

# **Fiscal Rules Effectiveness and Outcomes for Sub-Central Governments**

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## Foreword

This report is the result of collaboration between the Robert M. La Follette School of Public Affairs at the University of Wisconsin–Madison and the Fiscal Federalism Network of the Organisation for Economic Co-operation and Development (OECD). This study has provided graduate students at La Follette the opportunity to improve their research and policy analysis skills while producing a report that contributes to the work of the Fiscal Federalism Network.

The La Follette School offers a two-year graduate program leading to a master’s degree in international public affairs. Students study policy analysis and public management with an international and global perspective, and they pursue a concentration in a policy focus area of their choice. They spend the first year and a half of the program taking courses in which they develop the expertise needed to analyze public policies.

The authors of this report are all in their last semester of their degree program and are enrolled in Public Affairs 860, *Workshop in International Public Affairs*. Although acquiring a set of policy analysis skills is important, there is no substitute for doing policy analysis as a means of learning policy analysis. Public Affairs 860 gives graduate students that opportunity.

The students in the workshop were divided into four teams. The authors of this report were assigned to work on a research project for the OECD’s Fiscal Federalism Network. The topic of this report—an analysis of the effectiveness of fiscal rules imposed on sub-central governments—was proposed by Dr. Hansjörg Blöchliger, Head of the Fiscal Federalism Network.

In many OECD-member countries, central governments restrict the fiscal behavior of their sub-central governments by imposing rules on these governments that limit their ability to spend money, to raise revenues, or to borrow for public projects. The authors of this report employ data on various fiscal rules from 17 different countries to empirically test whether spending, revenue, or borrowing by sub-central governments is lower and grows at a slower rate in countries with the most stringent set of fiscal rules.

This report would not have been possible without the support, encouragement, and assistance of Dr. Blöchliger. I thank him for his contributions.

The report also benefited greatly from the support of the staff of the La Follette School. Mary Mead and Gregory Lynch contributed logistical and practical support, and Karen Faster, the La Follette Publications Director, edited the report and managed production of the final bound document.

By involving La Follette students in the tough issues confronting governments around the world, I hope they not only have learned a great deal about doing policy analysis but have gained an appreciation of the complexities and challenges facing governments at all levels. I also hope that this report will contribute to the work of the Fiscal Federalism Network and to the ongoing public debates about how governments at every level can most efficiently deliver public services to their residents.

Andrew Reschovsky  
May 2009  
Madison, Wisconsin, USA

## **Acknowledgments**

At the La Follette School, we would like to thank Dr. Andrew Reschovsky for his close support and attention to our project and for sharing his extensive knowledge of public finance. We thank Dr. Hansjörg Blöchliger, Head of the Fiscal Federalism Network at the Organisation for Economic Co-operation and Development, for the opportunity to do this research. We would also like to thank Pablo Mitnik and Dr. Geoffrey Wallace for their invaluable advice on statistical research methods and their willingness to consult with us throughout the capstone process. Finally, thanks to Karen FASTER for helping us to polish up the final product.





## Executive Summary

This paper aims to measure the effectiveness of fiscal rules in achieving their desired outcomes at the sub-central government level in 17 member countries of the Organisation for Economic Co-operation and Development (OECD). Our work stems from an OECD research project that investigates the design and impact of fiscal rules at the sub-central government level. We discuss perspectives on the use of fiscal rules to limit the size of the public sector. We then review recent literature that explores justifications for employing fiscal rules at the sub-central level of government.

Our study uses measures of the stringency of fiscal rules to test whether more stringent rules are more effective than weaker rules in producing desired outcomes. Our models address fiscal rule performance in three areas: expenditure limits, limits on tax autonomy, and debt control. We hypothesize that, in each rule area, stricter rules will yield lower levels and slower rates of growth of the desired outcome. For example, in the case of tax autonomy, we hypothesize that stricter limits on tax autonomy will produce lower levels of sub-central government tax revenue and slower rates of tax revenue growth.

We find almost no empirical support for our hypotheses about the impacts of more stringent fiscal rules on fiscal outcomes. The inability of our models to identify a significant link between fiscal rules and fiscal outcomes may well be due to data limitations. First, we only had data for 17 OECD countries. Second, we lacked detailed information about the date that various fiscal rules were implemented, and third we had no way to deal with the possibility of the endogeneity of fiscal rule stringency. Endogeneity, in this context, refers to how our predictor for debt control, and the stringency of those rules, may itself affect the level of debt.

We conclude that more data collection on the use of sub-central government fiscal rules is needed in order to conduct further research into the impacts of these rules on fiscal outcomes. Furthermore, while econometric analysis can contribute to assessments of the effectiveness of fiscal rules, policymakers still must evaluate the benefits and costs of these rules in a national context. We believe that a fuller understanding of the impacts and consequences of fiscal rules may require the completion of a set of detailed case studies in various OECD member countries.



## I. Introduction

In most countries belonging to the Organisation for Economic Co-operation and Development (OECD), central governments impose fiscal rules on their provincial and local governments. Many states or provinces in these countries also impose limitations on their local governments. Fiscal rules generally aim to restrict the behavior and the autonomy of sub-central governments by limiting their permitted level of spending, putting a ceiling on the amount of revenue they can raise, and/or constraining the amount of borrowing they are eligible to take on.

