Fiscal Stabilization vs. Passivity*

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Abstract

Fiscal policies that stabilize debt may not provide the fiscal backing necessary for monetary policy to successfully target inflation. Appropriate backing is provided by passive fiscal behavior. Understanding the distinction between stabilizing and passive fiscal policies is central to the design of fiscal rules.

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1 Introduction

Fiscal frameworks and associated fiscal rules are being designed with two objectives in mind: ensuring fiscal sustainability and providing some degree of countercyclical policy. The thinking behind this design is that with fiscal sustainability ensured, an independent central bank can pursue inflation targeting without fear that fiscal considerations will undermine its efforts to control inflation. Portes and Wren-Lewis (2014) thoughtfully discuss the considerations that underlie the fiscal rules countries are adopting.

This institutional design aims to insulate the central bank from the kinds of fiscal pressures that advanced economies have not experienced since the hyperinflations in Austria, Germany, Hungary, and Poland after World War I. Confronted with debts denominated in units of goods—gold or foreign currency—those countries resorted to printing fiat currency to generate real revenues—seigniorage [Sargent (1986)]. Memories of the spectacular failure of those policies continue to condition how macroeconomists frame monetary-fiscal policy interactions and continue to guide macroeconomic policy design.

Governments today, particularly in advanced economies but also in many emerging economies, do not primarily issue debt denominated in units of goods. Instead, the vast majority of government debt is nominal: government bonds are predominantly promises of payments in domestic currency—units of fiat money. The presence of nominal government debt introduces fresh channels for fiscal inflation that carry broad implications for monetary-fiscal interactions, implications that fundamentally alter the nature of price-level determination.

Designers of fiscal rules believe that by ensuring fiscal sustainability, the rules will permit monetary policy to achieve its flexible inflation targeting objectives. This perspective misapprehends the nature of price level determination. Fiscal sustainability may or may not be consistent with *passive* fiscal behavior.[1] It is passive fiscal behavior that provides the fiscal backing necessary for the central bank to control inflation. For example, a contractionary open-market sale of government bonds raises nominal interest rates, including yields on government bonds. If the higher debt service is permitted to flow into more rapid growth in nominal debt with no prospect of eventually higher taxes—or primary surpluses, more generally—then bond holders will perceive that their wealth has increased and seek to convert that wealth into purchases of goods. This higher aggregate demand will ultimately *raise* the price level.[2] For the monetary contraction to reduce inflation, higher debt service must portend higher taxes that eliminate the wealth effect from the monetary action.

Remarkably, the distinction between stabilizing and passive fiscal policy behavior does not appear in the monetary-fiscal policy interactions literature.

This note draws on Patinkin's (1974, p. 16) observation that analyses that followed from Keynes (1936) tend to concentrate on "...the substitution effects, to the exclusion of the possible wealth—or real-balance—effect." This observation is equally true of the class of

[1] Leeper (1991) defines "active" and "passive" policy behavior. Essentially, an active policy authority is free to pursue its objective, whatever it might be, while a passive authority is constrained by private behavior and the behavior of the active authority to support the active authority's actions.

[2] Sims (2011) calls this "stepping on a rake:" a higher nominal interest rate initially reduces inflation, but raises inflation once the wealth effect dominates. Cochrane (2016) explores the mechanism in detail. Wallace (1981) recognized the centrality of fiscal backing for monetary policy impacts.

new Keynesian models now in wide use by central banks and academics to study monetary policy [for example, Woodford (2003)]. This note uses a simplified version of those models to illustrate that conventional effects of exogenous monetary policy actions *require* fiscal policy to neutralize monetary policy's wealth effects. That is, conventional monetary effects in dynamic models require passive fiscal behavior. Fiscal policy must not only be sustainable, it must also provide the right kind of fiscal backing for monetary policy to operate as the inflation targeting framework intends.

