U.S. Monetary Policy—a View from Macro Theory

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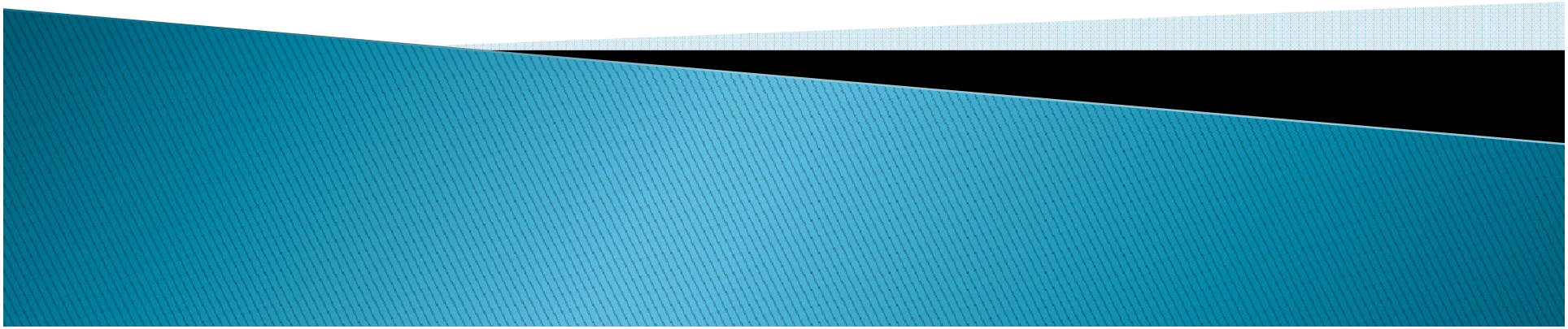
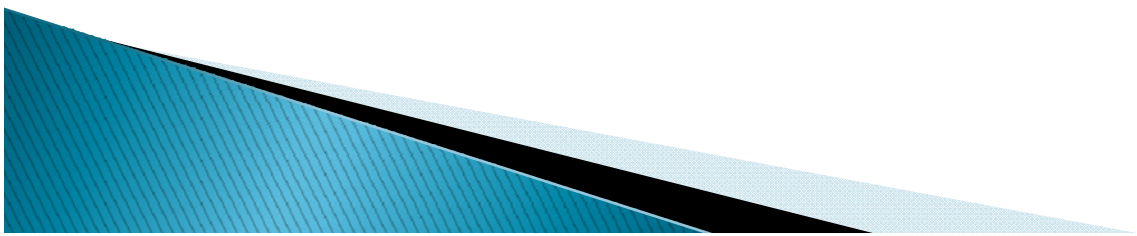
Federal Reserve Bank of St. Louis
Remarks at Bank of Greece
May 23, 2012



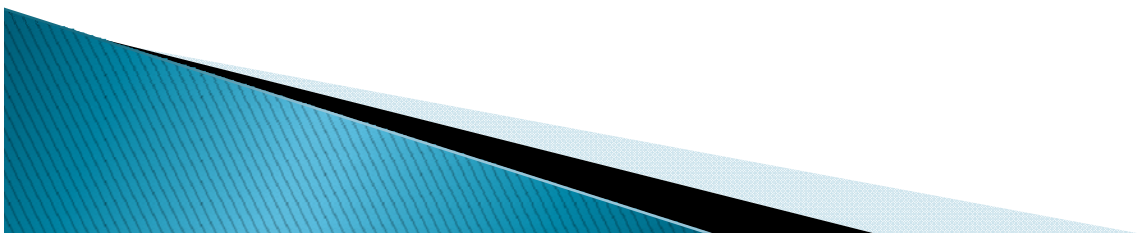
Disclaimer :

- Today's talk is about what macro theory implies about aspects of the policy process in the United States. There is and always will be some discrepancy with practice.
- I will be glad to answer questions during and after the talk.
- The ideas and opinions in this talk are mine and do not necessarily represent official views of the Federal Reserve Bank of St. Louis or any other part of the Federal Reserve system.



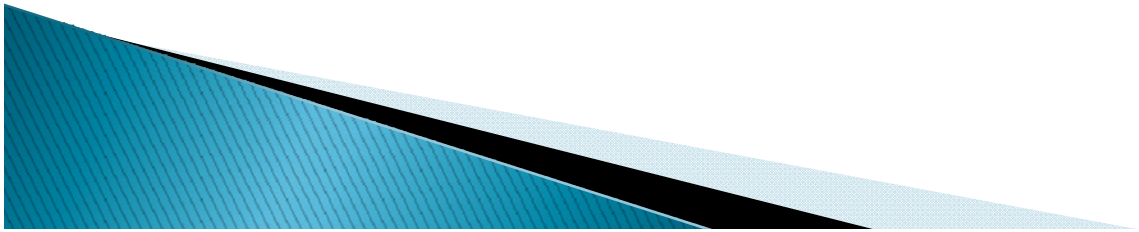
Main Ideas

1. DSGE—an element of Modern Macro Theory.
2. The U.S. monetary policy process in a DSGE model.
3. Is the Zero Lower Bound (ZLB) a trap?



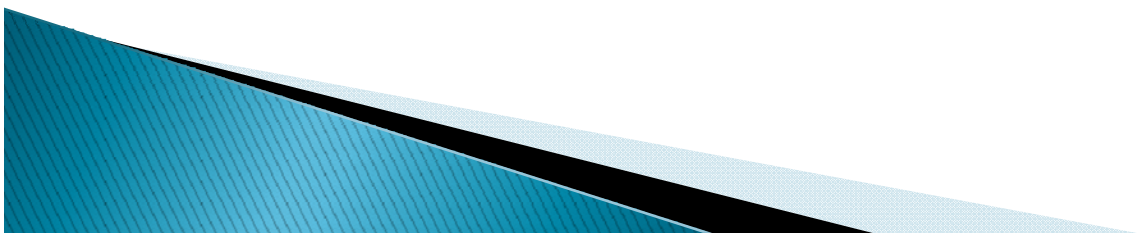
Models of Monetary Policy

- Rational Expectations and Real Business Cycles
- Lucas (1987, page 88) DSGE with sticky prices
  - "I prefer to pursue the more conventional view that the real effects of policy arise … because a monetary contraction has real effects, not only through its *information effects, but also through a direct effect, the latter arising because nominal prices do not* respond in proportion to movements in money as they occur. "… I would like to consider … monetary business cycle models based on … nominal price *rigidity."*
- Woodford (2003) among others.
- Key was to add an interest rate rule to the model.



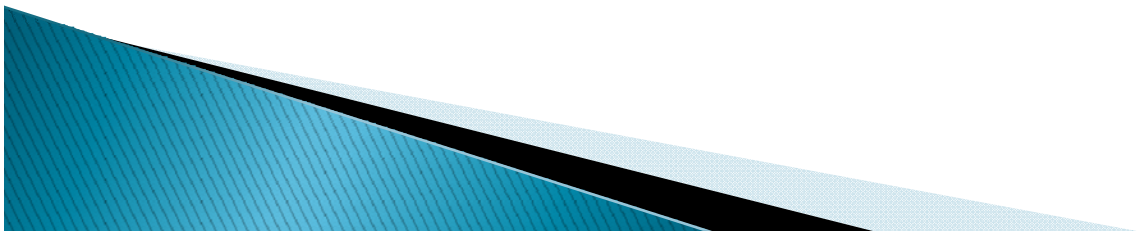
Macro Theory: What is DSGE?

- **Dynamic**—The model is built around a long-run equilibrium and describes the transition path from initial conditions to the steady state.
- **Stochastic**—The model includes random shocks to parameters governing behavior and underlying trends. Tries to match empirical properties of the data.
- **General Equilibrium**—the model considers the feedback effects from economy-wide changes in prices and interest rates. Transition paths depend on expected future prices.



Our DSGE Model

- Households maximize utility
- Firms maximize profits
- Government implements monetary policy
- Particular version is “New Keynesian”
- Results hold in all forward-looking models



Policy Process: Taylor (1993) Rule implies a Dual Mandate

$$R_t - R^* = \theta_\pi(\pi_t - \pi^*) + \theta_y(y_t - y_t^*)$$

Inflation Gap

The % deviation of inflation from target

Our baseline assumption sets $\theta_\pi = 0.5$

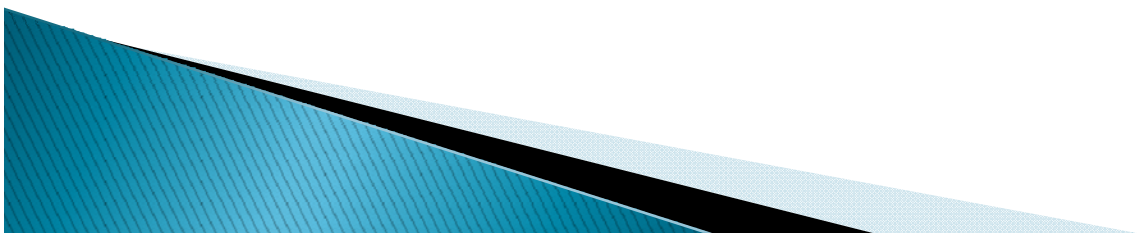
Output Gap

The % deviation of GDP from potential GDP

Our baseline assumption sets $\theta_y = 0.5$

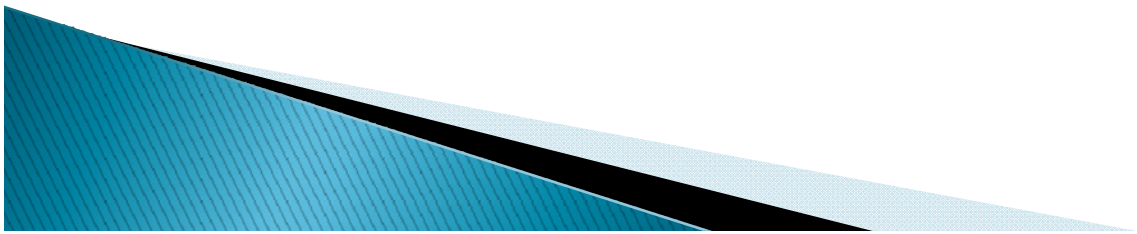
Is hitting the zero lower bound a bad thing?

- Maybe not
  - Friedman (1969) Kocherlakota (2009).
  - Williams (2009) "… central banks should 'embrace' the zero lower bound."
- But it can be
  - Benhabib, Schmitt-Grohe and Uribe (2001).
  - Output stabilization policy constrained.
  - Saver's are forced into risky assets to earn positive returns.

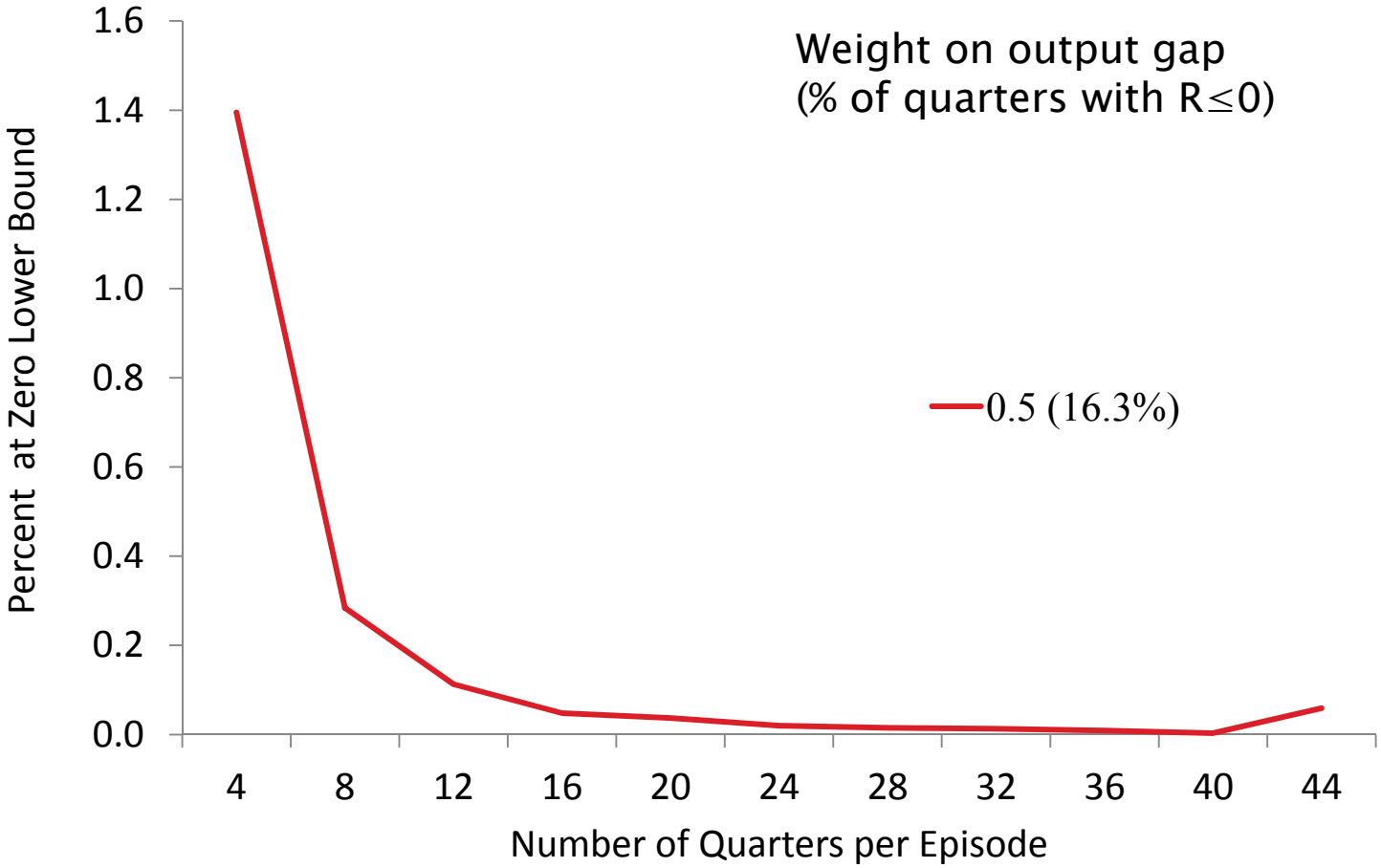


How likely are we to reach the zero lower bound if we use the Taylor Rule?

- We run counterfactual experiments with the model by drawing shocks to aggregate demand, technology, mark-up, and monetary policy.
- Each policy rule is run for 25,000 years.
- We record the number of times the nominal interest rate gets to zero and how long each episode lasts.

