



Inflation dynamics: The role of public debt and policy regimes

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ABSTRACT

In a passive monetary and active fiscal policy regime, changes in the value of public debt generate wealth effects on households. Then, in contrast to the active monetary and passive fiscal policy regime, inflation moves oppositely from the inflation target and a stronger reaction of interest rates to inflation increases the response of inflation to shocks. Moreover, a higher level of public debt increases the response of inflation while a weaker reaction of taxes to debt decreases the response of inflation to shocks. In a passive monetary and passive fiscal policy regime, both monetary and fiscal policy parameters affect inflation.

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1. Introduction

Using a dynamic stochastic general equilibrium (DSGE) model, we address three classic questions in monetary economics and policy in this paper. First, does monetary policy always properly control the dynamics and path of inflation? Specifically, can a time-varying inflation target decisively influence the path of actual inflation? Second, does the level of public debt matter for inflation dynamics? In particular, does a higher level of public debt lead to a greater equilibrium response of inflation? Third, what roles do monetary and fiscal policy stances play on inflation dynamics? For example, how does the behavior of inflation change when interest rates respond more aggressively to inflation? Does the fiscal policy stance matter for inflation dynamics and if so, how does a variation in the response of taxes to public debt affect inflation?

These issues, while long of great interest in monetary economics, have received a renewed interest recently. For instance, rising levels of public debt in many countries have recently raised concerns of such a development leading to future inflation. Another example is the research that aims to explain the rise of U.S. inflation in the 1970s and its fall in the 1980s. Proposed explanations typically rely on dynamics of the inflation target and/or changes in policy stances. They include a persistent rise in a time-varying inflation target in the 1970s (Ireland, 2007; Cogley et al., 2010); indeterminacy due to a weak monetary policy stance with respect to inflation in the pre-Volcker period (Clarida et al., 2000; Lubik and Schorfheide, 2004; Bhattarai et al., 2012a, 2012b); and, finally, a weak response of taxes to debt in the face of increased government spending in the 1970s (Sims, 2011; Bianchi and Ilut, 2012).¹

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E-mail address: sub31@psu.edu (S. Bhattarai).¹ Primiceri (2006) and Sargent et al. (2006) provide a learning-based explanation for the rise and fall of U.S. inflation while Sims and Zha (2006) attribute it to time-varying volatility of shocks.

Motivated by these considerations, the first part of this paper provides a complete and analytical characterization of these questions in a prototypical DSGE model with feedback policy rules. Three different policy regimes are analyzed. The first is an active monetary and passive fiscal policy regime, where a high response of interest rates to inflation is coupled with a high response of (lump-sum) taxes to public debt.² This is the most common policy regime considered in the literature where monetary policy controls inflation dynamics while fiscal policy plays no role. In this regime, as is well understood, inflation closely follows the path of the inflation target and in fact, stronger the reaction of monetary policy to inflation, more closely will actual inflation follow the inflation target and lower is inflation volatility.

The second is a passive monetary and active fiscal policy regime, where a low response of interest rates to inflation is coupled with a low response of taxes to public debt.³ In this regime, in sharp contrast to the previous regime, inflation moves in the opposite direction from the inflation target. In fact, stronger the systematic reaction of monetary policy to inflation, greater will be the divergence between the inflation target and the actual inflation. In addition, and again in sharp contrast to the previous regime, a stronger reaction of monetary policy to inflation increases the response of inflation to non-policy shocks and raises inflation volatility. Moreover, now, fiscal policy – the level of public debt and the fiscal policy stance – matters for inflation dynamics. In particular, a higher level of public debt leads to an increase in inflation, while a more active fiscal policy leads to a weaker response of inflation to non-policy shocks and a greater divergence between the inflation target and the actual inflation.

