

Assessing Level-targeting rules with Real-time Forecast Data

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Motivation and Contribution

- With the federal funds rate at its lower bound, rules involving some degree of price level targeting have recently received increased attention as practical tools for the conduct of monetary policy.
- However, previous literature has documented that imperfect observability may significantly limit the desirability of activist monetary policy rules.
- This paper proposes to use survey data on private sector forecasts in real time to characterize the outcomes that alternative rules would have produced over the last 30 years, both through the Great Moderation and in the wake of the Great Recession.

Overview of results

- The nominal gap was noticeably more volatile during the Great Moderation than was the output gap.
- Suitably optimized nominal income targeting rules can deliver quite good inflation performance over both periods.
- These rules would have been much less successful at output gap stabilization during the Great Moderation.
- However, nominal income targeting rules which performed well during the Great Moderation were also reasonably successful at controlling output gap movements following the Great Recession.

Policy Rule Errors in the Baseline Characterize the Performance of Alternative Rules

- For every time t , we are given a sequence $E_t X_{t+s}(0)$ of state vector forecasts from an equilibrium where the monetary policy rule is $R(0)E_t X_t(0)$.
- Consider alternative equilibrium with the same optimality and equilibrium conditions, but with monetary policy rule $R(1)E_t X_t(1) + \epsilon_t^R$
- If both equilibria are unique and the sequence $E_t \epsilon_{t+s}$ is chosen such that $R(0)X_{t+s}(1) = 0$, then the equilibrium outcomes must be identical.

Policy Rule Errors in the Baseline Characterize the Performance of Alternative Rules

- Conclusion: for any time t , the expected path of static policy errors (under the alternative rule) in the baseline characterizes the deviation of outcomes under the alternative rule from that baseline.

$$X_t(1) - X_t(0) = G(1)X_{t-1}(1) + H(1)\omega_t - \left(G(1)X_{t-1}(0) + H(1)\omega_t + \theta_0\epsilon_t + \theta_X E_t \sum_{s=0}^{\infty} \theta^s \theta_\epsilon \epsilon_{t+s+1} \right) \quad (1)$$

- Given just forecasts of conditioning variables in alternative rule, can compute outcomes under alternative policy, without complete modeling of expectations formation or monetary policy behavior in the baseline.

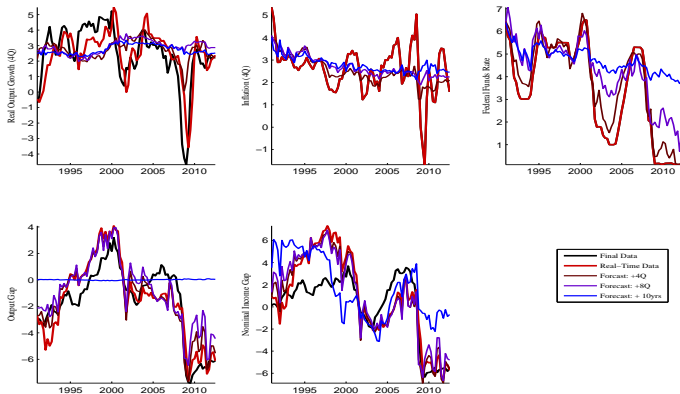
Simulating Alternative Policies using Survey Forecast Data

- Survey forecast data
 - Blue Chip forecasts from 1991:Q1 to 2012:Q4 (final month of the quarter): CPI, nominal GDP and real GDP, short-term nominal interest rates.
 - Use CBO estimates and forecasts for the output gap.
 - With some interpolation, can construct forecasts out to 10 years for these variables.
- Use the FRB medium-scale DSGE model (EDO) for dynamics: 10 years of forecasts should be sufficient to characterize even rules targeting gaps which fail to close in the baseline. [▶ EDO simulations](#)

Caveats

- Running rules on headline CPI is problematic: does not revise, very volatile.
- Policy rules must run on “observable” state estimates: cannot address informational asymmetries between CB and public.
- Theoretically, analysis here abstracts from
 - endogeneity of agents’ filtering problem: signal/noise generally MP-dependent.
 - dynamics of higher-order beliefs: generic to fully specified models with imperfect observability.

Figure: Nowcasts and forecasts of key variables.



