Discussion of

"Using a Projection Method to Analyze Inflation Bias in a Micro-Founded Model"

by Gary S. Anderson, Jinill Kim, and Tack Yun

Federal Reserve Board

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Motivation: What is the inflation bias?

- Quantify the inflation bias due to lack of policy commitment in a nonlinear model.
- Compare the precision of a *local* approximation to a *global* approximation.

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Framework

- Small well-known New Keynesian model with sticky prices á la Calvo (1983).
- Steady state output is inefficiently low which allows for positive steady state inflation á la Yun (2005).
- The policymaker maximizes welfare for the representative agent, but does not pre-commit to a path for future actions.
- Find a *smooth* global approximation of the optimal policy through standard Chebyshev polynomials á la Judd (1998).

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Main Point: Should we linearize our models...

- This is a very interesting exercise for a number of reasons:
  - inflation ultimately reduces standards of living;
  - linearity is a stark assumption;
  - better models/methods/solutions may foster better policies.
- For the model in the paper, however, a local approximation *may seem* a good approximation because it underestimates the inflation bias up to a tenth only.
- . . . for sake of simplicity, we should linearize our models if the nonlinearity is of second order.

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Check precision beyond the steady state

- A local approximation is a good approximation for the steady state, but is it a good approximation beyond the steady state?
- Turn on the productivity shock, solve the stochastic model, and perform stochastic simulations:
  - Compare impulse responses of inflation for local and global approximation.
  - Compare unconditional moments of the long-run stationary distribution of inflation—mean, variance, skewness, and kurtosis.

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Could quantify inflation bias due to key nonlinearities

- Both a *linear* approximation and a *smooth* global approximation fail to capture key nonlinearities such as the zero lower bound (ZLB) on nominal interest rates.
- Billi (2007) uses a *non-smooth* global approximation to quantify the optimal long-run rate of inflation subject to the ZLB—the policymaker can pre-commit to a path for future actions.
- Billi (2008) compares price-level targeting and inflation targeting when the economy is stuck at the ZLB—the policymaker can pre-commit to a simple interest-rate rule.
- If the policymaker cannot pre-commit, how much larger is the inflation bias subject to the ZLB?

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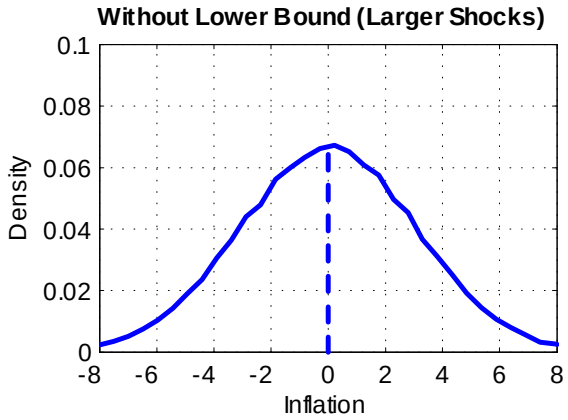
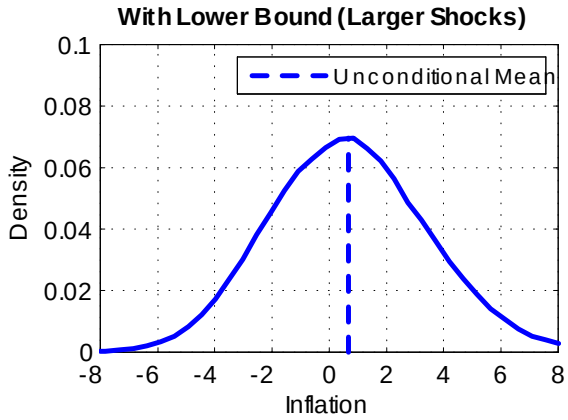
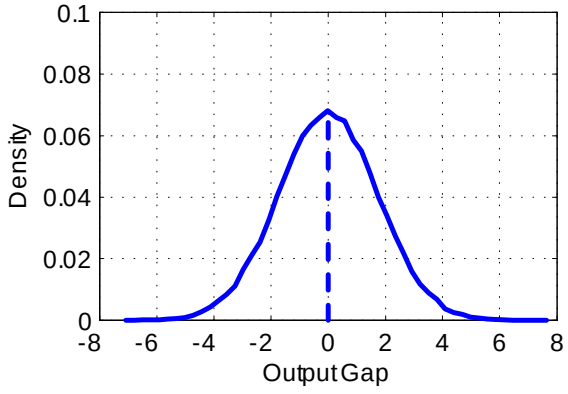
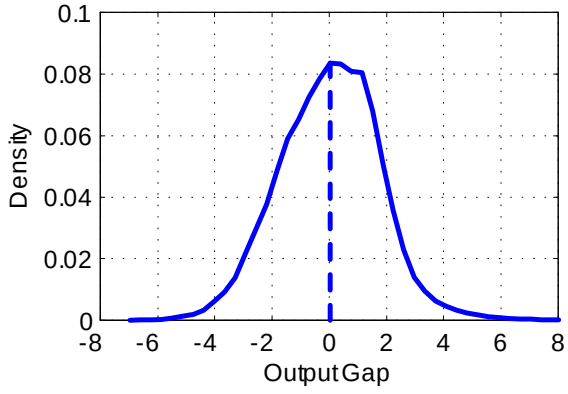

