, this practice had the advantage of producing uncomplicated effects on identification."



"It is my view, however, that rational expectations is more deeply subversive of identification than has yet been recognized."

How to deal with anticipation econometrically

- Leeper, Walker, and Yang (2013) work out the econometrics of "fiscal foresight" for taxes, showing that foresight can lead to a non-fundamental moving average representation.

- Ways to address the issue econometrically:

  - Collect data to construct anticipation series, e.g. narrative military news, tax news implicit in municipal bonds, futures prices, etc.

  - Estimate structural DSGE models that allow for news (e.g. Schmidt-Grohe and Uribe).

But measuring news shocks can be challenging

Examples of identified news that I will discuss:

- News about oil discoveries

  Arezki, Ramey, Sheng (2017) "News Shocks in Open Economies: Evidence from Giant Oil Discoveries"

- News about future government spending – military events, infrastructure

  Ramey-Shapiro (1998), Ramey (2011), Owyang-Ramey-Zubairy (2013), Ramey-Zubairy (2018), Ramey (2021)

- News about future tax changes

  Leeper, Walker, Yang (2013), Mertens-Ravn (2012), D'Acunto et al. (2018), Bachmann et al. (2021)

Case study from

"News Shocks in Open Economies:
Evidence from Giant Oil Discoveries"

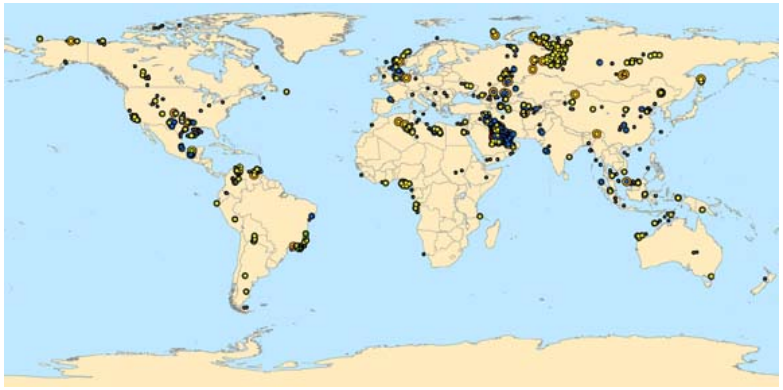
Arezki, Ramey, Sheng (2017)

Uses data on an observable news shock – giant oil discoveries - to analyze the effects of news on macroeconomic variables.

(Actually, it is both oil and gas discoveries, but will use oil for short.)

Why giant oil discoveries?

1. There are many - 371 discoveries from 1970 to 2012.



2. They are big.

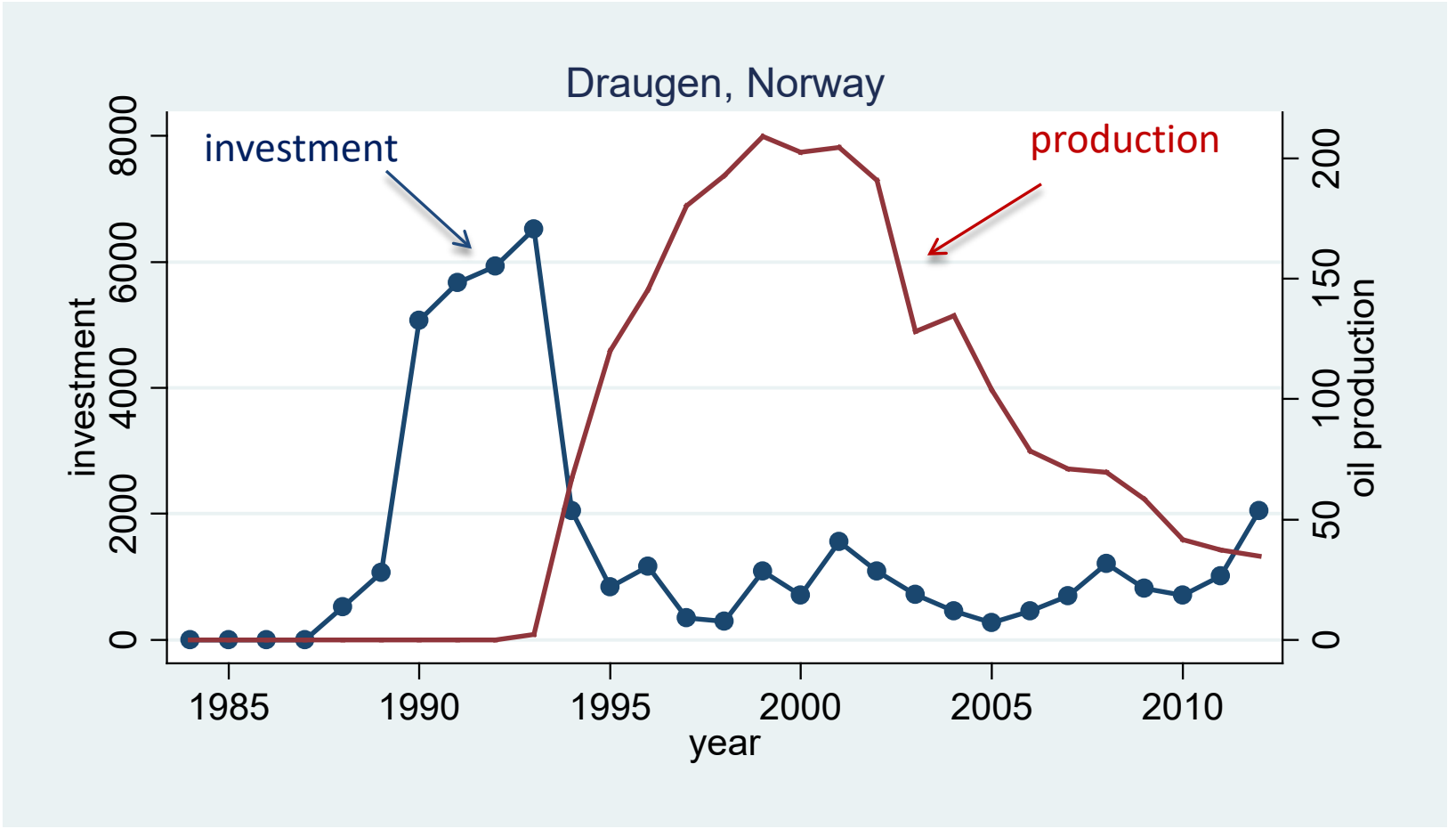
   Median estimated NPV of the future flow of output is 9% of initial GDP.

   This means that they are *salient*.

Ekofisk in Norway.