Use of fiscal rules is controversial. Proponents suggest that rules are an essential mechanism of public finance required to protect local residents from excessive government spending, taxing, and borrowing. They suggest that if given complete freedom in fiscal policymaking, provincial and local governments will systematically spend and borrow more than their citizens desire. Further, they contend that irresponsible spending, taxing, and borrowing will endanger their country's economic prosperity and growth. Conversely, opponents of fiscal limits argue that the existence of limits seriously reduces the fiscal autonomy of sub-central governments. As a result, fiscal rules enable a stronger, but more distant, central government to impose its will on local voters. In addition, opponents often argue that fiscal limits will reduce spending on essential public services that sub-central governments normally provide. This, they argue, may result in undesirable deficiencies in education, health, and welfare services for local residents.

While debate on the merit of fiscal rules continues, relatively little is known about the effectiveness of these rules in achieving their intended goals. For instance, does a rule that limits annual increases in provincial spending actually lower the rate at which spending grows? Do countries that limit the rate of local taxation actually experience lower local tax revenues than countries without such limits? These questions by and large have gone unanswered.

Using measures of the stringency of fiscal rules that were developed as part of a 2005 OECD working paper, this report attempts to determine whether more stringent rules do, in fact, achieve their desired outcomes. Based on fiscal rules reported by sub-central governments in 17 OECD-member countries, we develop a set of regression-based models to test whether more stringent rules—on spending, for example—result in lower levels of spending and lower growth rates of spending.

We first provide a background of sub-central fiscal rules and descriptions of rules associated with expenditure limits, debt sustainability, and tax autonomy. Second, in a literature review we outline the justifications for employing rules at the central and sub-central levels of government. Third, we explain our hypotheses and the analytic models we use to measure rule stringency levels with associated outcomes. In the fourth section, we present the results of each regression. We conclude with implications drawn from our results and an explanation of the limitations of our study.

## II. Sub-Central Fiscal Rules: A Description

Sub-central governments (at the state/provincial or local level) have varying degrees of freedom to make spending and taxation decisions. When sub-central government policymakers have unfettered freedom in fiscal decision-making, they may choose levels of spending, taxation, and borrowing that only focus on economic conditions within the current electoral cycle. In the long run, unpredictable and unconstrained use of public funds at the sub-central level may lead to macroeconomic volatility, curtailed investment growth, high deficits, or excessive debt (Fatás and Mihov, 2003).

Motivated by a desire to hedge against economic instability and to instill discipline in sub-central government spending, national governments have implemented a range of political and institutional constraints on sub-central governments called “fiscal rules.” These rules are designed to be permanent, remaining in place through successive governments. In theory, fiscal rules can exert a stabilizing force on macroeconomic conditions and build credibility in fiscal planning over time (Taylor, 1993).

Formal measures to instill fiscal discipline have been in use in varying forms for more than 150 years. These rules began with the establishment of state and local level balanced budget requirements dating from the mid-19th century in the United States. The scope of fiscal rules expanded to include provisions that tightened or prevented the practice of financing budget deficits from certain domestic sources like central banks (as in many industrialized European countries after World War II). Since the early 1980s, a growing trend of deficit spending developed in sub-central levels of government in OECD countries. This “deficit bias” prompted industrial and emerging economies to implement more stringent fiscal rules like stronger balanced budget constraints, expenditure limits, debt controls, and limits on tax autonomy at local and central levels of government (Kopits, 2001). Although these types of rules are most frequently imposed on sub-central governments by higher level governing bodies, they are occasionally self-imposed.

Regardless of a government’s objective in employing fiscal rules, their function is to limit, restrict, or restrain one or more dimensions of sub-central government fiscal behavior. Fiscal rules are designed to accomplish these goals by establishing a specific level or range of fiscal performance for sub-central government metrics like debt, deficits, taxes, and expenditures. They are typically structured as spending parameters or numerical targets in proportion to gross domestic product. Some fiscal rules limit spending growth or cap spending at a percentage based on the jurisdiction’s income from tax revenue and other sources. Other rules limit the use of certain taxes or restrict borrowing and the amount of debt that a government can take on. For example, central governments may choose to respond to constituent complaints about high tax levels by imposing limits on certain sub-central government taxes or by placing a ceiling on expenditures. This type of action would allow a central government to respond to constituent demand, while passing the political cost of cutting services down to the local government service providers (Kopits and Symansky, 1998).

Limits on expenditure increases are used to restrain growth in spending over annual or longer-term periods. Only a few OECD countries impose these rules on sub-central governments. For example, in 2002 Germany imposed expenditure limits on *länder* (intermediate-tier governments, similar to a province or state) and local governments (though the federal government was not exempt) as part of its attempt to meet national deficit targets. This plan capped expenditure growth at a 1-percent average annual rate between 2002 and 2006 (Lubke, 2005). South Korea assigns specific categories of expenditure limits for its local governments and Turkey restricts civil servant personnel costs at the sub-central level. Other countries use non-binding arrangements to achieve similar expenditure restraints. In Denmark, the national government sets targets for sub-central spending growth over the long term. Some cantons (intermediate-tier governments) in Switzerland use self-imposed rules to restrain expenditures when an increase in budget deficits occurs (Sutherland et al., 2005).

