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# A set of estimated fiscal rules for a cross-section of countries: Stabilization and consolidation through which instruments?

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ABSTRACT

Not much cross-country evidence exists on the time-series behavior of individual fiscal instruments in response to the public debt and to output. To remedy this situation, this study provides a set of detailed estimated fiscal reaction functions (or "fiscal rules") governing these responses for a panel of twenty OECD countries. A number of commonalities and differences emerge. In general, the countries in the panel adjust tax revenues strongly in response to the public debt, and they adjust tax revenues and transfer payments but, interestingly, not tax rates or government purchases, strongly in response to output. Furthermore, a high rate of transfer payments is associated in the cross-section with reduced output volatility. These results support some recent developments in the theoretical literature, namely, an increased emphasis on the effects of countercyclical transfer payments as an anti-cyclical fiscal policy instrument.



## 1. Introduction

Following the failure of the Stability and Growth Pact, the Great Recession, and the European debt crisis, a conversation has ensued regarding the design of fiscal policy rules. In order to design a fiscal policy rule with a better chance of success and to design better models of fiscal policy over the business cycle, it is worthwhile to understand the past behavior of the systematic portion of fiscal policy. Nonetheless, not much comprehensive evidence exists to date on the past behavior of systematic fiscal policy, particularly with regard to the behavior of individual fiscal policy instruments in response to the public debt or to output. In order to provide more comprehensive evidence on the behavior of individual fiscal policy instruments, this study presents a set of estimated multi-instrument fiscal policy rules for a panel of twenty OECD countries. In these fiscal policy rules, individual fiscal instruments – different categories of tax rates, transfer payments, or government purchases – systematically respond to the public debt and to output. These fiscal policy rules are analogous to monetary policy rules whereby a short-term interest rate target responds to the inflation rate and to output. The results from these estimated policy rules suggest an important role for transfer payments as an anti-cyclical fiscal policy tool, and there also appears to be a negative statistical relationship between the prevalence of transfer payments and output volatility. These results justify an

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increased emphasis by researchers on the effects of countercyclical transfer payments as an anti-cyclical fiscal policy instrument, which is in line with recent developments in the theoretical literature.

The estimated fiscal policy rules show a number of commonalities across countries. For the twenty OECD countries on average, out of the fiscal instruments, tax rates respond most strongly to the public debt, as do government purchases to a lesser extent. Transfer payments do not respond strongly to the public debt. On average, out of the fiscal instruments, tax revenues and transfer payments respond most strongly to output, while government purchases and, interestingly, tax rates do not respond strongly to output. For individual OECD countries, there is some heterogeneity, with some particular fiscal instruments responding more strongly to either the public debt or to output in some countries than in others. Examples of such fiscal instruments would be the capital tax rate in the United States and public investment in Germany, both of which respond relatively strongly to the public debt, or transfer payments in France and Germany, both of which respond relatively strongly and negatively to output. Additionally, when looking at the cross-section, countries with a larger rate of transfer payments in particular exhibit less volatility in output growth. While this correlation does not strictly imply causation, these findings in general point toward and important macroeconomic response of transfer payments to output and possibly vice versa. These responses have until recently remained relatively underexplored by researchers, who had instead focused mostly on tax rates and government purchases as anti-cyclical policy instruments. The results presented here suggest that the recent shift in the literature toward analyzing transfer payments has a good empirical justification.

The focus on transfer payments adds an additional dimension to the previous literature on systematic fiscal policy. This literature is large, but it has not yet converged on a particular modeling approach. This is in contrast with the literature on systematic monetary policy, which has turned toward modeling monetary policy as following an interest rate rule following Taylor (1993). Attempts to model fiscal policy have had to deal with a multiplicity of possible fiscal aggregates or fiscal instruments, each of which might operate through different economic channels. In response to this heterogeneity, one major strand in the literature on fiscal policy has related different high-level aggregates to macroeconomic or fiscal conditions. That strand has described the behavior of deficits, total revenues, or total spending in response to the business cycle and/or the public debt. Bohn (1991), using a VECM approach, find a significant role for adjustments to taxes and to total spending in the United States in response to the public debt since 1791. Taylor (2000) proposes a fiscal policy rule (a "fiscal Taylor rule") which allows for a procyclical response of fiscal surpluses to output. Auerbach (2002) estimates a two-instrument fiscal policy rule featuring revenues and spending and replicates the results of Bohn (1991) for the postwar period. Reicher (2012) examines how total tax revenues, government purchases, and transfer payments have responded to the public debt and to output since 1946, finding similar results to the previous authors. In contrast with that study, this study focuses on a broader range of fiscal instruments for a sample beginning in 1955. Relative to the earlier literature and to the 2012 study, the current study finds a slight reduction in the response of government purchases to the public debt for the United States, although government purchases still appear to respond to the public debt. In addition, this study also examines a broader array of fiscal instruments.

While one strand of the literature has focused mostly on the United States, another strand has focused more on patterns in the cross-section of countries. This strand has come to somewhat more contradictory conclusions. Lane (2003) estimates procyclicality of various categories of government spending in the cross-section based on an estimated government spending rule, finding that GDP per capita may be related negatively to the procyclicality of government spending. Galí and Perotti (2003) estimate a set of fiscal policy rules which allow for deficits to respond to output, past deficits, and the level of the public debt, for a panel of countries. They find a clear negative overall response of deficits to output, and they find some systematic consolidation in response to deficits, but not in response to the debt level. They find ambiguous patterns with respect to the behavior of revenues and spending when taken separately. García et al. (2009) find broadly similar results to Galí and Perotti with some exceptions. In contrast with most of the other studies, García et al. estimate fiscal rules for individual countries. They caution that fiscal policy across European countries appears to be strongly heterogeneous. Égert (2010) estimates the response of deficits in OECD countries to output and to the public debt, finding that deficits respond negatively to either output or to the public debt, particularly when a fiscal policy rule is estimated in first differences. Égert also finds possible asymmetries in the conduct of fiscal policy over the business cycle. Finally, Végh and Vuletin (2012) estimate the response of statutory tax rates to output in a large panel of countries, finding a response near zero on average across countries. In general, results from the empirical fiscal policy literature have varied widely, with results varying with respect to model specification, time period, time-series assumptions, fiscal instruments, and countries under investigation. Relative to the cross-country literature, the current study shows that the average pattern of fiscal policy in the cross-section mirrors that in the United States, with a slightly stronger response of transfer payments to output.[1]

The analysis is based on a fiscal policy rule for individual OECD countries, which is in turn based on the rule estimated by Reicher (2012) for the United States. Compared with the earlier study, the current study looks at a wider array of fiscal instruments and at a broader range of countries. This rule allows for fiscal instruments to have a component which systematically responds to output, a component which systematically responds to the public debt, and a nonstationary trend component. The baseline estimation results for the OECD on average point toward a modest response of the primary surplus to

[1] Other studies which focus on estimating the cyclicality and/or consolidation behavior of fiscal policy through various means include those of van den Noord (2000), Bouthevillain et al. (2001), Girouard and André (2005), Mendoza and Ostry (2008), Fedelino et al. (2009), Fatás and Mihov (2012) and Bénétrix and Lane (2013). Plödt and Reicher (2014) systematically explore the role that different modeling assumptions play when estimating a primary surplus rule for the euro area, reconciling previous time-series estimates of fiscal rules or fiscal response functions with cyclical responses found in the cyclical adjustment literature.