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Should we reject the natural rate hypothesis?

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Edgeworth lecture, Dublin

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50 years ago: The natural rate hypothesis

- Friedman's presidential address. 1967

- In effect, application of general long-run neutrality of money proposition

- Two sub-hypotheses:

    - The natural unemployment rate independent of monetary policy. ``Independence hypothesis''

    - Maintaining actual rate below natural rate leads to increasing inflation. ``Accelerationist hypothesis''

- Strong organizing framework, and strong policy implications:
    - Structural versus stabilization policies.
    - Limits to stabilization policies: Booms fully offset by busts
    - Monetary policy can smooth, but no more.

Acceptance, old and new grumblings

- Quickly accepted.
  - Empirically: Increase in Phillips curve coefficient, from 0 to 1.
  - Conceptually: Dominant framework

- Basis for inflation targeting framework. ``Divine coincidence''

- But:
  - The disinflations of the 1980s, and hysteresis.
  - More recently:

  - The effects of the Great Financial Crisis on output.
  - The disappearance of the accelerationist Phillips curve.

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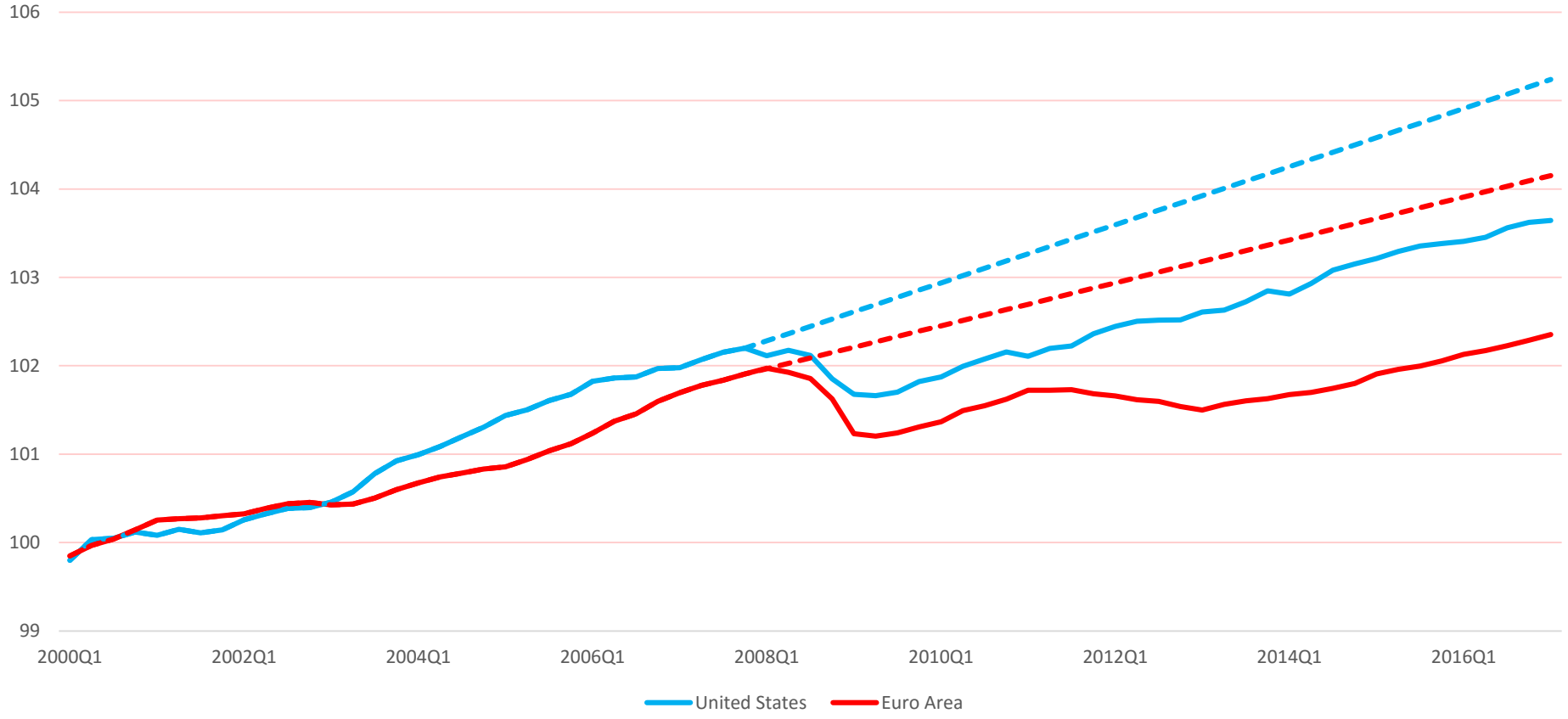
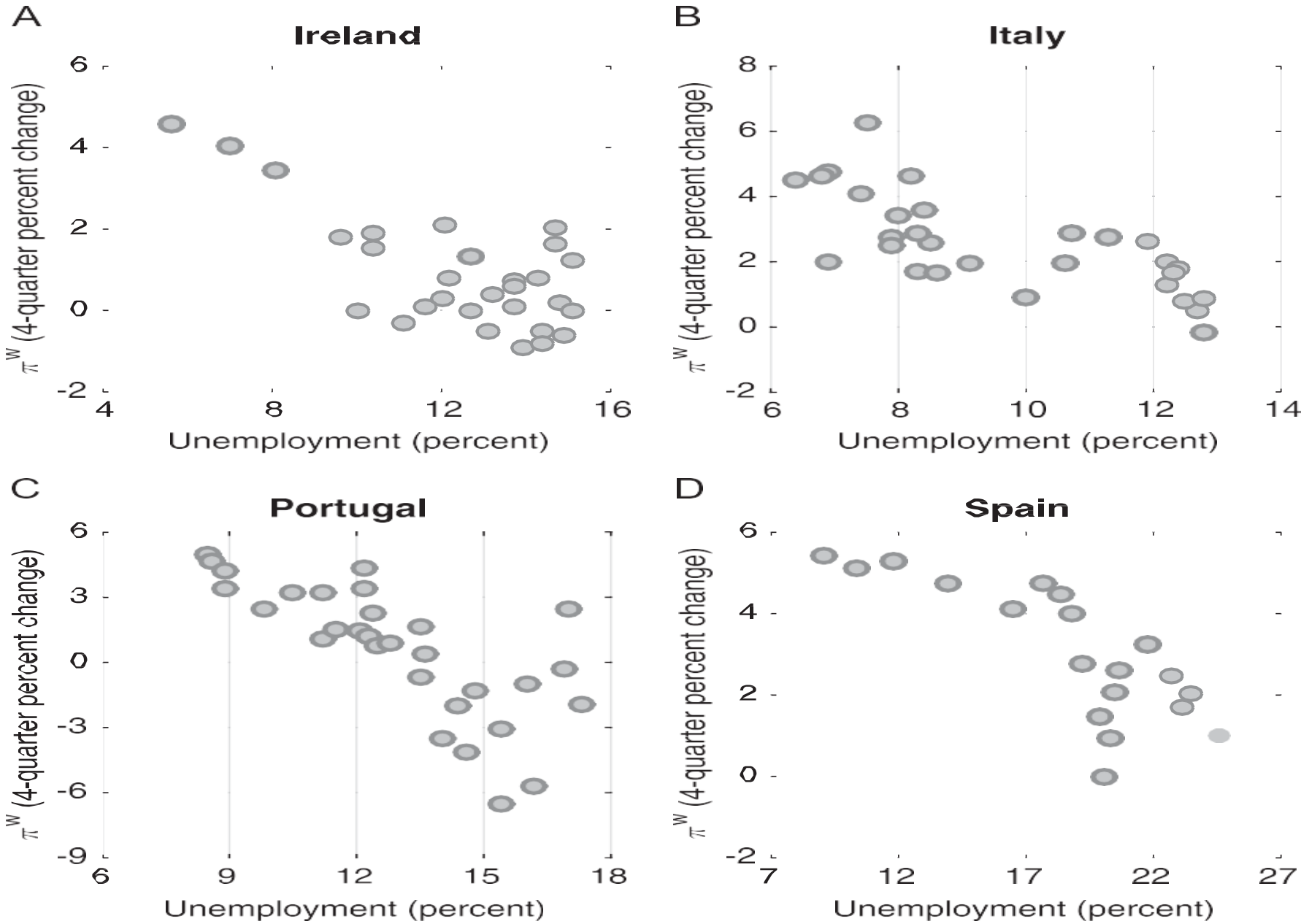
Advanced Economies log Real GDP and extrapolated trend (Index, 2000=100)