Limits on a sub-central government's autonomy to levy taxes are typically lumped with expenditure limits (in what are commonly referred to as "tax and expenditure limits"). However, sub-central government tax autonomy restrictions represent something distinct. According to Blöchliger and King (2006), tax autonomy "encompasses features such as sub-central government's right to introduce or to abolish a tax, to set tax rates, to define the tax base, or to grant tax allowances or reliefs to individuals and firms." Whereas explicit restraints on expenditures are fairly uncommon, "most countries impose limits on tax rates or reliefs that can be set by sub-central governments" (Sutherland et al., 2005).

Higher levels of government routinely constrain sub-central governments in terms of the debt they can incur. One common rule requires sub-central governments to obtain permission from central governments to borrow funds. In Poland, sub-central government borrowing is prohibited if debt exceeds 60 percent of gross domestic product. Local governments in Denmark, plus state governments in South Korea and Spain, are not permitted to borrow at all. Other countries only limit specific types of borrowing. This is the case for local governments in Spain. They can meet short-term spending requirements by borrowing up to 30 percent of their locally raised revenue. A few countries, including the Czech Republic, Japan, the Netherlands, and Finland, place no constraints on local governments' ability to borrow. Many other countries take a different approach, requiring balanced budgets to prevent sub-central governments from going into debt (Sutherland et al., 2005).

In addition to constraining the behavior of sub-central governments, fiscal rules can be applied to central governments. For example, Austria's internal stability pact sets a national balanced budget target to be phased in over multiple years with the fiscal consolidation apportioned among the different levels of government. In this case, the balanced budget objective results from a future domestic commitment to shrink the tax burden and current obligations under the European Union's Stability and Growth Pact (Kanda, 2008).

Governments implement sub-central fiscal rules through constitutional amendments, statutory provisions, or policy guidelines. A variety of enforcement mechanisms exist to punish governments that do not comply with fiscal rules. When rules are violated, sub-central governments may be subject to administrative sanctions, financial penalties, or a loss of prestige and reputation. For instance, Brazil's central government can nullify contracts found to be in violation of fiscal responsibility legislation and those officials responsible can be imprisoned or impeached. Germany uses "peer pressure" in the form of recommendations by the Financial Planning Council to restore fiscal discipline when sub-central governments fail to adhere to rules. Austria levies non-compliance fines but refunds them if the sub-central government returns to compliance within a year. In Ireland, the central government can remove local level authorities from office for violating fiscal rules. The ministry of home affairs in Japan can take over local government if they borrow beyond their imposed limits. In the Canadian province of Manitoba, chief financial officials can be fined for fiscal rule violation (Kopits and Symansky, 1998; OECD, 2003).

### III. Fiscal Rules: Why and Why Not?

Public choice theory is one set of ideas that provides justification for fiscal rules. Public choice theorists argue that the self-interest of public officials drives governments at every level to tax and spend at a higher level than the median voter would prefer. A fundamental insight of public choice theory is its recognition that public officials can accrue benefits to themselves by exploiting their monopoly on the provision of public goods. At the sub-central level, this means that officials will try to expand the role and size of state and local governments. Employing the metaphor of a “leviathan,” public choice theorists argue for the use of stringent limits on taxation and spending to curb the ambition and fiscal excess of public officials. Fiscal rules on sub-central governments thus play this role of controlling the “leviathan” (Brennan and Buchanan, 2000).

Yet, even a leashed beast can cause harm. In a 2007 study, Downes and Figlio present evidence that highlights possibly unintended consequences of fiscal rules. Their assessment of U.S. empirical literature on the impact of state-level tax and expenditure limits on primary and secondary education performance concludes that small spending reductions due to tax and expenditure limits can cause disproportionately large, presumably unintended, negative effects on student achievement. Downes and Figlio also report evidence suggesting that teacher wage contracts may shift the greatest impact of tax and expenditure limitations to students and new teachers, away from teachers with long tenure.

#### *OECD Investigations of Fiscal Rules*

The OECD investigated multiple dimensions of the intention and implementation of fiscal rules for sub-central governments and reached a number of conclusions about the effectiveness of fiscal rules in its 2005 report “Fiscal Rules for Sub-Central Governments: Design and Impact.” The study finds fiscal rules are generally designed to control the size of the public sector and to prevent large increases in debt or public spending. Rather than directly restraining sub-central government spending, most OECD governments use rules limiting tax autonomy and restricting the amount of borrowing to control the outstanding debt of sub-central governments (Sutherland et al., 2005).

Since fiscal rules are a form of intervention by the central government in provincial and local affairs, these policies tend to generate side effects and tradeoffs that create inefficiencies in public finance and shortchange critical public services. For example, the OECD found that constraints associated with balanced-budgets rules might create incentive to spend unnecessarily near the end of a budget cycle. The OECD also found that tax and expenditure limits can distort public spending patterns. When lawmakers apply across-the-board tax and expenditure limits, they may find they cannot prevent other policymakers from funding public programs and services. Across-the-board limits on taxes and spending force policymakers to allocate funds for programs and services in inefficient ways. (Sutherland et al., 2005).

Sutherland et al. based their findings on a questionnaire distributed to members of the OECD Network on Fiscal Relations across Levels of Government in early 2005. The questionnaire sought information on the types of fiscal rules and relevant associated regulations in use at the time. The authors used these data to develop indices that measure the stringency of different types of fiscal rules, and then they identified trends in the use of fiscal rules in OECD countries (Sutherland et al., 2005). Stringency indicators are designed to reflect the diversity in the design and application of fiscal rules in different countries. More stringent rules often impose sanctions on violators, avoid the use of escape clauses, or have greater numerical or categorical limits on sub-central government fiscal policy. Sutherland et al. developed their stringency indices by coding the different characteristics of each rule in terms of how severe and how binding they are (see Appendix A for detail).



