Should one reject the natural rate hypothesis?

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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 policy implications:
    • 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.

- 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.

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

United States   Euro Area
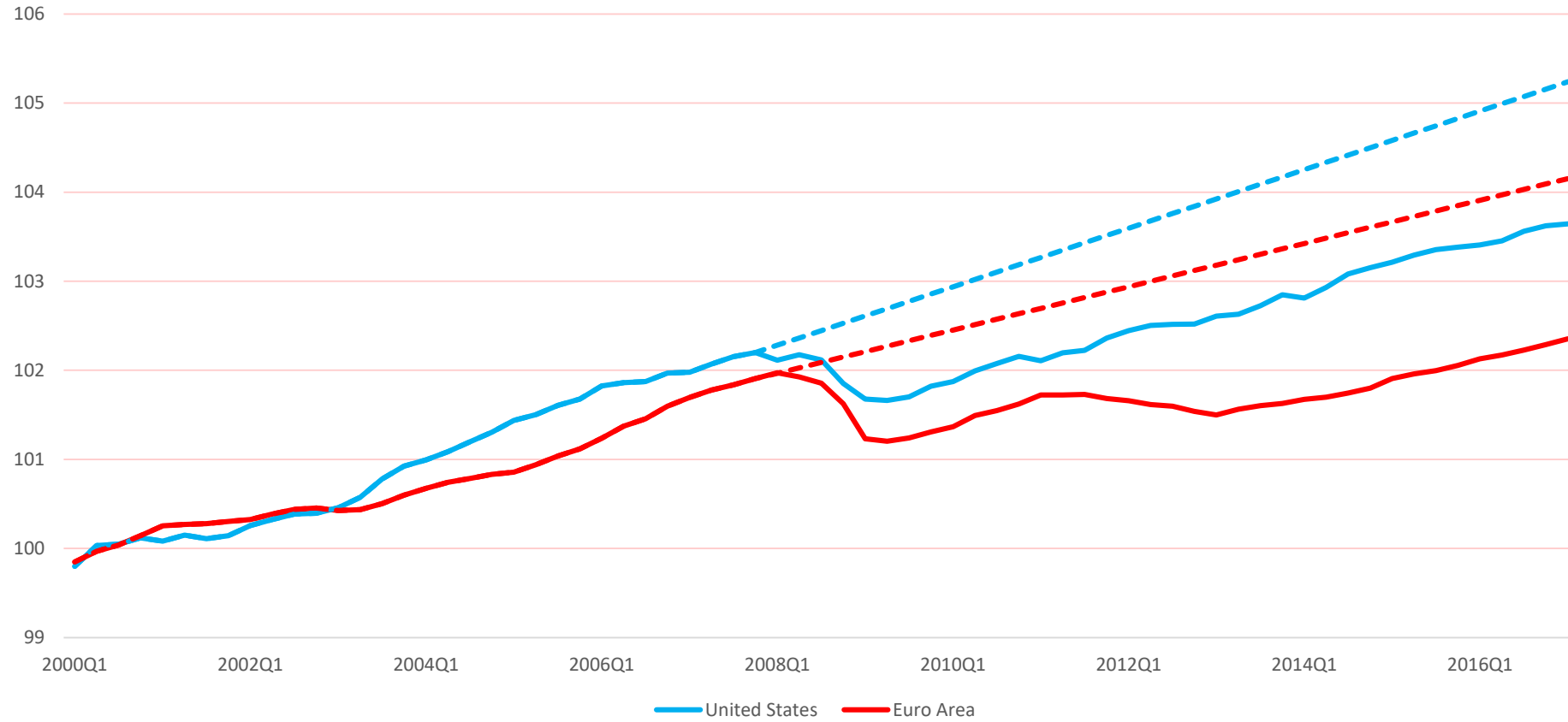
Advanced economies CPI inflation vs. Unemployment rate