These results arise because of the wealth effect on households when the value of outstanding public debt varies due to interest rate and (lump-sum) tax changes. When monetary policy raises interest rates – whether responding to a reduction in the inflation target or to other shocks – the value of public debt rises to cover the increased interest expense. In this regime, in contrast to the active monetary and passive fiscal policy regime, households, who hold public debt, perceive this increase in the value of debt as increasing their wealth since it is not matched by tax increases that are enough to satisfy the intertemporal government budget constraint at prevailing prices. This positive wealth effect then leads to increased spending by households, which in turn increases inflation in equilibrium. Thus, inflation will move in the opposite direction from the inflation target. Moreover, greater the systematic response of interest rates to inflation, stronger is the wealth effect and higher is the response of inflation, which leads to a greater deviation of inflation from the target.

Similarly, fiscal policy matters for inflation dynamics. Importantly, as explained above, a higher level of public debt is inflationary. Moreover, fiscal policy stance now affects inflation, but unlike the monetary policy stance, it affects household wealth by controlling directly the magnitude of the change in taxes – rather than interest expenses – after a shock. When non-policy shocks generate inflation and lower the real value of debt, the government responds by collecting lower taxes, which in turn, creates a positive wealth effect and raises inflation further. Weaker the response of taxes to debt however, lower the decrease in taxes and the positive wealth effect. Thus, a more active fiscal policy generates a smaller response of inflation to non-policy shocks. In contrast, a more active fiscal policy generates a greater divergence between inflation and the inflation target. A decrease in the inflation target raises the value of public debt, which generates a positive wealth effect and increases inflation. At the same time, the increase in public debt induces the government to raise taxes, which partially offsets the positive wealth effect. Under a more active fiscal policy, the tax increase is smaller and the (net) wealth effect is greater. This leads to a bigger inflation increase.

The third is a passive monetary and passive fiscal policy regime, where a low response of interest rates to inflation is coupled with a high response of taxes to public debt, and which leads to equilibrium indeterminacy. Then, both monetary and fiscal policy stances matter for inflation dynamics, although the level of public debt does not affect inflation.

We conclude the first part of the paper by comparing in a common framework, the wealth effect based mechanism at work in the passive monetary and active fiscal policy regime with the classic seigniorage based mechanism at work in the fiscal dominance regime of [Sargent and Wallace \(1981\)](#). Government debt influences inflation dynamics in both of these cases, but the implications with respect to the correlation between monetary policy shocks and inflation are different. The second part of the paper conducts a quantitative experiment with a rich DSGE model that includes a variety of shocks and frictions and shows that for realistic parameter values, our analytical results continue to apply.

Our results have implications for both the empirical and the theoretical literature in monetary economics. For example, consider the recent practice of using a time-varying inflation target process to explain the low frequency movement in actual inflation. In particular, [Ireland \(2007\)](#) and [Cogley et al. \(2010\)](#) show that the estimated inflation target tracks actual inflation remarkably well in post-WWII U.S. data. Moreover, in a comprehensive study of various monetary policy reaction functions, [Curdia et al. \(2011\)](#) show that using a persistent time-varying inflation target improves the fit of the model since it helps capture the low frequency variation in inflation. Our results show that this strategy works only if one imposes an active monetary and passive fiscal policy regime as well as an inflation target shock that is more persistent than other non-policy shocks.⁴

² The language of [Leeper \(1991\)](#) is followed in characterizing policies as active and passive.

³ [Leeper \(1991\)](#), [Sims \(1994\)](#), and [Woodford \(1995\)](#) are early treatments of this policy regime. [Kim \(2003\)](#) and [Canzoneri et al. \(2011\)](#) present numerical results for some shocks in a sticky-price model. Our paper analytically characterizes both the solution and the comparative statics with respect to policy parameters.

⁴ [Curdia et al. \(2011\)](#) use data from 1987:III to 2009:III, a period during which an active monetary and passive fiscal policy regime is a reasonable description of policy. However, using an estimated model and a pre-Volcker and a post-Volcker subsample analysis, [Bhattarai et al. \(2012b\)](#) show that the correlation between inflation and the inflation target depends on which policy regime is imposed during estimation.

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