Relation between wage inflation and unemployment, 2008-1 to 2015-2



Arias, Erceg, Trabandt

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Map

- The independence hypothesis.
  - Persistence versus permanence
  - Macro evidence
  - Micro evidence
- The accelerationist hypothesis.
- Policy implications

1. Persistence versus permanence

- Need to clarify the issues. Discussion often presented as

  - Standard models: zero effect of m pol on potential output

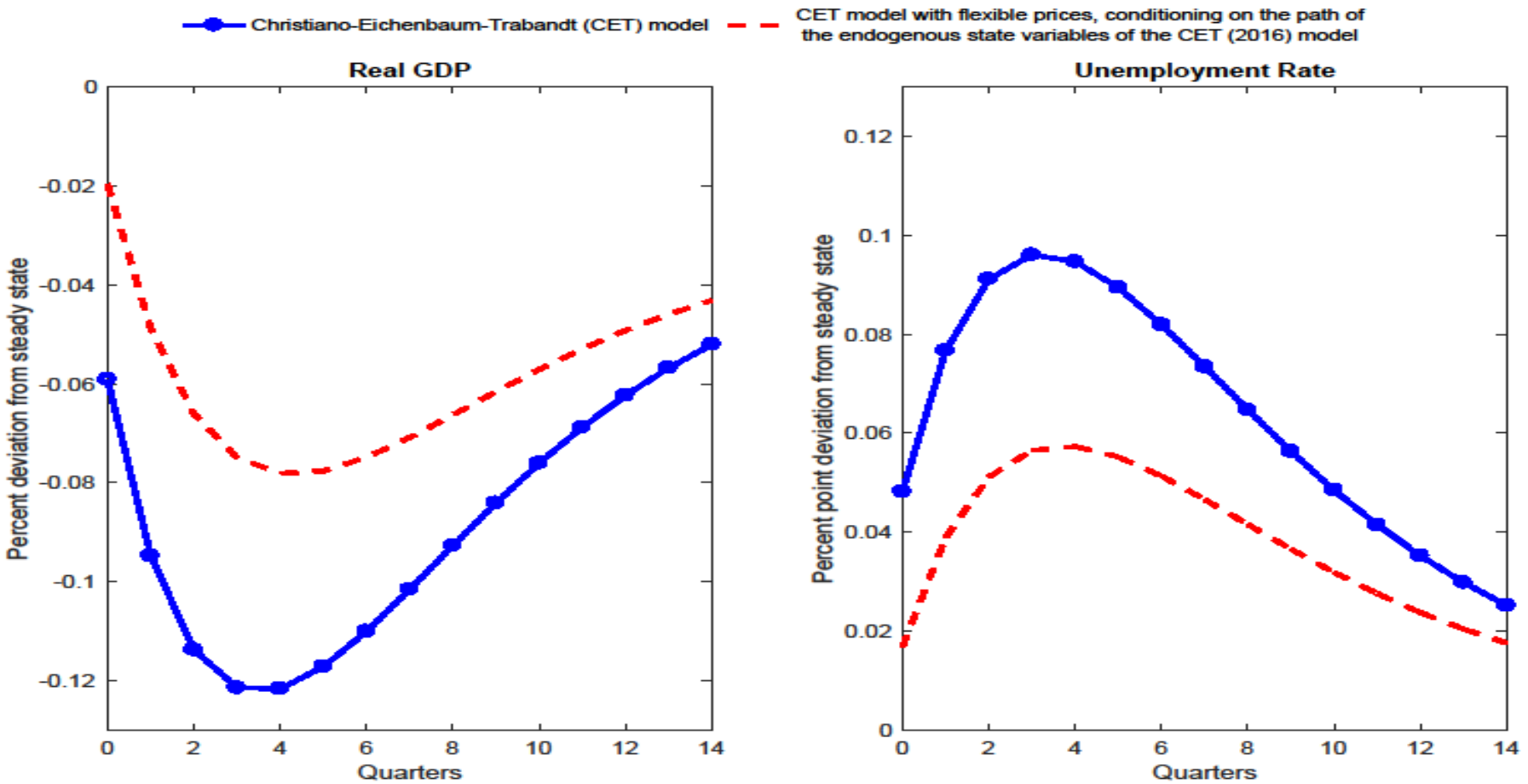
  versus :

  - Hysteresis: permanent effect of m pol on potential output

- In fact:
  - All models have some, persistent, effect of m pol on potential output
    - Recessions, capital accumulation, potential output
    - State variables. Capital, Unemployment (if matching frictions).
  - Hysteresis models often do not imply permanent effects
    - R&D, TFP, and potential output
    - Disenfranchised workers.

- Bottom line: Issue is the degree of persistence. High or low?

Impulse Responses to a Contractionary Monetary Policy Shock (50 Annual Basis Points)



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Macro evidence. Unemployment.

- Effects of monetary policy shocks?
  - Look at recessions caused by intentional disinflations
  - Clearly monetary shocks. Large. Plausibly exogenous

- Data set. 22 advanced economies, 50 years.
  - Identify recessions. 122
  - Caused by disinflation decision. 22.
- Methodology
  - Look at average unemployment rate pre- and post-recession
  - Time intervals. Pre-recession. -2 to -6, …, -2 to -12
    Post-recession. +3 to +7, …, +10 to +14
- Caveats:
  - Time fixed effects, heterogeneity, actual or natural rate?