● United States ● Euro Area
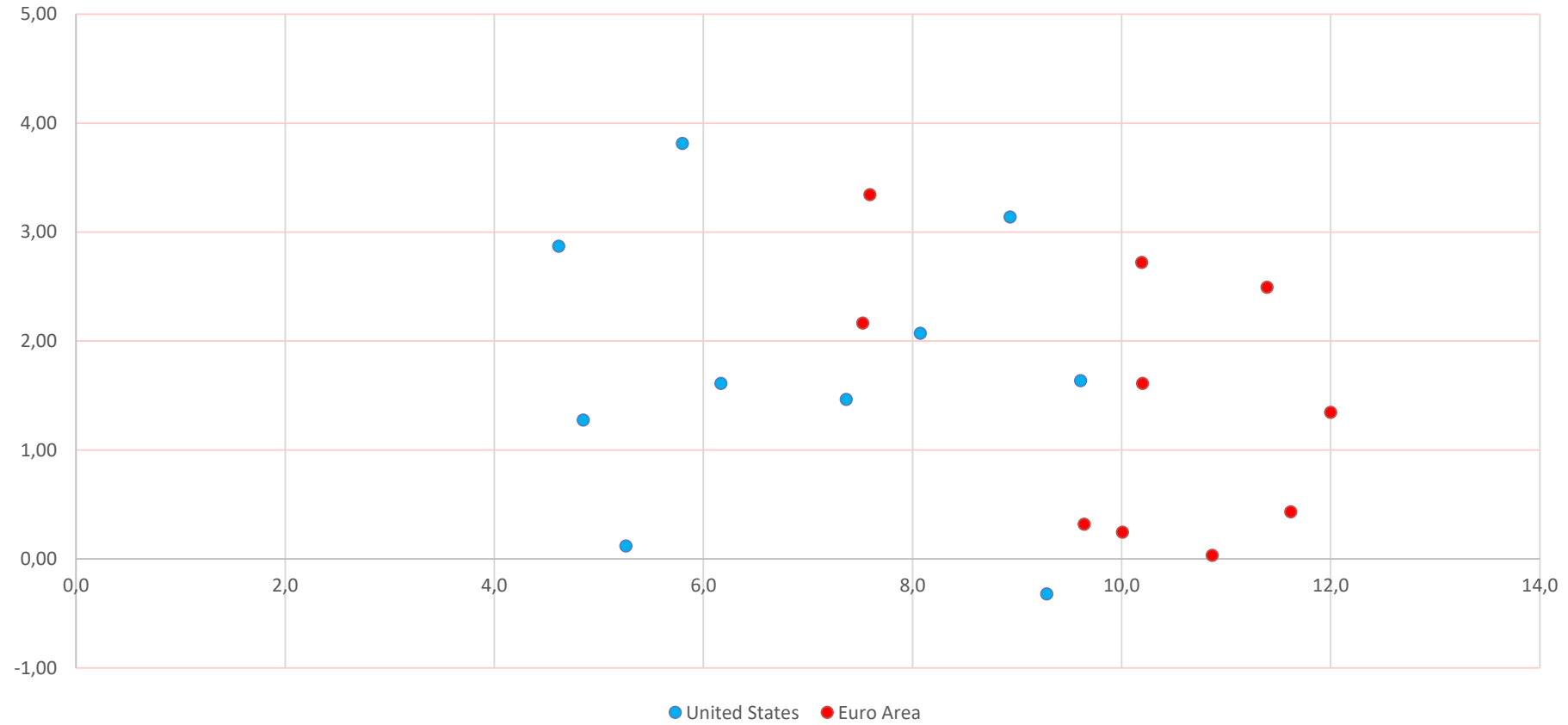
Map

- 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)
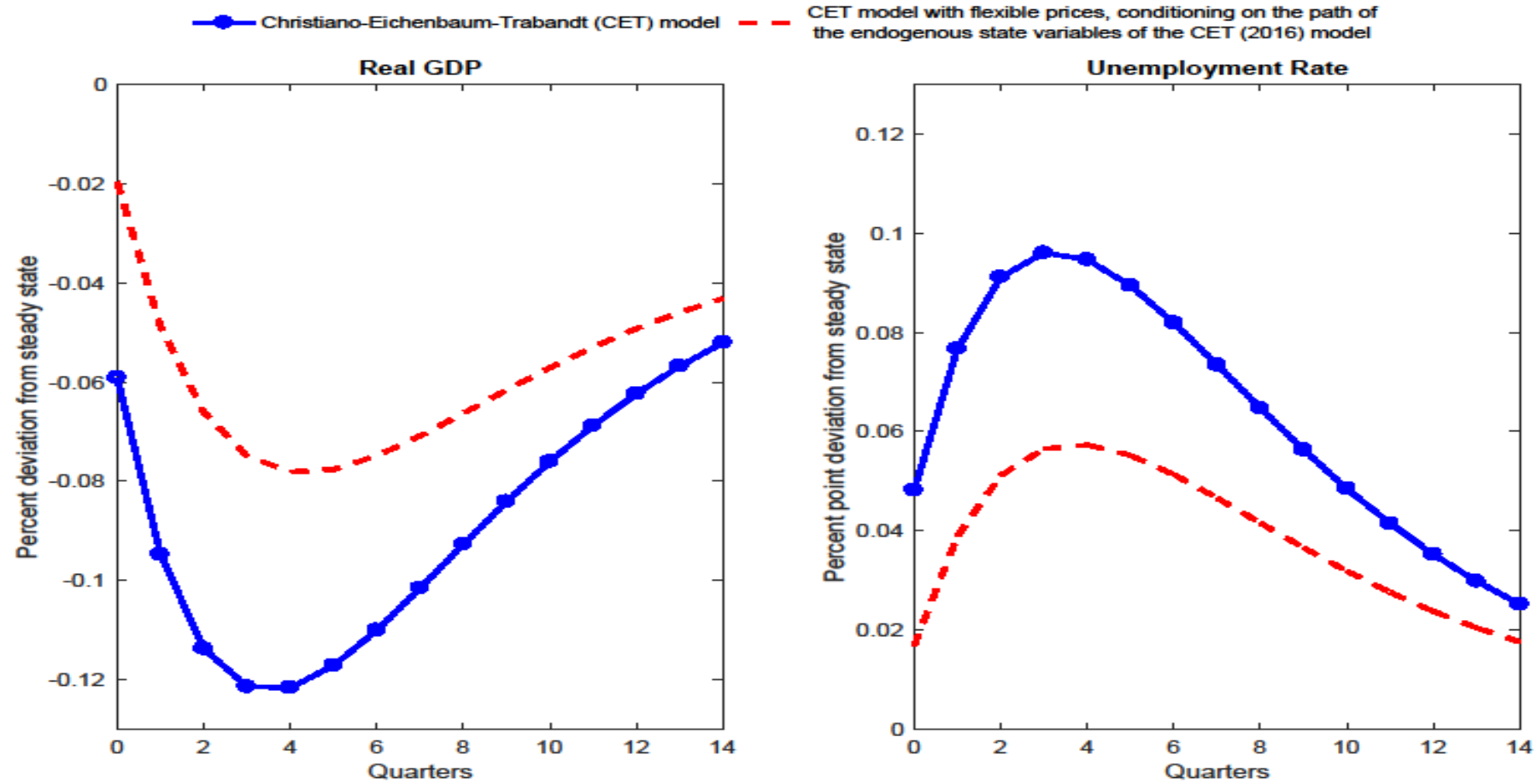
Macro evidence. Unemployment.