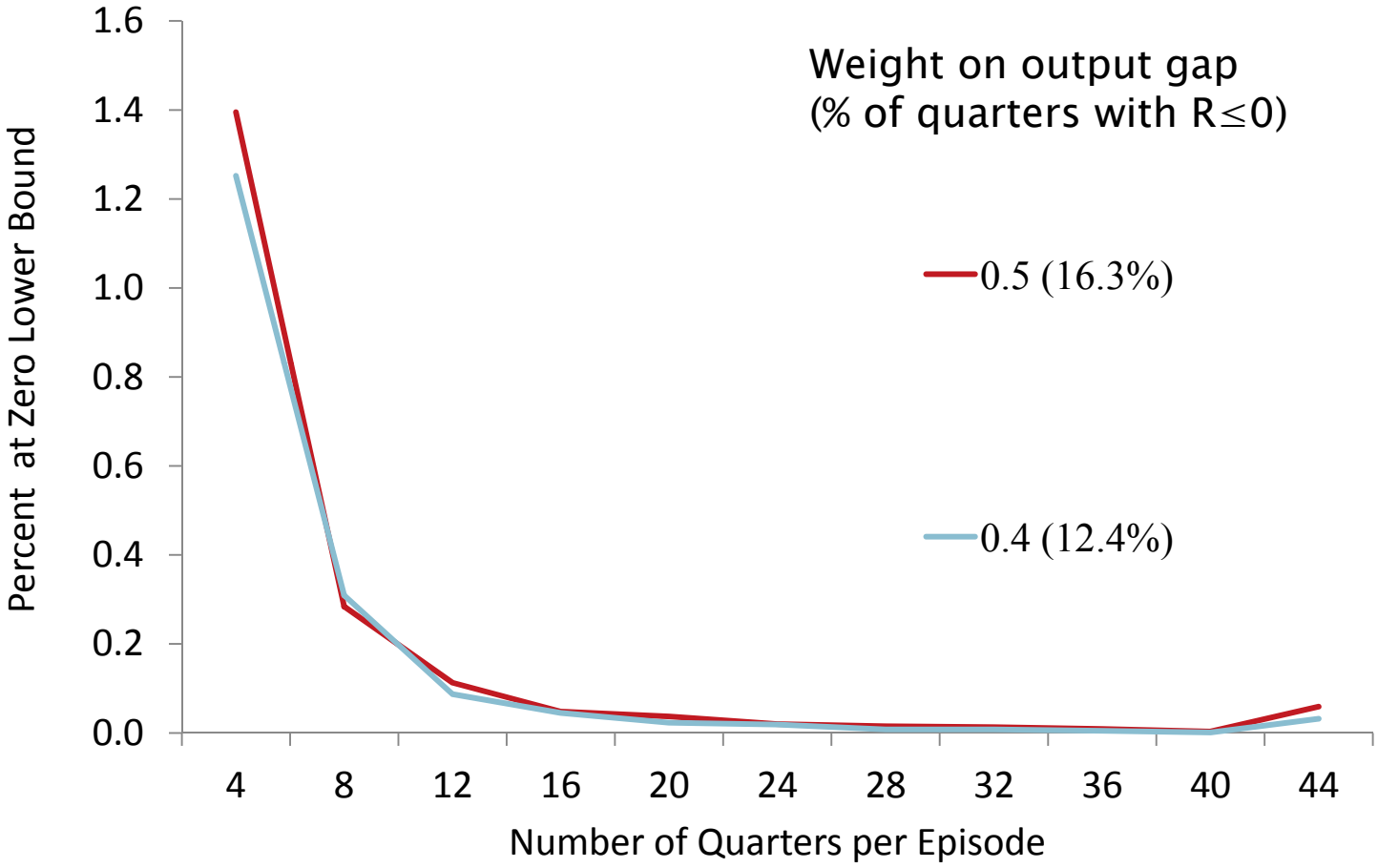


The Dual Mandate



Episode defined as having at least 2 consecutive quarters of zero nominal interest rate

The Dual Mandate



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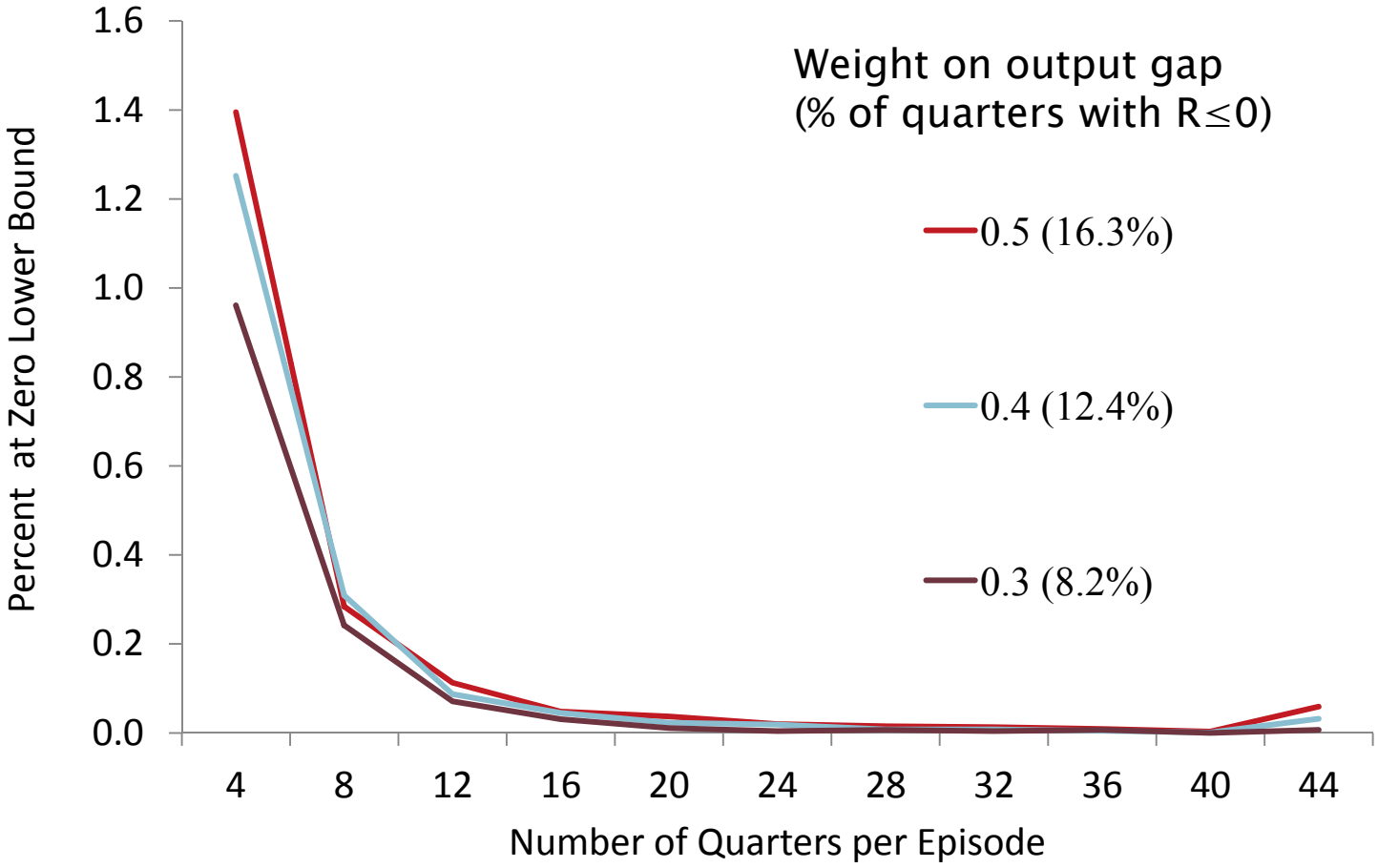

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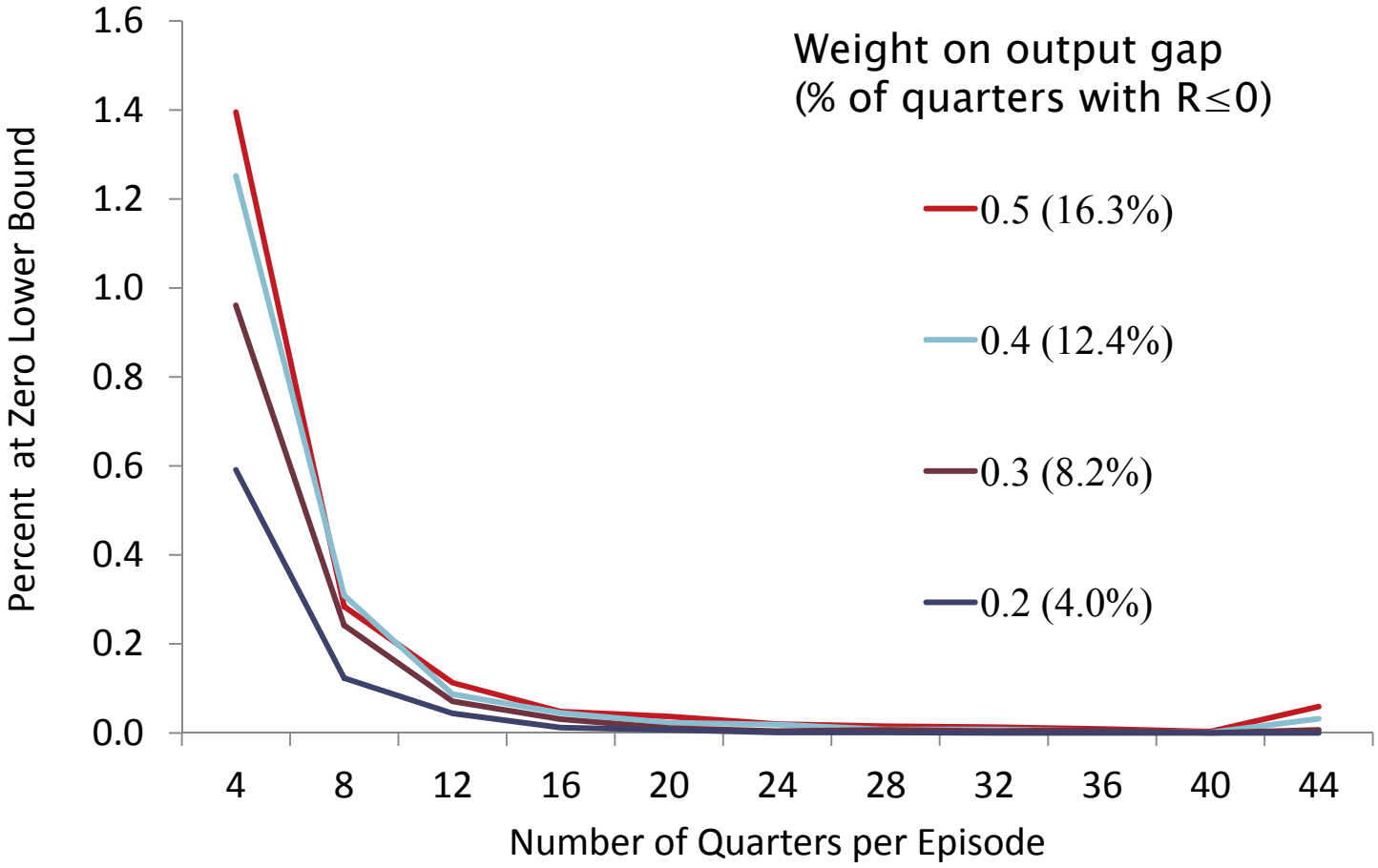

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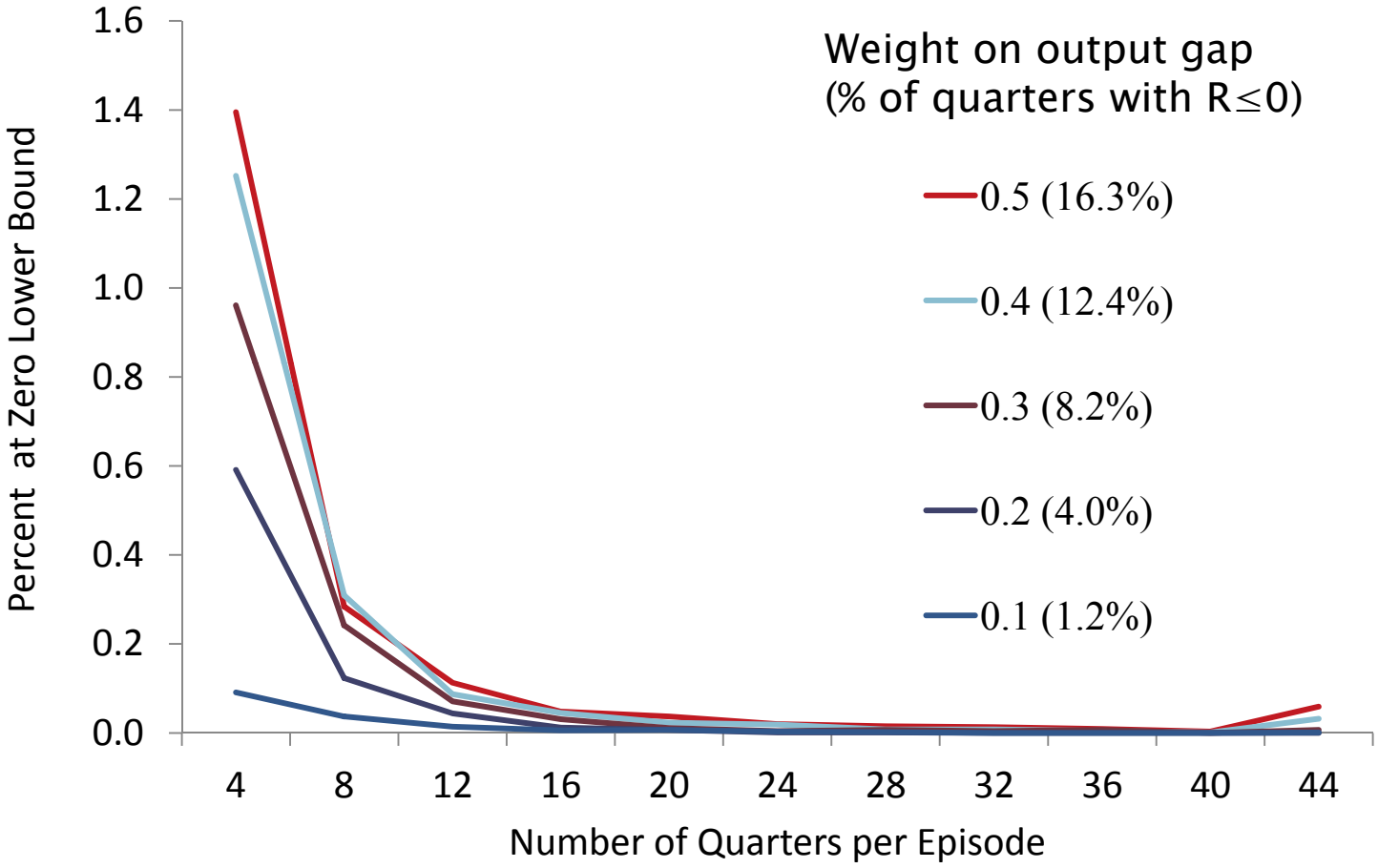

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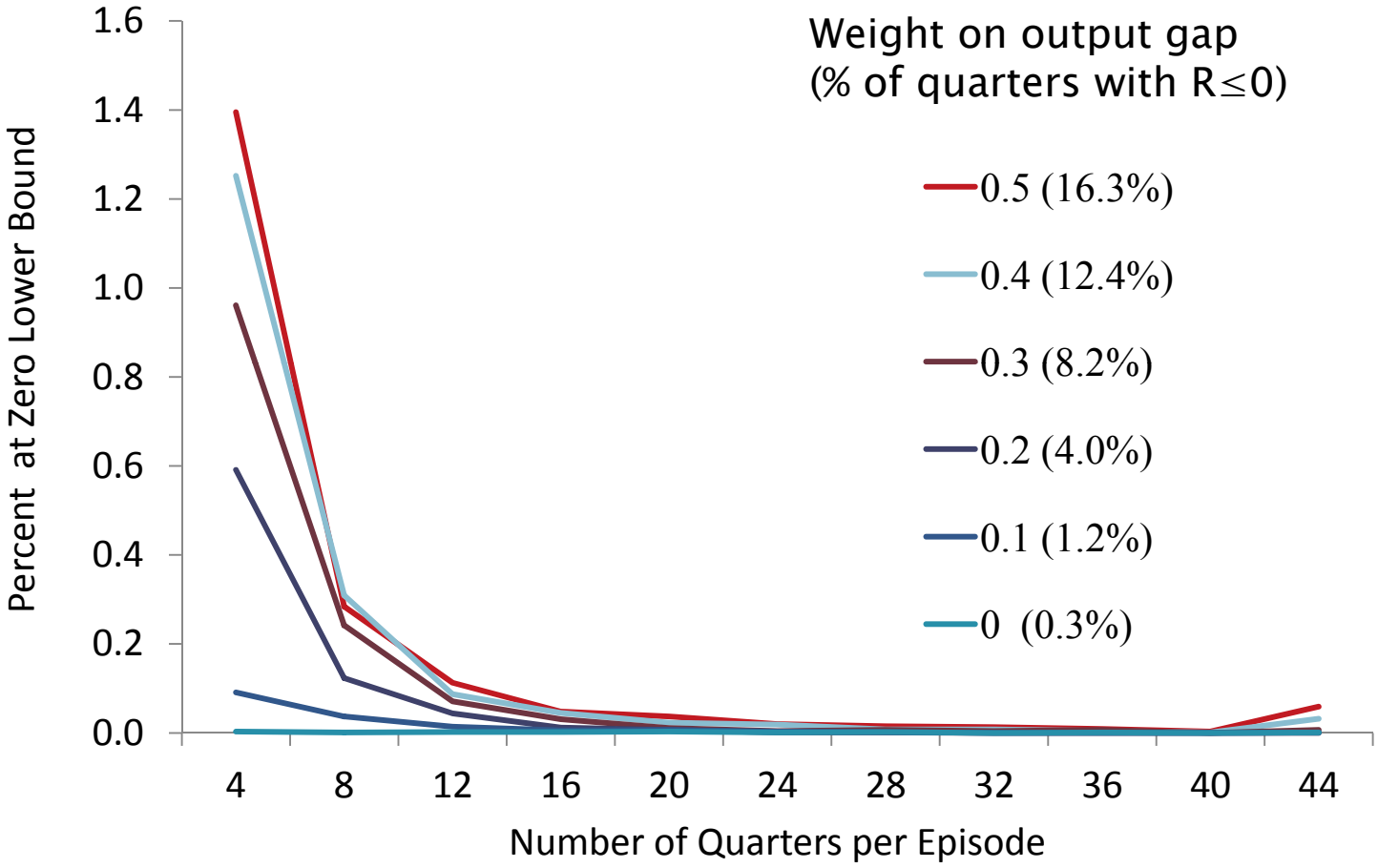

