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ABSTRACT

The fiscal policy environment central banks operate in can be radically different with respect to debt levels, maturity structures and whether or not fiscal adjustments are spending- or tax-based. Despite this, most analyses of monetary policy delegation schemes typically ignore the behavior of the fiscal policy maker. This paper investigates whether delegating either nominal income or price level targets to a monetary authority yields social gains in an economy with government debt, where the fiscal policymaker, acting strategically, may support or undermine the policies of the central bank. We argue that the fiscal environment plays an important role in determining the performance of monetary policy. The gains to price level targeting typically found in the literature can be overturned at empirically relevant debt-to-GDP ratios, when debt stabilization is achieved through spending cuts. In contrast these gains are retained if the fiscal authorities utilize taxes to respond to shocks and stabilize debt.

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1. Introduction

Advanced economies differ considerably with regard to their sovereign debt levels and the maturity of that debt. In 2015, for example, government net debt was about 25% of GDP in Switzerland but 113.5% in Italy. The average term to maturity of Sweden's public debt was five years, whereas that of the UK was 14.5 years (Source: IMF, 2016). Sims (2013) has stressed that the effectiveness of monetary policy is influenced by fiscal policy, and that both the level and maturity of debt play a key role in determining inflation. Nevertheless, the literature concerned with optimal delegation of monetary policy largely abstracts from such differences in the fiscal position. The current paper argues that the fiscal position should be considered a central determinant of an optimal monetary delegation scheme. Countries operating within different fiscal environments may require different forms of monetary delegation.

This paper builds a New Keynesian business cycle model augmented with fiscal policy, that is subject to both inflationary cost-push shocks and technology shocks. In the standard New Keynesian model without a meaningful fiscal policy, optimal monetary policy under commitment – i.e. time-inconsistent policy where the policy maker is known to keep policy promises – possesses two important properties. First, it produces the lowest possible welfare loss, thanks to the policy maker's ability

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to manipulate the expectations of the private sector through the policy commitments it makes. Second, following a shock, it manipulates expectations in this beneficial way by committing to stabilize not only inflation, but also the price level itself. Instead, a benevolent central bank which is unable to precommit to such a plan and which has to act in a sequential and time consistent manner, known as discretionary policy, creates an additional loss: a welfare-reducing ‘stabilization bias’, see [Currie and Levine \(1993\)](#) and [Svensson \(1997\)](#). Two prominent proposals to improve welfare outcomes under discretion are to give the central bank a mandate for price level targeting ([Vestin, 2006](#)) or nominal GDP targeting ([Jensen and McCallum, 2002](#)). The rationale is that such mandates would lead the discretionary central bank to act in a way that induces a history dependence to policy making, through the adoption of price level control, which is similar to the one arising under commitment. The current paper examines the effectiveness of these two targeting regimes, albeit in the context of a richer fiscal environment.

Specifically, we assume that fiscal policy has to finance welfare-relevant government consumption and government debt through distortionary income taxes. Assuming that fiscal policy, as well as monetary policy, acts under discretion and is bound by existing debt levels and a given debt maturity structure, we ask what the welfare gains would be from providing the monetary authority with either a price level or nominal GDP target. We find that the answer to this question depends crucially on whether the fiscal policy maker can adjust taxes, or has to adjust spending to pay the debt. When the fiscal authority has access to taxation, both delegation schemes perform well, while when the only available fiscal instrument is government spending the effectiveness of each delegation scheme depends, differently in each case, on the level and maturity of government debt. It is, in fact, possible, when fiscal adjustment is conducted solely through government spending, for the delegation scheme to worsen outcomes relative to discretion, even though such nominal targets have been shown to dramatically improve welfare outcomes in the context of monetary economies.

The reason for this is as follows. In an economy with meaningful fiscal policy and with access to taxation as an instrument (in combination with the monetary instrument), the joint monetary and fiscal policy under commitment can deal effectively with both technology and cost-push shocks without generating significant unwanted inflation. As a result, although the optimal commitment policy does not perfectly control the price level, the extent of price level drift is small. Under discretion, the presence of nominal government debt gives rise to a substantial ‘debt stabilization bias’, which depends upon both the level and maturity of government debt ([Leeper and Leith, 2016](#)) as policy makers face the temptation to inflate away any shock-induced fluctuations in debt. Economic agents anticipate this and inflation expectations (and inflation itself) rise until the temptation is removed. This implies a far larger amount of price level drift under discretion. Delegating a nominal income or, more effectively, price-level target to the monetary authority, can improve on this significantly, with welfare gains amounting, under our calibration, to around 0.53% of steady-state consumption that the consumer would be willing to give up to move from the actual regime to the steady-state allocation in the case of a relatively high debt economy like Italy.

In contrast, without access to taxation as a fiscal instrument the policy makers’ ability to stabilize the economy in the face of cost-push shocks under commitment is more limited. Therefore, under the optimal commitment policy there is far less price level control, particularly in the short run, as surprise inflation becomes a useful tool in stabilizing debt. The corresponding incremental welfare loss under discretion is smaller, but the two forms of nominal target can actually make outcomes worse. Essentially, the discipline imposed by price level control can be counter-productive since the first-best policy under commitment features a non-trivial degree of price level drift. For example, with high debt levels a price level target can undermine the use of a short burst of surprise inflation which would otherwise facilitate the stabilization of debt following a shock. Therefore, the welfare loss in Italy, for example, would increase by 0.16% of steady-state consumption, although it would be improved by 0.16% in a low debt economy like Sweden if these countries were to adopt a price-level target. At the same time, a nominal income target moderates the initial movements in bond prices when debt is of longer maturity, thereby reducing the policy makers’ ability to reduce the initial impact of the shock on debt and forcing them to rely on costly changes in government spending to stabilize debt in the longer-term. This gives rise to a welfare gain of between 0.03%–0.06% of steady-state consumption across all economies in our sample of 11 representative advanced economies.

The fact that our results depend on the choice of fiscal instrument is of practical relevance, since [Alesina and Ardagna \(2010\)](#) find that the composition of fiscal consolidation packages varies over time and across economies with major consolidations in OECD economies between 1970 and 2007 being three times as likely to be tax, rather than spending, based. However, the [IMF \(2012\)](#) suggest, more recently, that the nine major fiscal consolidations being implemented at the time were all predominately spending based, as policy makers no longer appear able to implement significant tax increases. The results in the current paper suggest this may have negative welfare consequences.

While rich in some dimensions, our analysis deliberately abstracts from analyzing the transmission mechanism of monetary and fiscal policy in the presence of the zero lower bound (ZLB), debt management policies, and the transition from one steady-state debt level to another. Instead, we take a range of combinations of debt level and maturity as given, and ask how the impact such changes in the fiscal environment have on the policy transmission mechanism affects the desirability of alternative monetary policy delegation schemes.

The paper is organized as follows. Next, we review the related literature, which further pinpoints the contribution of this paper. In the following section we outline the model. [Section 3](#) defines all policy scenarios of interest and [Section 4](#) describes the calibration. [Section 5](#) presents the analysis of all cases we consider, for each of the fiscal instruments. In [Section 6](#) we apply our results to a representative sample of 11 advanced economies. [Section 7](#) concludes.

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