"The Optimal Inflation Target and the Natural Rate of Interest" by Andrade, Gali, Le Bihan, and Matheron

Discussion by
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Contribution

1. Estimated new Keynesian model with
   - endogenous ZLB
   - nominal wage rigidity

2. Uncover new relationship between π^* and r^*
   - Not one-for-one: for reasonable r^*, slope ≈ -0.9.
   - Slope does not vary much with source of variation in r^*.
   - Robust to permutations (model uncertainty, large shocks,...).

WHY IS SLOPE $= -1$ THE BENCHMARK?

- Welfare function that is only a function of the steady state nominal rate:

$$W(\bar{i}) = W(r^* + \bar{\pi})$$

  - E.g., cost of binding ZLB constraint.

- Optimal inflation solves (assuming interior solution):

$$W_i(r^* + \pi^*(r^*)) \equiv 0$$

- The derivative of this policy function is -1:

$$W_{ii}(r^* + \pi^*(r^*))[1 + \pi_r^*(r^*)] = 0$$

Why is slope $= -1$ the benchmark?

- In most models, welfare is also a function of the level of inflation,

$$W(\bar{i}, \bar{\pi}) = W(r^* + \bar{\pi}, \bar{\pi})$$

  - E.g., cost of price dispersion.

- Optimal inflation solves:

$$W_i(r^* + \pi^*(r^*), \pi^*(r^*)) + W_\pi(r^* + \pi^*(r^*), \pi^*(r^*)) \equiv 0$$

- Assuming $W_{i\pi} = 0$, the derivative of this policy function is,

$$\pi_r^*(r^*) = -\frac{W_{ii}}{W_{ii} + W_{\pi\pi}}$$

  - Usually, $W_{ii} < 0$ and $W_{\pi\pi} < 0$, so slope greater than -1.

Is constant slope ≈ -0.9 surprising?

- Suggests $W_{ii} \approx 9W_{\pi\pi}$.
- $W_{ii} \approx 9W_{\pi\pi}$ also in robustness checks (e.g., model uncertainty).
- Constant slope $\Rightarrow$ Welfare function approximately quadratic in $(\bar{i}, \pi)$ when evaluated at π^*.
- Ex ante, I would call these results surprising.

How general/robust is constant slope $= -0.9$?