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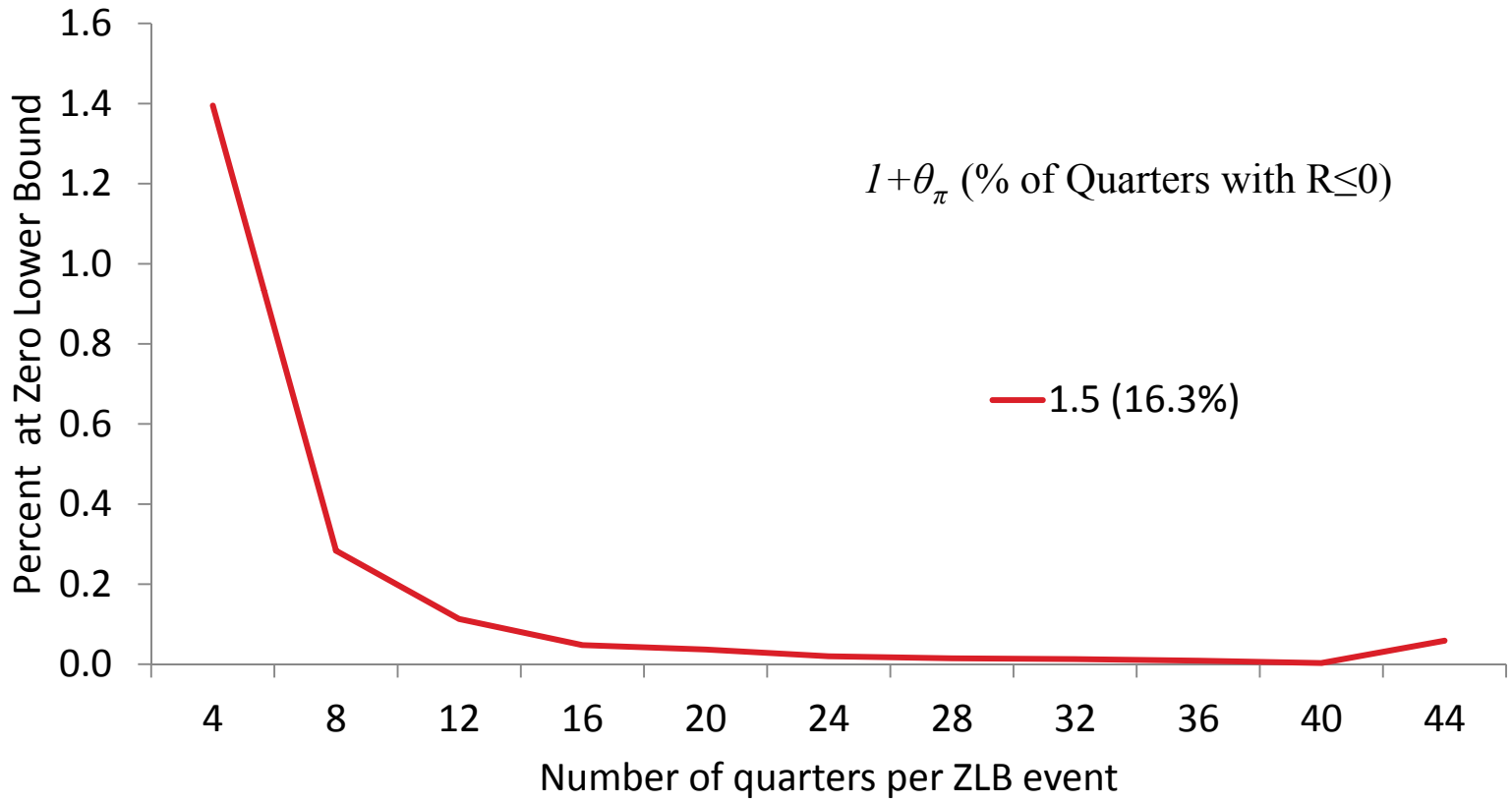
Sensitivity to Weight on Inflation Gap



ZLB event defined as having at least 2 consecutive quarters of zero nominal interest rate.

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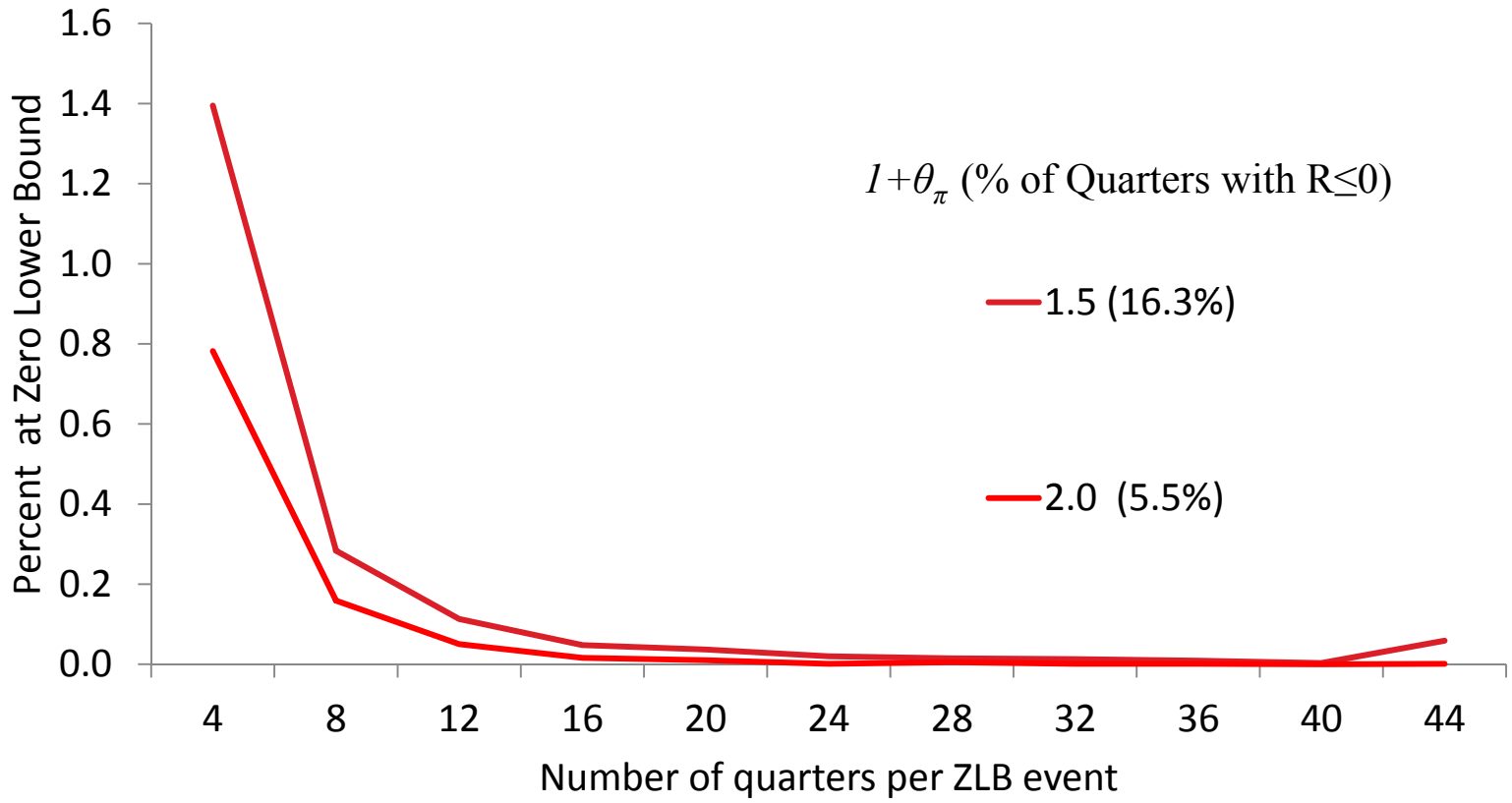

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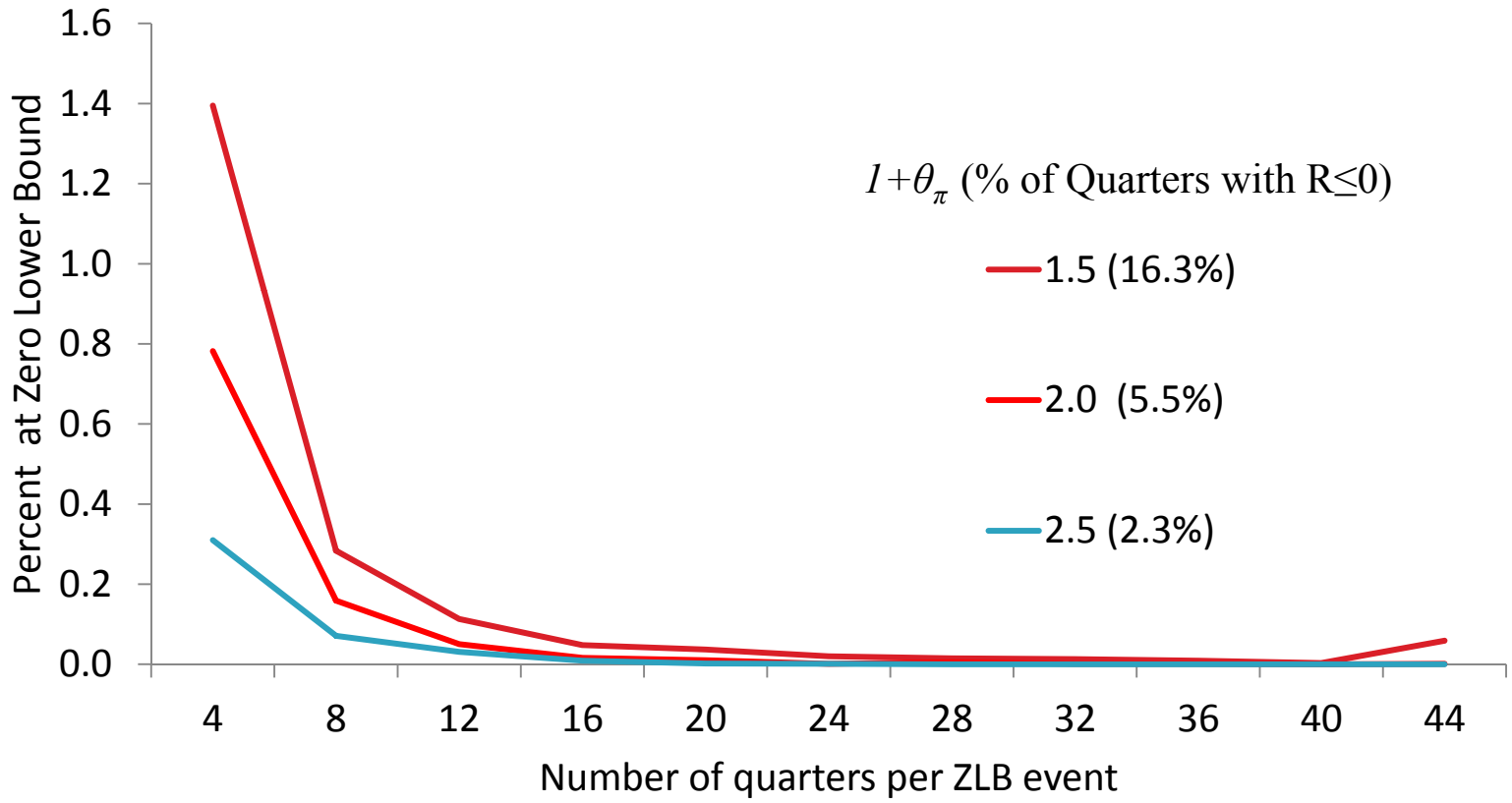

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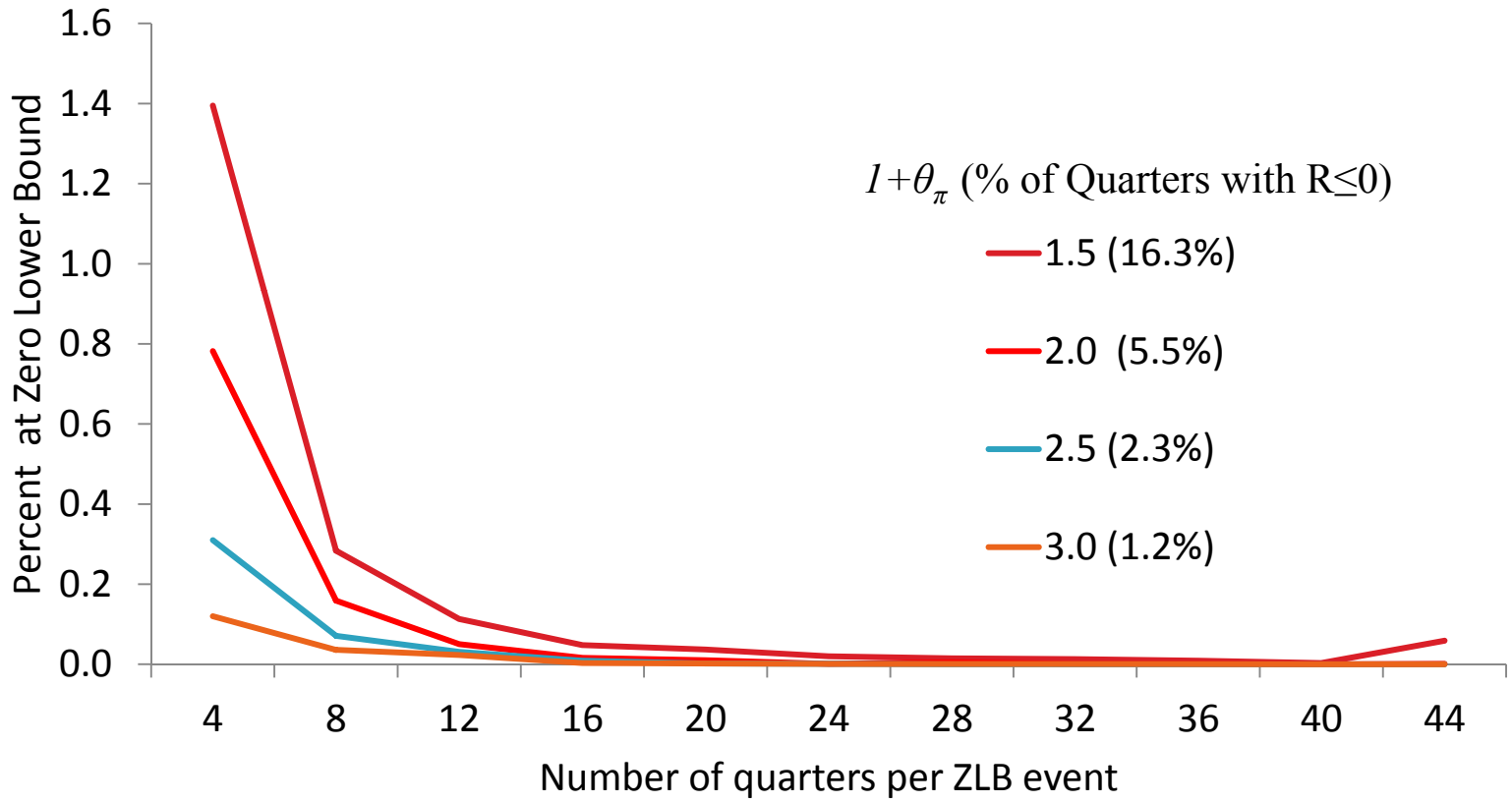