- 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?

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)
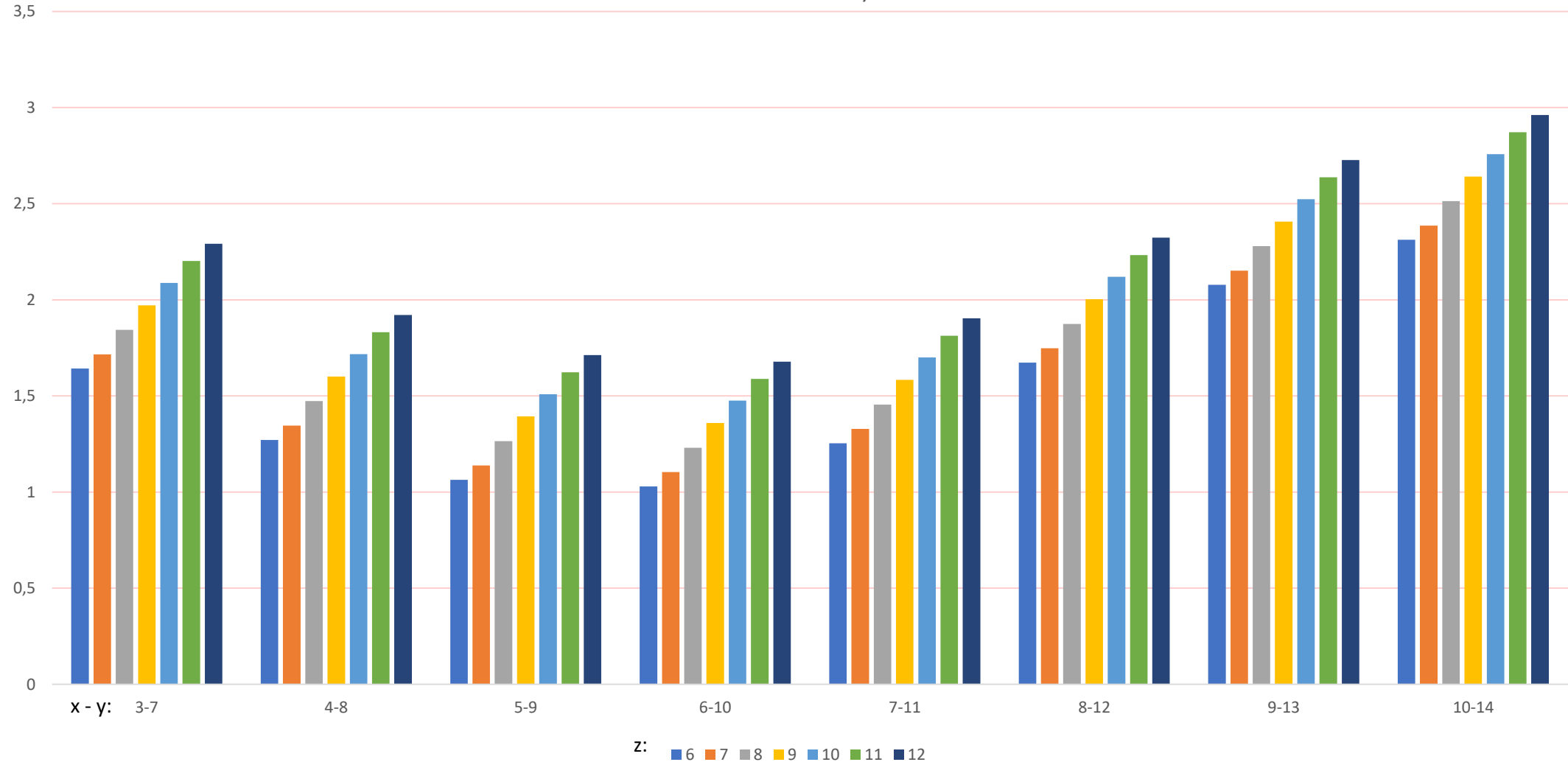
Macro evidence: Output