3. There is a 4 to 6 year lag between discovery and first oil production.

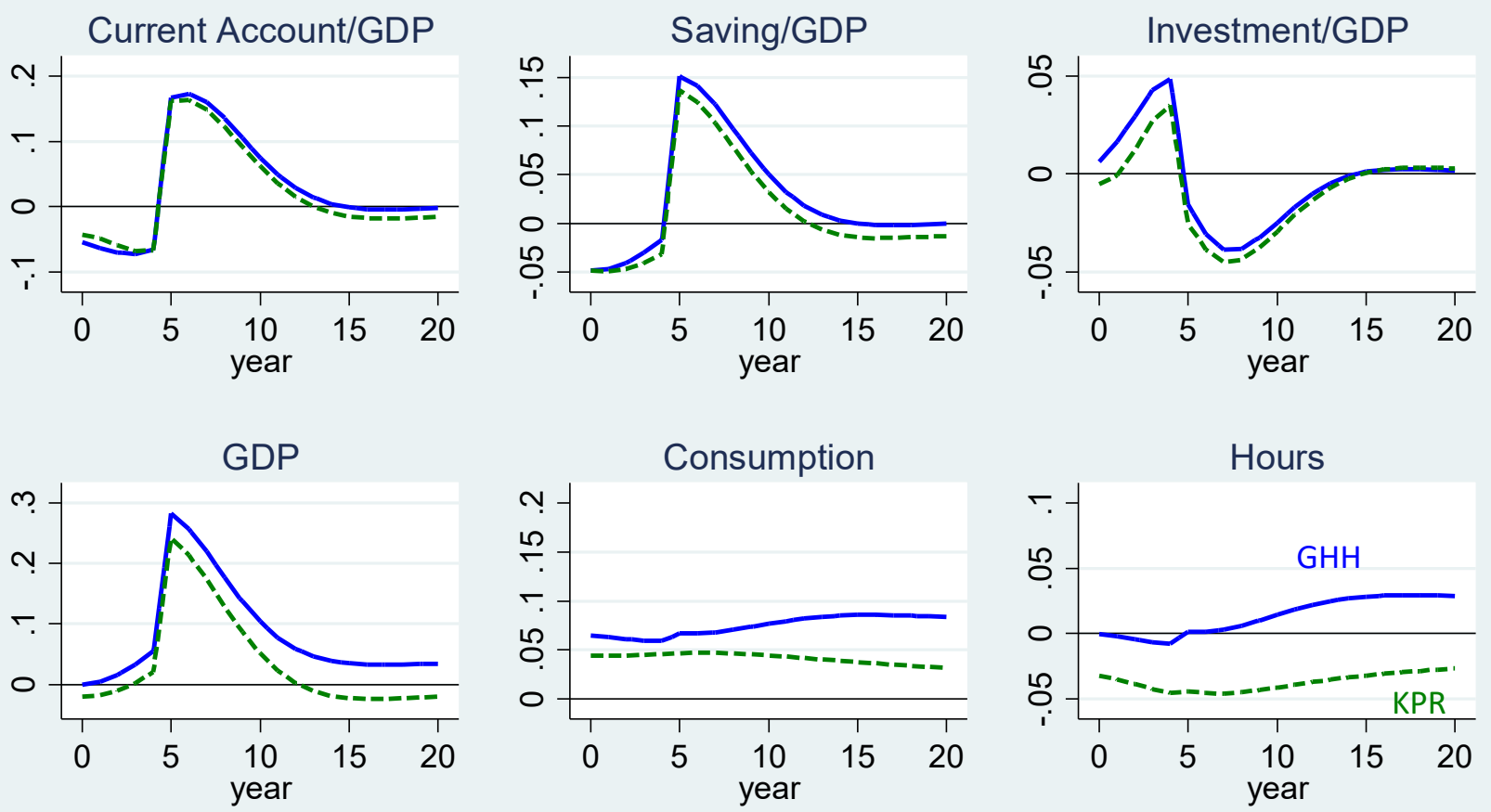
Typical Oilfield Investment and Production Pattern



Arezki, Ramey, Sheng Model

- **Jaimovich-Rebelo Open Economy Model features**
  - JR preferences – shuts down most of the wealth effect on labor supply.
  - Investment adjustment costs
  - Labor adjustment costs
  - Rational expectations, i.e., salience, comprehensibility, and actionability
- **Our extensions**
  - Two-sector model
  - News is about oil sector, with 5-year lag
  - Oil sector has higher capital share, lower labor share

Oil News Shock: Model Predictions



Baseline Model, 5-year lag of news

How well does the theory explain the data? Econometric Specification

Dynamic panel: i = country, t = year

$$y_{it} = A(L)y_{it} + B(L)Disc_{it} + \alpha_i + \alpha_t + \gamma_1' Z_{it} + \epsilon_{it}$$

Variable of interest

Lags

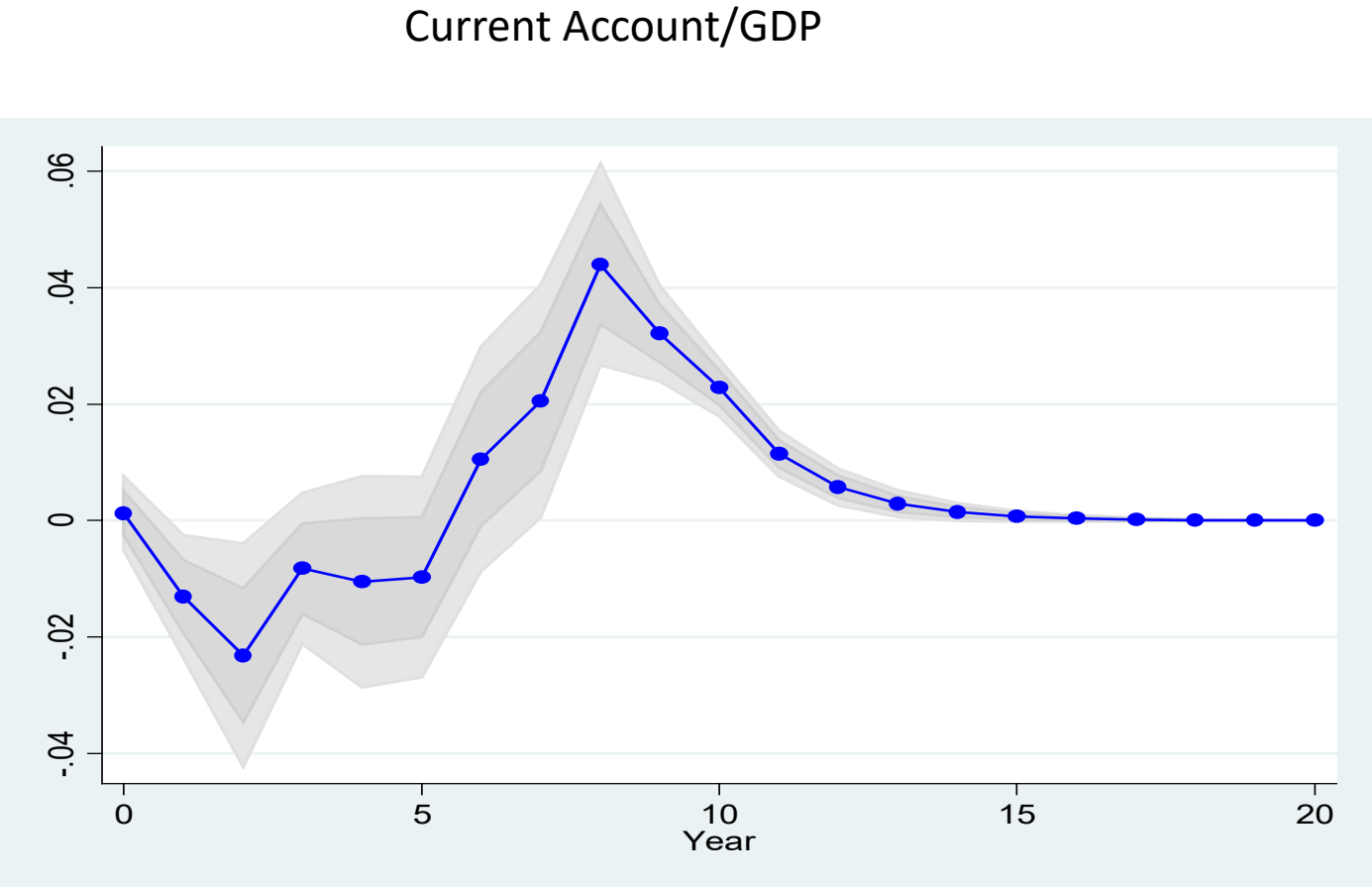
Current and lagged values of oil discovery news