## IV. Empirical Test of the Effectiveness of Fiscal Rules

In this report we empirically assess the effectiveness of sub-central government fiscal rules in producing their intended outcomes. Specifically, we consider the issue of rule stringency as a predictor. Using regression analysis, we test whether the stringency of fiscal rules can explain the fiscal outcomes that the rules are designed to achieve. If the use of fiscal limits on sub-central government is indeed effective, then the stringency of each rule should be a strong predictor of cross-country variation in the intended outcome. For example, rules limiting sub-central government expenditures should lead to a slower rate of growth of sub-central government spending in countries that employ more stringent expenditure limits. In this section, we pose our hypotheses, present the models we use to test them, and describe the relevant independent and dependent variables used in the analysis.

### *A. Hypotheses*

This analysis considers the effectiveness of fiscal rules in restraining the size of the sub-central level public sector in terms of expenditures, taxation, and debt. Thus, we hypothesize that the rule index stringency score is a significant explanatory variable in a regression in which the dependent variable is a measure of the level and growth rate of the intended outcome for each rule.

Each model controls for variation in the demographic or macroeconomic changes within a country that increase demand for public services. We propose that sub-central government expenditures, taxation, and debt are affected by population growth, aging, unemployment, and gross domestic product per capita. These variables act as a proxy for the demands on a country's social safety net. These demands can have a large impact on sub-central government expenditures, taxation, and debt, especially in the context of the reassignment of service provision to the sub-central levels of government in many OECD countries (Sutherland et al., 2005).

Higher levels of population growth, aging, and unemployment can each lead to a greater demand for public services. In a decentralized setting, this increase in demand often creates an incentive for a sub-central government to increase public expenditures, raise levels of taxation, or take on increased debt. Declining levels of wealth, as indicated by falling rates of per-capita and growth in gross domestic product, can also have these effects. Higher population growth leads to higher education expenditures by the state. Additionally, higher population growth rates increase the transfer of wealth between generations in countries where the processes for such transfers may include government mechanisms. To provide another example, larger populations of older adults necessitate more health services, which the government often provides. Unemployment affects government spending, since unemployed people are likely to be the beneficiaries of social welfare programs. As a result, we control for these in our models to separate their effects from our dependent variables: debt, expenditure, and tax revenues.

The following section describes the models and motivating hypotheses we test for each type of rule: expenditure limits, limits on tax autonomy, and debt control.

### **i. Rule: Expenditure Limits**

First, we look at expenditure limits to determine whether greater stringency in these rules results in (1) comparatively smaller sub-central government expenditures, and (2) slower rates of sub-central government expenditure growth. If the expenditures limits are indeed effective, then those countries with more stringent spending constraints should exhibit lower levels of spending and spending growth.

**Hypothesis 1:** Countries with stricter sub-central government (SCG) expenditure limits have smaller SCG expenditures as a percentage of gross domestic product (GDP) per capita.

*Dependent variable:*

SCG expenditures as a percentage of GDP

*Controls:*

GDP per capita,  
Percentage of population older than 65,  
Unemployment rate

*Specification:*

$$\begin{aligned} [\text{SCG expenditures as a percentage of GDP per capita}] = \\ b_0 + b_1[\text{Expenditure limits index}] + b_2[\text{GDP per capita}] + \\ b_3[\text{Percentage of population older than 65}] + \\ b_4[\text{Unemployment}] + \text{error} \end{aligned}$$

**Hypothesis 2:** Countries with stricter SCG expenditure limits have slower growth rates of SCG expenditures

*Dependent variable:*

Rate of growth of SCG expenditures

*Controls:*

GDP growth rate,  
GDP per capita,  
Population growth rate,  
Percentage of population older than 65,  
Unemployment rate

*Specification:*

$$\begin{aligned} [\text{Rate of growth of SCG expenditures}] = \\ b_0 + b_1[\text{Expenditure limits index}] + b_2[\text{GDP growth}] + \\ b_3[\text{GDP per capita}] + b_4[\text{Population growth}] + \\ b_5[\text{Percentage of population older than 65}] + \\ b_6[\text{Unemployment}] + \text{error} \end{aligned}$$

## ii. Rule: Limits on Tax Autonomy

The second type of rule limits the tax autonomy of sub-central governments. For this, we test whether stricter tax autonomy limits result in (1) comparatively smaller levels of sub-central government tax revenue, and (2) slower rates of sub-central government tax revenue growth.

**Hypothesis 1:** Countries with stricter limits on SCG tax autonomy have smaller SCG tax revenue as a percentage of GDP per capita.

*Dependent variable:*

SCG tax revenue as a percentage of GDP per capita.