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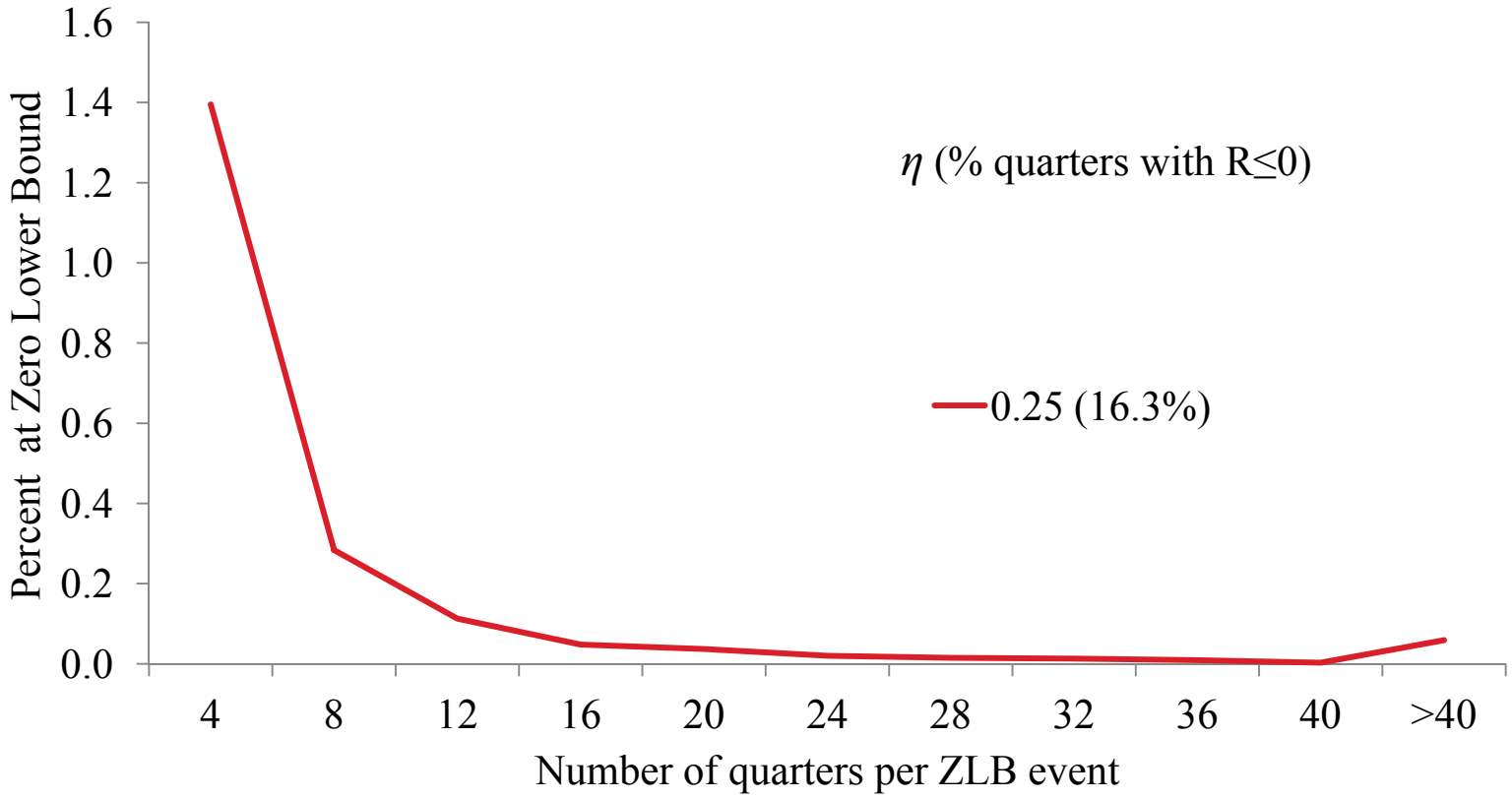
Sensitivity to Price Stickiness



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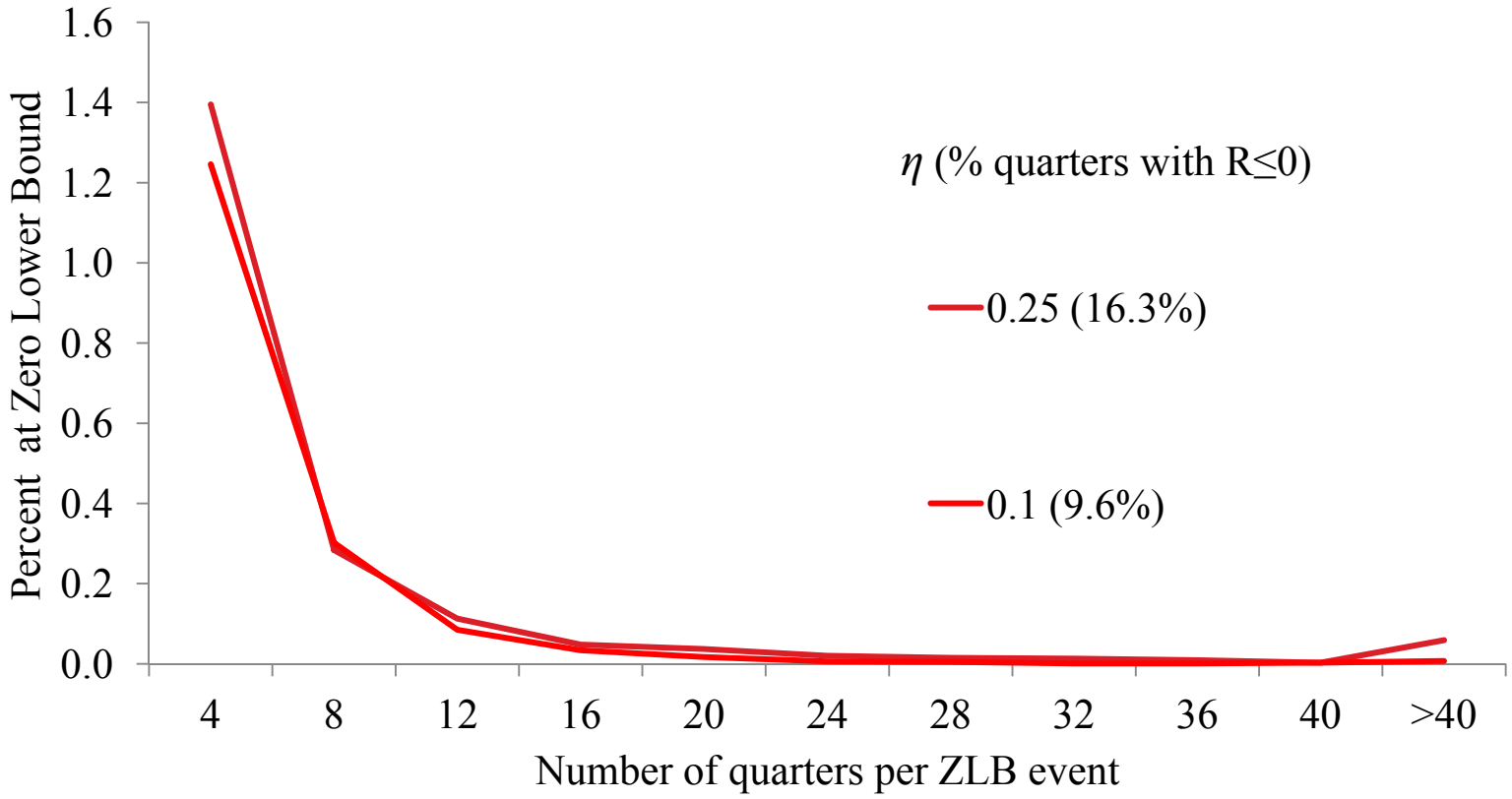

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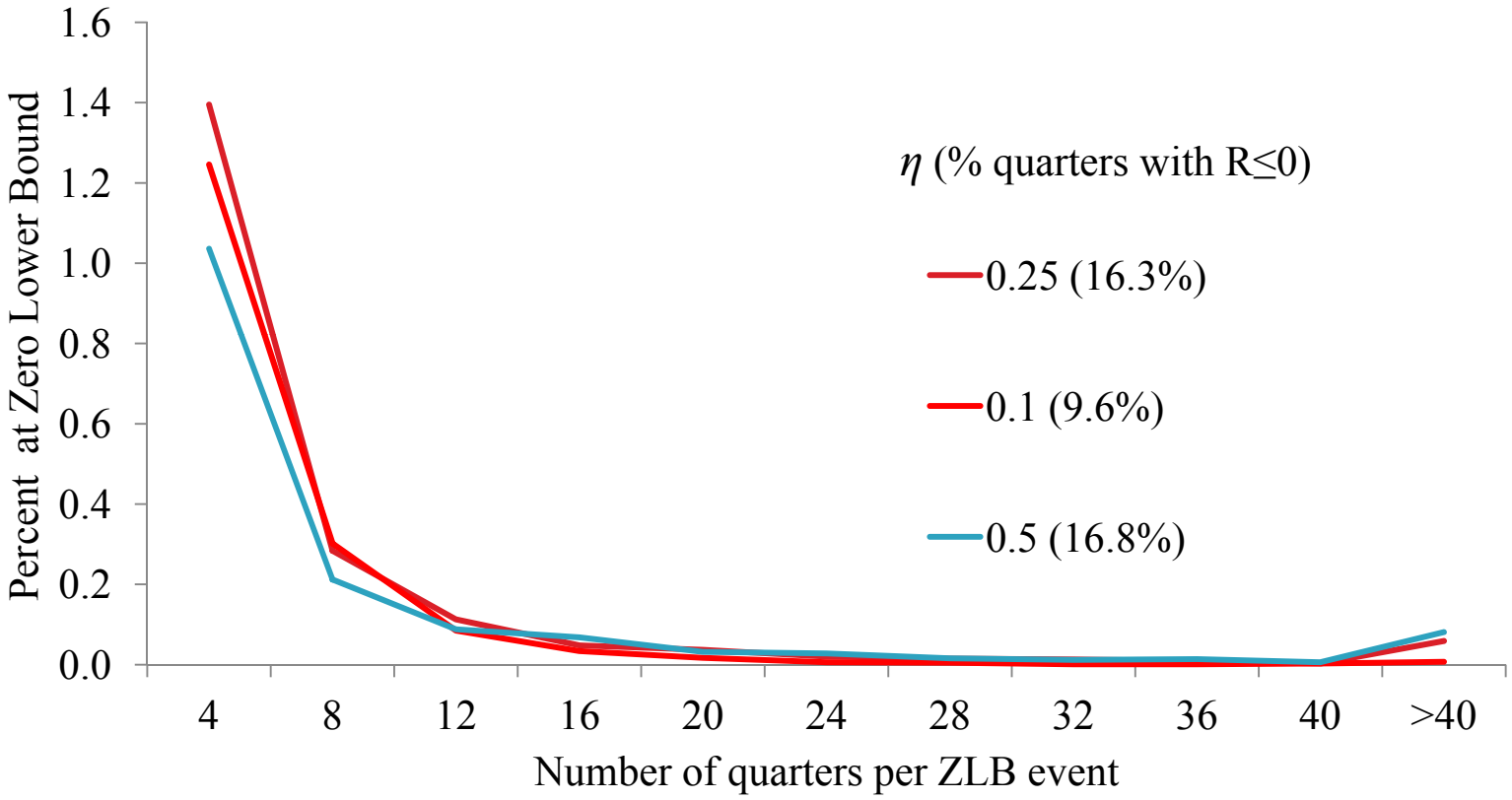

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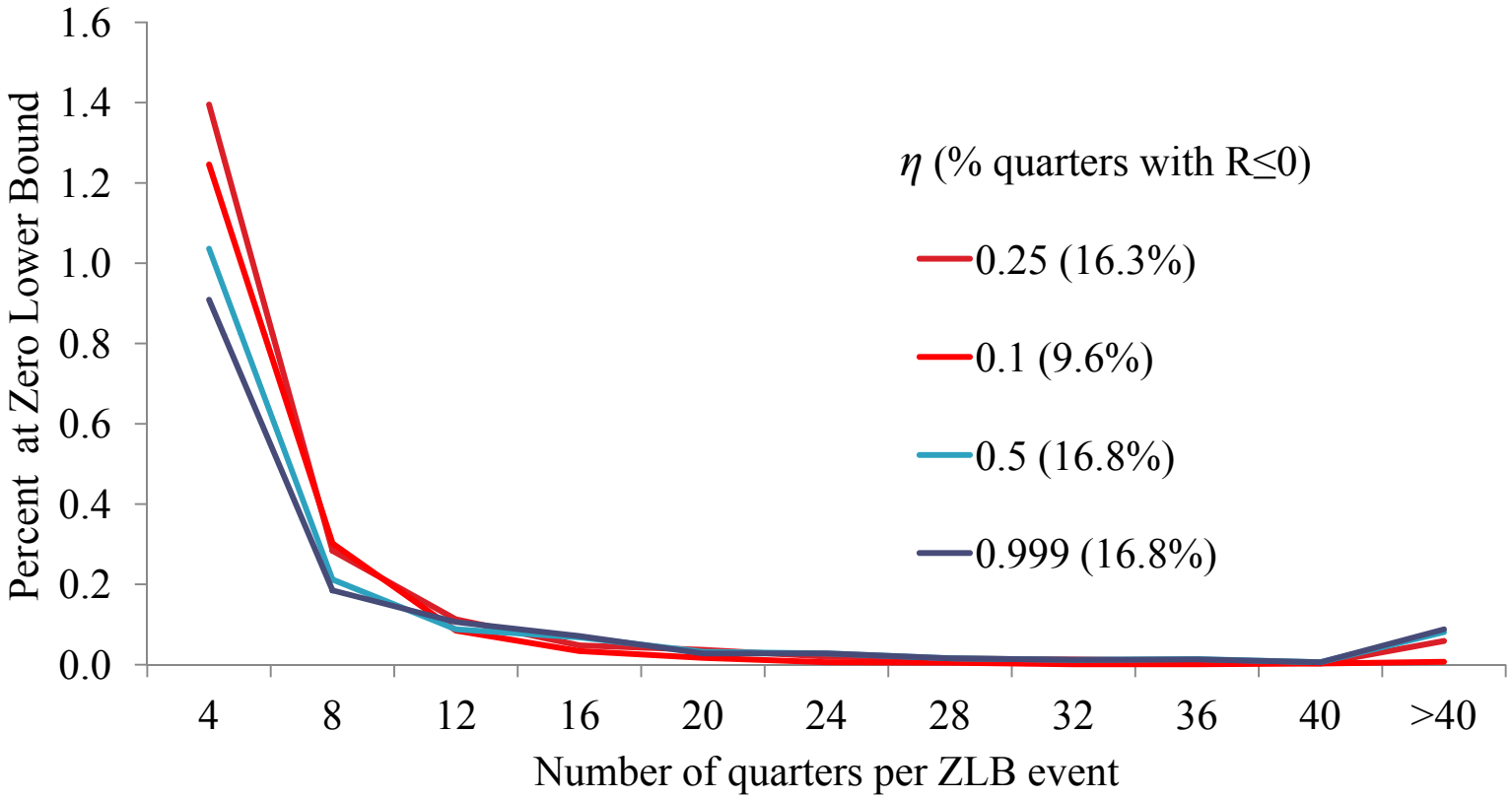
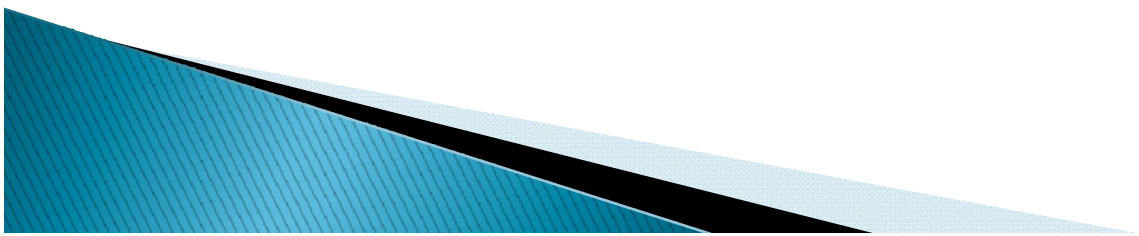


ZLB event defined as having at least 2 consecutive quarters of zero nominal interest rate.