- 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
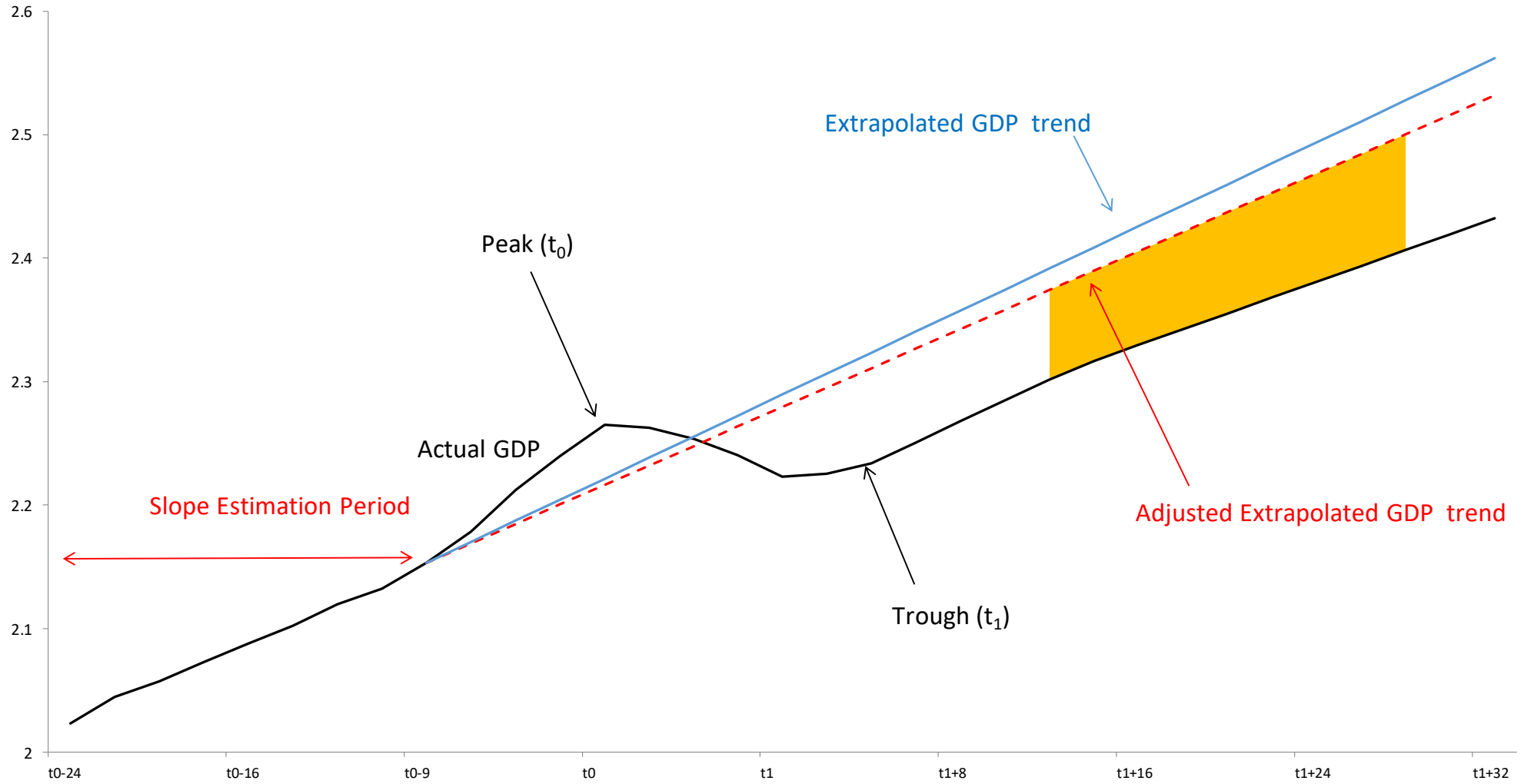
Disinflation recessions - Output gaps by pre-recession/post-recession windows
(Average output gap x to y years after the recession. Extrapolated trend estimated 2 to z years before the recession)
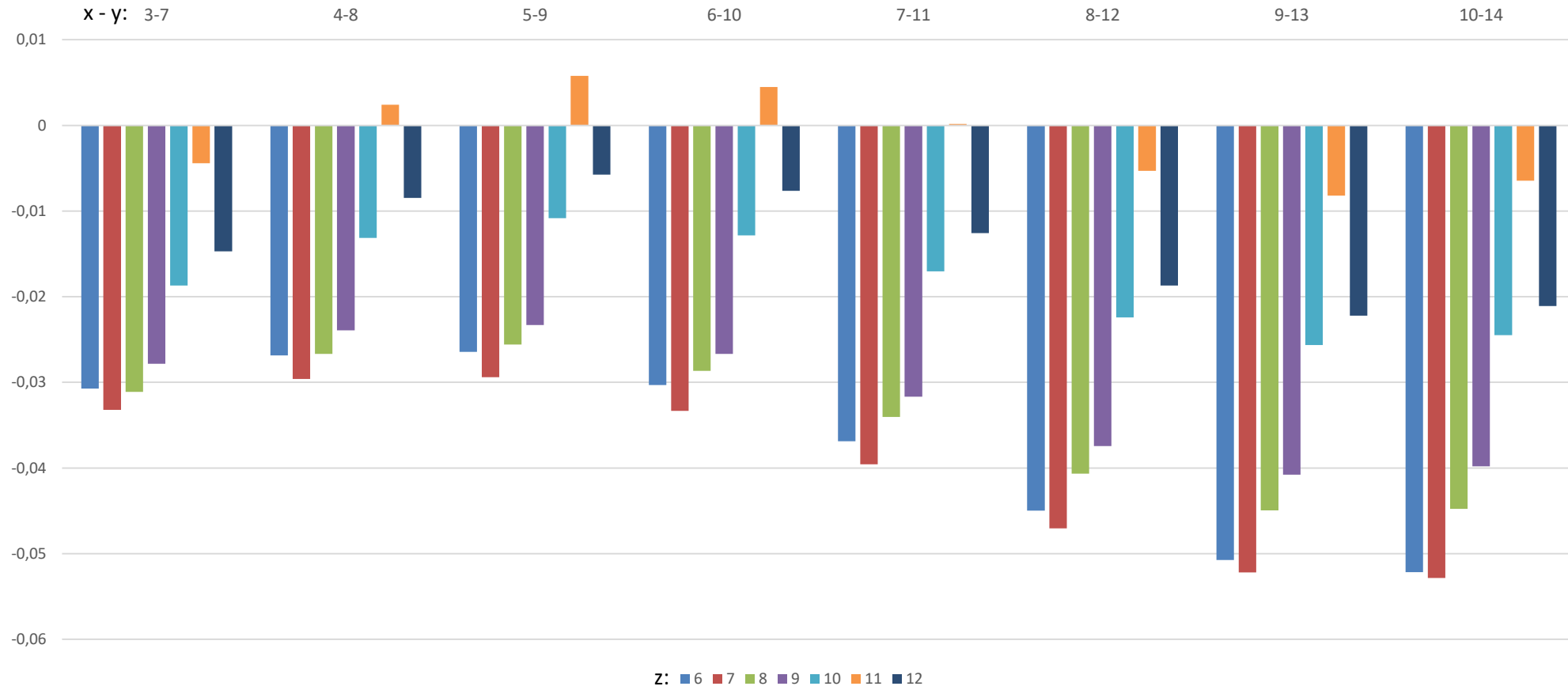
Can we learn from other recessions?

