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Fiscal limits and monetary policy: default vs. inflation

Anna Sokolova *

National Research University Higher School of Economics, 101000, Myasnitskaya Street, 20, Moscow, Russia

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ABSTRACT

This paper studies the monetary policy trade-off between low inflation and low sovereign risk in the environment where fiscal authorities fail to fully ensure the sustainability of government debt. Building on the Fiscal Theory of Price Level (FTPL) and the Fiscal Theory of Sovereign Risk (FTSR), this paper differs in its baseline assumption about the monetary policy objective, which is neither to rule out defaults regardless of inflation costs (as in FTPL), nor to follow inflation targeting regardless of associated sovereign risk (as in FTSR). Instead, we study the case in which the central bank controls the risky interest rate to minimize the probability of default while ruling out large inflation hikes. We show that this policy regime can mitigate default risks only when the central bank is expected to allow sufficient increases in inflation. When agents believe that the central bank's tolerance toward inflation hikes has increased, equilibrium risk premium goes down, suggesting that information concerning changes in the central bank's preferences over inflation directly impacts default risks.

1. Introduction

In the aftermath of 2007–2008 crisis, some economies of the European Monetary Union (EMU) have found themselves in a complex situation. On the one hand, there is a pressing need to increase budget surpluses to mitigate default risks; on the other hand, the scope of raising extra revenues through fiscal austerity is limited because such policy may lead to further recession and cause political crises. In the presence of fiscal stress, fiscal policy by itself may fail to ensure the sustainability of government debt. In this environment, it is crucial to learn what the monetary policy controlling the costs of borrowing can do to mitigate the debt crisis.

Sovereign defaults have devastating consequences for the financial system. Ensuring the stability of the financial system is one of the key functions of a central bank. When government debt is denominated in national currency, the central bank is capable of resolving debt sustainability issues by causing the costs of debt servicing to be reduced.

Uribe (2006) shows that in the presence of sovereign default risks, two fundamental functions of the central bank are in conflict: ensuring debt sustainability (stability of the financial system) and maintaining low inflation. In the literature studying default risks and monetary policy, authors often presuppose that one of the two aims of the central bank is dominant; the results concerning the dynamics of inflation and the risk premium are contingent on the underlying assumption about the central bank's priorities. Specifically, in Sargent and Wallace (1981) as well as in the papers on Fiscal Theory of Price Level (FTPL),[1] the authors presuppose that the primary goal of the central bank is to avoid sovereign defaults, regardless of the costs in terms of inflation. Rational agents are aware of the central bank's preferences and thus believe that the probability of default is zero. It follows that in those models there is no risk premium on government bonds.

By contrast, Uribe (2006) and Guillard and Kempf (2012) study the case when maintaining low inflation is a primary objective of the central bank — monetary policy is conducted in a way that excludes deviations of inflation from the target. In these models defaults emerge whenever debt becomes unsustainable under the target level of inflation.

In this paper, the baseline assumption is that although the central bank is eager to minimize the probability of default arising from fiscal stress, it is constrained by formal requirements concerning inflation: there is a maximum level of inflation that the central bank may allow to avoid sovereign default. Thus, the central bank controls the costs of borrowing to mitigate default risks while maintaining low inflation.

This specification of the central bank's problem seems particularly relevant for the analysis of monetary policy within a monetary union. When the central bank of a monetary union conducts accommodative policy intended to stabilize the debt of one of the member regions, the costs in terms of inflation are spread across all member regions. Fiscally prudent governments may be unwilling to share these costs and thus may have an incentive to collectively impose an upper limit on inflation, restricting the central bank's policy choices.[2] Alternatively, the central bank may determine the upper limit on inflation by comparing the costs associated with an increase in inflation with the costs arising

* Corresponding author at: National Research University Higher School of Economics, Laboratory for Macroeconomic Analysis,101000 Myasnitskaya Street 20, Moscow, Russia.
E-mail address: asokolova@hse.ru.

[1] Leeper (1991), Woodford (1995, 1998), Cochrane (2001) and others.

[2] This outcome seems reasonable if fiscal policy differs across regions. For instance, if the probability of default is rather small in the majority of regions, costs associated with an increase in inflation for these regions exceed benefits from reduction of the probability of default resulting from an increase in the upper limit of inflation.

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from a sovereign default of one of the member states.[3] Finally, the upper limit on inflation may be treated as a formal commitment of the central bank. A study of monetary policy that controls the costs of borrowing appears to be urgent in light of the recently launched OMT program (Outright Monetary Transactions), a program presupposing that the European Central Bank would buy bonds of troubled governments to mitigate default risks given that they implement fiscal austerity.

Methodologically, this specification of the central bank's problem can be viewed as a compromise between baseline assumptions of FTPL models and models in which the central bank does not allow any deviations of inflation from the target, such as Uribe (2006), Guillard and Kempf (2012). An advantage of this framework is that it avoids the issue of zero risk premium that occurs in Uribe (2006), while allowing a study of the capabilities and limitations of monetary policy aimed at mitigating default risks.