*Controls:*

GDP per capita,  
Percentage of population older than 65,  
Unemployment rate

*Specification:*

$$\begin{aligned} [\text{SCG tax revenue as a percentage of GDP per capita}] = & b_0 + \\ & b_1[\text{Tax autonomy limits index}] + b_4[\text{GDP per capita}] + \\ & b_5[\text{Percentage of population older than 65}] + \\ & b_6[\text{Unemployment}] + \text{error} \end{aligned}$$

**Hypothesis 2:** Countries with stricter limits on SCG tax autonomy have slower rates growth of SCG tax revenue.

*Dependent variable:*

Rate of growth of SCG tax revenue

*Controls:*

GDP growth rate,  
GDP per capita,  
Population growth rate,  
Percentage of population older than 65,  
Unemployment rate

*Specification:*

$$\begin{aligned} [\text{Rate of growth of SCG tax revenue}] = & b_0 + \\ & b_1[\text{Tax autonomy limits index}] + b_2[\text{GDP growth}] + \\ & b_3[\text{GDP per capita}] + b_4[\text{Population growth}] + \\ & b_5[\text{Percentage of population older than 65}] + \\ & b_6[\text{Unemployment}] + \text{error} \end{aligned}$$

### iii. Rule: Debt Control

To assess the effectiveness of rules that aim to control sub-central government debt, we test whether stricter limits on debt result in (1) comparatively smaller levels of sub-central government debt, and (2) slower rates of growth of sub-central government debt.

**Hypothesis 1:** Countries with stricter SCG debt control have smaller SCG debt as a percentage of GDP per capita.

*Dependent variable:*

SCG debt as a percentage of GDP per capita.

*Controls:*

GDP per capita,  
Percentage of population older than 65,  
Unemployment rate

*Specification:*

$$[\text{SCG debt as a percent of GDP}] = b_0 + b_1[\text{Debt control index}] + b_2[\text{GDP per capita}] + b_3[\text{Percentage of population older than 65}] + b_4[\text{Unemployment}] + \text{error}$$

**Hypothesis 2:** Countries with stricter SCG debt control have slower rates of growth of SCG debt

*Dependent variable:*

Rate of growth of SCG debt

*Controls:*

GDP growth rate,  
GDP per capita,  
Population growth rate,  
Percentage of population older than 65,  
Unemployment rate

*Specification:*

$$[\text{Rate of growth of SCG debt}] = b_0 + b_1[\text{Debt control index}] + b_2[\text{GDP growth}] + b_3[\text{GDP per capita}] + b_4[\text{Population growth}] + b_5[\text{Percentage of population older than 65}] + b_6[\text{Unemployment}] + \text{error}$$

### B. Data

The three rules indices this analysis uses as independent variables measure the stringency of expenditure limits, limits on tax autonomy, and limits on debt. These data are taken from the indices developed in the OECD's "Fiscal Rules for Sub-Central Governments." Expenditure limit stringency is based on the scope of each variable's coverage (wide, partial, or none) and whether the limits are binding and/ or imposed by the central government. The index measuring limits on tax autonomy

captures the share of tax revenue that comes from taxes where the sub-central governing body controls the rate. The debt control index is constructed based on a more extensive set of institutional characteristics. These include the degree of sub-central government access to current and capital borrowing, the presence of numerical or categorical restrictions on borrowing, whether debt restrictions are imposed by the central government and are binding, the use of escape clauses, and the extent to which sub-central government have ownership or control over enterprise (Sutherland et al., 2005). For a more detailed explanation of data coding, see Appendix A.

Our empirical analysis is based on data from the 17 of the countries included in the “Sub-Central Fiscal Rules.” For Spain, Germany, and Switzerland, separate data are available for rules at the intermediate and local levels of government. Because these rules are sufficiently distinct, we treat them as separate observations in the regression. Table 1 lists the countries and levels of government included in our analysis.

**Table 1. Levels of Sub-Central Government Reflected in Sample**

Country	Local	State
Austria	√	
Czech Republic	√	
Denmark	√	
Finland	√	
France	√	
Germany	√	√
Iceland	√	
Japan	√	
Netherlands	√	
Norway	√	
Poland	√	
Portugal	√	
South Korea	√	
Spain	√	√
Sweden	√	
Switzerland	√	√
Turkey	√	

Indices from the “Sub-Central Fiscal Rules” report are coded on a 1 to 10 scale where higher values are associated with greater stringency. The data are from the year 2005. We were unable to determine when each rule went into effect or whether each rule is still in place. Table 2 shows the range of scores for the governments

represented in the sample, as well as the mean and standard deviation for each rule. Appendix B details each country's scores for the three rules.

**Table 2. Description of Indicators Data**

<b>Indicators</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Expenditure control	4.30	3.81	0	10
Tax autonomy	4.20	2.04	0	8
Debt control	5.37	2.30	0	7.5

Source: Sutherland et al., 2005

For outcome measures, our analysis focuses on levels and growth rates of sub-central government expenditures, tax revenue, and debt to enable a comparison of the impact of rule stringency in terms of both proportional levels and change over time. Data for the dependent variables come largely from OECD resources (OECD, 2008; OECD, 2009). For a few countries, including Iceland and Turkey, outside sources were required (Türkiye İstatistik Kurumu, 2008a, b; Hagstofa Íslands, 2007a, b, c; Econstats, 2009).

Table 3 shows the range of values for each of the outcome measures, as well as the means and standard deviations. Growth rate measures reflect the average annual change from 1998 to 2005.<sup>1</sup> These variables are intended to capture, to some extent, the long-term impact of fiscal rules. Although we do not possess data concerning when rules went into effect, a one-year snapshot of growth rates is insufficient due to the likelihood of volatility in these measures from year to year. Thus, to gain a broader understanding, we make the assumption that the relevant fiscal rules were in place during the period in which the growth rates reflect. This assumption is reasonable, given that fiscal rules are designed to be long-term and are rarely amended. For debt growth rates, a negative number indicates growing debt while a positive number indicates shrinking debt.