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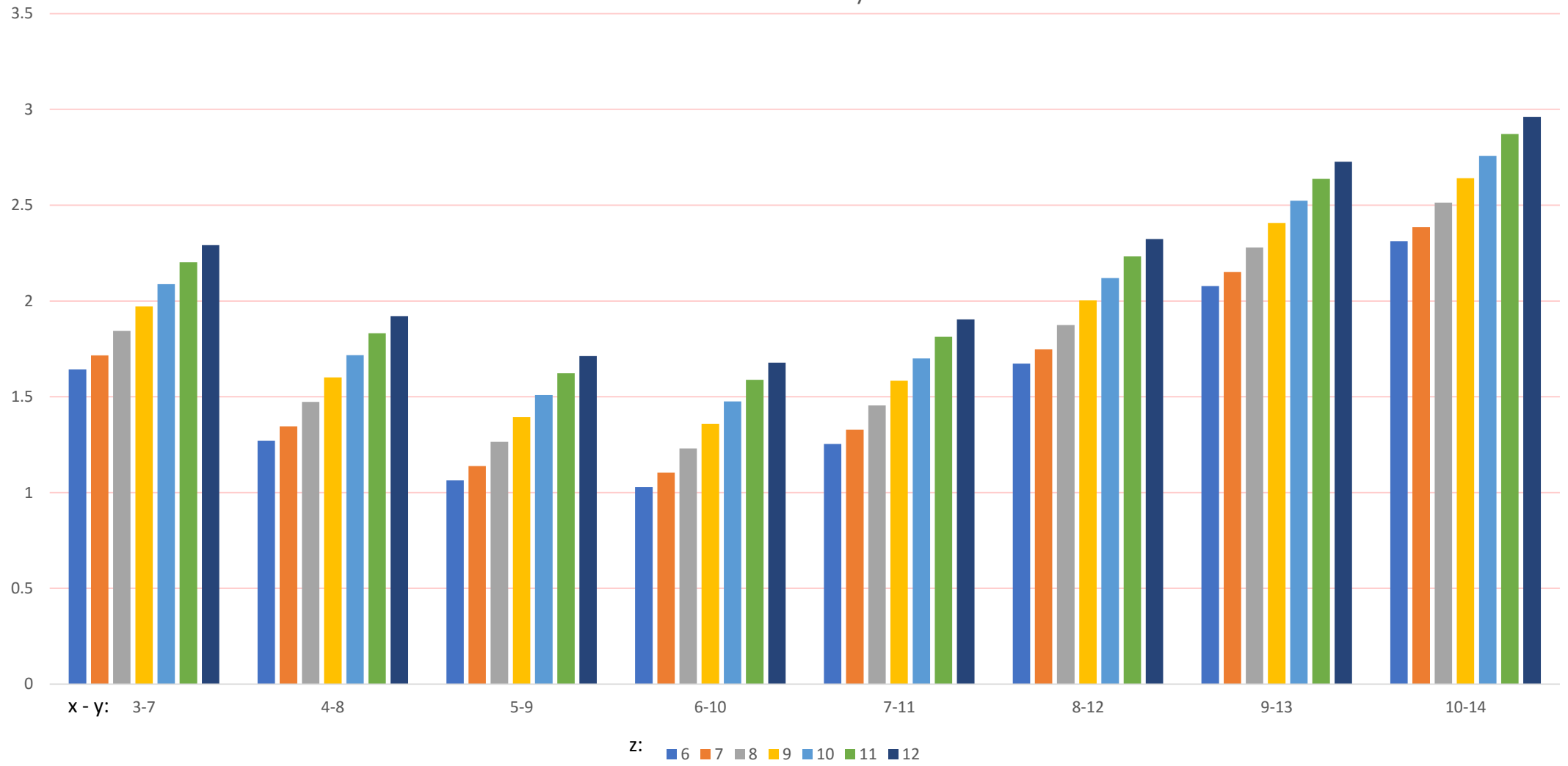
Disinflation recessions - Change in Unemployment rate
(Average unemployment rate x to y years after the recession - Average unemployment rate 2 to z years before the recession)



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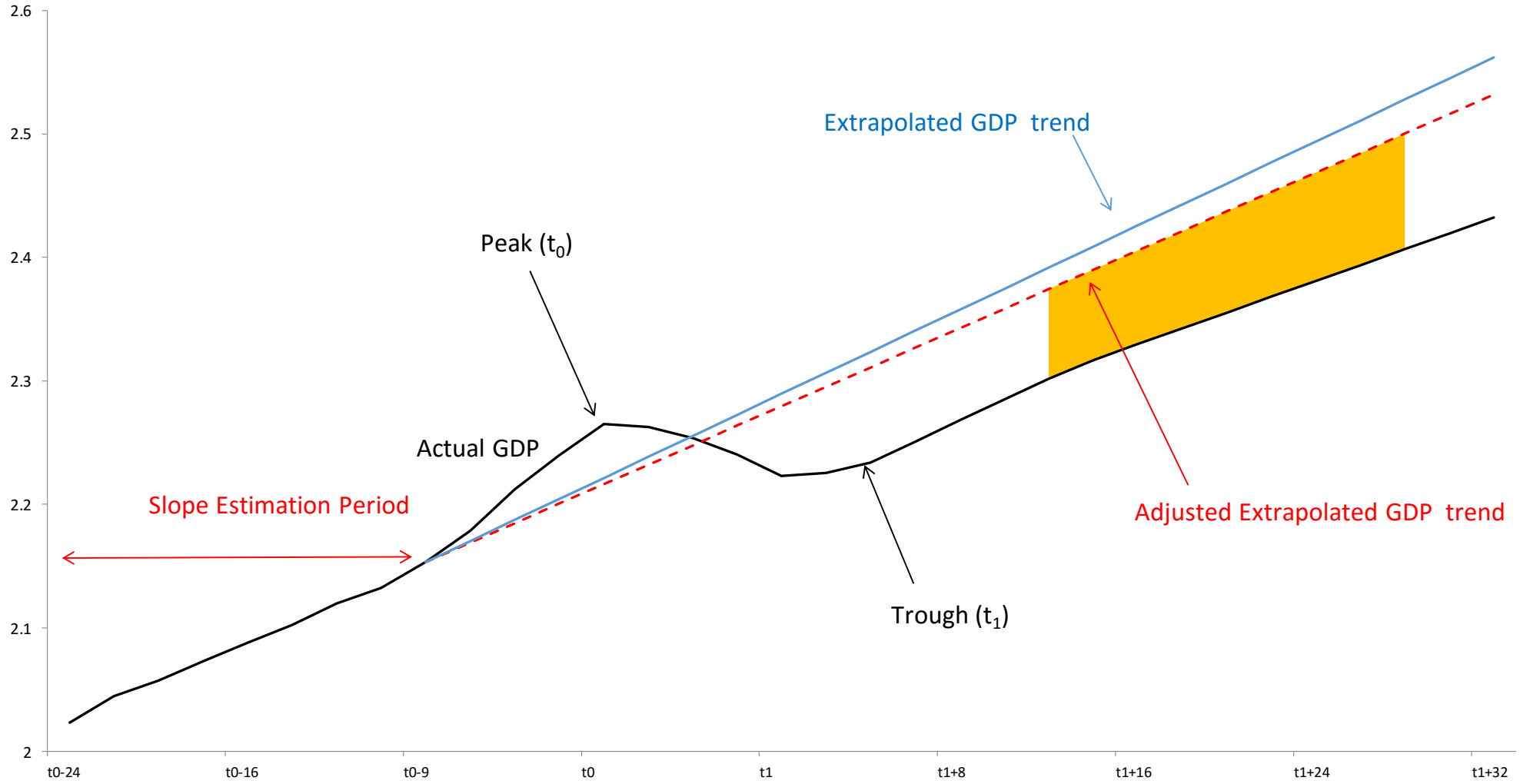
Macro evidence: Output

- Similar approach for output.
  - Why not look at output?