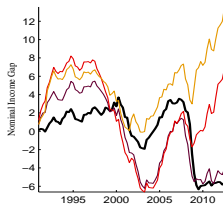
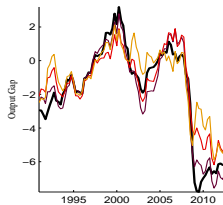
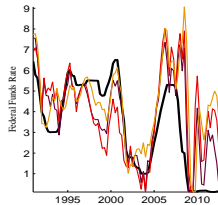
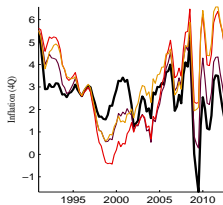
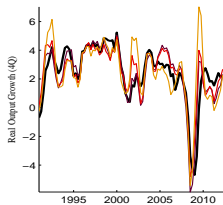
Some Properties of the Forecast Data

- As in previous literature, real-time output gap differs considerably from final data for extended periods of time.
- Revisions to nominal income gap (2.4 percent GDP inflation target, CBO potential) were even more substantial for much of the Great Moderation.
- Revisions to both gaps following the Great Recession are less consequential (so far).

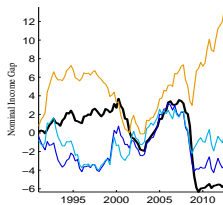
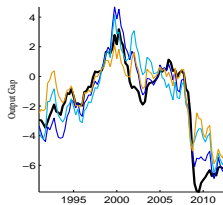
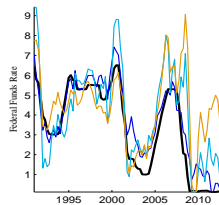
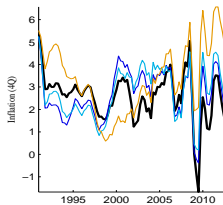
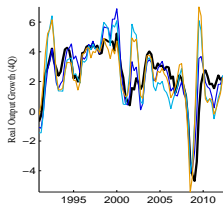
Policy Frontiers

- Choose “interesting” rules following Williams (1999): consider rules on policy frontier for all choices of weights on output gap and inflation stabilization.
- Simulate performance of rules prior to Great Recession.
- As in Williams (1999), must impose (binding) constraint on the variability of the funds rate to obtain plausible behavior.

Simulation Results



Simulation Results

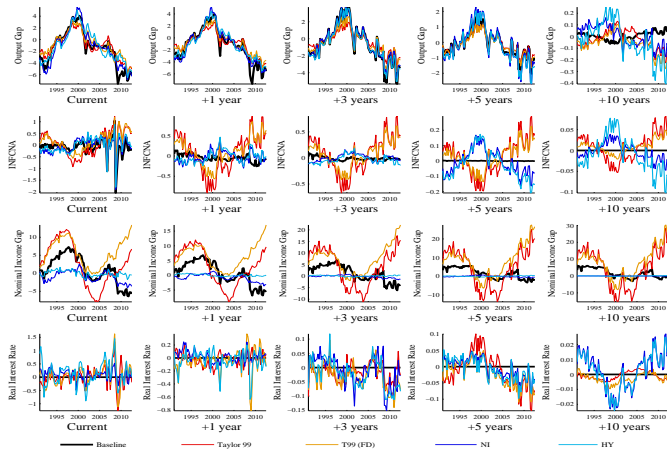


Simulation Results: Summary

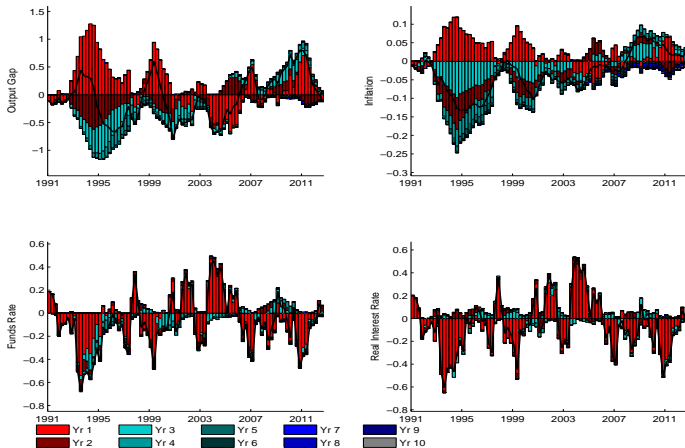
Table: Performance of Alternative Monetary Policy Rules

	Great Moderation			Great Recession		
	Inflation	Gap	R	Inflation	Gap	R
Data	1.02	2.03	2.71	1.32	8.32	0.76
Taylor 93	1.63	2.14	2.89	1.20	8.12	5.04
Taylor 99	2.95	1.33	3.88	2.58	4.67	5.08
Taylor 99 (FD)	2.08	0.92	2.72	2.75	3.94	5.95
Nom Inc	1.09	4.06	2.16	1.10	6.56	1.16
Nom Inc (Hy)	1.17	3.10	4.66	1.20	4.71	4.13