Country and year fixed effects

Other control variables

Error term

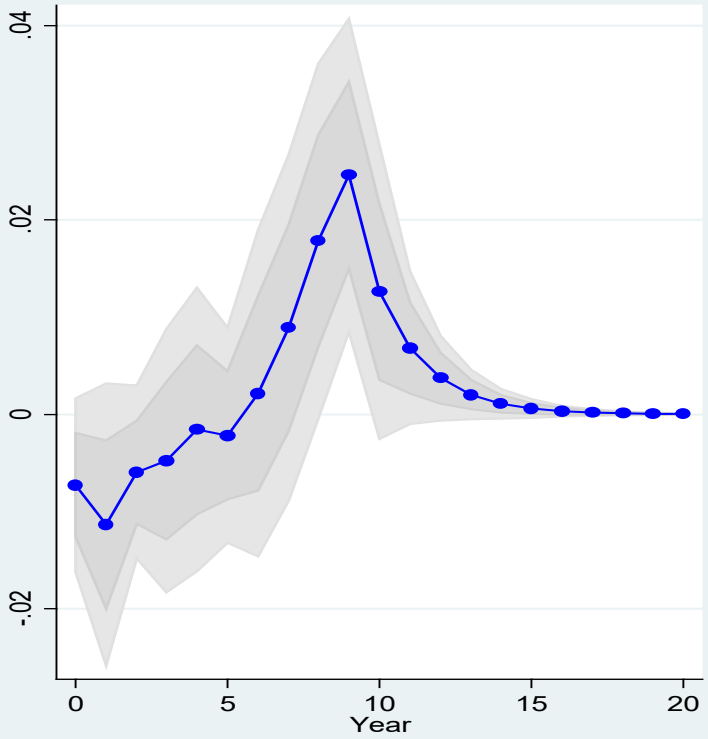
Empirical Results: Current Account (% of GDP)



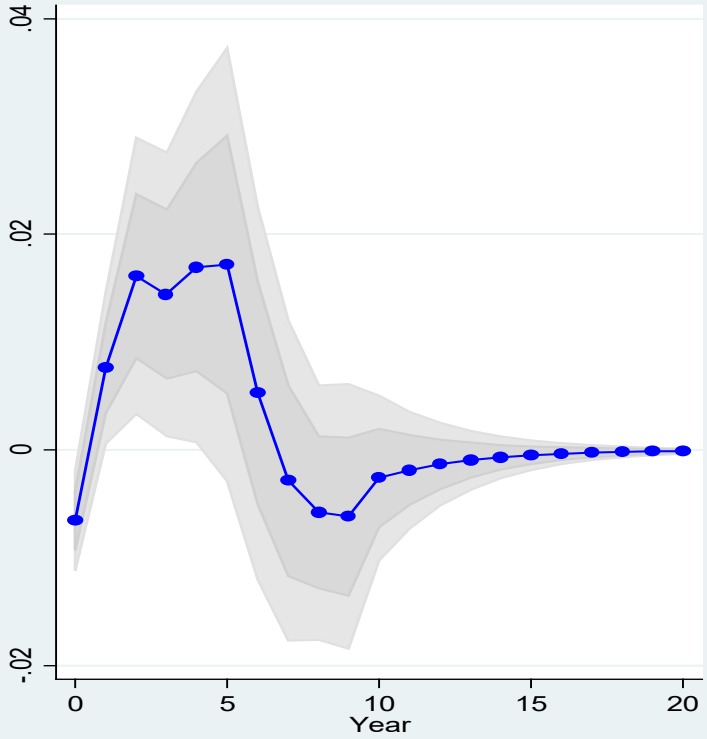
Percentage response to oil discovery news. Shaded areas are 68% and 90% confidence intervals.

Empirical Results: Saving and Investment (% of GDP)