Without Lower Bound (Larger Shocks)
Density
Inflation


With Lower Bound (Larger Shocks)
Unconditional Mean
Density
Inflation


Density
Output Gap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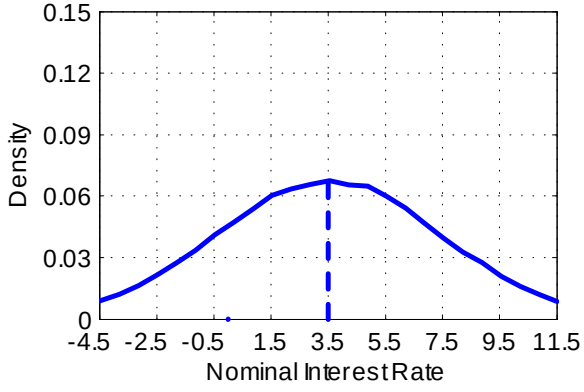
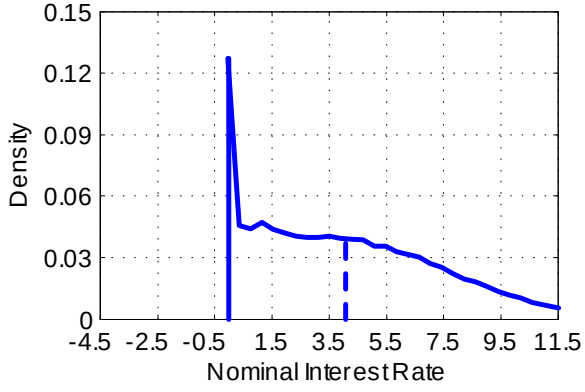

Density
Nominal Interest Rate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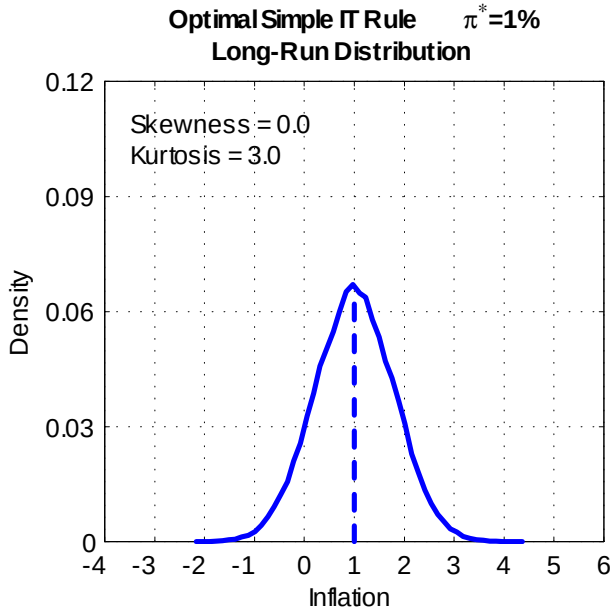
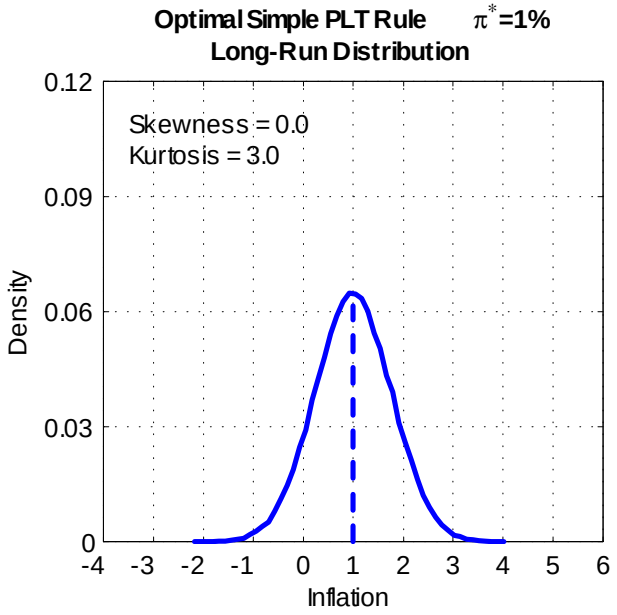