- Compute a pre-recession log-linear time trend.
- Extrapolate.
- Look at post-recession output gap.
- Do it over various pre- and post-recession intervals

- Complication. Underlying decreasing time trend.
  - If not corrected, will find negative output gaps on average

- Evidence.
  - Less impressive than for unemployment
  - Decomposition: employment, productivity


2.6
2.5
2.4
2.3
2.2
2.1
2
t0-24
t0-16
t0-9
t0
t1
t1+8
t1+16
t1+24
t1+32
Extrapolated GDP trend
Peak (t_0)
Actual GDP
Slope Estimation Period
Trough (t_1)
Adjusted Extrapolated GDP trend

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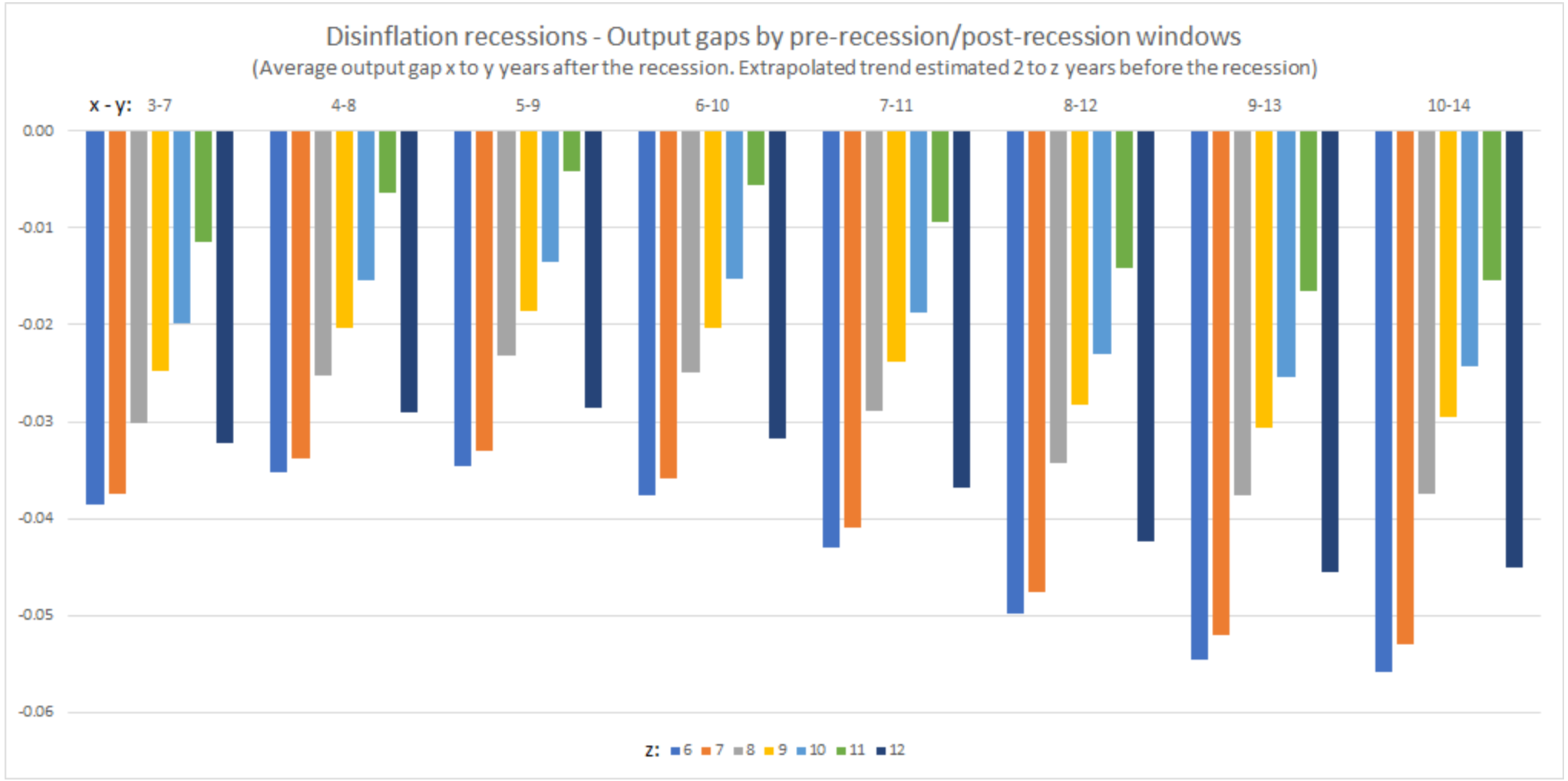

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Can we learn from other recessions?

- Can we learn from the other recessions, say, caused by oil shocks, financial crises, etc?

- Yes, with one additional strong assumption:

  - Zero long run elasticity of labor supply/wage curve

  - If so, can look at unemployment. (not output. Why?)

- Evidence.
  - Strong effects for both oil shocks, and financial crises.

  - Similar caveats. Largely bunched in time, so potential time effects.

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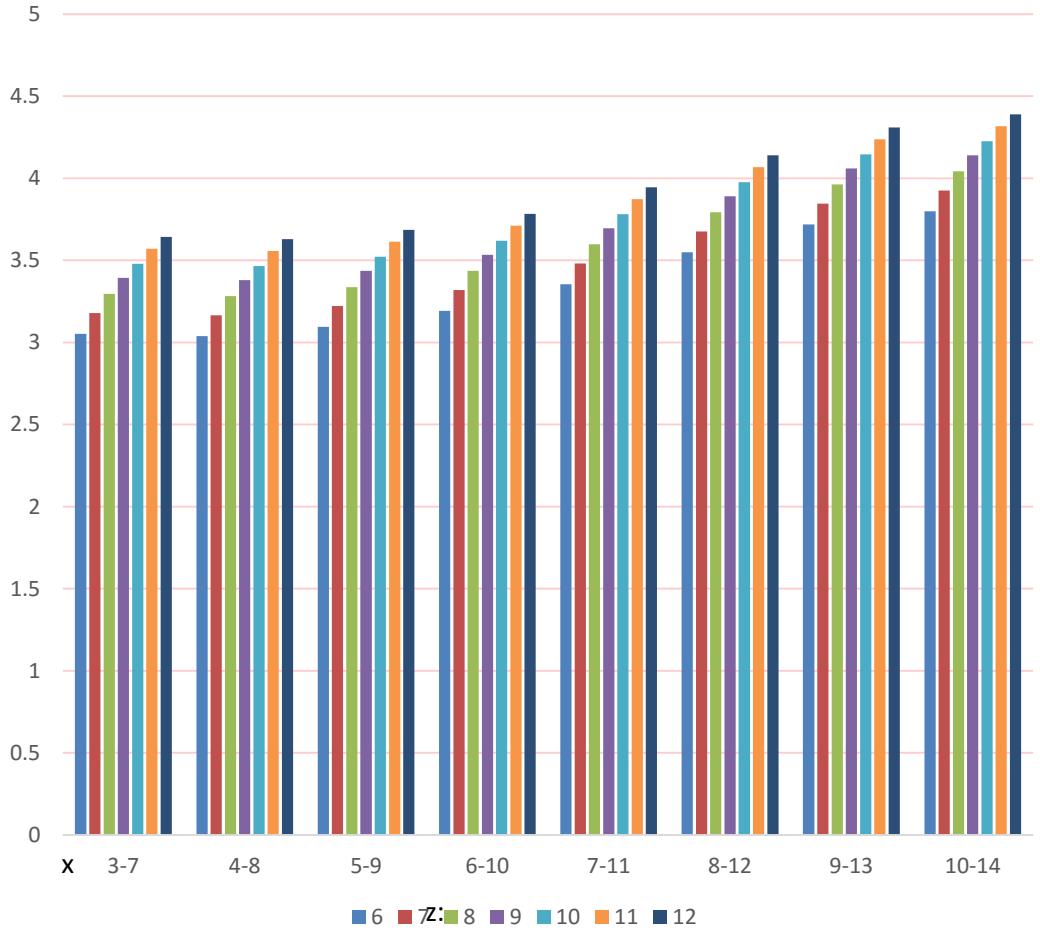
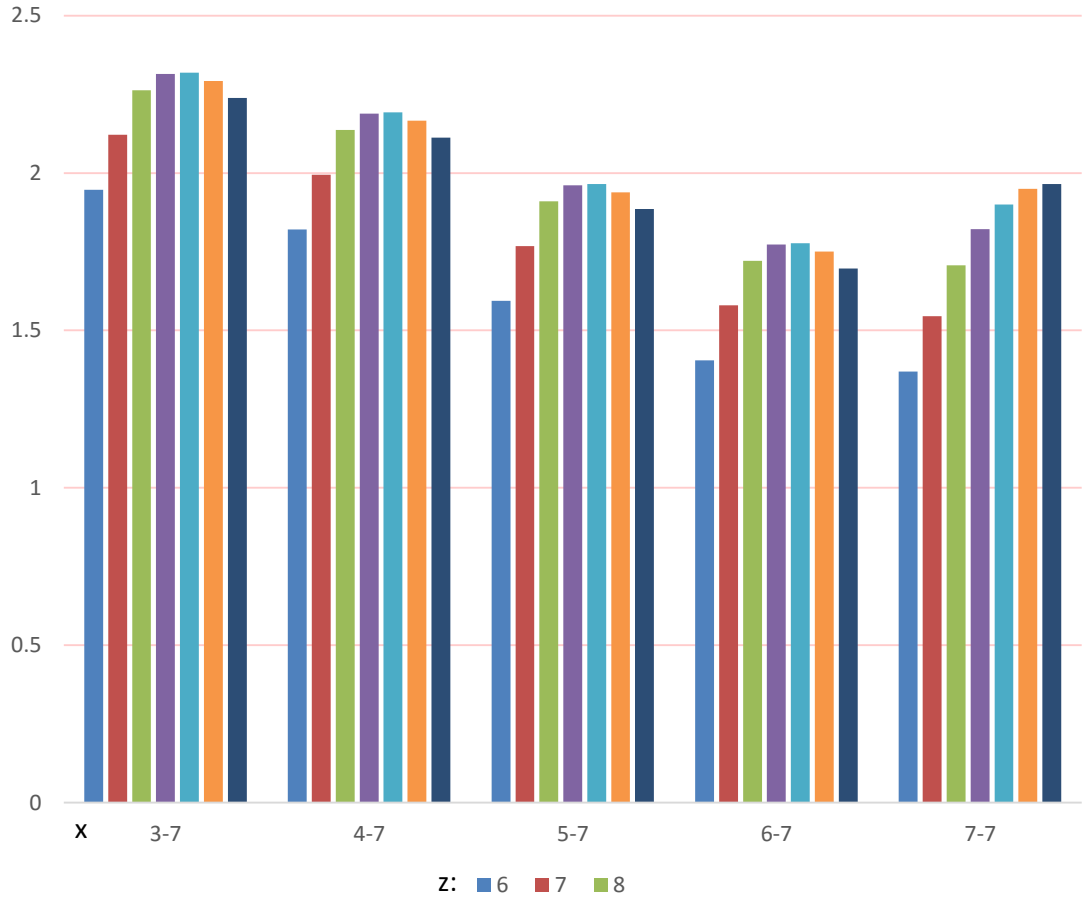
Oil related recessions