- 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.

Oil related recessions
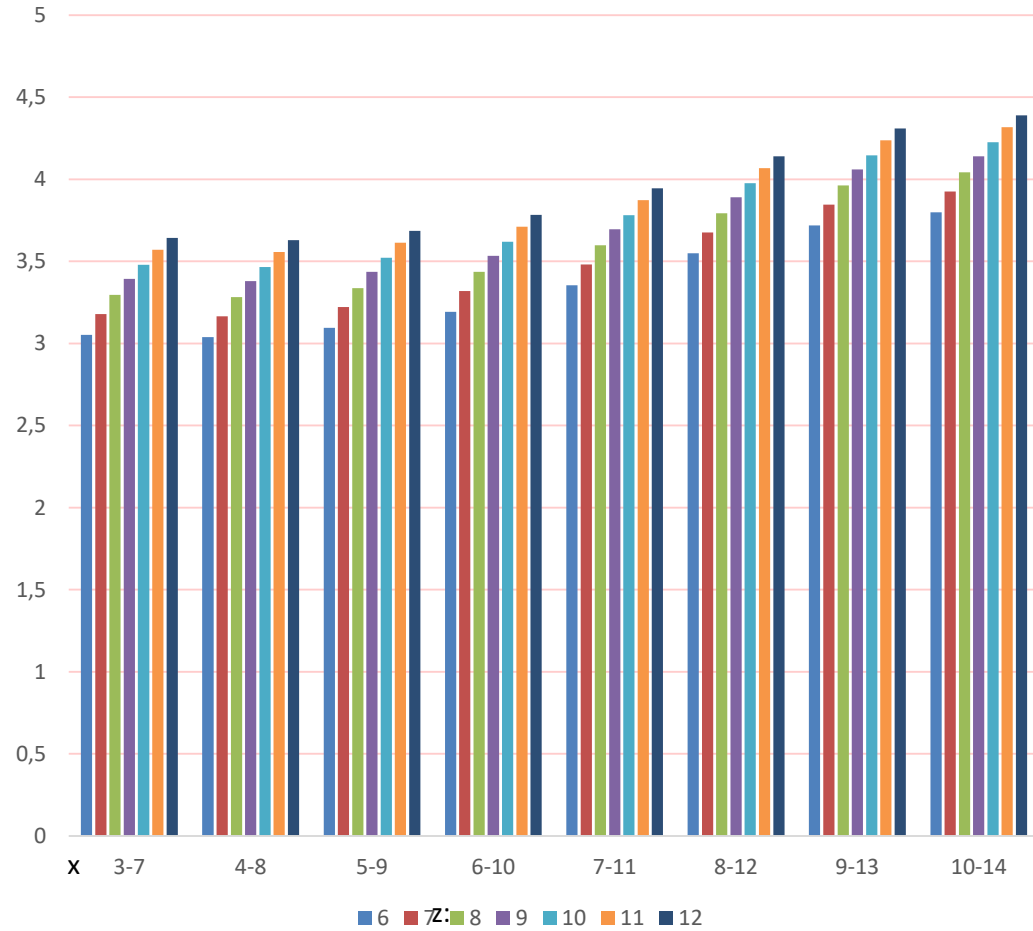
Financial crisis recessions
