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# A comparison of the constant-tax rule and a standard fiscal reaction rule in the IMF's MULTIMOD model

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## Abstract

Numerical macroeconomic models require fiscal reaction rules to prevent government debt from exploding. Present rules impose arbitrary, backward-looking reaction of taxes to deviations of the debt ratio from a target. A comparison between the constant-future-tax-rate rule and a standard fiscal rule in the IMF's MULTIMOD model suggests that the constant-future-tax-rate rule will generally induce smoother and hence preferable paths of consumption. This result suggests the constant-future-tax-rate rule may provide a better basis for forecasting and for policy than existing fiscal rules based on simple targets for the ratio of the deficit of debt to GDP.

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## 1. Introduction

Fiscal reaction rules are necessary in both real and model economies to specify how fiscal policy would change after an economic shock to prevent the ratio of

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government debt to GDP from exploding. Many fiscal reaction rules would prevent the debt-to-GDP ratio from exploding, so policymakers and modellers face the question of which rule to choose. Policymakers' choice of fiscal reaction rule will affect the time-path of taxes and thus economic efficiency and the distribution of wealth across generations. Modellers' choice of fiscal reaction rule will affect the performance of their models and thus any advice based on them. Central banks' and forecasters' simulation models contain a wide variety of fiscal reaction rules, showing there is little agreement on what these rules should be.

This paper uses the IMF's MULTIMOD simulation model to compare the consequences of two fiscal reaction rules for consumers' utility. MULTIMOD's fiscal reaction rule, itself typical of central bank models' fiscal rules, makes tax rates react to the deviation last period of the government debt-to-GDP ratio from a target. This type of reaction makes the path of aggregate consumption rather volatile. By contrast, Barro's (1979) rule of keeping the tax rate constant at the level that stabilizes the debt-to-GDP ratio in the long run generates smoother paths of aggregate consumption, which would be preferable to a representative indefinitely-lived consumer.

This result has two implications. First, since they assume arbitrary and suboptimal fiscal policy, many of the large-scale models in use at central banks and other policy institutions may generate misleading forecasts. Second, fiscal reaction rules based on simple targets for debt or deficit ratios can impose unnecessary costs on consumers. This criticism applies also to the E.U.'s Stability and Growth Pact and the often-proposed balanced-budget amendment to the U.S. constitution, which are also simple limits for the deficit or debt-to-GDP ratio. While such simple limits may help enhance the credibility of governments' promise to repay their debts without monetization, their costs should also be recognized.

This paper adds to the optimal fiscal policy literature by comparing fiscal rules outside the specific settings amenable to theoretical analysis. Barro (1979) showed that in a particular reduced-form deterministic model, a constant tax rate is optimal. The intuition of this result is that constant taxes allow the burden of temporarily high spending, such as on a war, to be spread over the entire future. While a constant tax rate is not optimal in all environments, this paper shows that the intuition behind it carries over into the MULTIMOD model. This paper also adds to papers by Mitchell, Sault, and Wallis (2000) and Church, Sault, Sgherri, and Wallis (2001) comparing debt and deficit-targeting rules in simulation models by showing how such rules compare to the qualitatively different constant-tax-rate rule.

This paper proceeds as follows. Section 2 explains the need for fiscal reaction rules. Section 3 reviews previous literature on fiscal reaction rules. Section 4 describes fiscal rules in several working macroeconomic models, and compares their properties to those of the constant-tax-rate rule. Section 5 compares economic outcomes given a government spending shock under the constant-tax rule and MULTIMOD's fiscal reaction rule. Section 6 concludes that simple debt or deficit-targeting rules impose real economic costs. Restrictions on fiscal policy

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