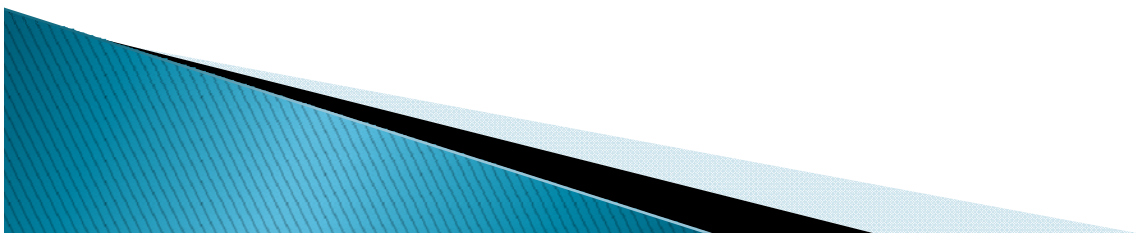
Intuition about the Dual Mandate

- Output and unemployment are volatile
- Taylor rule transfers that volatility to interest rates and inflation
- Giving up the dual mandate is one way to avoid the zero lower bound.
- Being extremely aggressive in fighting inflation also works.



A feasible way to be 'aggressive' Commitment to a Long-Run Inflation Target

- How can the Fed commit to a long-run inflation target?
  - It has to make past target misses part of future targets.
  - The objective is also to target the long-run inflation rate rather than just the short-run inflation rate. (Germany 1985, New Zealand, Canada, UK, etc post 1990—have not let bygones be bygones.)
- Svensson (1999) Free lunch paper
  - Discretion with price path => commitment with an inflation target



Taylor Rule is a Dual Mandate

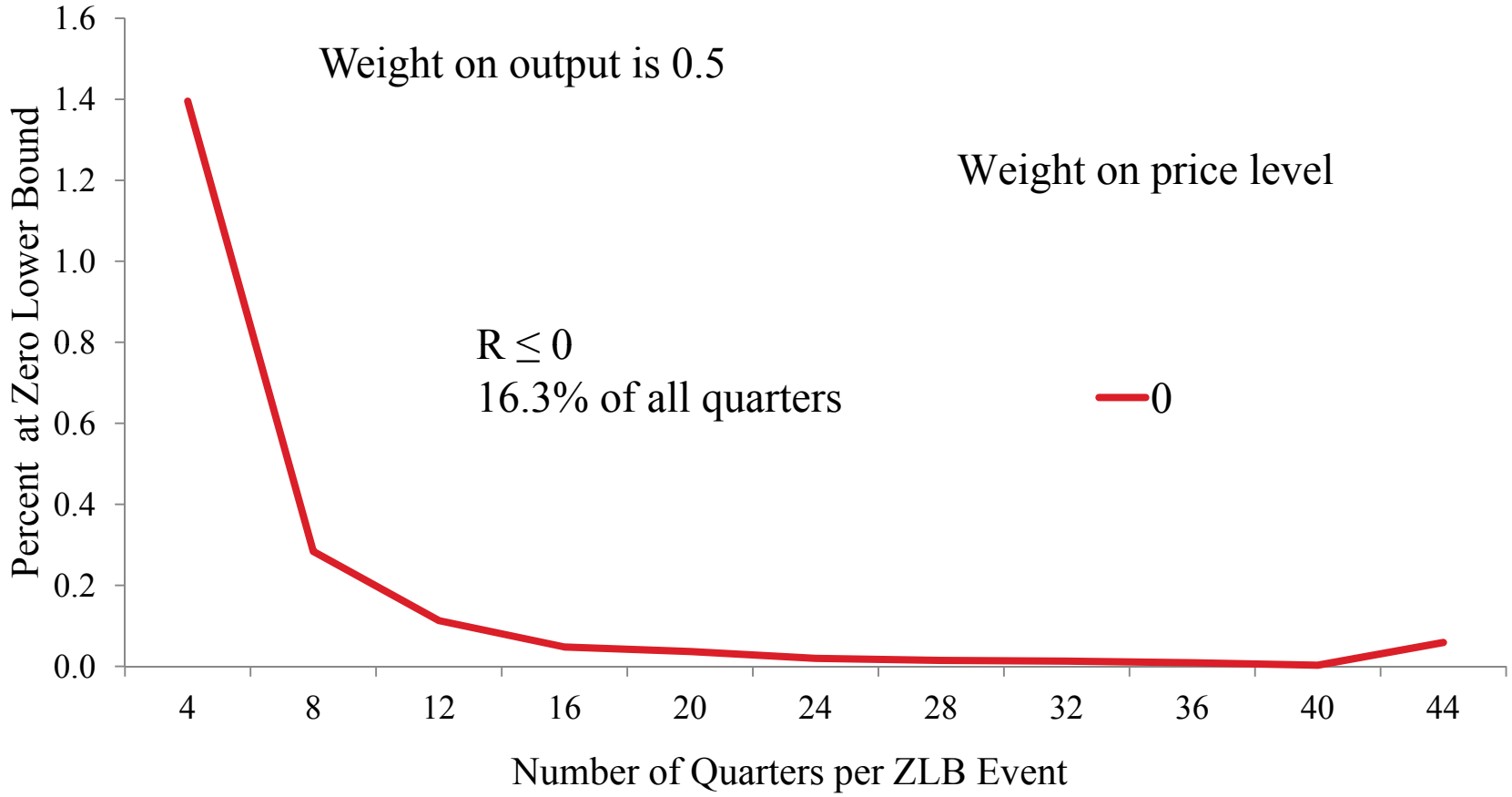
$$R_t - R^* = \theta_\pi(\pi_t - \pi^*) + \theta_y(y_t - y_t^*)$$

Dual Mandate with Commitment to a Long-Run Inflation Objective

$$R_t - R^* = \theta_\pi(\pi_t - \pi^*) + \theta_y(y_t - y_t^*) + \theta_p(p_t - p_t^*)$$

A small weight on a price path is a promise to offset past short-run inflation target misses!

Commitment to Inflation Objective



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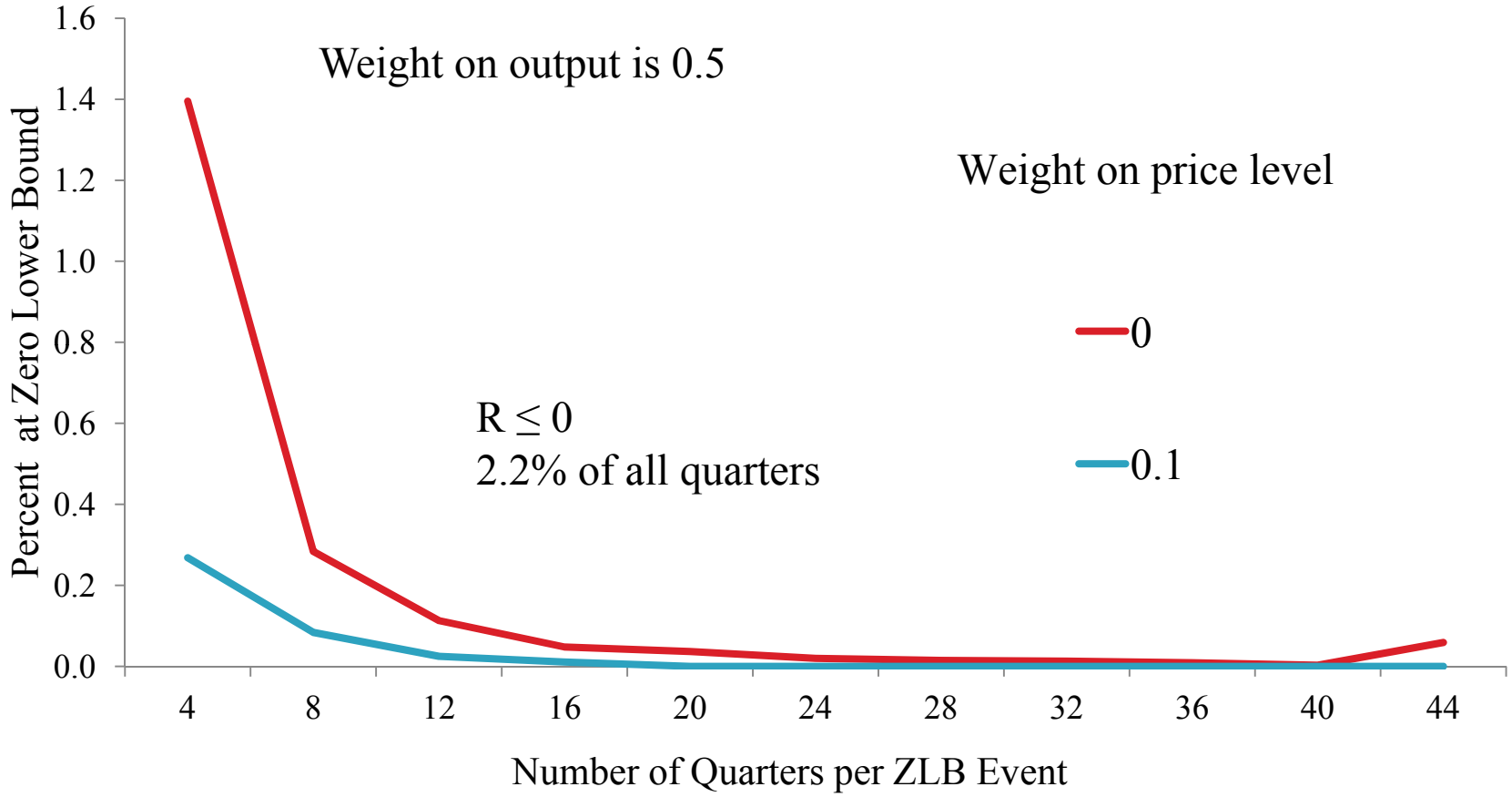

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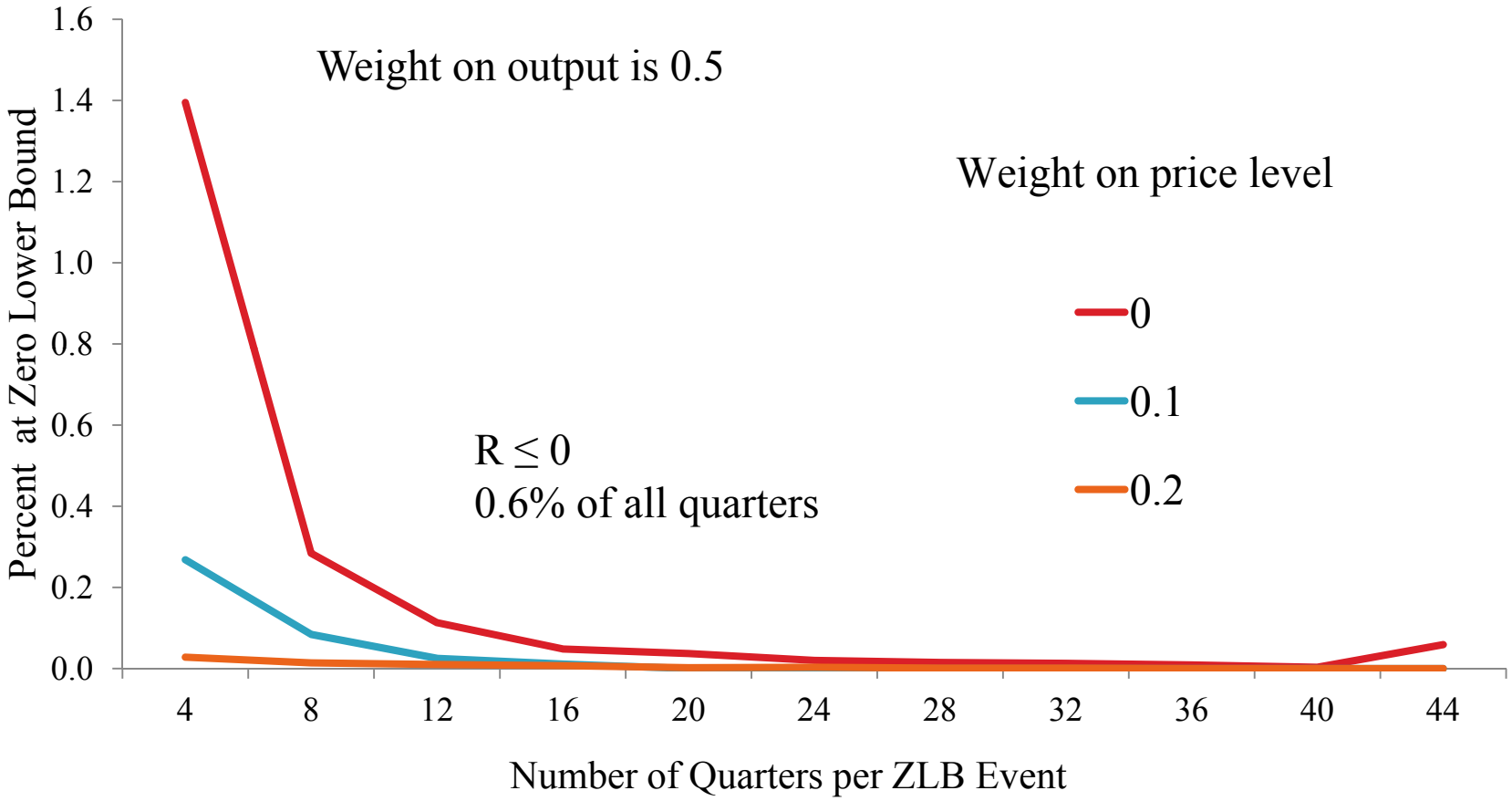