2 A Simple Model

Consider an infinitely-lived representative consumer who receives a constant endowment of goods each period in the amount y and derives utility only from consumption. The equilibrium real interest rate is constant at $r = (1/\beta) - 1$ where $0 < \beta < 1$ is the consumer's discount factor. The consumer makes a consumption-saving decision that produces the simple Fisher relation

$$\frac{1}{R_t} = \beta E_t \frac{1}{\pi_{t+1}} \tag{1}$$

where R_t is both the gross one-period nominal interest rate on nominal bonds bought at t and pay off in $t+1$ and the monetary policy instrument, and π_{t+1} is the gross rate of inflation between t and $t+1$. To derive (1) we imposed equilibrium in the goods market, $c_t = y - g$, which assumes the government purchases a constant quantity of goods each period.

Monetary policy follows an interest rate rule that responds to inflation[3]

$$\frac{1}{R_t} - \frac{1}{R^*} = \alpha \left(\frac{1}{\pi_t} - \frac{1}{\pi^*} \right) \tag{2}$$

where π^* is the inflation target and $R^* = \pi^*/\beta$ is the nominal interest rate consistent with the inflation target. We assume $\alpha \geq 0$. Monetary policy is *active* when $\alpha > \beta$ and *passive* otherwise.

Fiscal policy levies lump-sum taxes of τ_t and sets purchases to be constant, $g > 0$. Government issues one-period nominal bonds, B_t, that satisfy the flow constraint

$$\frac{B_t}{P_t} + \tau_t = g + \frac{R_{t-1} B_{t-1}}{P_t} \tag{3}$$

where P_t is the aggregate price level.

A commonly-used fiscal rule can illustrate the distinction between stabilizing and passive fiscal behavior. Posit that tax deviations from steady state are proportional to deviations of real debt from steady state

$$\tau_t - \tau^* = \gamma \left(\frac{B_{t-1}}{P_{t-1}} - b^* \right) \tag{4}$$

where τ_t is tax revenues, B_{t-1} is nominal debt outstanding at the beginning of t, P_{t-1} is the price level in period $t-1$, and τ^* and b^* are steady state levels of revenues and real government debt. Assume that $\gamma \geq 0$.

[3]This is a simplified form of Taylor's (1993) rule for monetary policy.

3 Stabilizing and Passive Fiscal Behavior

Combining (4) with (3) and defining real debt as $b_t \equiv B_t/P_t$ yields

$$b_t + (\tau^* - g) + \gamma(b_{t-1} - b^*) = \frac{R_{t-1}}{\pi_t} b_{t-1}$$

Taking expectations conditional on information at $t-1$, imposing the Fisher relation, (1), and simplifying gives the expected evolution of real debt[4]

$$E_{t-1}(b_t - b^*) = \left(\beta^{-1} - \gamma\right)(b_{t-1} - b^*) \tag{5}$$

which implies that for $T \geq t$

$$E_t(b_T - b^*) = \left(\beta^{-1} - \gamma\right)^{T-t}(b_t - b^*) \tag{6}$$

One of the household's necessary and sufficient conditions for optimality is the transversality condition

$$\lim_{T\to\infty} \beta^{T-t} E_t b_T = 0 \tag{7}$$

Evidently, the fiscal parameter γ figures prominently in ensuring this condition is satisfied. In fact, satisfaction of the transversality condition is how Bohn (1998) defines "sustainable" fiscal policy. It is clear from inspection of the debt evolution, (6), that $\gamma > 0$ ensures that the real value of debt is expected to grow at a rate less than $1/\beta$ so that (7) is satisfied.

With the tax rule in (4), when $\gamma > r = \beta^{-1} - 1$, this tax rule accomplishes two things. First, when taxes are proportional to debt by a constant that exceeds the real interest rate, the revenue increase is sufficient both to cover the additional real debt service from higher debt and to retire some of the newly issued debt each period. That response ensures that debt is stable, eventually returning to steady state. Importantly, this first accomplishment entails stabilizing real government debt.