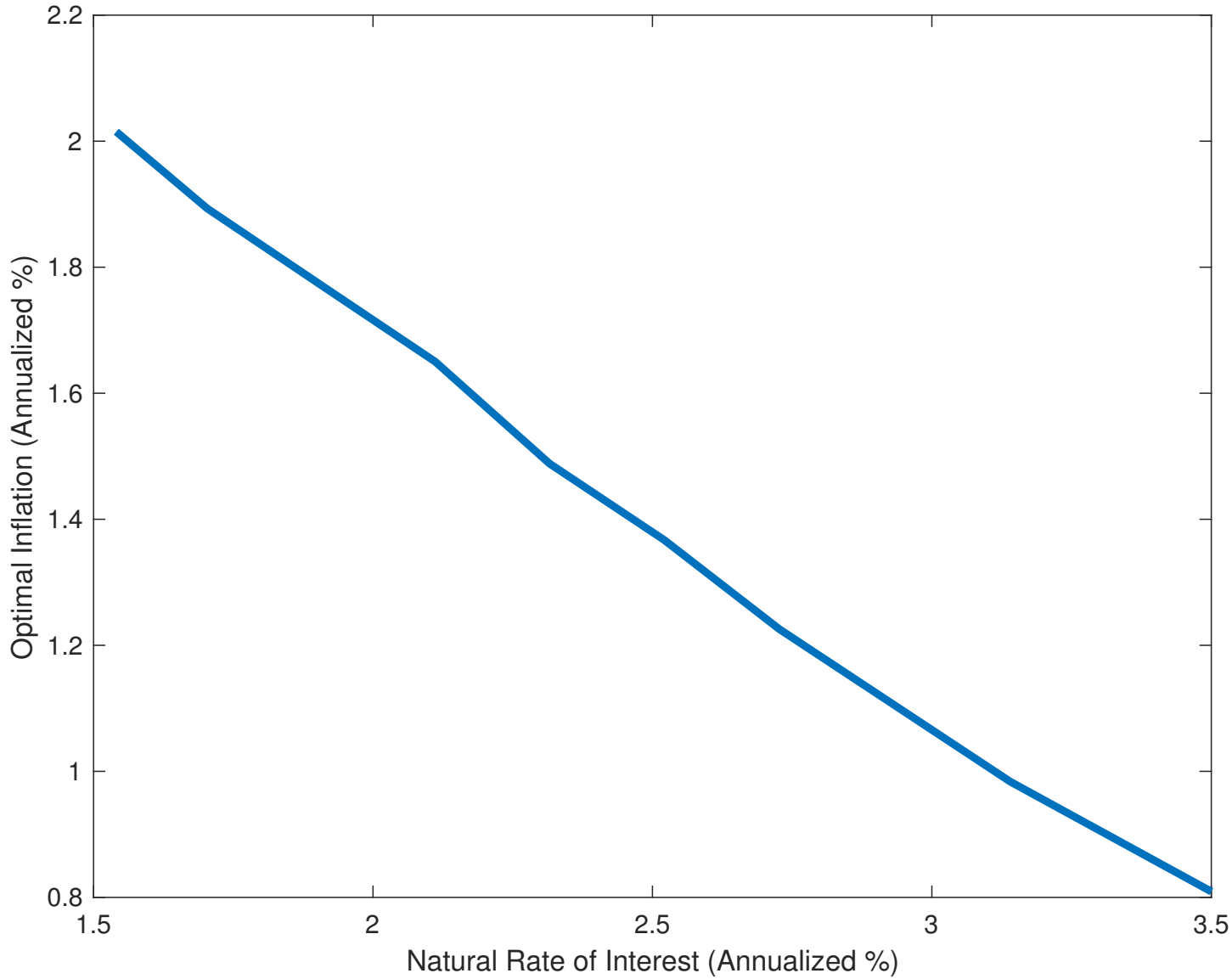
- Within U.S. and E.U. non-trivial differences.
  - U.S.: slope $= -0.99 \Rightarrow W_{ii} \approx 99 W_{\pi\pi}$
  - E.A.: slope $= -0.8 \Rightarrow W_{ii} \approx 4 W_{\pi\pi}$.
  - Paper attributes differences in slope to differences in price indexation: 0.2 in U.S. and 0.12 in E.U.

  $\Rightarrow$ Why are such small differences so important for the slope?

- Welfare is evaluated using quadratic approximation in trend inflation.

  $\Rightarrow$ Compare to Coibion, Gorodnichenko, Wieland (2012).

(π^*, r^*) IN CGW (2012)



- Slope varies from -0.57 to -0.68.