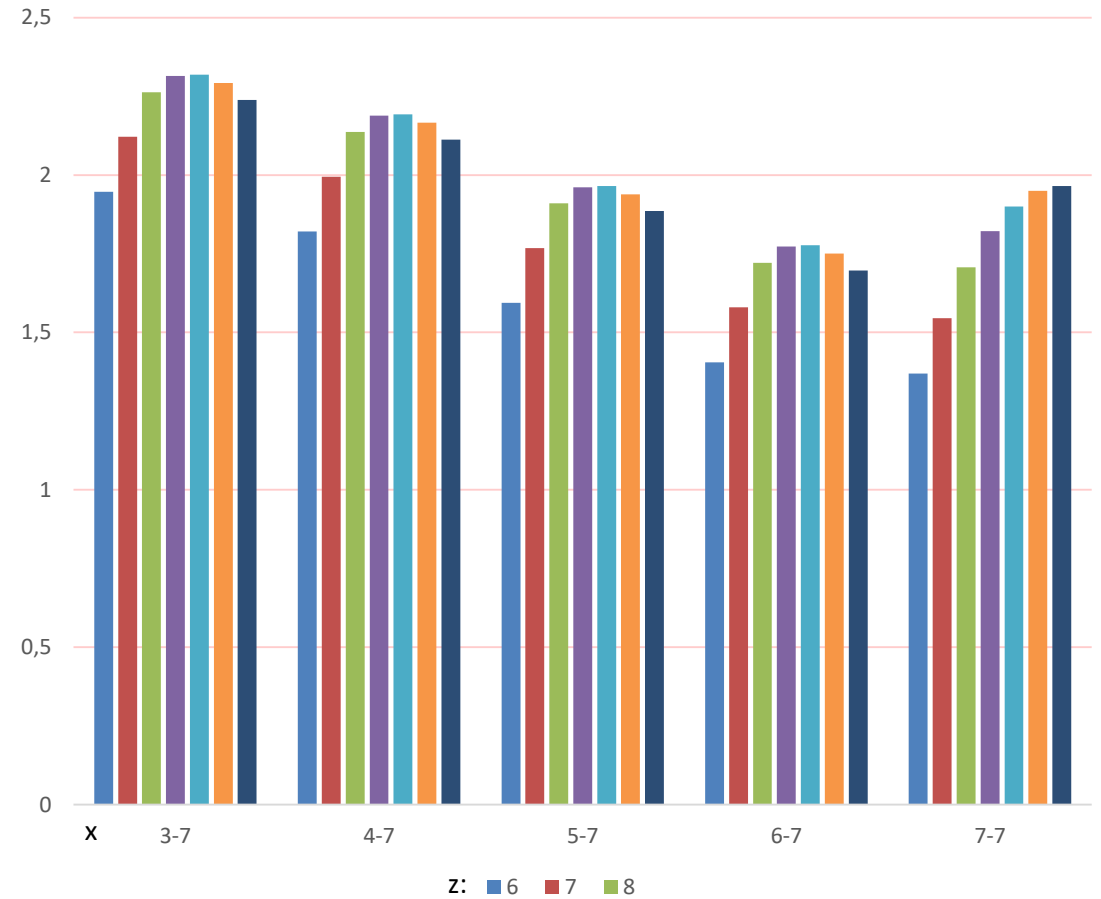
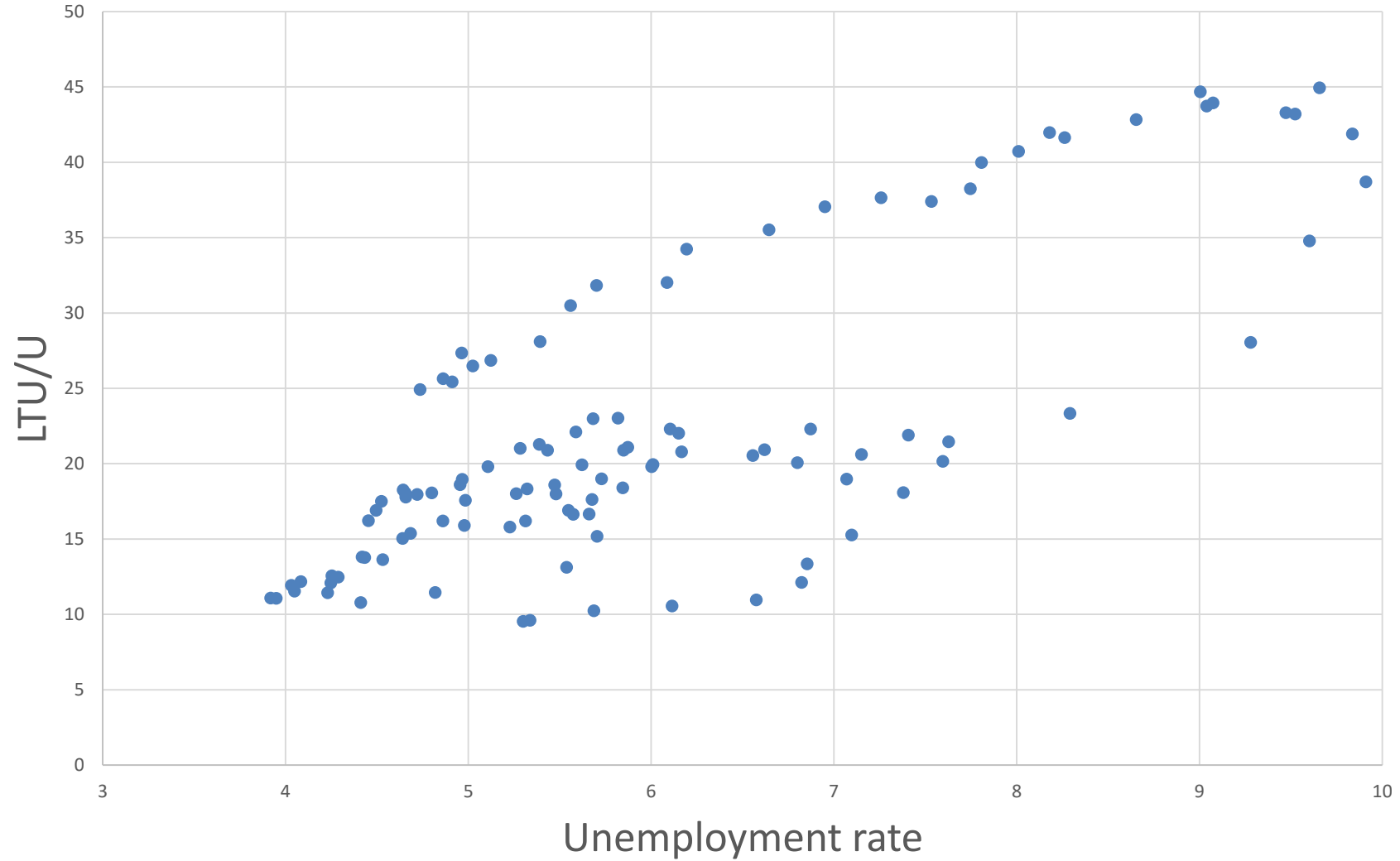Note: The 7-7 specification covers 11 out of 21 recessions