Saving/GDP

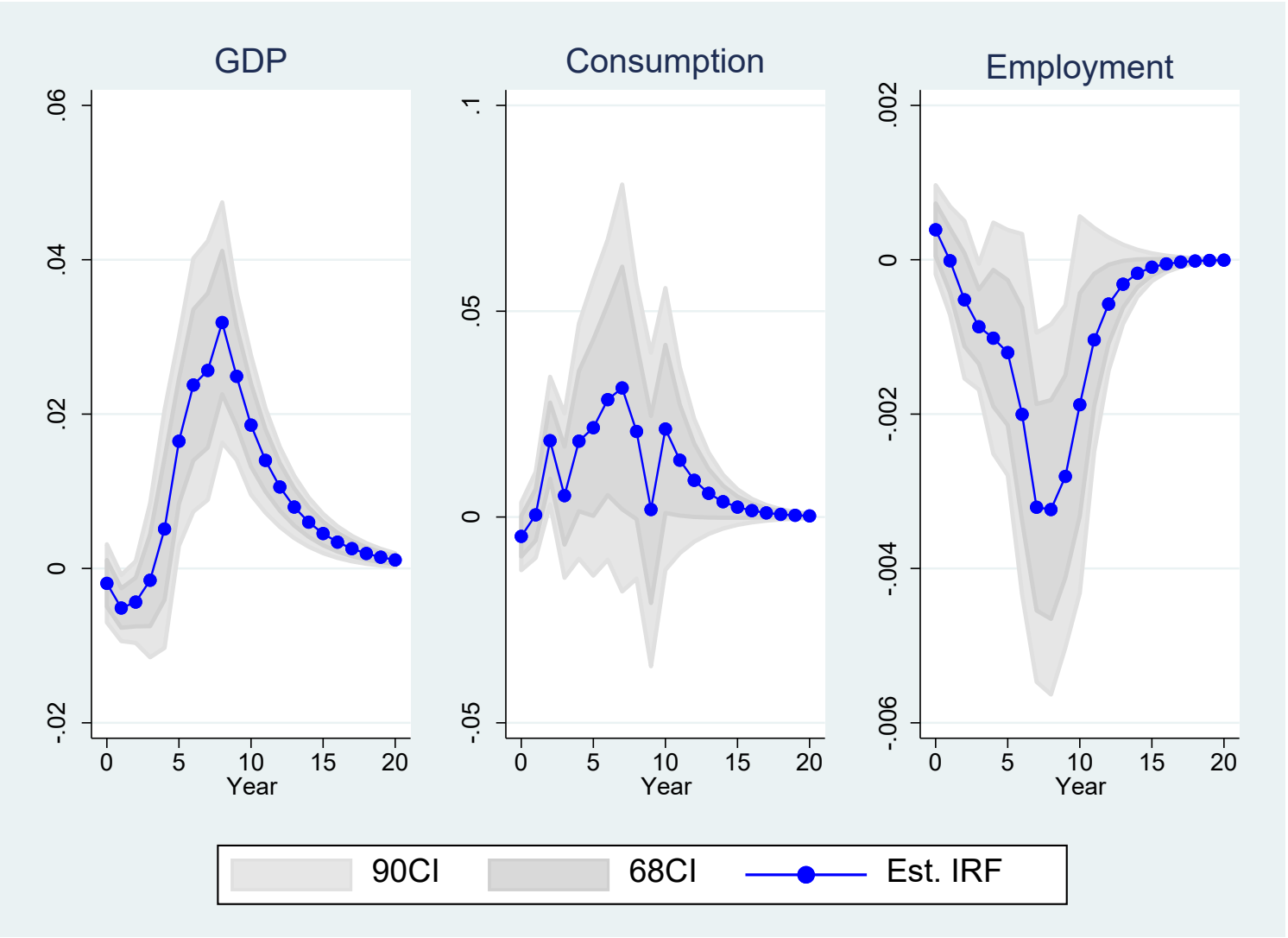


Investment/GDP

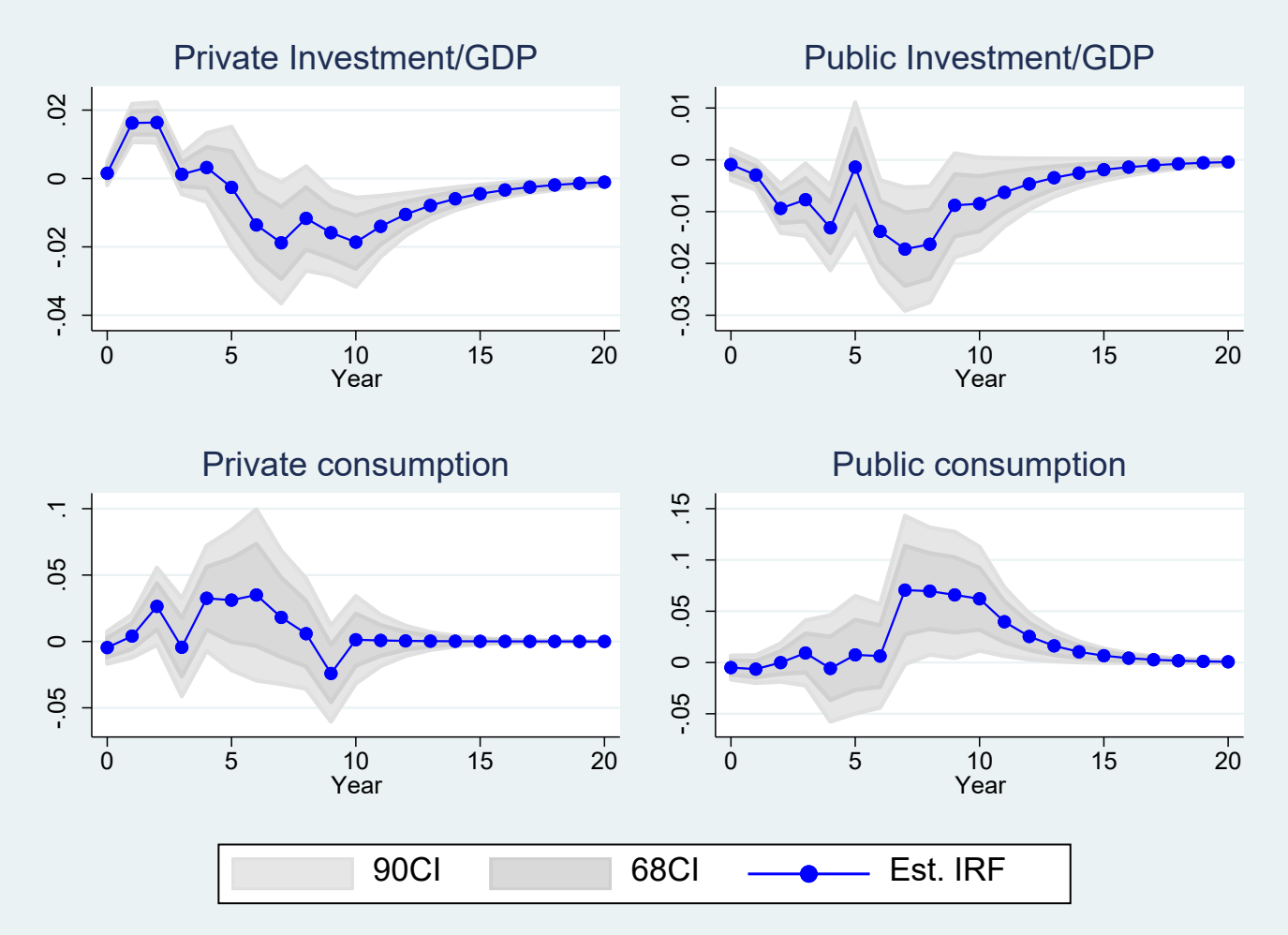


Percentage response to oil discovery news. Shaded areas are 68% and 90% confidence intervals.

Empirical Results: Real GDP, Consumption, and Employment



Whose Spending? Public vs. Private



It appears that the initial burst of spending is mostly private spending.

Summary

- Giant oil discoveries lead to macroeconomic effects in the data that are consistent with the predictions of a rational expectations model.

- Why does the model predict so well? I think it is because giant oil discoveries are:

  - Salient – it's usually "front page news."
  - comprehensible – even uneducated people understand that discovering oil can make you rich.
  - actionable – firms can invest in oil field equipment, borrow internationally, hire workers.