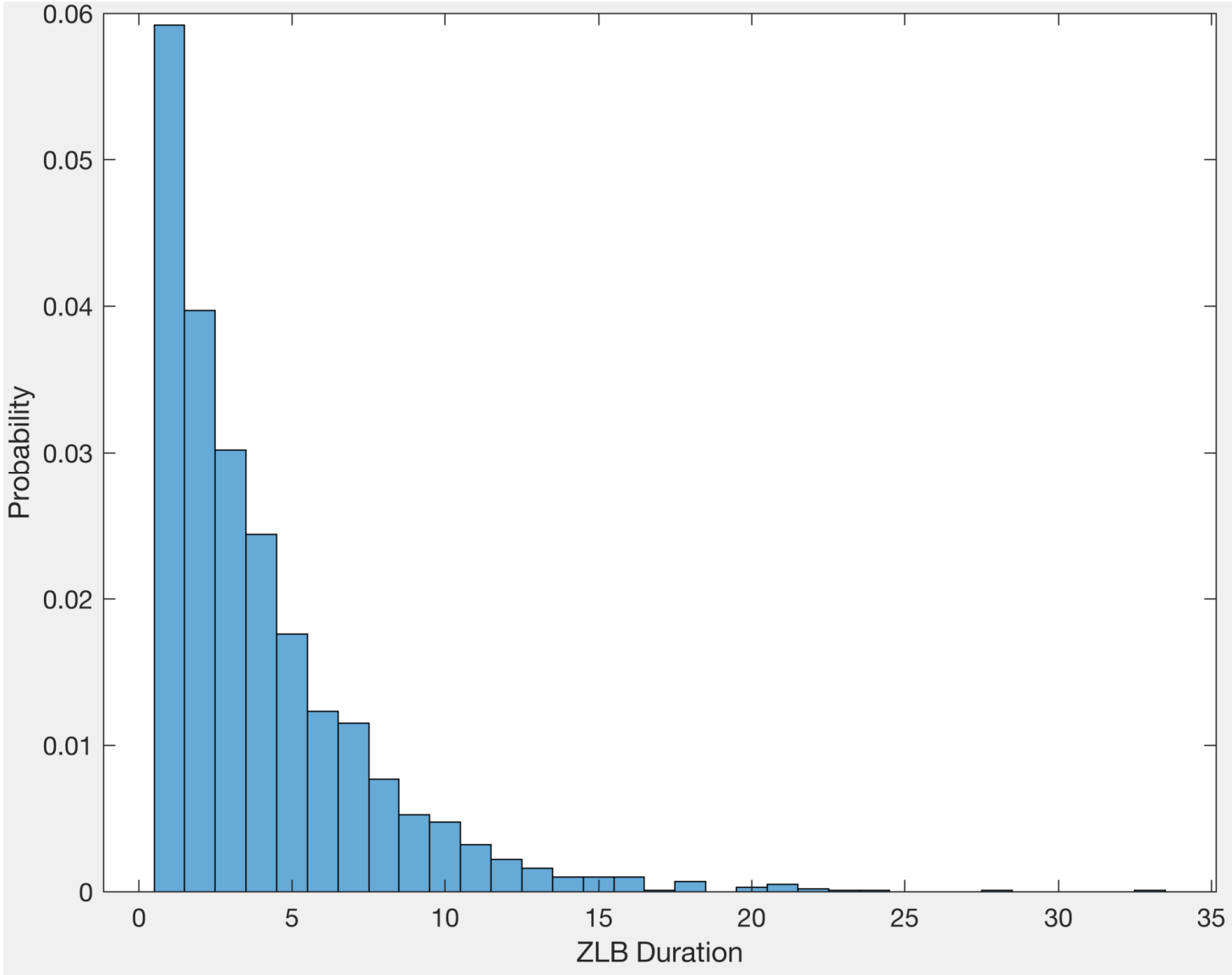
Estimation

- How much information is in the 1985-2008 sample?
  - For most parameters posterior standard deviation $\approx$ prior standard deviation.
  - Only 3 structural parameters with $> 25\%$ reduction in standard deviation.

  $\Rightarrow$ Parameter uncertainty exercise largely driven by prior choices.

