# Does the design of a fiscal rule matter for welfare?☆

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## A R T I C L E   I N F O

## A B S T R A C T

This study uses Monte Carlo methods to examine the impact on welfare of several types of commonly used fiscal rules. The simulations employ an expected intertemporal welfare function and the parameters from a three-variable structural VAR estimated using data for sixteen European countries. The VAR captures the potential interaction effects between output, government spending and revenue. We find welfare gains from many, but not all, of the fiscal rules. The best rules target a zero structural deficit and cause government spending volatility to fall by about one third. However, a simple rule, where government expenditure is set equal to a one-period ahead forecast of revenue, performs almost as well. In particular, this simple rule yields a welfare gain and a reduction in volatility similar to that of the more complicated zero structural deficit rule adopted by Switzerland and several other countries. Balanced budget rules perform less well than rules that target the structural deficit. A rule that keeps real per capita government spending equal to a constant—a type of rule adopted by some U.S. states—yields relatively low welfare and often leads to significant debt accumulation. These results highlight the importance of the appropriate design of a fiscal rule.

## 1. Introduction

Over the past decade, a growing number of governments have adopted fiscal rules (Bova et al., 2015). European countries are at the forefront of this trend and, in 2014, 25 European Union member states ratified a "fiscal compact" that commits them to introduce a fiscal rule. While there is a large empirical literature on fiscal rules (see the survey by Auerbach (2013)), there is no consensus on the welfare consequences of rules or whether fiscal rules provide stabilization benefits. This inconclusiveness may be due to differences in the types of rules studied.[1] Our analysis complements the growing empirical literature on fiscal rules by combining estimates for a panel of European countries with simulation methods to evaluate several rule types. We focus on welfare and the ability of a fiscal rule to stabilize government spending while, at the same time, avoiding excessive debt accumulation. The impact of a rule on these factors is found to differ across the rules considered, a result that highlights the importance of fiscal rule design.

One of our principal findings is that with several, but not all, of the commonly-used fiscal rules, it is possible to increase both welfare and government expenditure stability relative to the baseline of discretion. Expenditure volatility is an important issue for governments, not only because unpredictable levels of government services reduce welfare for risk averse individuals, but also because volatility can lead to higher government operating costs (Crain, 2003), and may reduce economic activity by causing greater uncertainty about future returns to capital (Born and Pfeifer, 2014; Fernández-Villaverde et al., 2015). With the best rules, government expenditure volatility is reduced by about a third. The gains are significantly greater when compared to spending under a dysfunctional or "profligate" government scenario, where the government has a spending bias and exhibits restraint only if debt becomes too large. Passarelli and Tabellini (forthcoming) argue that this type of behaviour may explain government expenditure in some countries, and our findings indicate that a well-designed fiscal rule can be particularly helpful in these cases.

Our results also show that a good rule need not be complex. The government of Switzerland employs a rule that sets the level of government spending equal to forecast revenue multiplied by trend output divided by forecast output (Geier, 2011). This rule is relatively complicated – it involves two forecasts and a trend calculation – and yields a welfare gain that is slightly lower than a simpler rule that sets spending equal to trend revenue. An even more straightforward rule, where government spending depends only on a one-period ahead

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[1] For a discussion of different types of fiscal rules, procedures and institutions, see Hallerberg et al. (2007), Debrun et al. (2008), and Schaechter et al. (2012).

univariate forecast of revenue, yields the same welfare gain as the rule employed by Switzerland. The greater simplicity of the univariate forecast-based rule may be a consideration for policymakers who must communicate the form and operation of a rule to the public.

A third major result is that some fiscal rules, although not those that yield the greatest welfare, generate high levels of government debt. The accumulation of considerable debt may be unsustainable if it leads to overly burdensome interest payments, significant interest rate hikes or complete exclusion from capital markets. An example of a fiscal rule that often leads to high debt and lower welfare is a rule that sets government real per capita expenditure equal to a constant, such as the historical average of real per capita government revenue. This type of rule has been employed by some U.S. states.

With the best rules, our findings reveal that government spending responds to changes in revenues, but does not respond so quickly that little expenditure stabilization is provided. A balanced budget rule, where program spending equals observed revenue from the previous period, with any accumulated debt repaid in the following period, prevents excessive debt accumulation, but provides virtually no expenditure stabilization and, as a result, yields lower welfare than most of the other rules.

As the future paths of output and revenues are unknown when a rule is chosen, we assess the fiscal rules using Monte Carlo simulations. Welfare is given by a standard expected intertemporal utility function in which utility in each period depends on both the level and volatility of government spending and private consumption, where the latter depends on total output and government revenue. The interaction between output, government revenue and government spending is represented by a three-variable structural vector autoregression (VAR). Given the impetus toward reform of fiscal institutions in Europe, we estimate the parameters of the structural VAR using a panel of data for sixteen European countries. The welfare gain from a rule is quantified by comparing expected welfare under the rule to expected welfare when government spending and private consumption are simulated using the estimates of a structural VAR – interpreted as the baseline *discretionary* policy.