Financial crisis recessions



Note: The 7-7 specification covers 11 out of 21 recessions

Micro evidence. Persistence channels. 1.

- The initial hysteresis argument (Blanchard-Summers). Insiders
  - Unions set wages. (eventually) do not care about the unemployed members.
  - No pressure of (some) unemployment on wages.
  - Natural rate has a unit root

- Too strong. Unemployment matters
  - Unemployment threat if fired
  - Unemployment threat from hiring unemployed
  - Role of employment protection: Firing/hiring costs

- DMP framework. Now incorporated in some DSGE

- How much persistence?
  - A function of labor market institutions.
  - Employment protection, u benefits, structure of bargaining

Micro evidence: Persistence channels. 2

- Loss of morale, skills, employability.

- Probability of employment if unemployed (CPS):
  - 1 month : 28% if U<27 weeks, 14% if U>27 weeks
  - 15 months : 55% 40%

- No proof of hysteresis however. Best hired first, pool gets worse?
  - Looking at past history of the short-term and long-term u
  - (Abraham et al). Similar employment status 8 quarters before

- If this is the channel, then asymmetric hysteresis.
  - LTU convex in U. *
  - More hysteresis in deep recessions than in booms.

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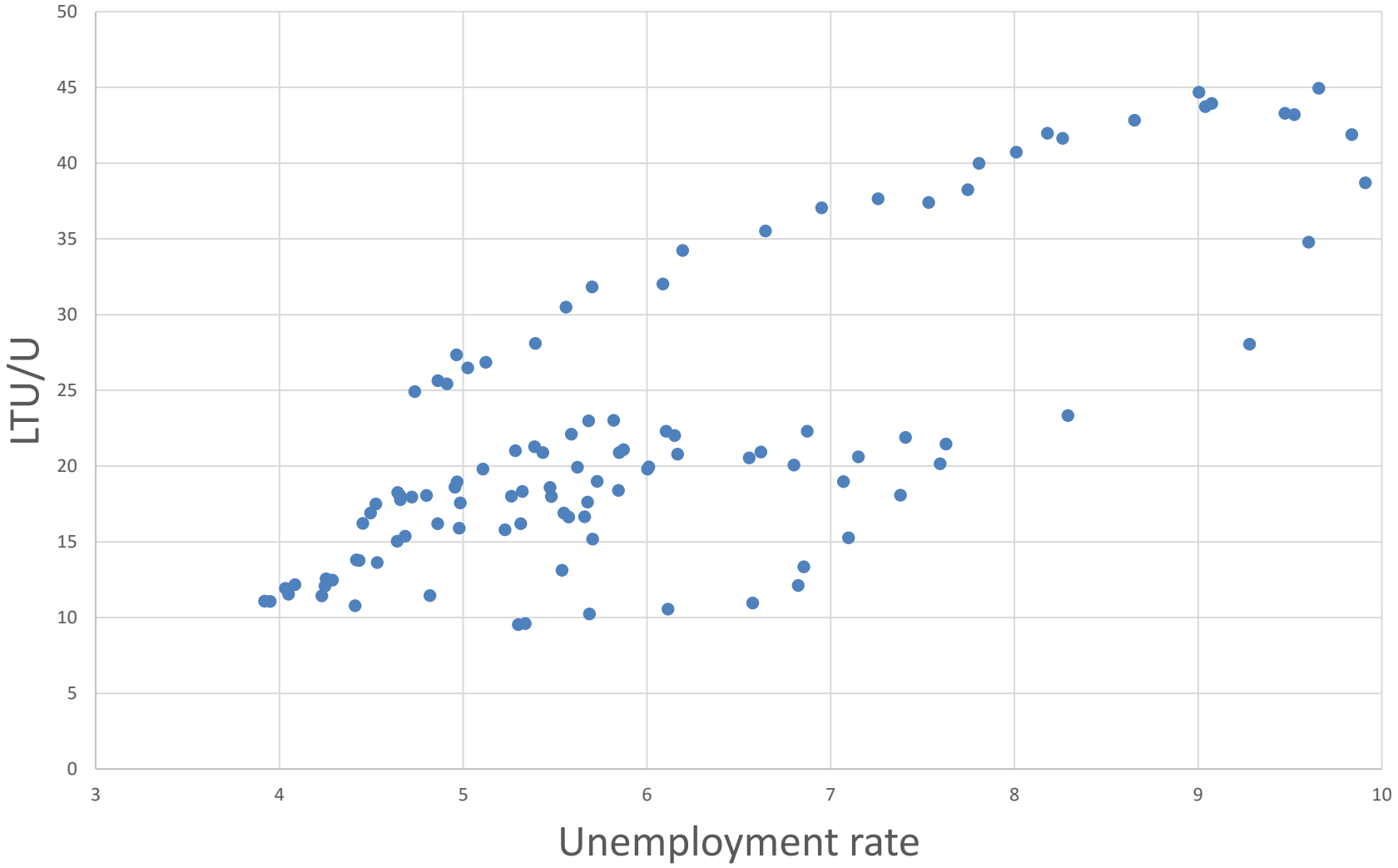
Ratio of long term unemployment against U rate, 1990-2016



Micro evidence: Persistence channels. 3

Focus at this point on low labor force participation (rather than unemployment rate, which is very low) in the US.