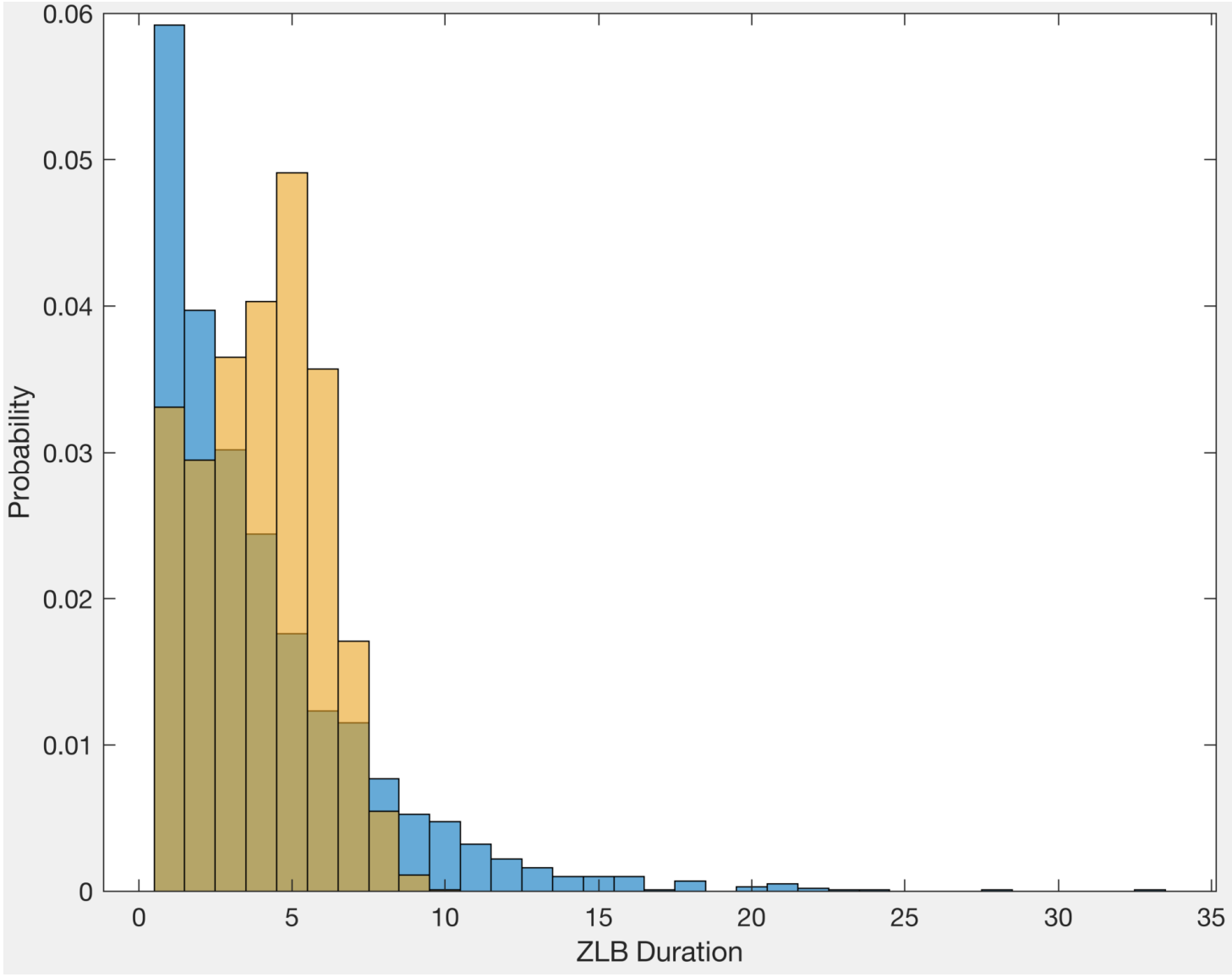
- With flat likelihood, paper should do more to justify prior (mean and variance).
  - E.g., price indexation priors may be too high/tight.