The Effects of Fiscal News

1. News about spending.
2. News about tax rates

News about Government Spending

- My 2011 QJE paper "Identifying Government Spending Shocks: It's All in the Timing" argued that

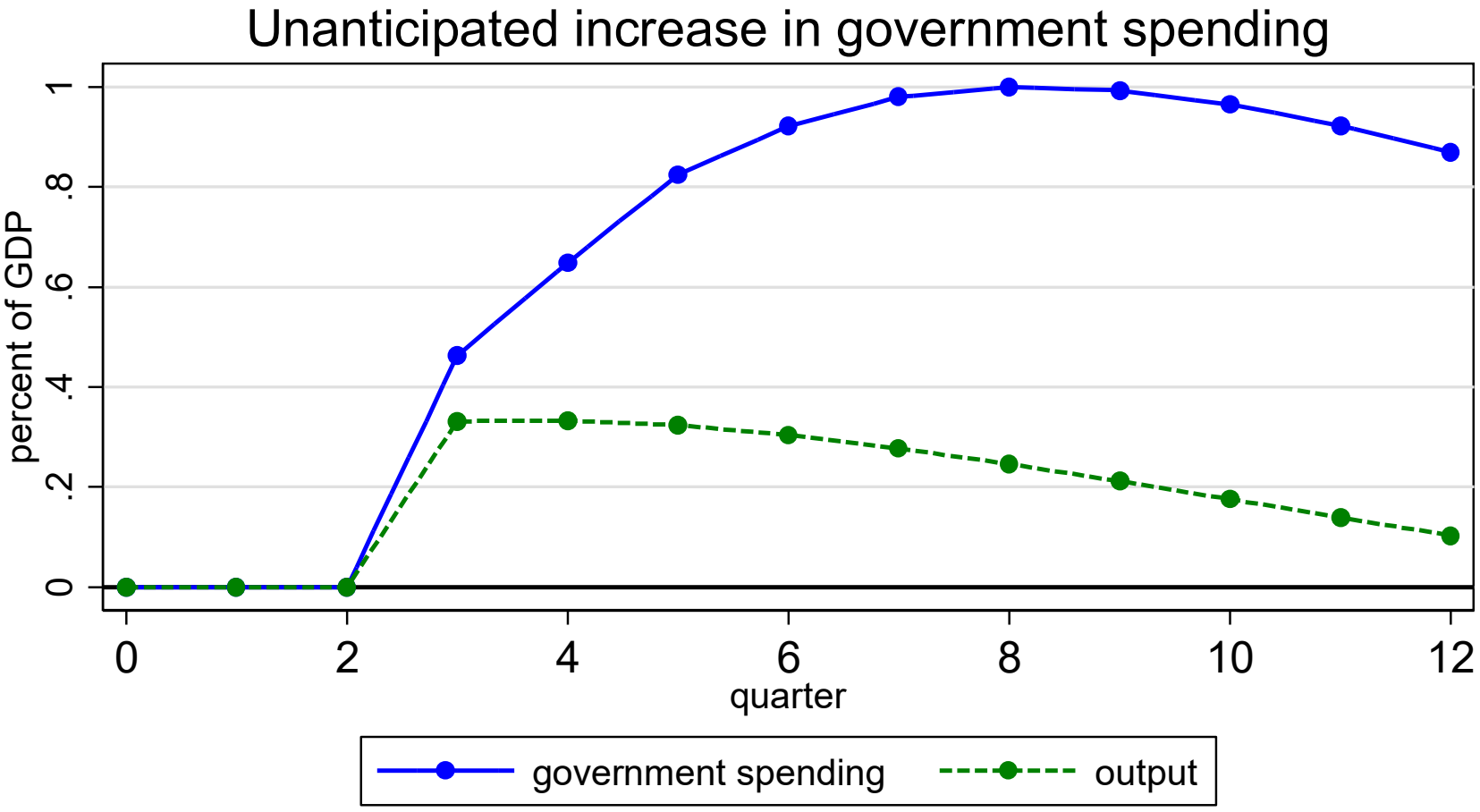
  - Most movements in government spending are anticipated.

  - In this case, the standard Cholesky identification of government spending shocks a la Blanchard-Perotti will get you the wrong answer.

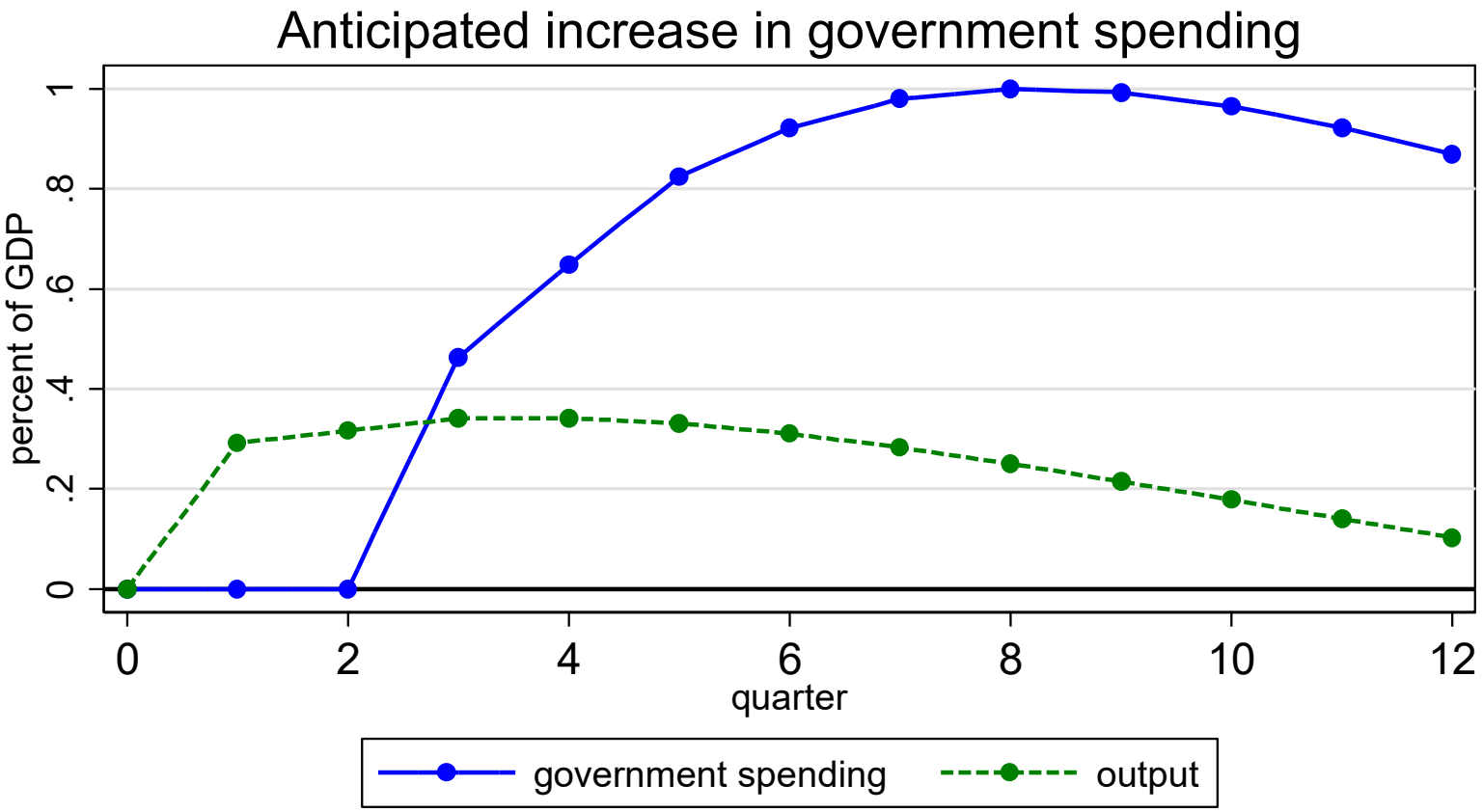
- The following shows the simple DSGE Monte Carlo (from the NBER working paper version of my paper).

  Simple closed-economy Baxter-King model, government spending financed with lump-sum taxes.