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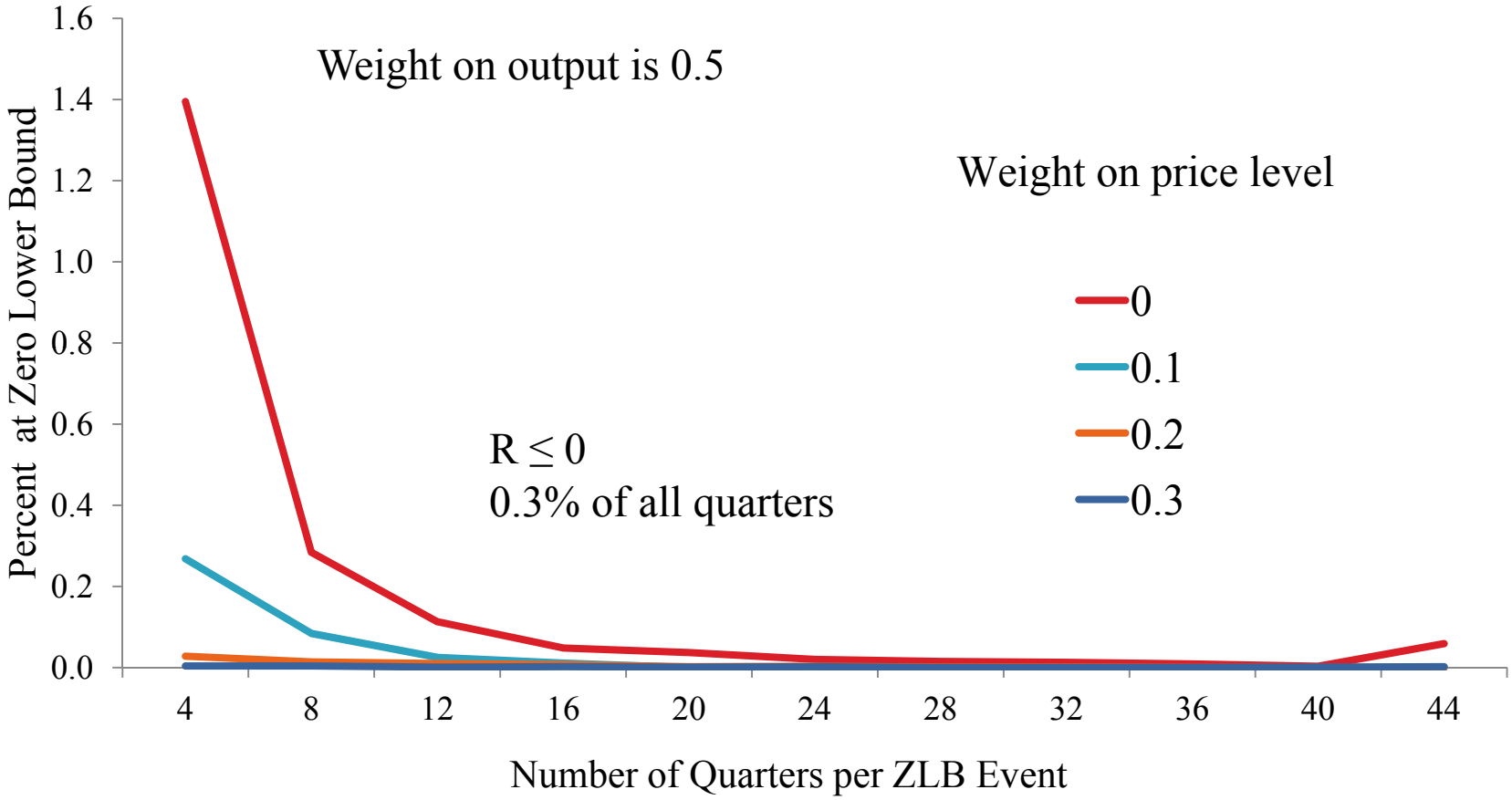

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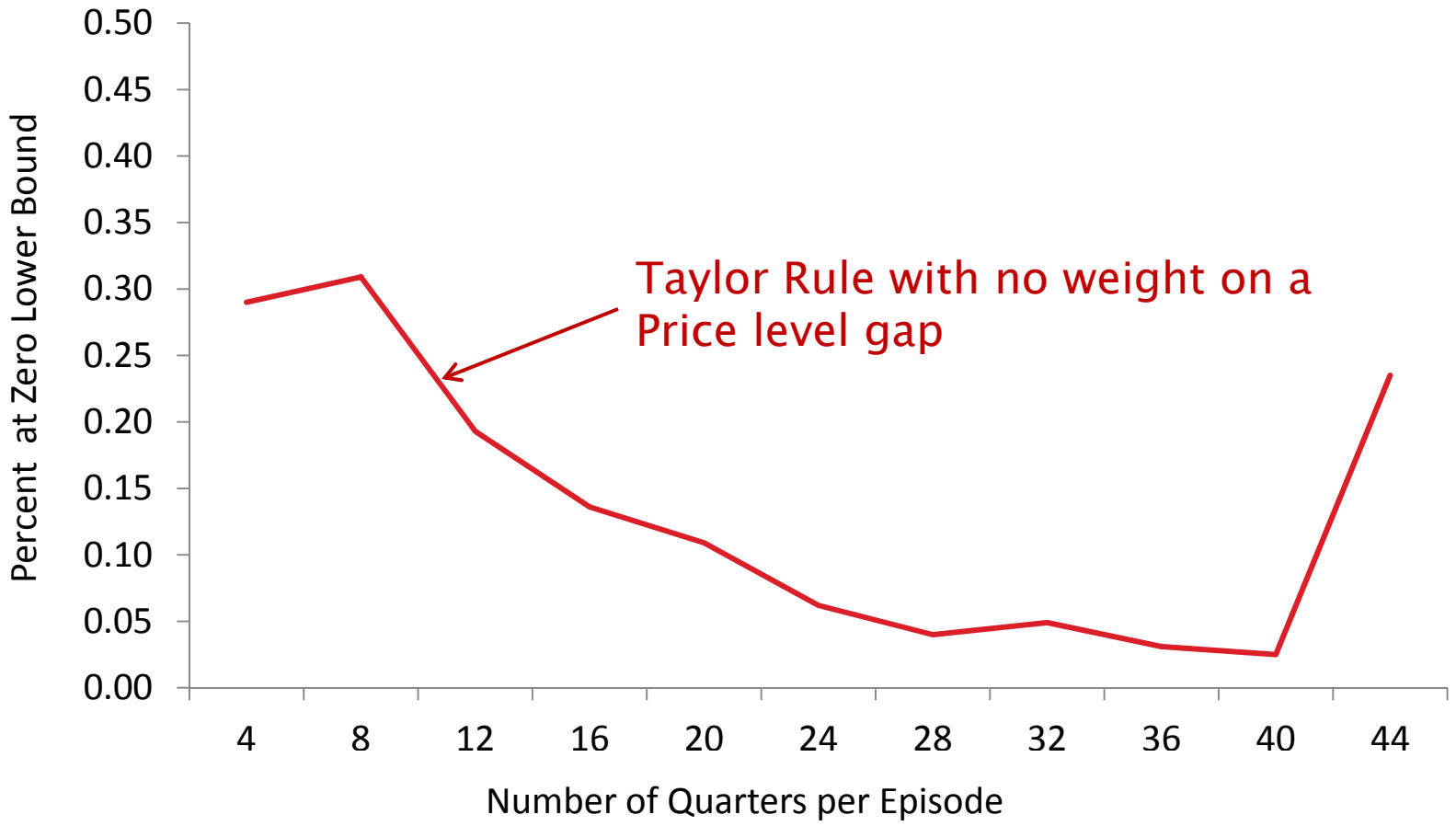
Price Level Targeting and Bouts of Deflation



Episode defined as having at least 4 consecutive quarters of deflation

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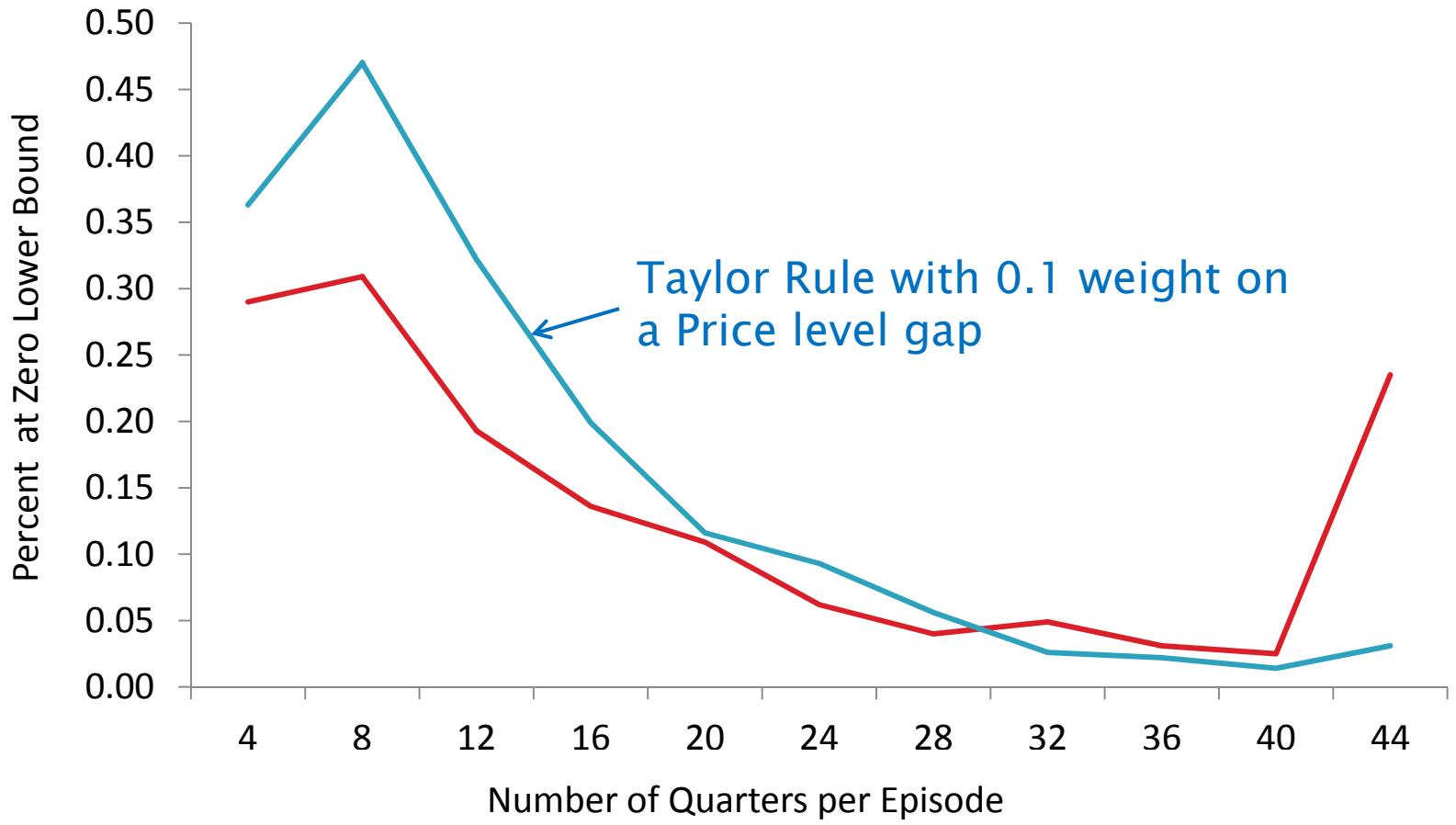

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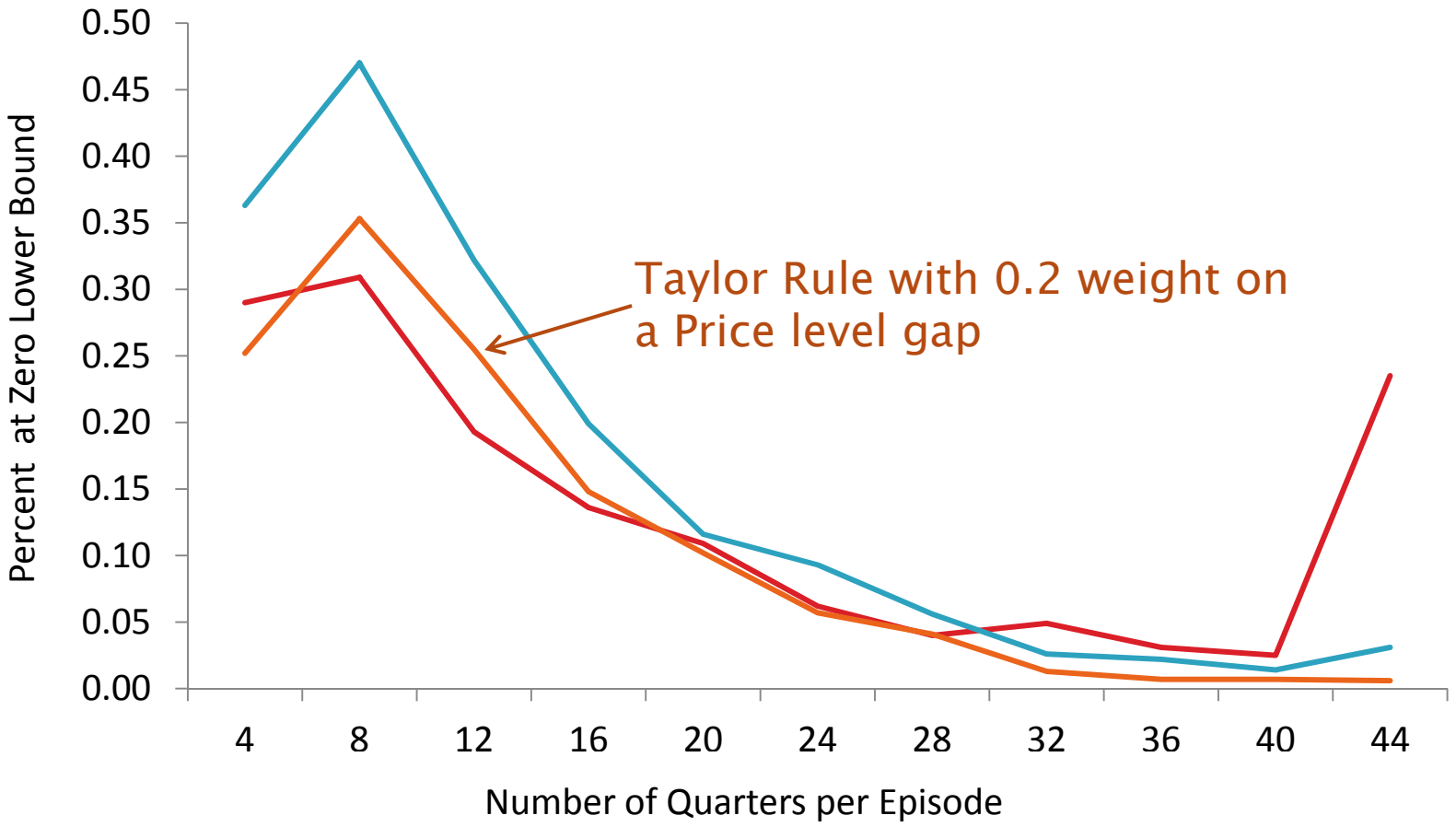

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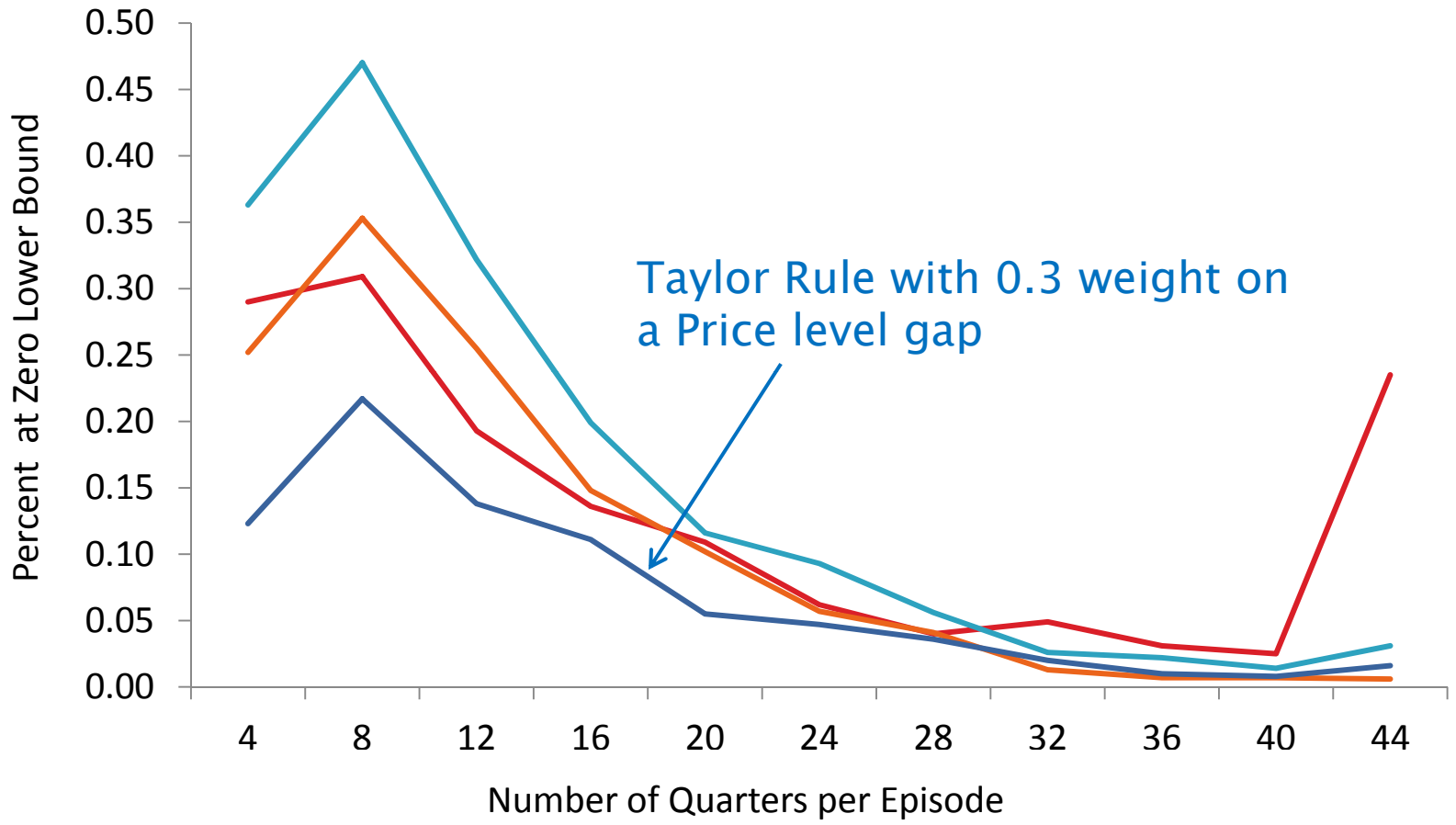