ZLB Distribution



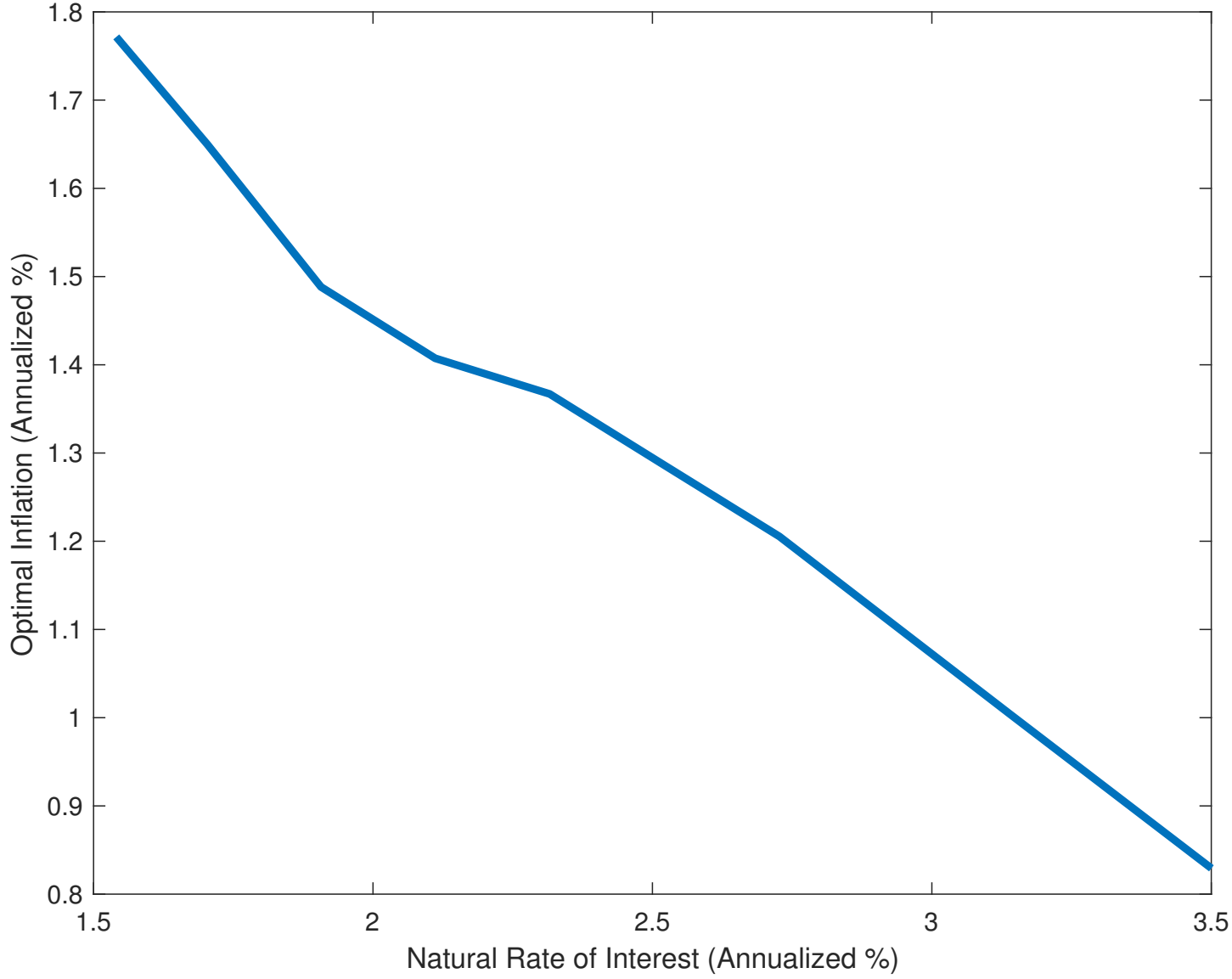
- AR(1) shocks $\Rightarrow$ Geometric distribution

ZLB Distribution



- CCGW (2016): regime-switching $\Rightarrow$ more uniform.

(π^*, r^*) IN CCGW (2016)



- Slope ≈ -0.48.

Summary

- Would want to know better what makes the (r^*, π^*) slope so large in the benchmark model.
- Slope in AGLBM may be inflated due to the counterfactual ZLB distribution with AR(1) shocks.
- Other abstractions may be important: unconventional monetary policy (e.g., Debortoli, Gali, and Gambetti, 2018).
- Slope looks largely constant, but magnitude appears to vary quite a bit across models—ranges from -0.48 to -0.99.

Still more to do

- Both main costs and main benefits of higher inflation come from price dispersion.

- We now have models with substantial costs of business cycles not coming from price dispersion (e.g. McKay and Reis, 2017).