Increase in government spending in quarter 3, unanticipated

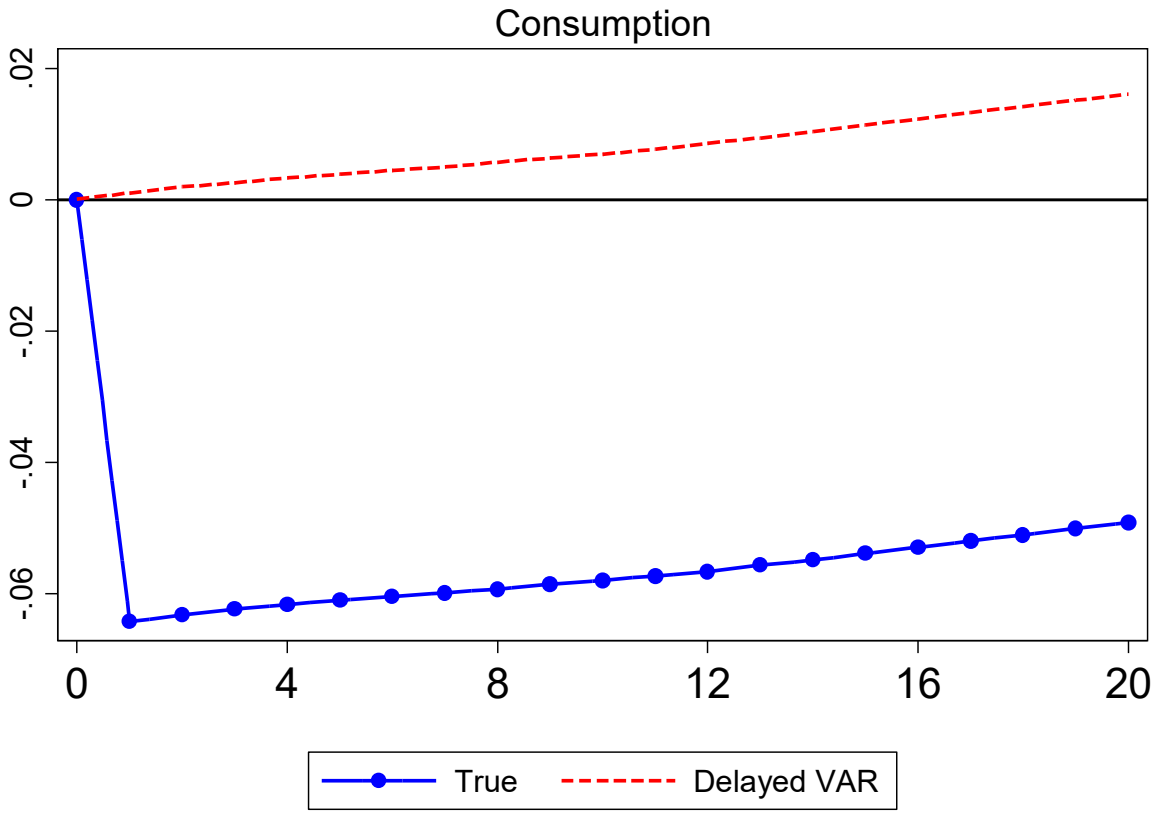


Increase in government spending in quarter 3, announced in quarter 1

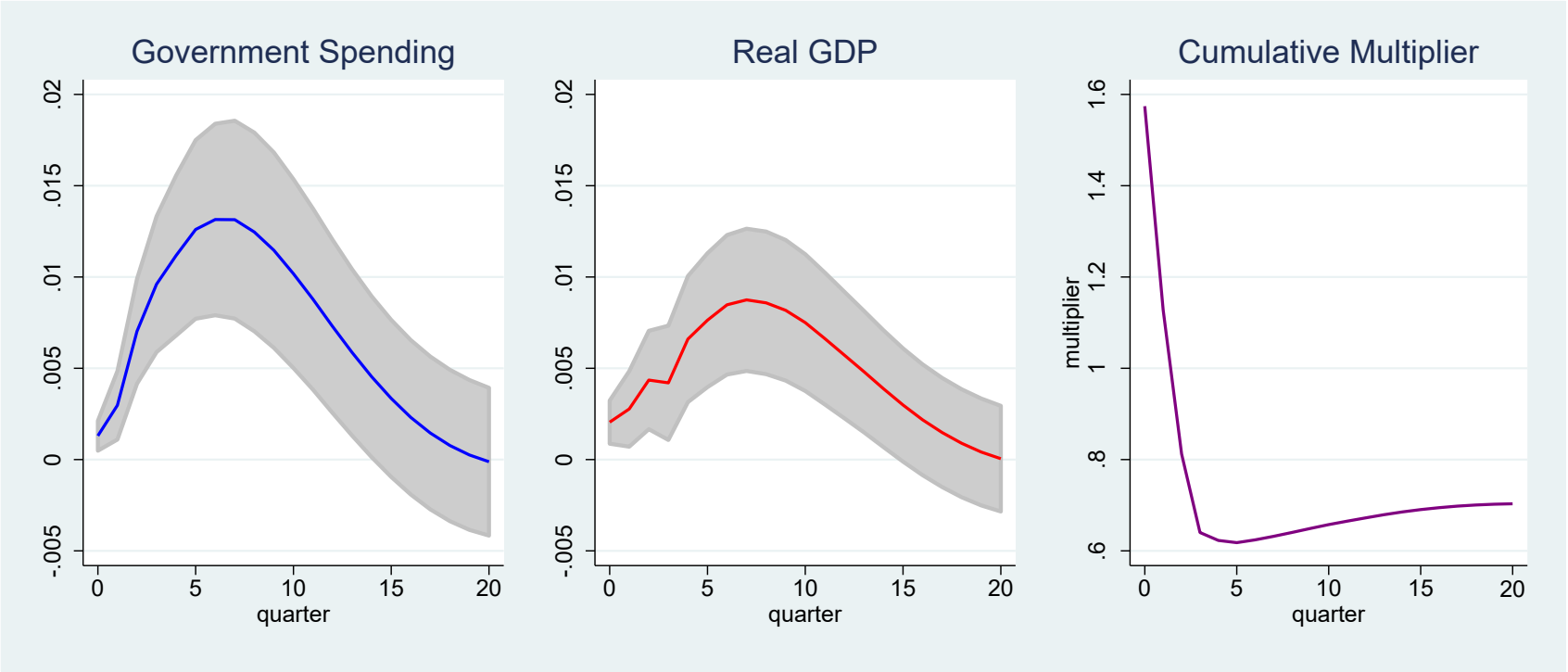


Because everything works through the wealth effect on labor supply, labor supply jumps immediately when the news arrives.

DSGE Monte Carlo:
IRFs from Blanchard-Perotti type identification



Estimated effect of a military news shock: quarterly 1939 - 2016



- The drop in the cumulative multiplier over the first few quarters is a measure of anticipation effects.

- The impact multiplier of 1.6 is more than twice the 20-quarter cumulative multiplier of 0.7

→ output responds more quickly than government spending.

Who is responding?

- Standard neoclassical model says that households respond to news about future ↑ in G through a negative wealth effect that ↑ labor supply and ↓ consumption.