Optimal Simple IT Rule π*=1%
Long-Run Distribution
Skewness = 0.0
Kurtosis = 3.0
Density
Inflation
0.12
0.09
0.06
0.03
0
-4 -3 -2 -1 0 1 2 3 4 5 6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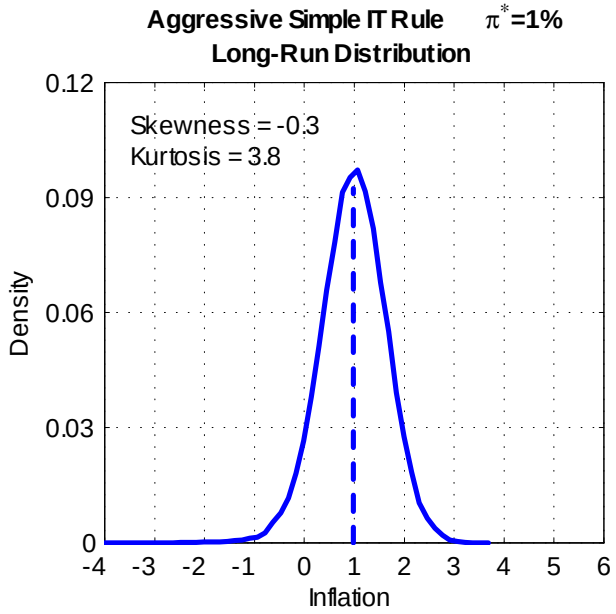
Aggressive Simple IT Rule π*=1%
Long-Run Distribution
Skewness = -0.3
Kurtosis = 3.8
Density
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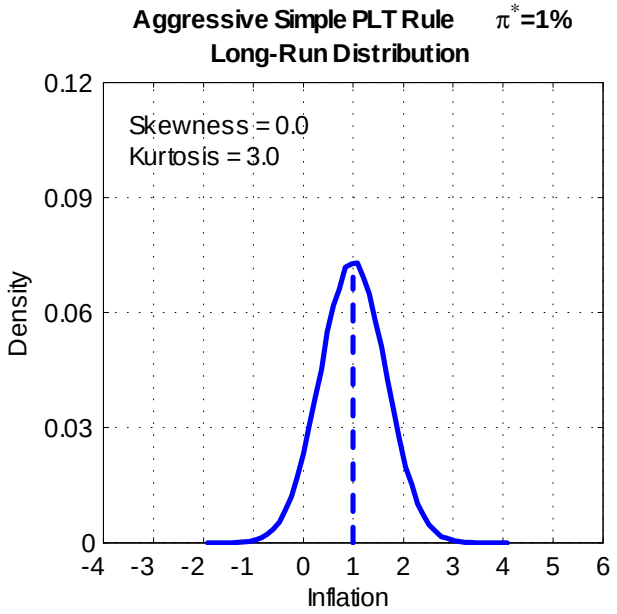
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