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<sup>1</sup> In the cases of South Korea, Switzerland, and Turkey, not all years had data available. In those cases, average annual growth rate reflects the change from 2000-, 2001-, or 2002-2005. The largest available range was used in each case. The specific time periods are: Turkey: tax revenue and expenditures 2001-2005, debt 1998-2005; South Korea: debt 2002-2005, tax revenue and expenditures 2000-2005; Switzerland: debt 2000-2005, tax revenue and expenditures 1998-2005.

**Table 3. Description of Outcomes Measures**

<b>Outcomes</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
SCG expenditures as a percentage of GDP	14%	7%	3%	33%
Rate of growth of SCG expenditures	8%	8%	-4%	27%
SCG Debt as a percentage of GDP	-2%	8%	-24%	9%
Rate of growth of SCG debt	26%	115%	-41%	511%
SCG tax revenues as a percentage of GDP	6%	4%	2%	17%
Rate of growth of SCG tax revenues	11%	16%	0	6%

Source: Authors' calculations

## V. Results

In estimating each of the models we describe in the previous section, we used quantile (median) regressions, which estimate the median of the dependent variable conditional on the values of the independent variable, rather than estimating the mean as in an ordinary least squares regression (Koenker and Hallock, 2001). Quantile regression is preferable to ordinary least squares because it is far more robust against the effects of outliers.<sup>2</sup> The small sample size ( $n=20$ ) for which there are rules index scores means that any regression will be highly vulnerable to the impact of outliers.

The results of each regression are presented in Table 4. The coefficients express that a one-unit change in the stringency index score is associated with the change indicated for each outcome measure. Note that the dependent variables are expressed as percentages and growth rates and, thus, so are the coefficients.<sup>3</sup>

Only one model yields a significant coefficient for any explanatory variable. This is model 5, which hypothesizes that countries with stricter SCG debt control have smaller SCG debt as a portion of GDP (hypothesis 1 for the debt control rule). In this model, the debt control index has a t-statistic of -3.03, meaning that it is statistically significant. However, the coefficient on the debt control index variable in this model is negative, indicating that a one unit increase in the stringency index score for debt control leads to a 1.6 percent *increase* in sub-central government debt (reported as a negative balance). This outcome is exactly the opposite of what we hypothesized, meaning we cannot reject the null hypothesis that sub-central government debt control rules do not lead to lower levels of sub-central government debt. Although the pseudo R-squared values in this type of analysis are presented, they are not directly comparable across estimators or quantiles.

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<sup>2</sup> The significantly different results of ordinary least squares regression in our analysis support this claim, although we do not present those results in this report.

<sup>3</sup> Because the level of sub-central government expenditures, taxes, and debt as a percent of GDP are all proportions, they are bounded variables. Therefore, a logit transformation of the proportional variables provides a more accurate representation of these variables in linear regression, because it lifts the assumption that the dependent variable has a normal distribution with infinite bounds (Baum, 2008). However, upon running these regressions, the logit transformation did not have a noticeable impact on the significance of our explanatory variables. Furthermore, the logit transformation is not easily applicable for the SCG debt variable because it has negative values to represent debt levels. Thus, the untransformed proportional dependent variables are used in these models.



**Table 4. Regression Results**

<b>1: Countries with stricter SCG expenditure limits have smaller SCG expenditures as a percentage of GDP</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>T-Statistic</b>
Expenditure limits index	-0.004	-0.52
GDP per capita	0.000	0.31
Percentage of population older than 65	0.004	0.49
Unemployment	-0.002	-0.16
Constant	0.035	0.19
Pseudo R-squared = 0.10		
Observations = 20		

<b>2: Countries with stricter SCG expenditure limits have slower rates growth of SCG expenditures</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>T-Statistic</b>
Expenditure limits index	-0.001	-0.68
GDP growth	-0.015	-0.41
GDP per capita	0.000	-2.46
Population growth	0.025	1.78
Percentage of population older than 65	-0.013	-3.58
Unemployment	0.004	1.54
Constant	0.330	5.11
Pseudo R-squared = 0.76		
Observations = 20		

<b>3: Countries with stricter limits on SCG tax autonomy have smaller SCG tax revenue as a percentage of GDP</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>T-Statistic</b>
Tax autonomy index	0.000	0.03
GDP per capita	0.000	0.36
Percentage of population older than 65	0.001	0.16
Unemployment	0.000	0.06
Constant	-0.001	-0.01
Pseudo R-squared = 0.14		
Observations = 20		

<b>4: Countries with stricter limits on SCG tax autonomy have slower rates growth of SCG tax revenue</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>T-Statistic</b>
Tax autonomy index	0.000	0.04
GDP growth	0.255	2.02
GDP per capita	0.000	-0.57
Population growth	0.029	0.69
Percentage of population older than 65	-0.008	-0.81
Unemployment	-0.002	-0.30
Constant	0.241	1.18
Pseudo R-squared = 0.54		
Observations = 20		

<b>5: Countries with stricter SCG debt control have smaller SCG debt as a percentage of GDP</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>T-Statistic</b>
Debt control index*	-0.016	-3.03
GDP per capita	0.000	-0.46
Percentage of population older than 65	-0.009	-1.98
Unemployment	0.001	0.32
Constant	0.236	2.86
Pseudo R-squared = 0.21		
Observations = 20                      *Significant explanatory variable		