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.

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?

- The 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.
    - Acceptance rate: 35%, so 0.8 million. (0.6% of labor force)

Applications to disability insurance vs U rate, 1960-2014
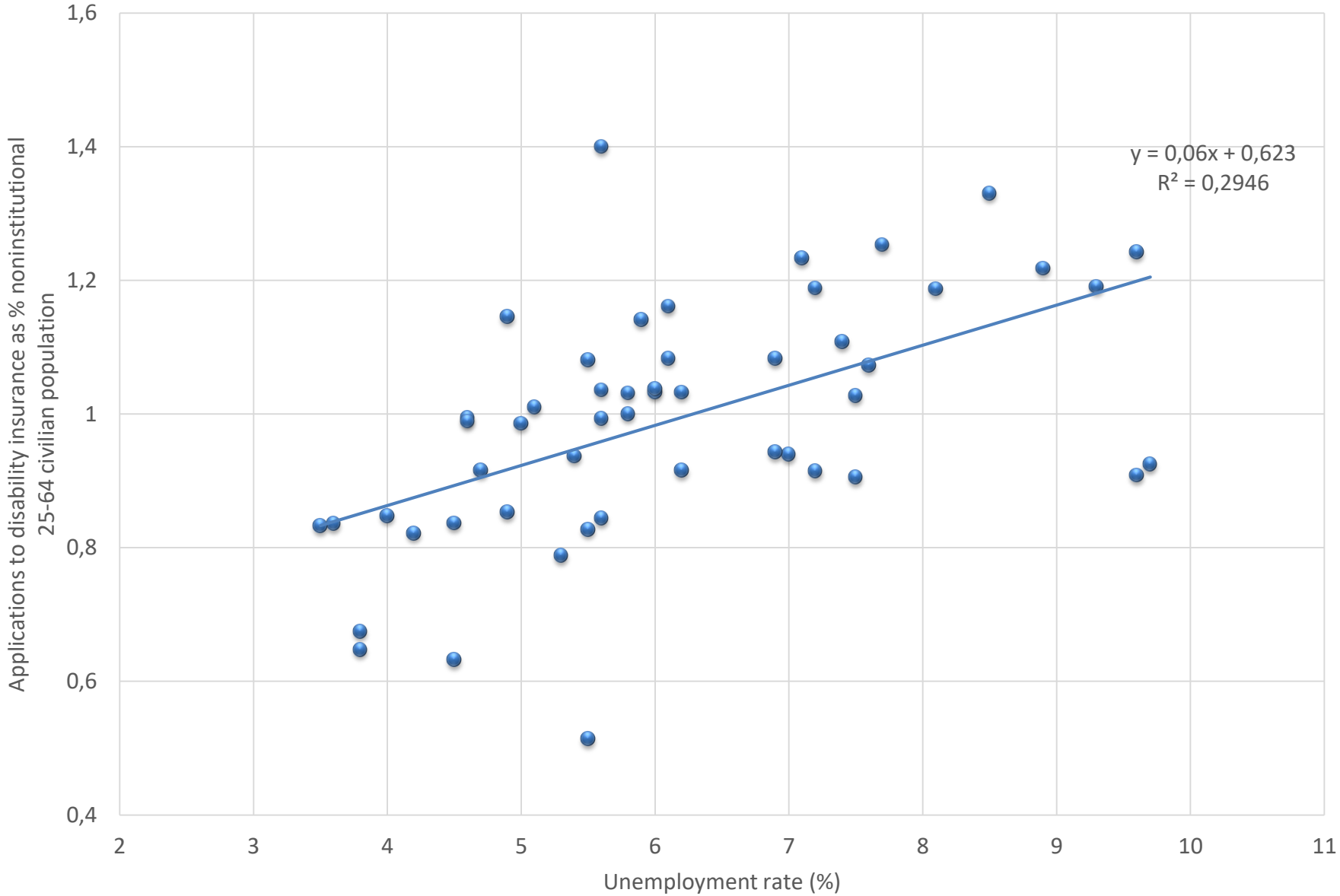
Micro evidence: Persistence channels. 4