Largely a downward trend, but is there more?

- Evidence (Yagan) 7.2% decrease in 2015 LFP for 30-49 cohort in 2007
  - 4.8% due to demographics. 1.8% due to high u in 2007-2009

- The longer evidence from disability insurance
  - Applications highly cyclical. *
  - Once accepted, low probability of coming back.

  - Over last 10 years, 20% ``excess unemployment''
  - 2.4 m applications more. (1.7% of labor force)
  - Acceptance rate: 35%, so 0.8 million. (0.6% of labor force)

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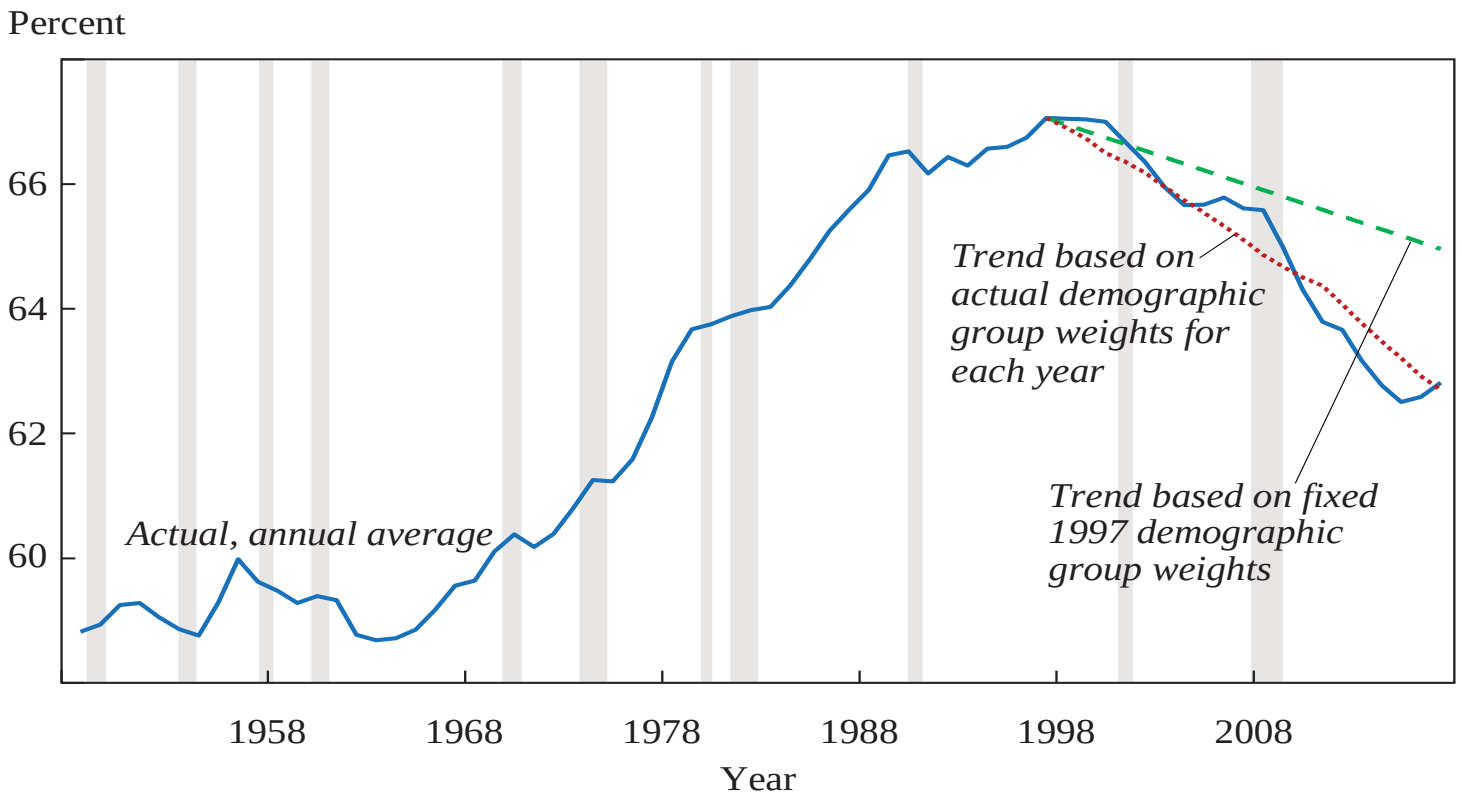
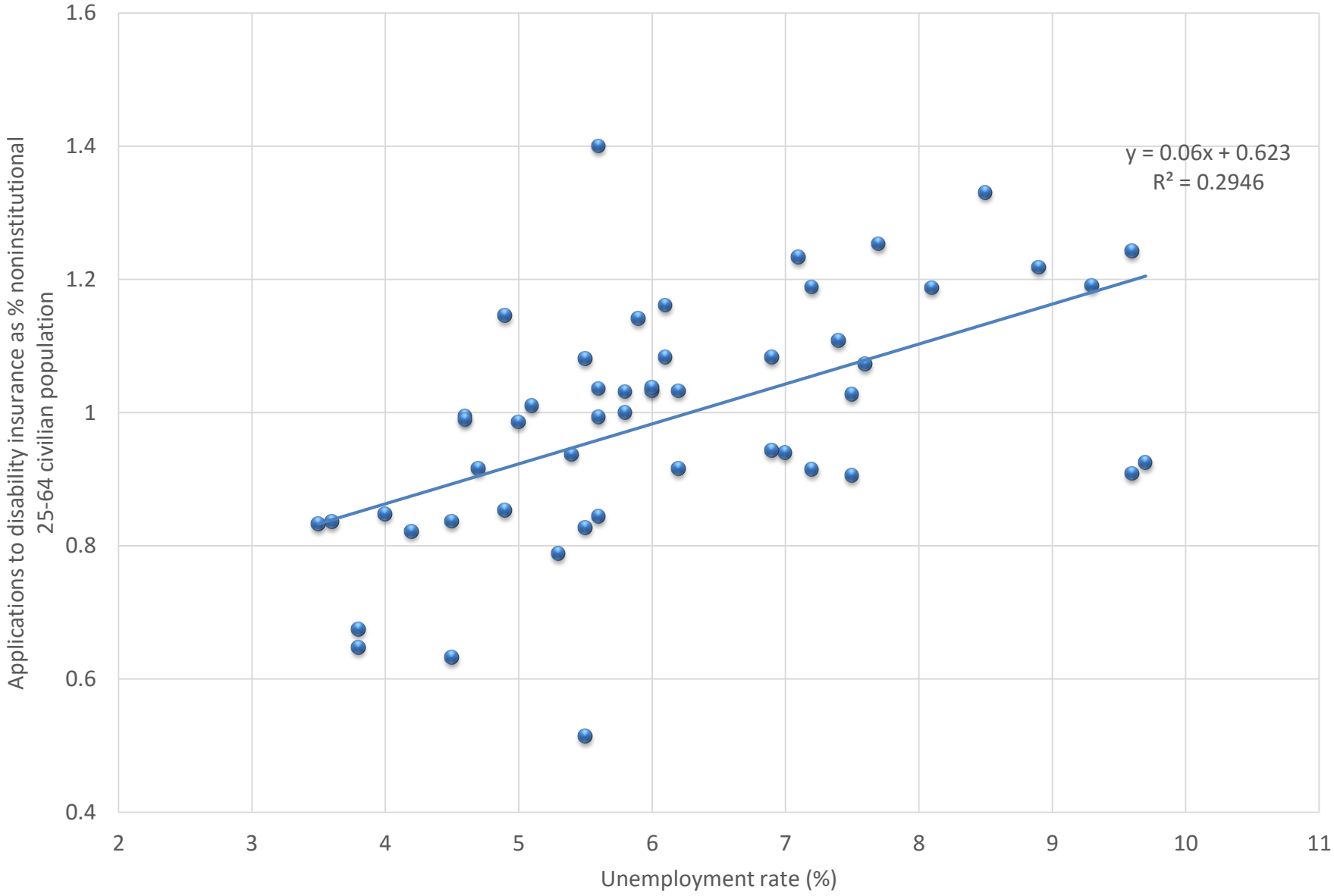
Figure 3. Labor Force Participation Rate, 1948–2017[a]