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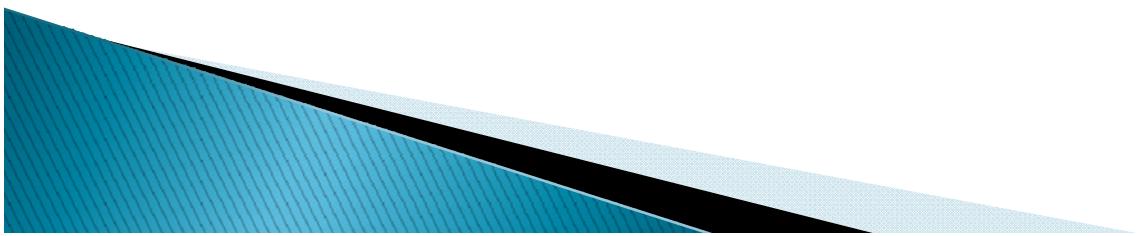
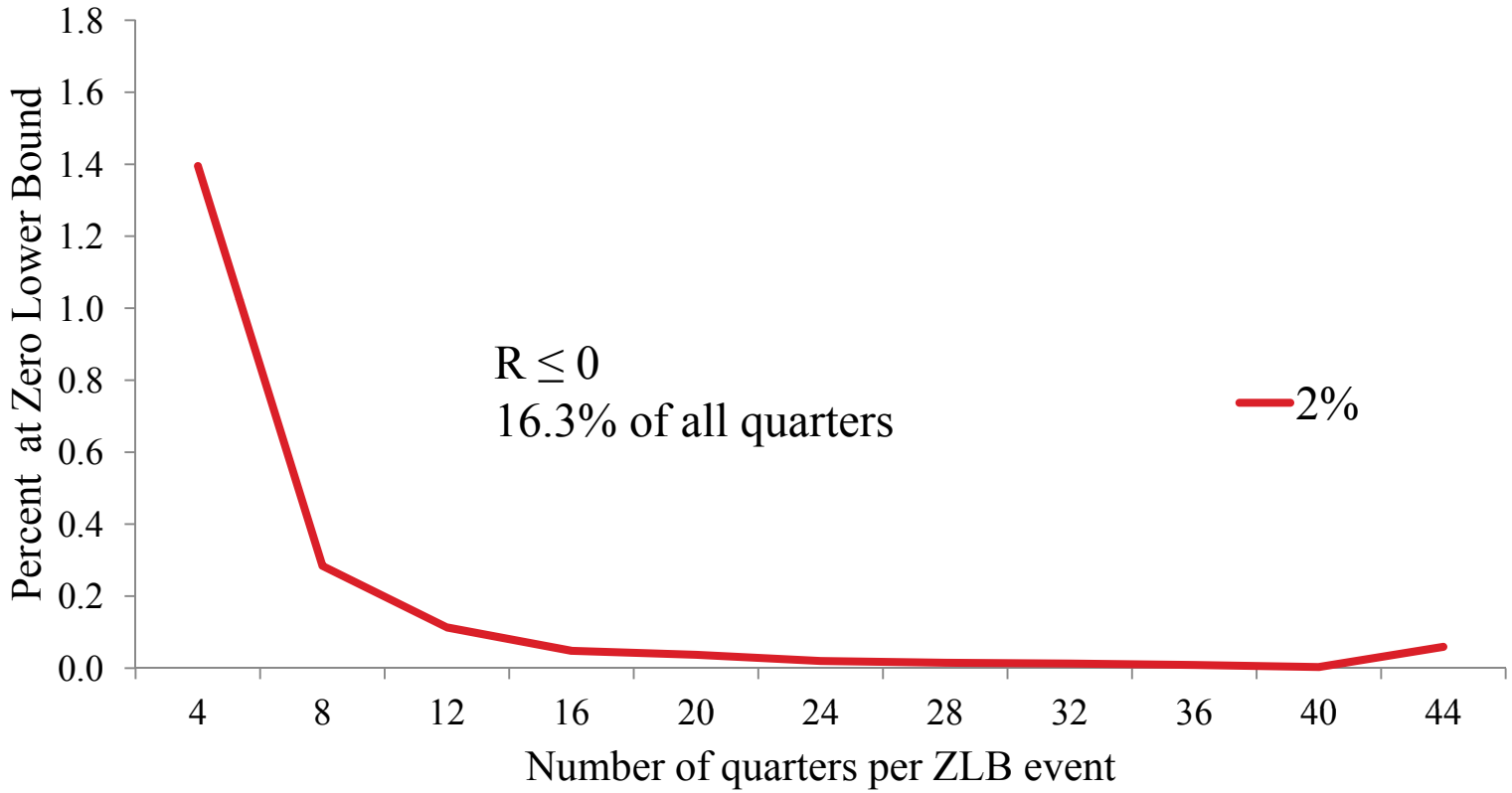
Some Economists Have Argued for a Higher Inflation Target

- Summers – 1990 (3%)
- Rogoff – 2009 (4 to 6%)
- Blanchard – 2009 (3 to 5%)



Blanchard and Rogoff Have Argued for a Higher Inflation Target



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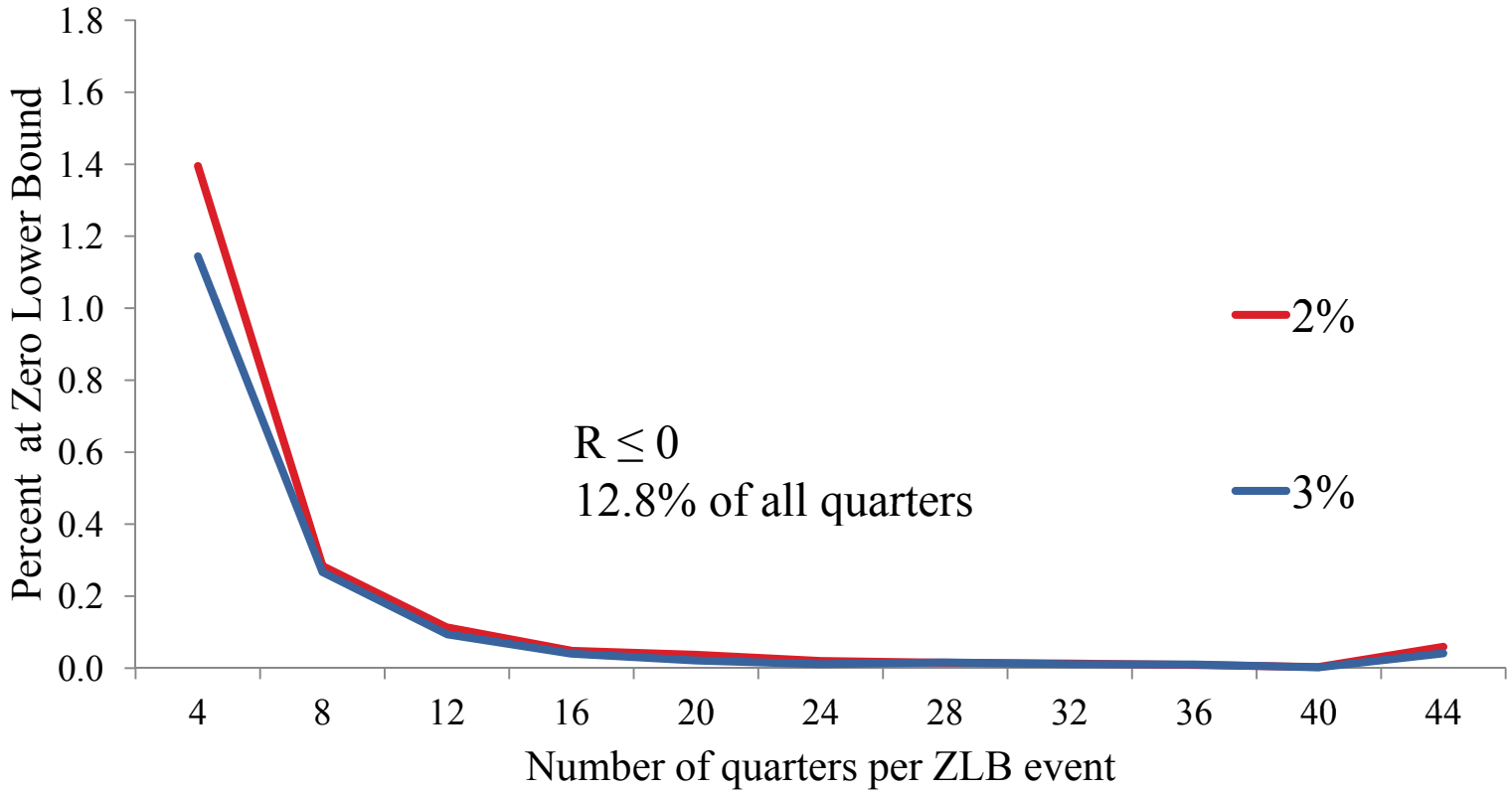

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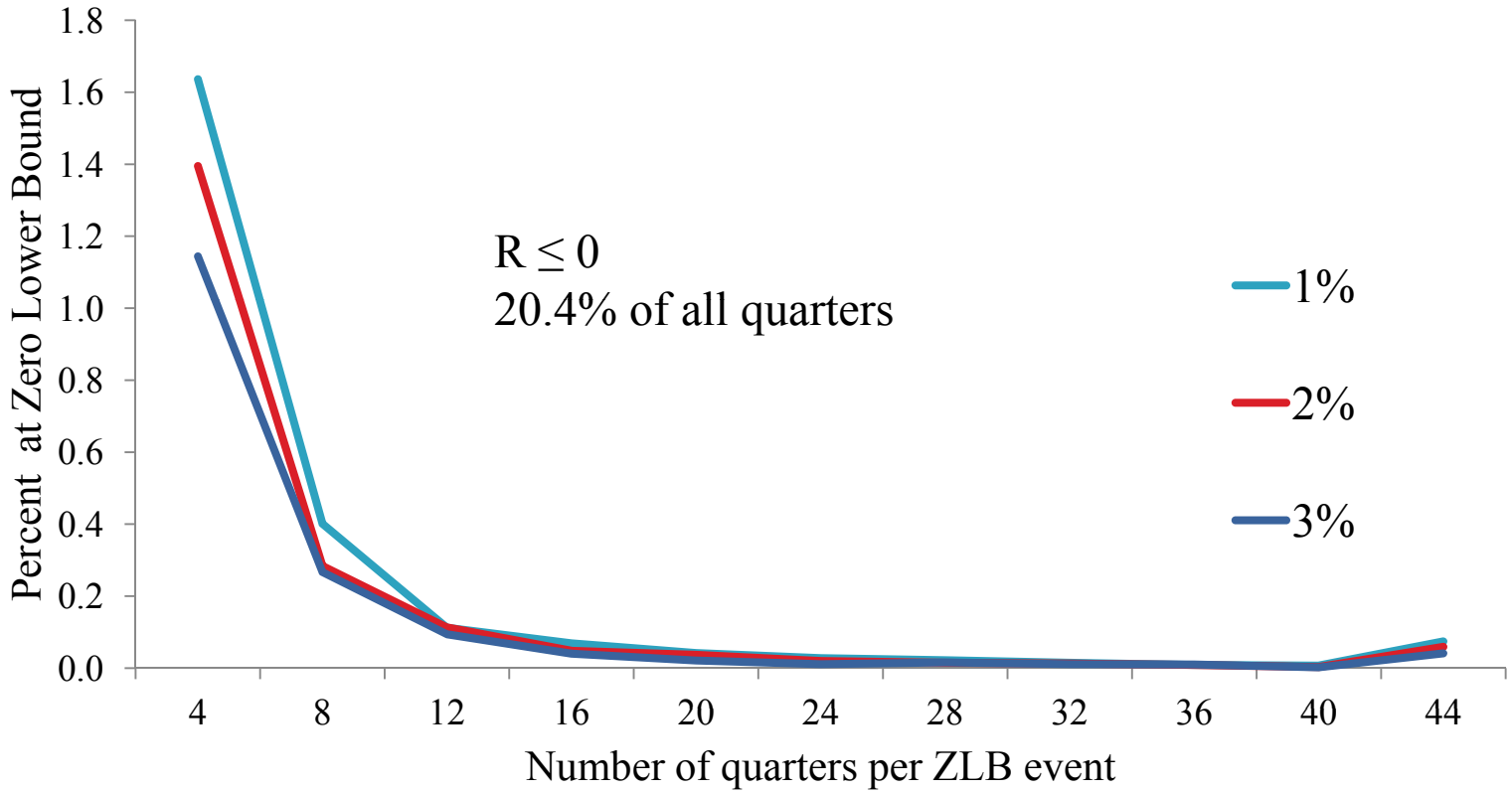