The second thing the tax rule in (4) accomplishes involves the response of taxes to changes in the price level, P_{t-1}. The contractionary monetary policy example illustrates that for monetary policy to control inflation, fiscal policy must neutralize the wealth effects that monetary actions produce. When $\gamma > 0$, tax rule (4) makes future taxes move inversely with the price level, so when a monetary contraction reduces inflation, the rule produces a higher path for tax revenues. To word this differently, passive fiscal policy delivers the fiscal backing necessary for monetary actions to affect inflation in the usual ways. That backing must take the form that fiscal contraction supports monetary contractions that reduce the price level. If those higher future taxes are not forthcoming, the monetary contraction must eventually raise the price level.

4 Stabilizing vs. Passive Fiscal Behavior

This discussion suggests that debt stabilization and passive fiscal behavior need not coincide, although setting $\gamma > r$ in (4) happens to deliver both outcomes. It is easy to construct examples of policies that stabilize debt, but do not provide the fiscal backing that passive policy delivers. And a policy may be passive but fail to stabilize debt. Both examples can come from the class of rules that (4) describes.

[4] The derivation uses the fact that in steady state $\tau^* - g = (\beta^{-1} - \gamma)b^*$.

4.1 Stabilizing $\not\Rightarrow$ Passive

The clearest example of stabilizing, but non-passive fiscal policy sets the primary surplus at a positive constant each period, $s > 0$. This is an example of both a sustainable fiscal policy and an *active* fiscal policy that delivers a unique equilibrium price level. Set $\gamma = 0$ so that $\tau_t = \tau^*$ for all t and $s = \tau^* - g$.

After taking expectations and imposing the Fisher relation, the government's flow budget identity reduces to

$$b_{t-1} = \beta E_{t-1}(b_t + s)$$

which implies that

$$b_t = b_{t-1} = b^* = \frac{\beta}{1-\beta} s \tag{8}$$

In this Fisherian model, a constant primary surplus implies that the real value of government debt is constant at its steady state value, b^*. Using (8) in (3) yields

$$\frac{R_{t-1} B_{t-1}}{P_t} = \frac{1}{1-\beta} s \tag{9}$$

With R_{t-1} and B_{t-1} predetermined at t, (9) delivers a unique equilibrium positive price level so long as $s > 0$.

In this example, fiscal policy is clearly sustainable: real government debt is constant, so discounted debt converges to zero. But because taxes are unresponsive to the price level, fiscal policy does not provide the backing that monetary policy requires to affect inflation in the usual ways. As (9) makes clear, if monetary policy increases the nominal interest rate at t, debt service rises at $t+1$, $(R_t - 1)B_t$. The household's higher interest receipts are not met with higher tax obligations, so the interest receipts raise nominal wealth. Converting that wealth into a higher path for consumption goods raises demand and the price level in $t+1$.

If monetary policy were to pursue an inflation target by setting $\alpha > \beta$, the monetary policy rule, (2), together with the Fisher relation, (1), imply that the bounded solution for inflation is $\pi_t = \pi^*$ for all t, without any reference to fiscal behavior or the government's budget identity. Evidently, this solution for the price level, $P_t = \pi^* P_{t-1}$, will generally conflict with the solution in (9) because the fiscal policy of a constant surplus, while sustainable, does not provide the necessary support for the central bank to successfully target inflation.