Sources: U.S. Bureau of Labor Statistics; National Bureau of Economic Research; author's calculations.

a. Shading denotes recessions. The data are not seasonally adjusted, annual averages. The 2017 data point is the average of data from January through June. Data for 1990 to 2016 have been adjusted to account for the effects of the annual population control adjustments to the Current Population Survey.

Applications to disability insurance vs U rate, 1960-2014



Micro evidence: Persistence channels. 4

Turning to persistent effects of recession on productivity.

- No evidence that it plays a role in disinflation-caused recessions

- R&D cyclical. But effect of cycle is small. 1% less growth. 1% less R&D.
  - Speed of adoption. Evidence. Some cyclical elasticity. Gertler et al.
  - Recessions and reallocation. Schumpeterian cleansing or inefficient closures? Foster et al: small positive effect (except during the GFC)

The accelerationist hypothesis

- The simple Phillips curve.
  $$\Pi = a\,\Pi(-1) + b\,(U-U^*)$$

- Phillips, Solow/Samuelson. a close to 0.
- Friedman: If try to use the trade off, a will go to 1.
- (Lucas/Sargent. Rational expectations version. NK version.)

- The evidence. Estimation with 15-year rolling sample
  - Dramatic increase after Friedman's address
  - Dramatic decrease since early 2000s.

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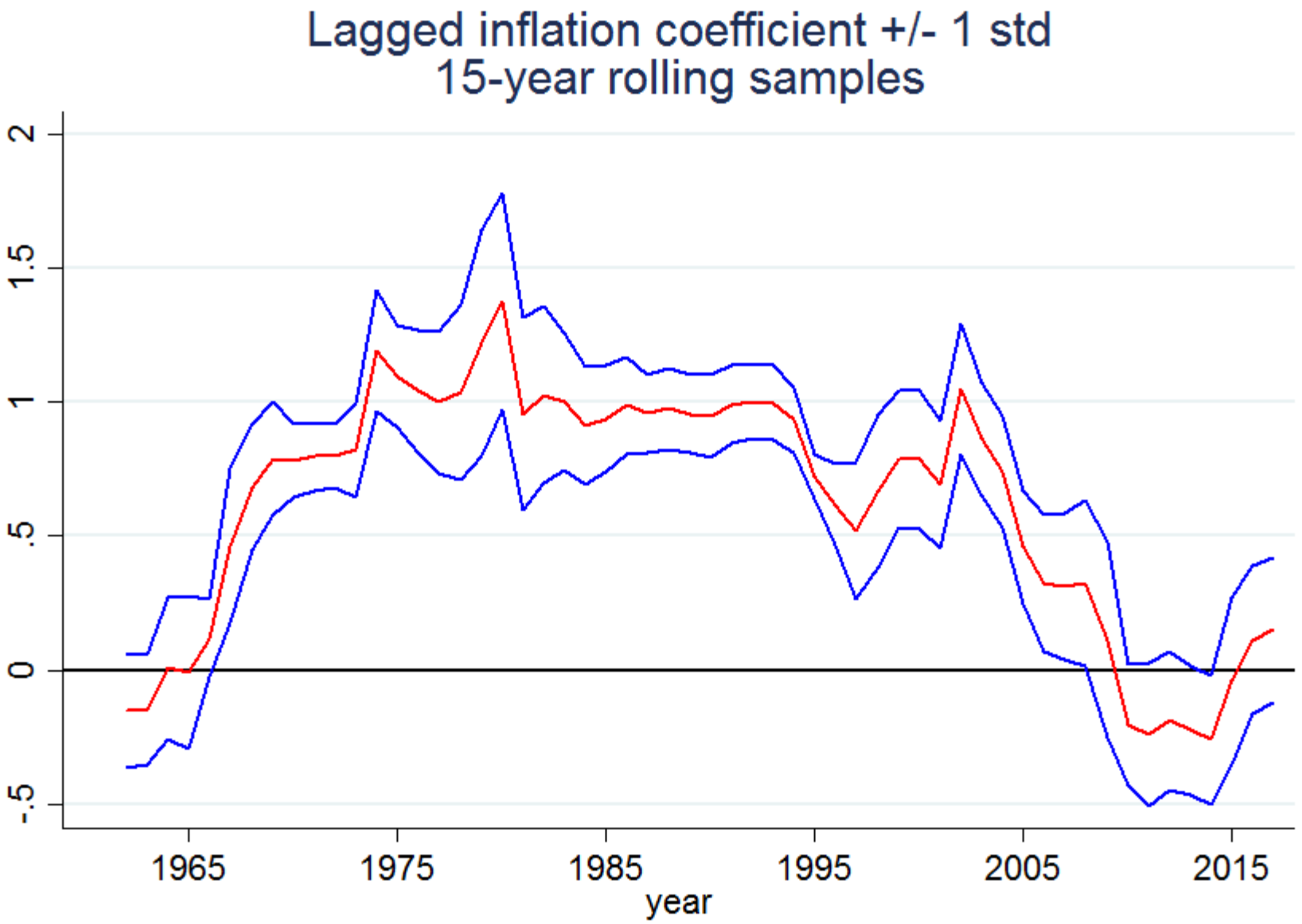

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Credibility or lack of salience?

- Why has the coefficient decreased back to zero?
  - Credibility? Inflation target, and inflation targeting.
  - Lack of salience? At low, stable inflation, inflation ignored
- How to test? Not easy
  - If credibility, response to core, but not to (headline – core)
  - If salience, response to (headline – core), but not to core. (e.g. response if price of gas increases/decreases a lot)
- Evidence from behavior of professional forecasters (SPF) households (Michigan survey).

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Table 1: Regressions of professional and consumers' forecasts of inflation

	1981Q3-1995Q4		1996Q1-2016Q3	
	SPF	Michigan	SPF	Michigan
ma_core	0.498***	0.375***	0.547***	-0.111
	[0.038]	[0.061]	[0.052]	[0.125]
ma_inflcore	0.125	0.288***	0.077**	0.231***
	[0.099]	[0.093]	[0.029]	[0.060]
Constant	2.024***	1.873***	1.098***	3.134***
	[0.174]	[0.267]	[0.103]	[0.244]
Observations	58	58	83	83
R-squared	0.746	0.66	0.598	0.19

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Policy implications. 1

- Long way from knowing enough. Strength, persistence, asymmetries…
-
- Nevertheless, a simple formalization:

(1) $y^*(+1) = a\, y^* + b\,(y-y^*)$

Pure independence hypothesis: b=0.
Pure hysteresis hypothesis : a=1, b>0
Realistic models: coefficients in between.