- But are households really this rational?
  - Military news is salient. 
  - In the past, households did seem to be aware that governments raise taxes to pay for wars – comprehensible. 
  - But does this translate into immediate ↑ labor supply?

    Actionable?

Can a medium-scale NK model capture the anticipation effect?

- Medium-scale NK model from my infrastructure paper.

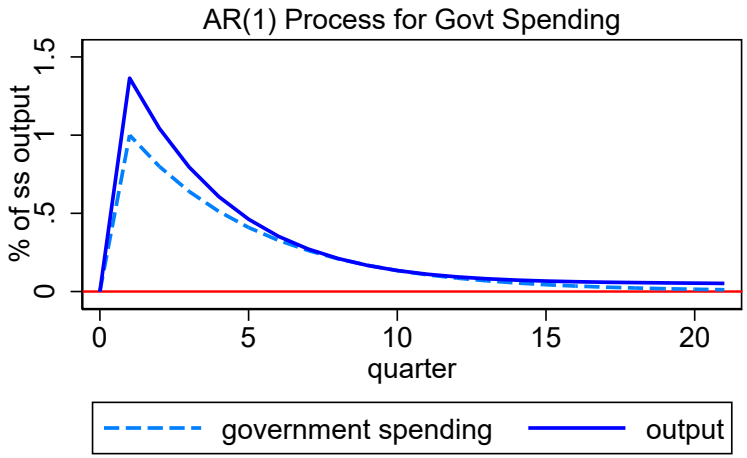
- Rigged to give multipliers > 1 in the standard AR(1) case:

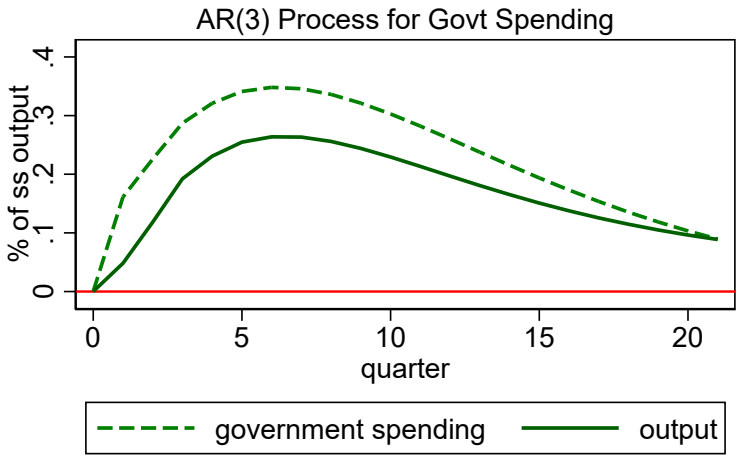
  - sticky prices and sticky wages, noncompetitive labor markets
  - 50% of households are hand-to-mouth
  - high Frisch elasticity
  - investment adjustment costs
  - variable capital utilization

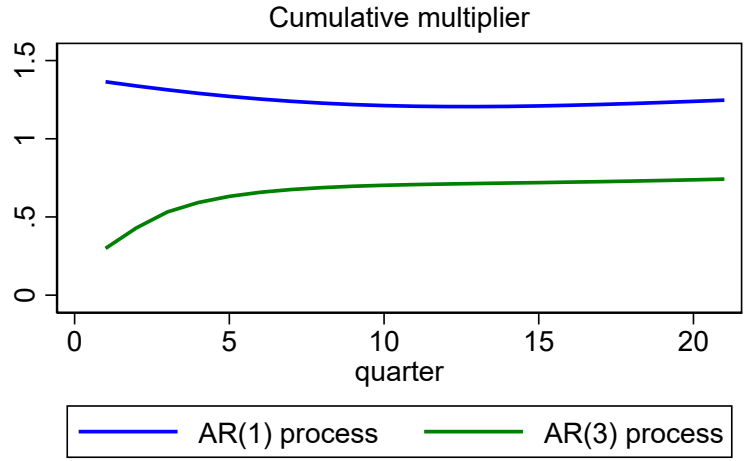
- Compare the outcomes for AR(1) to AR(3) spending process.

The AR(3) process is more realistic and also induces anticipation effects.

Simulations from a medium-scale NK model







- NK model doesn't produce anticipatory jump in output.
- Anticipations of higher future G ↓ the multiplier.

Summary

- The NK model features that produce high multipliers for an AR(1) shock don't produce high multipliers when the government spending starts up slowly.

  This is a key theme of my infrastructure paper, which emphasizes the time-to-spend delays inherent in infrastructure spending.

- Models with negative wealth effects (neoclassical, versions of NK) can produce anticipatory effects, but they rely on salience, comprehensibility, and actionability.

- One alternative: Brunet (2020), Briganti and Sellemi (in progress) argue that there are measurement delays between budget authority, prime contracts awarded, and government spending recorded in NIPA.

  Thus, most of the anticipation my simply involve firms anticipating that the government will pay them on the contracts.

  It provides another reason not to use Cholesky decompositions on NIPA data to identify shocks.

Anticipations of tax changes

- There are many examples of anticipated tax changes.

- There are multiple ways to capture news about future tax changes.

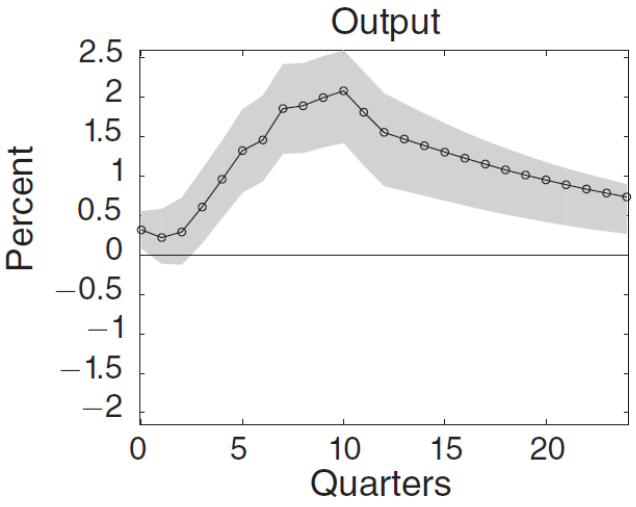
  - Mertens-Ravn extract from the Romer-Romer narrative tax series based on implementation lags.

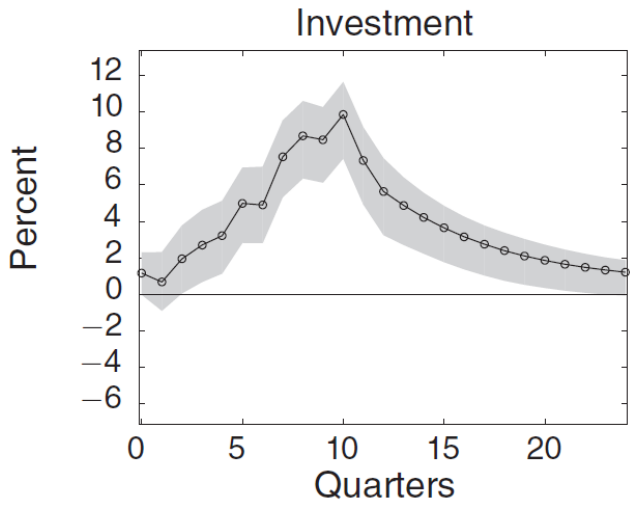
  - Lorenz Kueng and Leeper, Richter, Walker extract implied expectations from municipal bond spreads.