To see this in more detail, notice that when $s > 0$, (8) and (9) imply that $1/\pi_t = 1/(\beta R_{t-1})$, so the monetary policy rule becomes

$$\frac{1}{R_t} - \frac{1}{R^*} = \alpha \left(\frac{1}{\beta R_{t-1}} - \frac{1}{\pi^*} \right)$$

to deliver the difference equation in the nominal interest rate

$$\frac{1}{R_t} = \frac{\alpha}{\beta} \frac{1}{R_{t-1}} - \frac{1}{\pi^*}(\alpha - \beta) \tag{10}$$

If $\alpha < \beta$, this converges over time to $1/R_t = \beta/\pi^*$. But when the Taylor principle is satisfied, $\alpha > \beta$ in this model, R_t and, therefore, π_t diverge over time unless the economy

starts in its steady state and is never perturbed. More precisely, if $\alpha > \beta$, then (10) implies that the nominal interest rate and inflation either grow or shrink exponentially. In one direction lies hyperinflation; in the other direction the nominal interest rate eventually falls below any plausible lower bound. This is a version of the well-known result that if the primary surplus is constant, then a monetary policy that follows the Taylor principle will produce explosive inflation.[5]

4.2 Passive $\not\Rightarrow$ Stabilizing

Although of less practical interest in light of the fiscal rules countries are adopting, it is also possible for fiscal behavior to be passive, but not produce a stable process for real government debt.

If $r > \gamma > 0$, then as Bohn (1998) and Canzoneri, Cumby, and Diba (2001) show, fiscal policy is "sustainable" in the sense that the equilibrium debt process satisfies private agents' transversality conditions. But in this a rather special equilibrium, debt is not stable: the debt-output ratio grows without bound; the equilibrium requires access to tax revenues that can also grow without bound at the same rate that debt grows.[6]

How can it be feasible for the debt-output ratio to grow without bound? The equilibrium hangs together only if there is no limit to the tax revenue that can be raised. Then, when interest payments on the debt grow at rate r, bond holders' income also grows at rate r. A government that has access to non-distorting taxes simply extracts that growing interest income to finance the growing debt stock.[7] Of course, if the economy faces a fiscal limit—because economic or political considerations constrain tax collection—then government debt cannot grow faster than the economy forever. Those considerations call for setting $\gamma > r$, as much of the literature assumes, and passive fiscal behavior also stabilizes debt.

5 Fiscal Rules

A reading of fiscal rules that countries have adopted raises concerns about whether, if followed, those rules will provide the fiscal backing necessary for monetary policy to control inflation. Existing rules focus exclusively on fiscal sustainability, with some limited scope for countercyclical actions. By concentrating on how fiscal choices should react to real economic developments, the rules do not explicitly build in the responses to changes in the price level or other nominal variables that passive behavior requires.

Fiscal rules have become commonplace among both advanced and emerging economies. Bova, Kinda, Muthoora, and Toscani (2015) reports on *de jure* fiscal arrangements for 89 countries. Members of the European Union, for example, agreed to a "fiscal compact" in 2012 that calls on signatories to adopt fiscal rules that deliver general government budgets that are balanced or in surplus [European Central Bank (2012, p. 101)]. Country-specific medium-term fiscal objectives must be consistent with the balanced budget rule, though

[5] Loyo (1999) uses this combination of active monetary and active fiscal policies to explain Brazilian inflation in the late 1970s and early 1980s.

[6] In his empirical work with U.S. data, Bohn (1998) brings economic growth into the analysis and concludes that U.S. data imply dynamic inefficiency—the growth rate exceeds the real interest rate on government bonds—so that $\gamma > 0$ is sufficient to deliver a bounded debt-GDP ratio.

[7] McCallum (1984) may be the first to obtain this result in a general equilibrium setting.

in "exceptional circumstances" a country may deviate from those objectives. Countries must adopt "automatic correction mechanisms" to bring deficits and debt in line with the medium-term objectives.

To provide further flavor for prevailing fiscal rule, we briefly describe key features of the fiscal rules that Germany, Switzerland, Sweden, and the United Kingdom have adopted.

