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Taylor rules and the Great Inflation

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ABSTRACT

Can US monetary policy in the 1970s be described by a stabilizing Taylor rule when policy is evaluated with real-time inflation and output gap data? Using economic research on the full employment level of unemployment and the natural rate of unemployment published between 1970 and 1977 to construct real-time output gap measures for periods of peak unemployment, we find that the Federal Reserve did not follow a Taylor rule if appropriate measures are used. We estimate Taylor rules and find no evidence that monetary policy stabilized inflation, even allowing for changes in the inflation target. While monetary policy was stabilizing with respect to inflation forecasts, the forecasts systematically underpredicted inflation following the 1970s recessions and this does not constitute evidence of stabilizing policy. We also find that the Federal Reserve responded too strongly to negative output gaps.

1. Introduction

Can US monetary policy in the 1970s be described by a stabilizing Taylor rule, where the Federal Reserve increased the interest rate more than point-for-point with inflation? Or is it better described as a series of stop-start policies, where repeated abortive attempts to fight inflation over-stimulated the economy and ultimately produced the Great Inflation?

At first glance, the answer to this question seems obvious, as Federal Reserve policy during the 1970s is not normally thought of as satisfying a stabilizing rule and, in retrospect, certainly produced unfavorable outcomes. Meltzer (2009a), for example, describes the Federal Reserve during this period as knowing only two speeds: too fast and too slow. Taylor (1999) shows that the actual federal funds rate during the 1970s was considerably below the rate implied by the Taylor rule. The large literature on estimated Taylor rules, notably Clarida et al. (2000), finds that the Federal Reserve did not raise the nominal interest rate more than point-for-point with inflation, and thus the Taylor principle was not satisfied, during the 1970s.

Orphanides (2003a,b) has forcefully challenged this consensus. His argument is that the output gap used for estimating Taylor rules based on revised data is much smaller than the real-time data known to Federal Reserve officials at the time that policy decisions were made. Using data produced by the Council of Economic Advisors (CEAs), he shows that Federal Reserve policy in the 1970s is consistent with a stabilizing Taylor rule with a 2% inflation target.

While Orphanides' argument for the use of real-time data has become virtually universally accepted for Taylor rule estimation, his use of CEA output gaps for this period is controversial. Taylor (2000) argued that the CEA estimates of potential GDP and its growth rate were politicized starting in the late 1960s and that serious economic analysts paid no attention to them. Cecchetti et al. (2007) propose an alternative real-time output gap measure, the percentage deviation of GDP from its

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trend, computed by the Hodrick-Prescott (HP) filter, using only data available at the time. Their HP filtered output gaps are smaller than Orphanides' output gaps throughout the 1970s and are close to current Congressional Budget Office (CBO) estimates with revised data. Levin and Taylor (2009) use the same measure.

The question of whether the Federal Reserve followed a Taylor rule in the 1970s is not simply a matter of whether revised or real-time data is used. Using real-time HP filtered output gaps, we calculate the federal funds rate implied by a stabilizing Taylor rule with a 2% inflation target. The implied policy rate is closer to the rate calculated using revised CBO data than real-time CEA data. It is consistently higher than the actual rate, supporting the view that Federal Reserve policy was too stimulative during this period and, therefore, contributed to the Great Inflation. Monetary policy analysis for the 1970s does not just depend on the use of real-time versus revised data; it depends crucially on what real-time data is used.

The leading method for calculating output gaps in the 1970s was linear detrending, followed by quadratic detrending. Following Cecchetti et al. (2007), we calculate real-time detrended output gaps, but use linear and quadratic detrending. This exactly replicates the output gap a researcher in the 1970s would have calculated at the end of the sample. Both sets of output gaps are smaller in magnitude than the CEA estimates and larger than the HP filtered estimates. Most importantly, the policy rates implied by a Taylor rule with linear or quadratic detrended output gaps are consistently higher than the actual rates, supporting the conventional view that Federal Reserve policy was too stimulative during this period.