  - VAT changes in European countries (D'Acunto et al., Bachmann et al.)

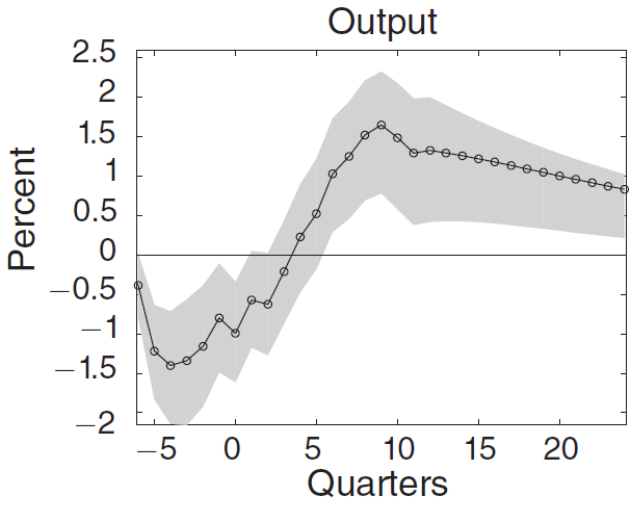
Example 1: Effects of anticipated tax changes in the U.S.
(Mertens-Ravn AEJ:EP 2012)

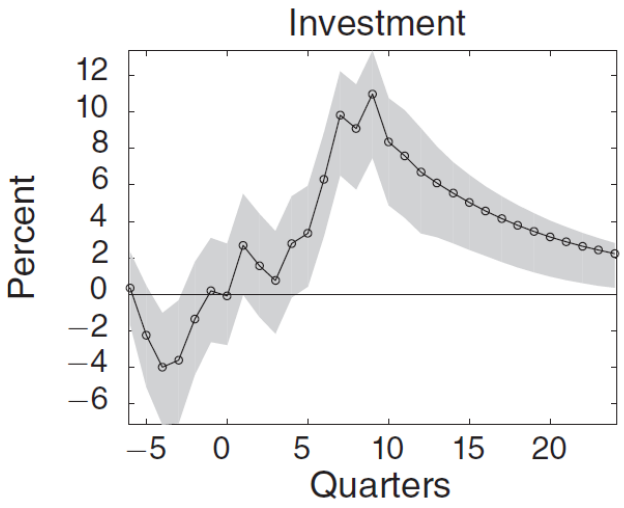
Unanticipated tax cut





Anticipated tax cut





Anticipated results are robust to alterative anticipated tax measures (my 2016 Handbook chapter).

Example 2: VAT Changes in Europe

- Several studies have investigated the effects of announcements of future VAT changes.

- D'Acunto et al. (2018) study the announcement in mid-2010 of an increase in the VAT starting in 2011 in Poland.

  They find that the announcement led to ↑ inflationary expectations and ↑ readiness to spend on durables.

- Bachmann et al. (2021) study Germany's unanticipated, temporary cut in the VAT in the second half of 2020.

  They find that spending on durable goods rose significantly, peaking at the end of 2020 just before the VAT reverted.

Why are responses to VAT and sales taxes strong?

- Changes in the VAT and sales taxes are **salient**.
  - Announced changes are typically “front page news.”
- The causal chain is **comprehensible** to the average consumer.

  ↑ future tax rate → higher future cost of purchase.
- The news is **actionable**.
  - Most consumers understand that adjusting the timing of purchases to take advantage of sales saves them money.
  - Adjusting the timing of purchases to take advantage of tax savings is a simple extension of this idea.

The importance of advertising

- **Advertising** helps make VAT and sales tax changes salient, comprehensible, and actionable.

- Advertising disseminates information, reminds consumers about deadlines, and tells them how to act!

Inflation expectations

In a low inflation environment, I think that monetary and fiscal policies that work through inflation expectations are likely to be ineffective. Why?

- Inflation is not salient during low inflation times.

  Until recently, inflation didn't get much news coverage.

- Inflation is not comprehensible to the average consumer (details on next slide).

- Inflation is not very actionable for the typical household.

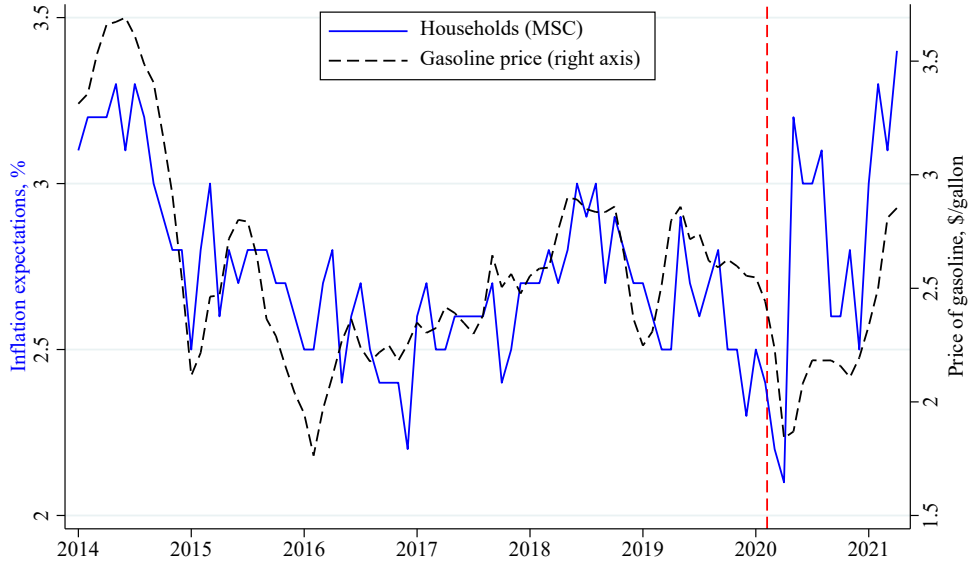
  Storage space constraints on stocking up, fixed costs of shifting funds from bank accounts to other financial assets, etc.

Comprehensibility of inflation

- Survey evidence suggests that consumers and firms often aren't even aware of the current rate inflation.

- Consumers and firms confuse price changes of particular products with inflation in the general price level.

From Gorodnichenko "How Are Expectations Formed? Lessons from Surveys"



- Most consumers don't understand the mechanism by which current actions or statements by central banks affect inflation.

My conclusion about inflation

Without the help of “Madison Avenue” advertising talent to inform consumers and explain to them what they should do and when, policies that work through inflationary expectations are likely to be ineffective.

Conclusion

- Consumers and firms do act on news of future events in many situations.
- However, it must be the case that the news is
  - salient
  - comprehensible
  - actionable
- Some policies may be doomed to be ineffectual when they cannot be understood by the average person.
- Significant challenge for monetary policy.