<b>6: Countries with stricter SCG debt control have slower rates of growth of SCG debt</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>T-Statistic</b>
Debt control index	-0.002	-0.08
GDP growth	0.009	0.03
GDP per capita	0.000	-0.06
Population growth	-0.011	-0.08
Percentage of population older than 65	-0.006	-0.23
Unemployment	0.002	0.06
Constant	0.131	0.27
Pseudo R-squared = 0.04		
Observations = 20		

Source: Authors' calculations

## VI. Interpretation and Limitations

Although the results of our econometric work do not yield conclusive evidence as to the effectiveness of sub-central government fiscal rules in producing their intended outcomes, the limitations of this study point to areas in which further research is still needed. Perhaps the most important limitation on the strength of the models in this report is the small sample size ( $n=20$ ) of our study. Despite the use of a regression method that is more robust than the ordinary least squares method against the effects of outliers, such a small sample size severely limits the degrees of freedom of the models, making statistical significance difficult to achieve. It is certainly possible that we are capturing the true lack of a relationship between the stringency of fiscal rules and various outcomes measures, but the sample size makes any definitive conclusion complicated to reach.

The problem of endogeneity is a second limitation. Our variables do not serve as predictors that fiscal rules serve to limit sub-central expenditures, tax revenue, or debt. The fiscal stringency variable may, in fact, not be exogenous: we find a correlation between increases in debt control and more sub-central government debt. For instance, countries with an aversion to government spending may, in practice, be more likely to impose strict expenditure limitations.

Another limitation of the analysis is that the data on fiscal rule stringency are cross-sectional, while the growth rates reflect a longer time span. Given the inability to capture change over a meaningful time period in a cross-sectional growth rate measure, we elected to use a longer time frame to present a more accurate picture of the growth rates of sub-central government expenditures, tax revenues, and debt. Thus, we assume that the fiscal rule indices accurately reflect the fiscal rules in each country before and during the time frame that the growth rates measure. We believe that this is a valid assumption, based on the fact that fiscal rules do not change frequently and are designed to be permanent. However, making this assumption introduces some concern about the internal validity of the models that use growth rates as an outcome measure.

With data on the adoption of fiscal rules, it may be useful for OECD to consider a model that compares the outcomes in countries with recently adopted fiscal rules to those in countries that have long governed sub-central government behavior. However, this comparison would leave much unexplained. For instance, national governments that direct their sub-central governments to make many expenditures may find themselves pressured to loosen fiscal rules if the alternative is to cut politically sensitive services.

We recommend that more data be collected before any attempts to further address the effectiveness of fiscal rules. Specifically, we suggest that the OECD identify when each country put each fiscal rule in place and in what circumstances. Such information would aid in the study of fiscal rule impacts by presenting a more complete and long-term picture of the use of sub-central government fiscal rules, thereby giving greater context to their outcomes. In addition, OECD data on sub-

central government fiscal outcome measures are incomplete for all years analyzed in this study. Specifically, Australia, Iceland, South Korea, Switzerland, and Turkey have missing data. Also, for our independent variables, we did not have state-level indicators for state-level governments in Australia and Turkey.

Finally, another key limitation of this study of fiscal rule effectiveness is that each country implements rules in response to its particular institutions and economic events. A strength of the OECD's "Sub-Central Fiscal Rules" report is its elaboration of the diversity of approaches to using fiscal rules to meet public finance objectives while trying to avoid side effects like the reallocation of spending and taxes in ways that circumvent fiscal rules while adhering to their stated provisions. Such an analysis, however, would not guarantee that policymakers could trust countries to follow their rules regarding expenditure limits and balanced budgets. Econometric analysis can contribute to an assessment of the effectiveness of fiscal rules, but policymakers still must evaluate their adoption in a particular national context. The complexities of fiscal rule application may best be captured through a representative set of case studies that policymakers could use as a reference in better understanding the rationale for and effects of using fiscal rules in their respective circumstances. Case studies might be the best method to capture how countries apply fiscal rules and the context of their implementation. Such analysis might provide policymakers a better understanding of each nation's rationale for the rules and how their application played out in each circumstance.