Many studies have examined the operation of fiscal rules in U.S. states, some of which have employed fiscal rules since the 1800s. These studies typically focus on a specific type of rule — a balanced budget rule — and emphasize the technical and political characteristics of various forms of balanced budget rules and the effect of these on the size and persistence of state budget deficits (Poterba, 1995; Bohn and Inman, 1996; Hou and Smith, 2010; Smith and Hou, 2013). In Europe, concern about debt growth in the euro area has led to a number of studies on the efficacy of fiscal rules (Brück and Zwiener, 2006; Hauptmeier et al., 2011; Maltritz and Wuste, 2015; Grembi et al., 2016). Some studies find that fiscal rules reduce government expenditure volatility (Badinger, 2009; Holm-Hadulla et al., 2012), but others conclude that rules lead to an increase in volatility (Bayoumi and Eichengreen, 1995; St. Clair, 2012; Staley, 2015). While the existing empirical studies are useful to assess the prudence (or lack thereof) of specific fiscal outcomes over particular historical periods, a key innovation of our study is that, through the use of empirical estimates and simulation methods, we can simulate the performance of any type of fiscal rule under comparable revenue and output shock conditions. This allows us to compare welfare under different fiscal rule designs, such as various types of balanced budget rules, which have been popular in the U.S., and rules that maintain a structurally balanced budget, which tend to be favoured in Europe.

Another literature related to the current study employs dynamic stochastic general equilibrium (DSGE) models to examine the benefits of fiscal rules. Pieschacón (2012) finds that fiscal discipline can smooth consumption and increase welfare following oil price shocks, but she does not evaluate or compare different fiscal rules. Medina and Soto (2016) compare a small number of rules in a DSGE model for Chile, but examine only the impact on macroeconomic variables, not the impact

on welfare. Kumhof and Laxton (2013) and Snudden (2016) find that a counter-cyclical rule can increase welfare by more than a balanced budget rule, but may do so only at the cost of greater instrument (tax rate) volatility. According to Vogel et al. (2013) and Ojeda-Joya et al. (2016), the potential welfare gains from a fiscal rule are large, but only if households are liquidity-constrained. Although they use a very different methodology than we employ, Mayer and Stähler (2013) observe welfare gains from switching to a Swiss-style "debt brake" rule from a balanced budget rule, a result that is consistent with our findings. Using an endogenous growth model, Groneck (2010) finds that the welfare implications of a deficit spending rule, relative to a balanced budget rule, depend on whether the increase in spending that generates the deficit goes on public consumption or public investment. The general differences between our study and these studies are that we employ the estimates of a structural VAR model in our simulations, examine a greater variety of rules and investigate the relative welfare impact of the different rules.

Some insight into the potential welfare benefits of fiscal rules can be gained from studies that focus on resource revenue stabilization funds in commodity-producing countries. These jurisdictions experience highly volatile revenues and are, therefore, more likely to benefit from a rule (Céspedes and Velasco, 2014). Using numerical simulations for a stylized oil-producing country, Maliszewski (2009) concludes that *ad hoc* savings rules perform poorly, but Engel et al. (2011) and Landon and Smith (2015) find considerable benefit from the use of simple savings rules for commodity exporters. While these studies focus on resource producers and resource revenue savings funds, they show that the design of a rule is important for welfare.

A government with complete information and no political constraints could choose the welfare maximizing path for government expenditures and would have no need for a fiscal rule to constrain government behavior. However, the structure of political decision making can generate an expenditure and deficit bias when different groups with influence over expenditure differ in their spending preferences and treat government resources as common property. Deficit bias may also arise due to information asymmetries and the delegation of decision making power to government representatives by the electorate, which allows the government to exploit the incomplete information of the electorate to increase the chances of re-election. As well, deficit bias can arise if, because they may lose office in an election, politicians discount the future using a higher discount rate than the electorate.[2] In such cases, a fiscal rule is a means to impose discipline on government and control expenditure and deficit bias.

Fiscal rules can be used to target government debt, deficits, expenditure, or other fiscal objectives. To reach these targets, governments must adjust revenue or expenditure. For all the rules we consider, the *instrument* we employ is government expenditure.[3] We focus solely on expenditure as the instrument since this allows tax rates to remain constant, which Barro (1979) argues can improve economic efficiency.[4] Further, Ayuso-i-Casals (2012) argues that expenditure is the part of the budget that governments can most easily control, and Anderson and Minarik (2006, 194) note that violations of constraints on expenditure are "transparent and incontrovertible." Finally, Hauptmeier et al. (2011) focus on expenditure since they find that

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[2] Calmfors and Wren-Lewis (2011) and Wyplosz (2013) discuss institutions aimed at overcoming deficit bias, including "fiscal councils" and independent fiscal policy committees such as Britain's *Office for Budget Responsibility*. On deficit bias see also Alesina and Perotti (1995), von Hagen and Harden (1995), Kontopoulos and Perotti (1999), Velasco (2000) and Lockwood et al. (2001).

[3] With a single policy target, if we had specified both revenues and expenditures as instruments, the levels of these instruments would have been indeterminate. For example, high spending and high revenues or low spending and low revenues can both generate a balanced budget.

[4] Boije et al. (2010) and Calmfors et al. (2012) argue that governments aim to adjust expenditure to "allow (marginal) tax rates to remain constant" and to "avoid a situation in which poor expenditure necessitates gradually higher taxes" (Boije et al., 2010, 207).