(2) $\Pi = c(y-y^*) + E\,\Pi$, $E\Pi = 0$ if $-x \leq \Pi \leq +x$, $\Pi(-1)$ otherwise

Salience if x>0

Policy implications. Inflation/output trade offs

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Consider a one-period increase in the output gap, $y-y^* = \Delta$

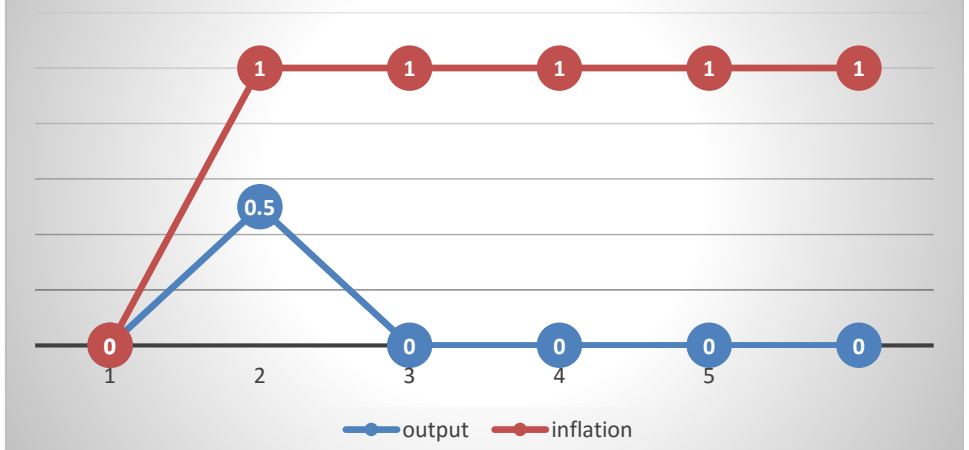
- If both independence and accelerationist hypotheses hold:
  - Permanent increase in inflation of $c\ \Delta$
  - One-period increase in output of Δ

- If only independence assumption fails (a, b positive)
  - Permanent increase in inflation of $c\ \Delta$
  - Increase in output of $\Delta, b\Delta, ab\Delta, \ldots,$: Bigger

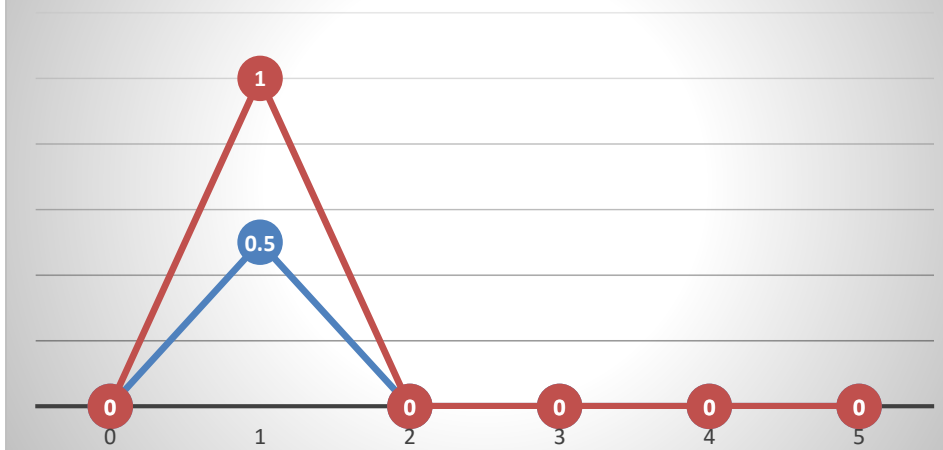
- If only accelerationist assumption fails ($x > \Delta > 0$)
  - Increase in inflation for one period of $c\Delta$: Smaller
  - One period increase in output of Δ

- If both fail
  - Increase in inflation for one period of $c\Delta$: Smaller
  - Increase in output of $\Delta, b\Delta, ab\Delta, \ldots,$: Bigger

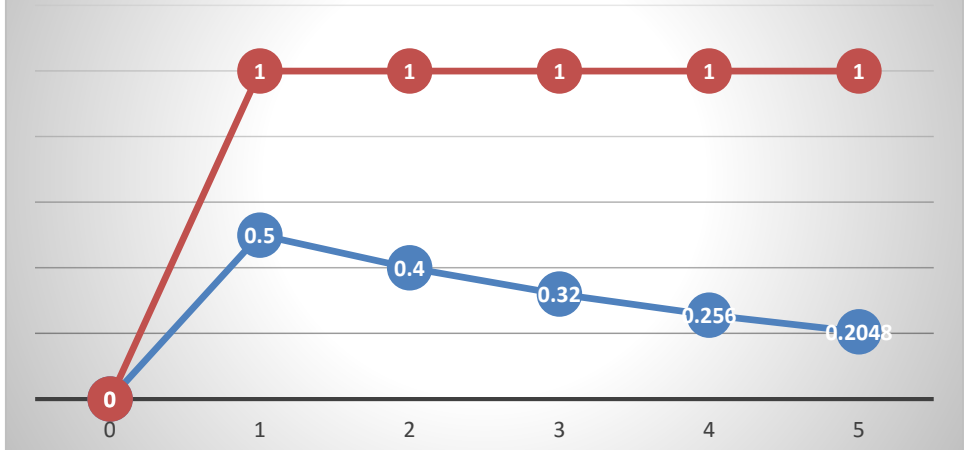
Both hypotheses hold



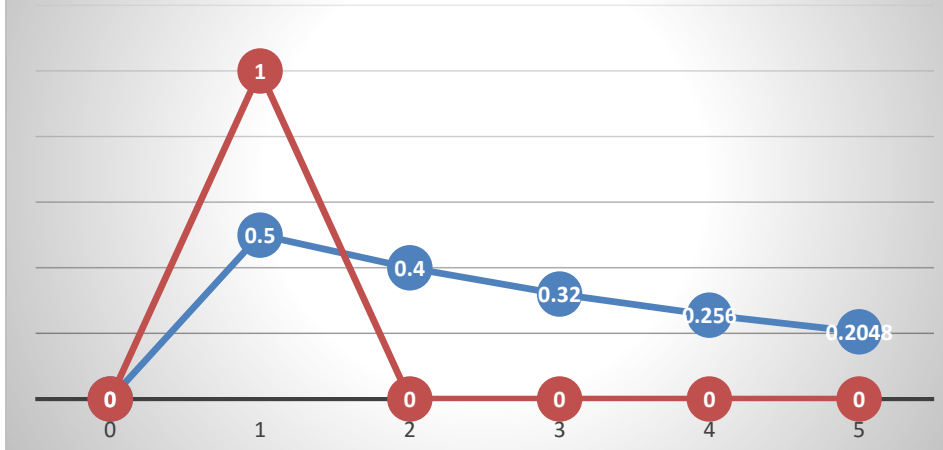
Accelerationist hypothesis fails



Independence hypothesis fails



Both hypotheses fail



Conclusions

- On the independence hypothesis
  - M policy (``demand shocks'') affects potential output/natural rate. a,b positive. But precise values?
  - Macro/micro evidence for highly persistent effects mixed.
    - Most convincing is disenfranchising.

- On the accelerationist hypothesis (or its RE version)
  - Some evidence of lack of salience. Usable?

- On policy implications. Not quite there yet.
  We really do not know the relevant values of a,b, x
  Need to work much more on wage bargaining channel.
  Micro evidence on disenfranchising fairly strong.

- What should the Fed do today?