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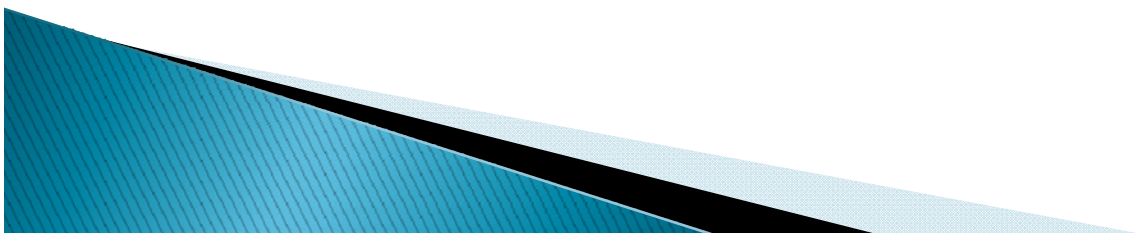
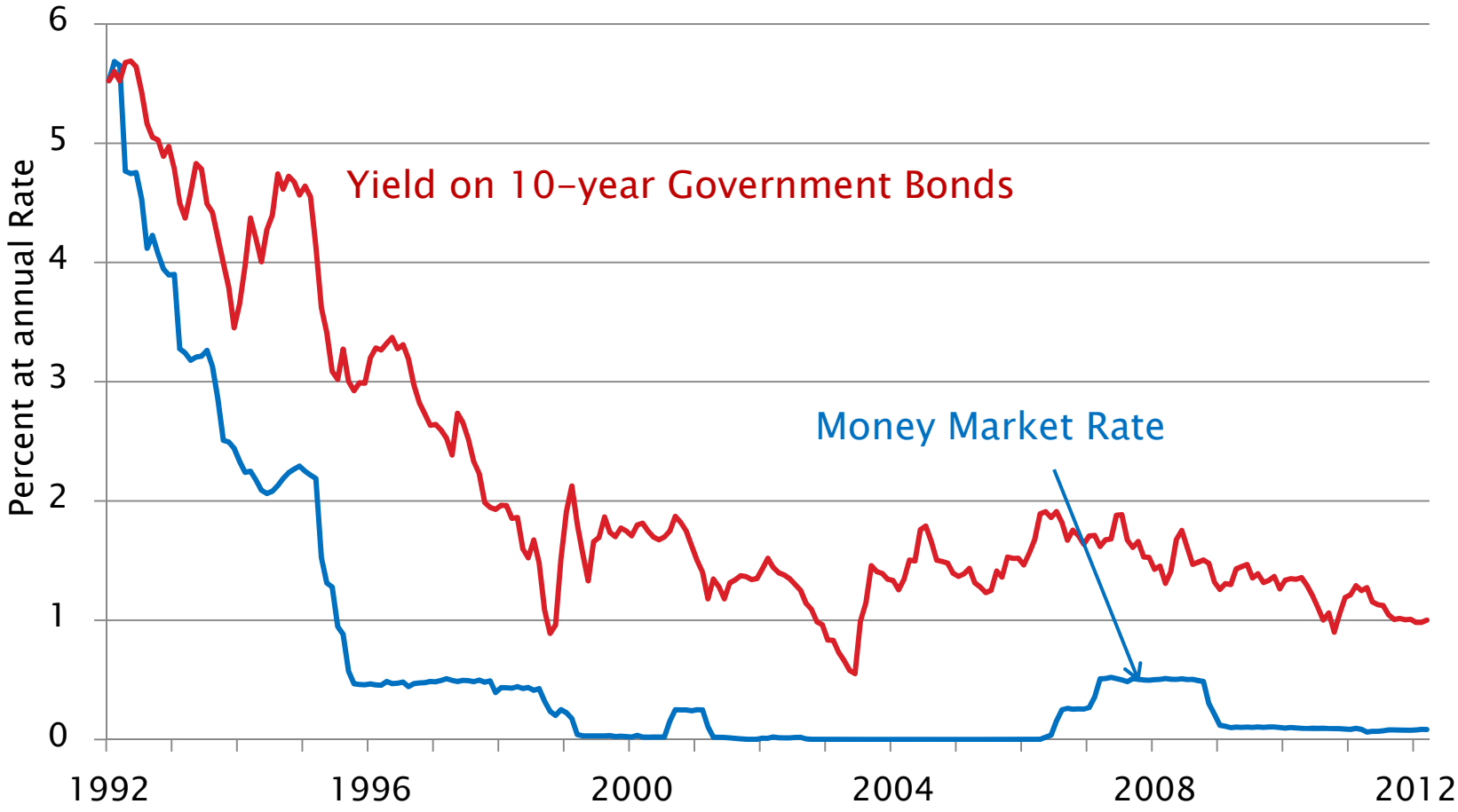
Policy at the Zero Lower Bound

- Japan adjusted to the zero lower bound by allowing the inflation objective to fall below zero.



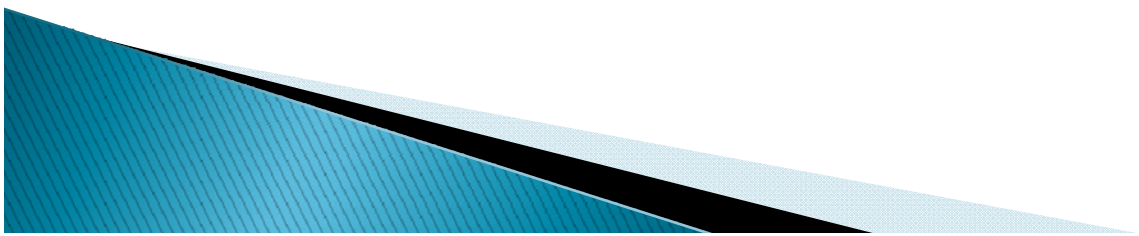
Japan Interest Rates



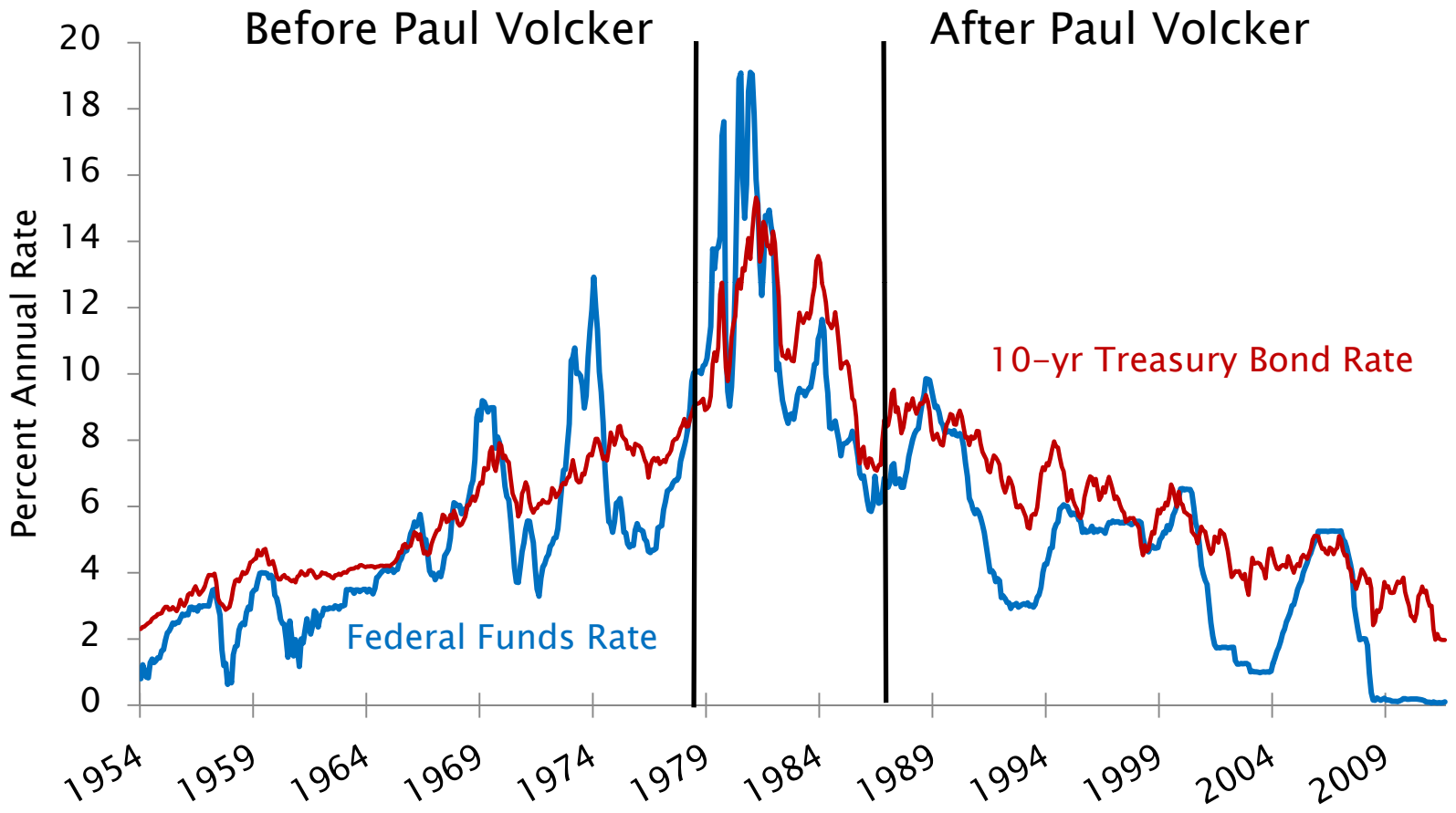
Note that the equilibrium has a near zero policy rate, a slightly positive real rate and a slightly negative inflation rate.

Policy at the Zero Lower Bound

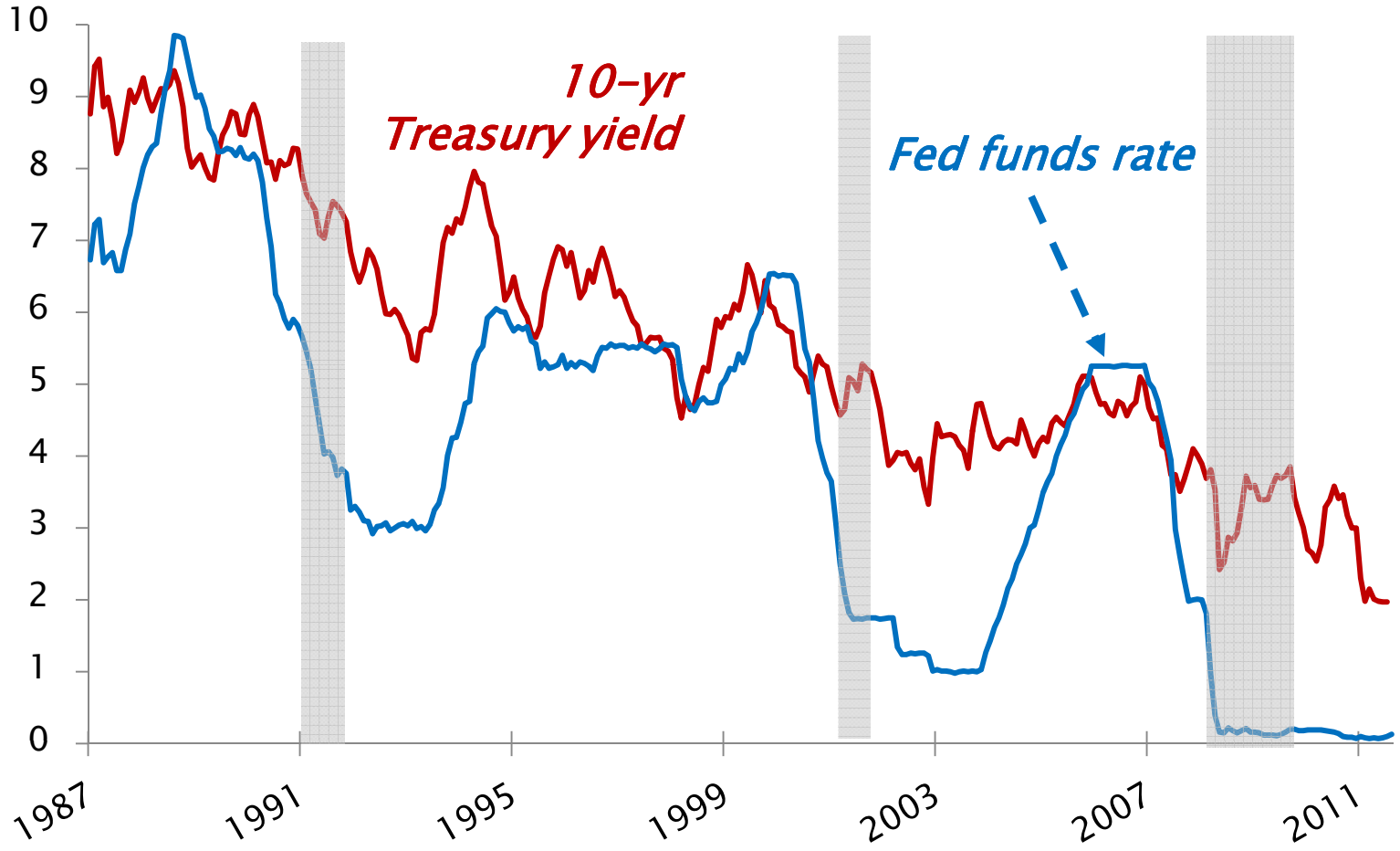
- Japan adjusted to the zero lower bound by allowing the inflation objective to fall below zero.
- In the United States there is still widespread belief that we can return to normal.
  - Fed funds rate around 3.5 to 4 percent.
  - Total reserves around $50 billion.



U.S. Monetary Policy and Interest Rates



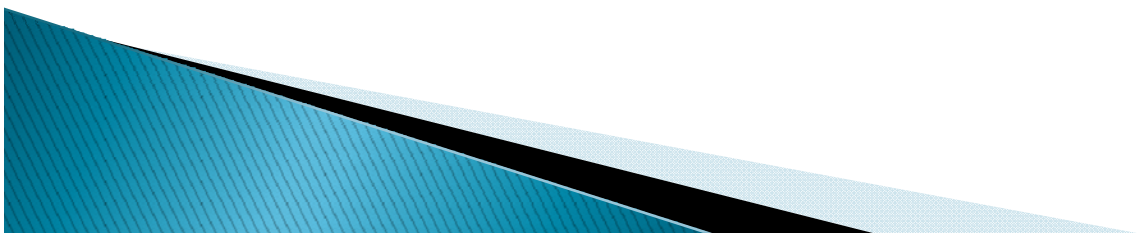
What is the rule guiding U.S. policy?



The federal funds rate has 3 states: A high state ≈ 10-yr Bond yield; a low state = 0, and a transition state.

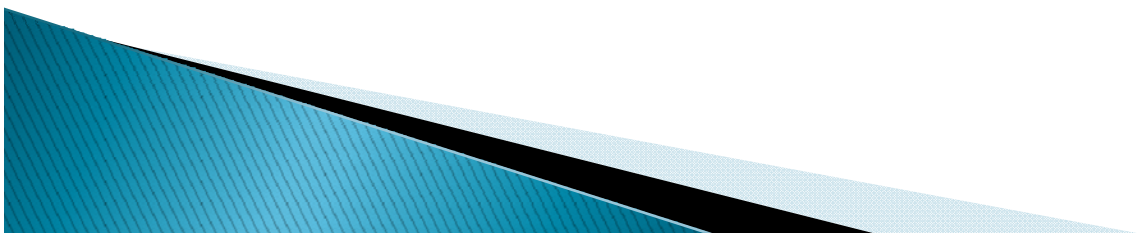
DSGE and the Fisher Equation

- R = real interest rate + expected inflation
- In a DSGE model with an fixed R
  - Inflation adjusts to clear the bond market
  - Taxes and risk premiums make calculations more complex, but
  - the Fisher equation for bonds holds in all finance and economic models, not just DSGE.
- Real interest rates rise with real growth rates
  - Real rates rise before we get to full employment
  - Real returns to capital (ex post) are correlated with consumption growth rates.
- What is the source of the wedge that is keeping real rates negative?
  - QE, financial crisis risk premiums?



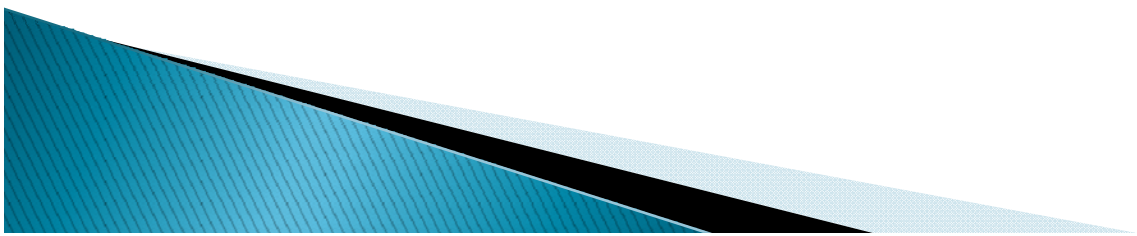
Is the Zero Lower Bound a Trap?

- The Fed has promised to keep R=0 for "an extended period."
  - If real rates rise and R=0, inflation may fall.
  - If inflation falls, Fed will want to lower the rate.
  - Replay of what happened in Japan after 1995?
- The 'extended period' language: Is 'until late 2014' a forecast or a commitment?
  - In theory, it should be a commitment if it is meant to lower longer term interest rates.
  - In public statements, it is treated as a conditional forecast (conditioned on continued low inflation).
- DSGE models => raise the policy rate to get positive real returns without deflation.



Conclusions

- DSGE models are the application of modern economic theory to policy analysis.
- The Dual Mandate in the United States is a recipe for hitting the zero lower bound.
- The zero lower bound is a trap because, when policy is credible, low interest rates put downward pressure on inflation through the clearing of asset markets.
- A feasible equilibrium with a zero policy rate is an inflation rate that is the negative of the short-term risk-free real rate (as in Japan).



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Any Questions?