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Inflation, unemployment, and the time consistency of the US monetary policy

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ABSTRACT

This paper verifies the performance of the Barro and Gordon (1983) model to explain the US inflation since the early 1950s. We divide the period from 1951:2 to 2010:2 according to each chairman of the Federal Reserve (FED). In addition, we consider aggregated periods, represented by pre-Volcker, Volcker–Greenspan, Greenspan–Bernanke, and whole sample. A genetic algorithm of stochastic search is applied to reduce the sensitivity of the maximum likelihood estimator to the initial parameter values. Surprisingly, our results show that the time consistency problem explains the US inflation during the Greenspan chairmanship at the FED.

1. Introduction

Inflation and unemployment are, usually, the major concerns of policy makers worldwide. Policy regulations and new designs for Central Banks have been developed to keep inflation at a desirable target level. The ultimate goal of such policies is to keep society from experiencing the costs associated with a raising inflation rate. Regardless of successful efforts to control inflation rates, unemployment is still a problem for both developed and developing economies. A simple check worldwide reveals unemployment rates close to 20% of the labor force in some countries.

Concerns regarding the ability of government to use the trade-off between inflation and unemployment led Kydland and Prescott (1977) and Barro and Gordon (1983) to question the time consistency problem of the monetary policy. The government recognizes the short run trade-off between inflation and unemployment and is tempted to make use of this trade-off, leading society to expect higher inflation. If the government does not commit to a low inflation rate, society will correctly believe that it will explore the short run trade-off. In practice, however, this would result in a higher equilibrium inflation rate without reducing the unemployment rate.

Can the United States inflation rate be explained by the monetary policy time consistency problem? According to Romer (2001, pp. 491–492), time inconsistency is no longer a major source of inflation to OECD countries. In agreement with this view, Ruge-Murcia (2003) suggested that a game theoretical approach – in which policy makers are not overambitious as in the Barro–Gordon model, but have asymmetric preferences – better explains US inflation than the standard Barro–Gordon (1983) model. Ireland (1999), however, argued that "the time-consistency problem may underlie inflation's initial rise and subsequent fall over the past four decades". This argument is corroborated

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by Christiano and Fitzgerald (2003) who stated that "The Barro–Gordon model is surprisingly effective at explaining key features of the inflation–unemployment relationship during the 20th century".

Recently, the time consistency problem of the monetary policy has called attention of some researchers. For instance, Berlemann (2005) used polled data from six developed countries and found significant inflationary biases in line with the time consistency problem for Denmark, Great Britain and the United States. In relation to Austria, Australia, and German, no inflationary bias was detected. Overall, his empirical results support the view of time inconsistency of monetary policy as a positive theory of inflation.

An alternative explanation for the great inflation of the 1970s is offered by Surico (2008), who developed a method to measure the time inconsistency of monetary policy when preferences of the central bank are asymmetric. Inflation mean is decomposed into a target and a bias component. The results for the pre-1979 period show that the implicit target was 3.81% and the bias about 1%. For the post-1979 period, the inflation target has declined to near 2% while the average inflation bias has disappeared. That is, the policy preference on output stabilization was large and asymmetric before but not after the appointment of Paul Volcker as FED chairman.

Bae (2010) investigated whether the long-run relationship between inflation and unemployment has changed since Paul Volcker's appointment to the FED. Differently from Ireland (1999), no assumption about the order of integration of the natural rate is made and the possibility of a breakdown in the long-run relationship between inflation and unemployment in the late 1970s or late 1980s is taken into account. Bae concludes that long-run correlations are significantly positive for the 1960s and 1970s, indicating that time inconsistency was at work during the pre-Volcker era, but are not statistically significant for the 1980s and 1990s, suggesting that time inconsistency is irrelevant to the disinflation of the post-Volcker period.

This paper tests whether the Barro and Gordon (1983) model is able to explain the behavior of the US inflation since the early 1950s. We modify Ireland's (1999) approach and contribute with the literature in three different ways. First, we divide the period from 1951:2 to 2010:2 according to each chairman of the Federal Reserve. In addition, we consider aggregated periods, represented by pre-Volcker, Volcker–Greenspan, Greenspan–Bernanke, and whole sample. These time divisions allow us to assess whether the conduct of the US monetary policy has concurrently changed with the chairman of the FED. The intention is to capture any change of preference across the FED chairmen.[2] Second, we apply the recently developed unit root tests, which do not suffer from low power and size distortions as the traditional tests applied by Ireland (1999). Third, we improve on the computational technique by introducing the genetic algorithm of stochastic search, which is less sensitive to initial values assumed by the parameters when determining the maximum likelihood estimates of the model's state space representation.

Our major findings indicate that there is evidence of co-integration between inflation and unemployment during the terms of Burns and Miller, Volcker–Greenspan, Greenspan, and in the whole period. This evidence supports the conclusions by Ireland (1999), who argues that the time consistency problem is able to explain the dynamics of US inflation in the last decades. Our results, however, pointed out to the inability of the Barro and Gordon (1983) model to explain short run movements in the US inflation in all periods but the Greenspan era. Thus, time consistency problem can explain both short and long run dynamics of the US inflation during the Greenspan term. Given that Ireland (1999) did not divide his sample by FED chairman, he missed this important result. In addition, the Surico (2008) and Bae (2010) results, which claim that time inconsistency was not a problem after Volcker's term, were driven by the Volcker's chairmanship but do not hold when the Greenspan's period is analyzed separately.

Our results are also in line with the argument that the great moderation experienced by the US economy in the last decades under the format of lower volatilities of both inflation and output growth was more of good luck than good policy. The time consistency problem explained long run inflation dynamics in the chairmanships of Burns–Miller, Volcker–Greenspan, and Greenspan at the FED and in the whole sample. In the short run, it also accounted for inflation dynamics during the Greenspan era. As recognized by Cogley and Sargent (2001), there is evidence of returning to an exploitable trade-off between inflation and unemployment in the US monetary policy conduction, a concern also raised by Taylor (1998). On the opposite side, claiming that the great moderation was more of good policy which is not captured by conventional econometric techniques, one can highlight Carlstrom et al. (2009), Benati and Surico (2009), Surico (2008), among others.

The paper is organized as follows. Section 2 briefly describes the estimated equations. Section 3 presents the data, tests the long and short run restrictions, and discusses the results. Section 4 reports the concluding remarks.

2. Theoretical model

The model is borrowed from Ireland (1999), who modifies Barro–Gordon (1983) by allowing for a unit root in the natural rate of unemployment and transitory deviations between the actual unemployment rate and the natural rate of unemployment. The natural rate of unemployment is assumed to follow a random walk and is represented by:

$$U_t^N - U_{t-1}^N = \lambda(U_{t-1}^N - U_{t-2}^N) + \varepsilon_t \quad (1)$$

where U^N is the natural rate of unemployment, $1 > \lambda > -1$, and ε is serially uncorrelated and normally distributed with mean zero and standard deviation σ_ε. Eq. (1) states that the natural rate fluctuates over time in response to a real shock ε in accordance to random walk process.

The Phillips curve is given by:

$$U_t = U_t^N - \alpha(\pi_t - \pi_t^e) \quad (2)$$

[2] Changes in the institutional aspects or changes in the structural characteristics of the economy can both justify this shortcut by sub-periods.