We determine the threshold value of real debt that triggers sovereign default and show that this threshold is an increasing function of the upper limit on inflation. We then show that under this specification of monetary policy the equilibrium risk premium and probability of default depend on the upper limit of inflation — the higher the limit, the lower the risk premium and probability of default. When the upper limit on inflation is high enough, a monetary policy that controls the risky interest rate can ensure a zero probability of default in equilibrium. Furthermore, if agents do not possess exact information concerning inflation constraint, the central bank has incentives to create inaccurate beliefs suggesting the upper limit on inflation to be higher than the actual value in order to lower the risk premium on government bonds and reduce the probability of default. Another implication of this analysis: if the central bank is committed to mitigating default risks, even if that means higher inflation, then the earlier the public learns about this commitment, the lower the costs of implementing such a policy.

1.1. Fiscal stress in the EMU

In the EMU, the ability of the governments to flexibly adjust fiscal policy in line with the sustainability criteria is debatable. Trabandt and Uhlig (2011) show that over the past 20 years, European economies have drawn closer to the peaks of their respective Laffer curves: the scope of raising extra tax revenues via increases in tax rates is limited since further increases in the tax rate would cause only a minor gain in a government's earnings. Cochrane (2011) asserts that even if an economy is supposed to operate well below the Laffer curve peak, a small rise in the tax rate may cause a prominent slowdown of economic growth thereby reducing future taxable income. Bi et al. (2013) show that expectations of increases in fiscal surpluses may have a different impact on output growth depending on the composition of fiscal consolidation. Particularly, expectations of an increase in the labor tax rate lead to a slowdown of output growth, whereas a decrease in government expenditures promotes it. Even if tax collection limits are to be neglected, it is plausible that a government facing a debt sustainability constraint would rather default on its debt than perform fiscal contraction even though such a move would facilitate debt service. Theoretical support for this view can be found in Eaton and Gersovitz (1981), who determine the "effective" tax rate – the highest rate it makes sense to impose before defaulting – which turns out to be lower than the rate corresponding to the Laffer curve peak.

Thus, austere tax policy has certain limitations. The scope of raising revenues through cutting transfers and government expenditures is limited as well. First, in a democratic environment it is difficult to implement such a policy without a substantial delay (see Alesina and Drazen, 1991). Second, due to adverse demographic trends on the one hand and the governments' obligations to support future retirees with appropriate benefits on the other, expenditures related to aging are expected to rise substantially in the next 50 years. According to the IMF (2009), the net present value of these promised expenses is averaging 409% of GDP across advanced G-20 countries, meaning that the transfers are not backed by tax revenues. These concerns show that fiscal stress is likely to remain a pressing issue in the long run.

The remainder of this paper is structured as follows. Section 2 presents the model: it lays out the design of fiscal policy and the household's problem. We determine the conditions insuring that government debt can be sold to households and describe the central bank's problem. In Section 3 we define equilibrium; determine conditions under which equilibrium exists; and express the default rate, the probability of default and the risk premium as functions of the risky interest rate. In Section 4 we determine the conditions guaranteeing that a solution to the central bank's problem exists, and characterize the solution, determining the risky interest rate. We explore equilibrium outcomes when households know the true value of the upper limit on inflation, and when they do not know it, so the central bank can influence beliefs about the limit's value. Section 5 concludes. The Appendix presents a numerical example for the Greek economy.

2. The model

2.1. The government

Consider an endowment economy where the government collects lump sum taxes, pays transfers and issues one-period bonds. The economy is subject to fiscal stress: the government is not always able to raise extra surpluses to prevent real government debt from expanding. As a result, the government may fail to insure debt sustainability and default risk may emerge. Using the terminology of Leeper (1991), fiscal policy is "active". We follow Uribe (2006) in assuming that fiscal surpluses (taxes minus transfers) follow an AR(1) process:

$$s_t - \bar{s} = \rho(s_{t-1} - \bar{s}) + \varepsilon_t, \tag{1}$$

where $\rho < 1$, $\varepsilon_t \sim F(0, \sigma^2)$ and $F(\cdot)$ is a symmetric probability distribution function[4] with zero mathematical expectation and a variance of σ^2, $\bar{s}$ is a steady state value of fiscal surplus. Government debt is risky: in period t the government defaults on a δ_t fraction of its debt. The dynamic budget constraint in period t is given by

$$\frac{B_t}{P_t} = \frac{R_{t-1}B_{t-1}(1-\delta_t)}{P_t} - s_t, \tag{2}$$

where B_t is the nominal debt in period t, P_t is the price level, R_{t-1} is the gross nominal interest rate. Following Bi (2012), Bi and Traum (2012), Guillard and Kempf (2012), we assume that default occurs when the real value of debt exceeds an upper limit, $\hat{b}_t$, in which case the default rate equals δ. Thus, the default rule is given by

$$\delta_t = \begin{cases} 0, & \text{if } b_{t-1} < \hat{b}_t \\ \delta, & \text{if } b_{t-1} \geq \hat{b}_t \end{cases}. \tag{3}$$

We derive $\hat{b}_t$ in subsection 3.1.

2.2. The central bank

In subsequent sections we will show that in times of fiscal stress there is a negative relation between inflation and the default rate (Eq. (18)) — thus, when the central bank allows increases in inflation,

[3] Cooper et al. (2010) show that in a monetary union the decision of the central bank on whether to bailout a member state or not depends on the allocation of risky bond holdings across regions. Since monetization leads to inflation growth, allocation of risky bonds might as well influence the maximum value of inflation that the central bank can tolerate to avoid defaults.

[4] Here we do not restrict $F(\cdot)$ to a specific distribution function — we only assume that the distribution is symmetric, as symmetry is crucial for derivation of main results.

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