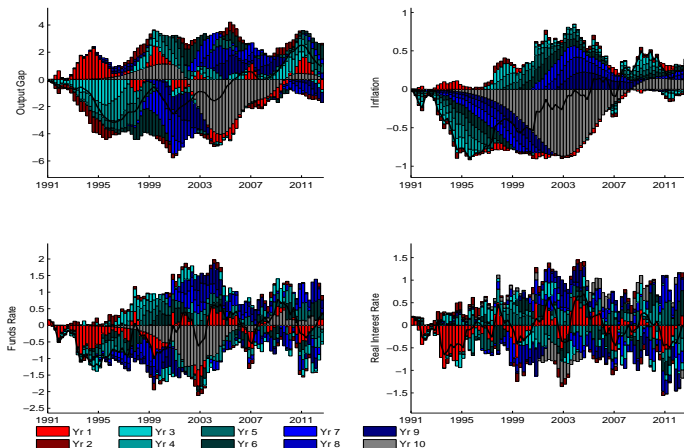
Alternative Forecasts



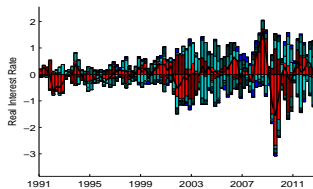
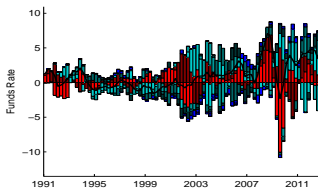
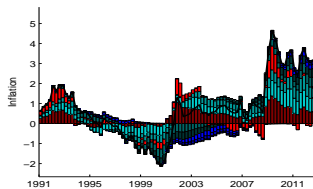
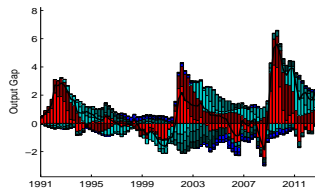
Decomposition of Taylor 99 Results: EDO Baselines



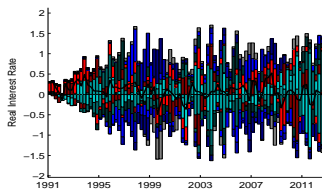
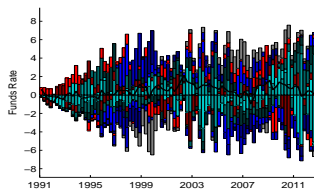
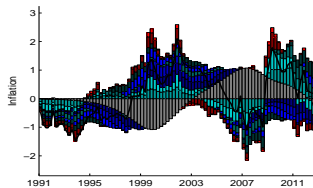
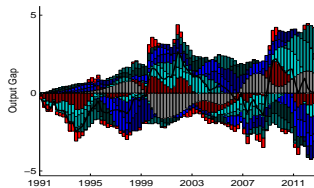
Decomposition of Hybrid Nominal Income Rule: EDO Baselines



Decomposition of Inertial Taylor 99 Results



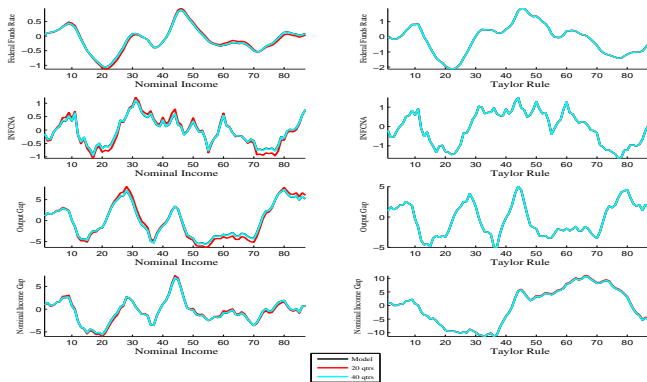
Decomposition of Hybrid Nominal Income Rule Results



Summary and Plans for Future Work

- Despite quite substantial real-time uncertainty about the nominal income gap, rules which target this variable deliver only slightly worse results than baseline during the Great Moderation, and much better performance following the Great Recession.
- Future work:
 - Monetary policy is probably not well characterized as responding to headline CPI inflation. Short horizon Greenbook forecasts for core CPI inflation are available through 2007, after which forecasts from the Survey of Professional Forecasters can be used.
 - Similarly, Greenbook forecasts for core PCE inflation are available beginning in 1999, with SPF forecasts beginning in 2007.
 - It should be possible to calculate optimal discretionary policy outcomes using the same methodology as employed here.

Figure: Accuracy of alternative truncation assumptions for nominal income targeting and Taylor rules.



Go back