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.

$$\Pi = a\ \Pi(-1) + b\ (U-U^*)$$

- Friedman: If try to use the trade off, a=1.
- (Lucas/Sargent. Rational expectations version)

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

Lagged inflation coefficient +/- 1 std
15-year rolling samples
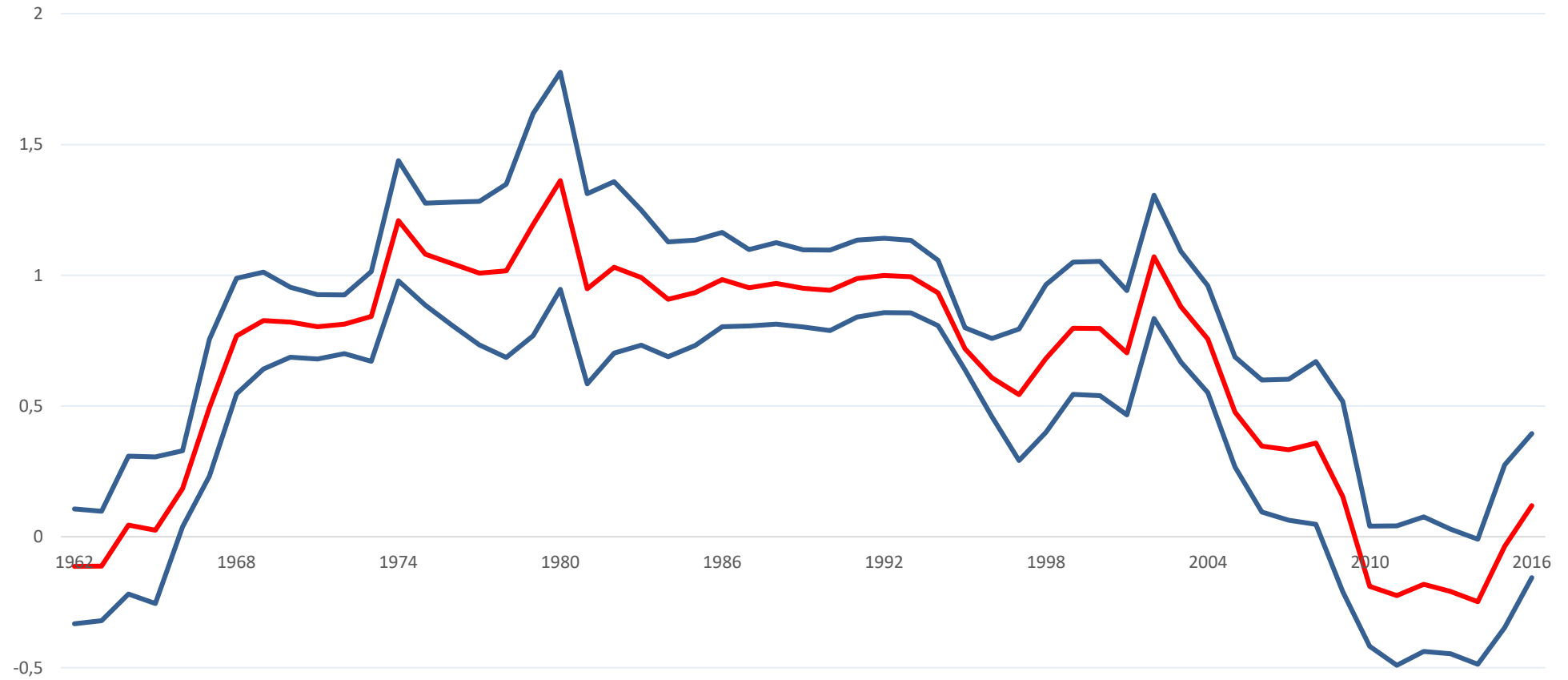
Credibility or lack of salience?

- 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).

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

	1981-3 to 1995-4		1996-1 to 2016-1	
	SPF	Michigan	SPF	Michigan
Core	0.498***	0.375***	0.547***	-0.111
	[0.034]	[0.035]	[0.073]	[0.145]
Headline – Core	0.125*	0.288*	0.077**	0.231**
	[0.126]	[0.127]	[0.035]	[0.069]
Constant	2.024***	1.873***	1.098**	3.13***
	[0.207]	[0.209]	[0.158]	[0.314]
Observations	58	58	83	83
R-squared	0.676	0.508	0.396	0.111

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 $-x \leq \Pi \leq +x$, RE otherwise

Salience if x>0

Policy implications. 2

- Optimal policy, with commitment, if CB maximizes output:

$$y^* = b\ x/c(1-a) \qquad\qquad y-y^* = x/c$$

- Strict hysteresis and lack of salience: Endogenous growth…

$$\Delta y^* = \Delta y = b\ x/c$$

Interpretation.
　　The higher a, or b. 　　The higher potential output.
　　The higher x, the lower c. The higher potential output

What if only one of the hypotheses fails?   (say salience)
　　Return to an increase in output higher.

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 rational expectations version)
  - Some evidence of lack of salience.

- 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.

- Is the current US labor participation case strong enough?