Adopted in 2009, the German debt brake restricts structural deficits to no more than 0.35 percent of GDP for the federal government and 0 percent for the Länder governments [Mayer and Stähler (2009), Deutsche Bundesbank (2011), and Federal Ministry of Finance (2015)]. Deficits are permitted over the cycle symmetrically, but only automatic stabilizers are allowed. Any divergence between actual and planned expenditure is booked to a control account, which under certain conditions triggers immediate budget policy actions. The rules seem to be having their desired effects. After peaking at about 81 percent of GDP in 2010, debt has been steadily falling [Eurostat]. Its general government, which includes federal, state and local, and social security funds, has recorded positive net lending since 2014. German government bond yields have been extremely low; even the 10-year yield was negative for much of 2016.

Switzerland adopted similar debt control through a permanently balanced budget rule that is applied each year [Bodmer (2006) and Danninger (2002)]. Since 2003, any deviations of actual spending from the adjusted pre-determined spending ceiling, are accumulated in a notional "compensation account" and are required to be corrected within three years. The Swiss debt brake was fully implemented in 2006: debt immediately started to fall from a peak of 51 percent of GDP in 2003 to under 35 percent of GDP since 2010. Since 2015, the Swiss general government budget has been balanced. Over that same period, Swiss government bond yields have been negative along nearly the entire yield curve, while consumer price inflation has been significantly below the Swiss National Bank's 2 percent target, averaging 0.26 percent from 2009 to 2016.

Sweden adopted a ceiling on non-interest expenditures of the central government in 1997 [Swedish Government (2011)]. This ceiling is coupled with a net lending—surplus inclusive of interest expenses—target specified as a percentage of GDP. The surplus target was 1 percent from 2000 to 2016; in June 2016 seven out of eight political parties in Sweden agreed to reduce the target to 1/3 percent of GDP starting in 2019 [National Institute of Economic Research (2016)]. Local governments must balance their budgets. Along with the new surplus target is a debt anchor at 35 percent of GDP, which implies that deviations of debt from target are treated symmetrically. Like Switzerland, Swedish government debt has fallen fairly steadily since 2000, while inflation has been below target, and zero coupon nominal bond yields have been negative.

Since 2010, the United Kingdom has also been aiming to satisfy a balanced budget rule that would achieve cyclically-adjusted current balance by the end of the third year of the rolling, five-year forecast period, and a debt rule targeting a falling public sector net debt-to-GDP ratio, supplemented by a predetermined welfare ceiling [HM Treasury (2014)]. So far, the U.K. has not achieved these goals: figures from the Office for Budget Responsibility show that by Maastricht treaty definitions, debt rose to 87.6 percent of GDP, though the deficit fell to 4 percent of GDP in fiscal year 2015–2016. In contrast to Sweden and Switzerland, U.K. CPI inflation averaged 2.2 percent from 2009 to 2016, close to the Bank of England's target.

6 Concluding Remarks

The overarching objectives of all these adopted rules is debt reduction with eventual debt stabilization. The rules seem clearly designed to solve political economy problems that lead to chronic fiscal deficits and elevated levels of government debt. Aside from some provisions for automatic stabilizers, the rules are not state contingent in the manner that passive behavior prescribes. Support for monetary policy is implicit, but appears only in the form of stabilizing debt at a low level to remove any pressure on the central bank to help with fiscal financing.

The discussion in the last section and the evidence presented is, at best, merely suggestive that adopted fiscal rules do not passively support monetary policy. While it is possible, as Mayer and Stähler (2009) do, to characterize debt-brake rules as passive, it is not at all clear whether, in practice, fiscal authorities actually behave passively. The rhetoric of governments is nearly lexicographic in debt reduction and stabilization.

Two types of future research may shed light on whether it is feasible for central banks to achieve their inflation targets under current fiscal rules. First, theory needs to deliver empirically verifiable predictions of how an economy behaves if inflation targeting is coupled with fiscal behavior that does not consistently provide appropriate fiscal backing. Simple theory, like that above, makes dire predictions of explosive inflation or deflation, which we do not observe. Second, detailed analysis of actual fiscal actions and their rationale may help us to identify the rules that fiscal authorities actually follow. No fiscal authority obeys the simple rules that are currently embedded in theoretical and empirical models of policy.

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