Which real-time output gap measure should be used for monetary policy evaluation during the Great Inflation? We pose the following question: What would have been a reasonable metric for a researcher to approximate the output gap during this period? Our answer is to use Okun's Law, where the output gap is equal to a (negative) constant times the difference between unemployment and the natural rate of unemployment. The use of Okun's Law leads to our next question: what were the "real-time" estimates of the natural rate of unemployment and the Okun's Law coefficient during the 1970s, particularly during the recession of 1975. Using research published during the 1970s, mostly in *Brookings Papers on Economic Activity*, we document that, by 1975, a consensus had developed around 5.5% for the natural rate of unemployment and −3.0 for the Okun's Law coefficient.

We use real-time estimates of the natural rate of unemployment to evaluate the four real-time output gap measures. Focusing on 1975:2, the quarter of peak unemployment, we show that the real-time Okun's Law output gap approximation is smaller than the CEA estimated output gap, but larger than the HP detrended output gap. The output gaps constructed using real-time linear and quadratic detrending are much closer to the real-time Okun's Law approximation than either the CEA or the HP filtered measures. The same picture emerges from considering 1971:4, the quarter of peak unemployment following the recession of 1969–1970, although the evidence for the real-time measure of the natural rate of unemployment is not as comprehensive.

We proceed to estimate Taylor rules for the late 1960s and 1970s, using real-time inflation and four real-time measures of the output gap: linear detrended, quadratic detrended, HP detrended, and CEA, as well as within-quarter CEA output gap forecasts.[2] With all four output gap measures, the coefficient on the four-quarter average inflation rate is below one, so that monetary policy did not follow a stabilizing Taylor rule. Using one to four-quarter inflation forecasts, the coefficient is both above and significantly different from one for some specifications. This does not, however, provide evidence that the Federal Reserve followed a stabilizing Taylor rule. The inflation forecasts are consistently lower than the inflation rates during and immediately following the two recessions of the 1970s. It appears that the Federal Reserve was overly optimistic about how quickly recessions would bring inflation down and, as a result, failed to sufficiently raise interest rates.[3]

The second aspect of the Taylor rule involves the response of the interest rate to the output gap. With both linear and quadratic detrended output gaps, the estimated coefficients are higher than Taylor's postulated coefficient of 0.5. The response to the output gap, especially during times of peak unemployment, contributed to making monetary policy too stimulative in the 1970s.

Following Levin and Taylor (2009), we investigate stop-start monetary policy by allowing for changes in the inflation target starting in 1970:2, when Arthur Burns became the Federal Reserve Chairman, and in 1976:1, the start of the election year. With four-quarter average real-time inflation rates, the inflation coefficient is not significantly different from one, and consequently there is no well-specified inflation target, for any of the real-time output gap measures. With one to four-quarter inflation forecasts, the inflation forecast coefficient is significantly different from one in most cases and, for these specifications, the target increased in either 1970:2 and/or 1976:1. These results, however, do not support Levin and Taylor's conclusion that the Federal Reserve stabilized inflation around an increasing target, as stabilizing inflation forecasts is not the same as stabilizing inflation when the forecasts are too optimistic.

2. Taylor rules with real-time data for the 1970s

Following Taylor (1993), the monetary policy rule postulated to be followed by central banks can be specified as

$$i_t^* = \pi_t + \phi(\pi_t - \pi^*) + \gamma y_t + r^* \tag{1}$$

[2] Murray et al. (2009) estimate Markov switching models for forward-looking Taylor rules from 1965:4–2007:1, using real-time CEA, linear detrended, and HP filtered output gaps.

[3] Kozicki and Tinsley (2009) estimate time-varying parameter models with real-time inflation forecasts and unemployment gap estimates. The estimated response to inflation falls below unity in the mid-1970s.