## References

- Baum, Christopher F. (2008). "Stata Tip 63: Modeling Proportions." *The Stata Journal*. 8 (2), 299-303.
- Blöchliger, Hansjörg & King, David. (2006). "Fiscal Autonomy of Sub-Central Governments." Organisation for Economic Co-operation and Development Working Paper No. 2. <http://www.oecd.org/dataoecd/48/26/37159974.pdf>. Retrieved on 25 Apr 2009.
- Brennan, Geoffrey & Buchanan, James. (2000). The Collected Works of James M. Buchanan. Vol. 9. *The Power to Tax: Analytical Foundations of a Fiscal Constitution*. Indianapolis: Liberty Fund.
- Downes, Thomas A. & Figlio, David N. (2007). "Tax and Expenditure Limits, School Finance and School Quality." In Helen F. Ladd and Edward B. Fiske (Eds.), *Handbook of Research in Education Finance Policy*, New York: Routledge, 373-88.
- Econstats. (2009). "Global Economic Data." [http://www.econstats.com/index\\_gl.htm](http://www.econstats.com/index_gl.htm). Retrieved on 22 Apr 2009.
- Fatás, Antonio & Mihov, Ilian. (2003). "The Case for Restricting Fiscal Policy Discretion." *Quarterly Journal of Economics*. 118 (4), 1419-1447.
- Hagstofa Íslands. (2007a). "Tafla 15.3. Helstu hagstærðir sveitarfélaga 1980–2006." <http://www.statice.is/uploads/files/LH07/L071503.xls>. Retrieved on 17 Apr 2009.
- Hagstofa Íslands. (2007b). "Tafla 15.6. Tekju-, gjalda- og fjárstreymisreikningar sveitarfélaga 1980–2006." <http://www.statice.is/uploads/files/LH07/L071506.xls>. Retrieved on 17 Apr 2009.
- Hagstofa Íslands. (2007c). "Tafla 15.13. Peningalegar eignir og skuldir sveitarfélaga 1998-2006." <http://www.statice.is/uploads/files/LH07/L071513.xls>. Retrieved on 17 Apr 2009.
- Kanda, Daniel. (2008). "Perspectives on the Reform of Fiscal Federal Relations in Austria," in *Austria: Selected Issues*. International Monetary Fund Country Report No. 08/189. <http://www.imf.org/external/pubs/ft/scr/2008/cr08189.pdf>. Retrieved on 18 Apr 2009.
- Koenker, Roger, & Hallock, Kevin F. (2001). "Quantile Regression," *Journal of Economic Perspectives*. 15 (4), 143-156.
- Kopits, George. (2001). "Fiscal Rules: Useful Policy Framework or Unnecessary Ornament?" IMF Working Paper No. 01/145. Washington, D.C.: International Monetary Fund.

Kopits, George & Symansky, Steven. (1998). "Fiscal Policy Rules." IMF Occasional Paper 162. Washington, D.C.: International Monetary Fund.

Lubke, Astrid. (2005). "Fiscal Discipline between Levels of Government in Germany." *OECD Journal on Budgeting*. 5 (2), 23-37.

Organisation for Economic Co-operation and Development. (2009). "OECD.Stat." SourceOECD.  
<http://masetto.sourceoecd.org/vl=2477204/cl=24/nw=1/rpsv/dotstat.htm>. Retrieved on 22 Apr 2009.

Organisation for Economic Co-operation and Development. (2008). National Accounts of OECD Countries Volume IV General Government Accounts, 1996-2007 (Data File).  
[http://www.oecd.org/document/33/0,3343,en\\_2649\\_34245\\_33777633\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/33/0,3343,en_2649_34245_33777633_1_1_1_1,00.html). Retrieved on 17 Apr 2009.

Organisation for Economic Co-operation and Development. (2003). "Chapter 5: Fiscal Relations Across Levels of Government." OECD Economic Outlook No. 74.  
<http://www.oecd.org/dataoecd/58/18/23465547.pdf>. Retrieved on 26 Apr 2009.

Sutherland, Douglas, Price, Robert & Joumard, Isabelle. (2005). "Fiscal Rules for Sub-Central Governments: Design and Impact." Organisation for Economic Co-operation and Development Network on Fiscal Relations Across Levels of Government Working Paper No. 1.  
<http://www.oecd.org/dataoecd/53/0/37388379.pdf>. Retrieved on 25 Apr 2009.

Taylor, John. (1993). "Discretion vs. Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy*. 39, 195-214.

Türkiye İstatistik Kurumu. (2008a). "Türkiye İstatistik Yıllığı 2007."  
[http://www.turkstat.gov.tr/yillik/stat\\_yearbook.pdf](http://www.turkstat.gov.tr/yillik/stat_yearbook.pdf). Retrieved on 17 Apr 2009.

Türkiye İstatistik Kurumu. (2008b). "İstatistik Göstergeler 1923-2007."  
[http://www.turkstat.gov.tr/yillik/stat\\_indicators.pdf](http://www.turkstat.gov.tr/yillik/stat_indicators.pdf). Retrieved on 23 Apr 2009.

## Appendix A. Coding for Rule Indices

	Weight 1	Weight 2	Coding
<b>Expenditure Control</b>			
Expenditure limitation coverage	1/2		
Wide			10
Partial			5
No limit			0
Binding	1/2		
Imposed (self-imposed if state) or negotiated and binding			10
Self-imposed or non-binding			5
No limit			0
<b>Tax Autonomy</b>			
Sub-central government has: (where X is the share of tax revenue)			
Control over rates and reliefs	X		0
Control over rates or reliefs	X		3.33
Shared taxes	X		6.67
No control over tax revenue	X		10
<b>Debt Control</b>			
Access to borrowing	1/5		
Current borrowing		1/2	
Unrestricted			0
Prior approval required			5
Prohibited			10
Capital borrowing		1/2	
Unrestricted			0
Prior approval required			5
Prohibited			10
Restrictions on borrowing	1/5		
Limiting uses		1/2	
No limits on use			0
If limited to particular uses			5
Numerical constraints		1/2	
No numerical constraints			0
For each numerical constraint			2.5
Borrowing constraint binding	1/5		
None			0
Self-imposed or voluntary			5

	<b>Weight 1</b>	<b>Weight 2</b>	<b>Coding</b>
Imposed (self-imposed if state) or negotiated and binding			10
Escape clauses	1/5		
None			10
For each escape clause			2.5
No borrowing constraint			0
Relations with enterprises	1/5		
Enterprise ownership or control			
No ownership or control			10
Ownership or control, subject to restriction			5
Ownership or control with no restriction			0

Source: Sutherland et al., 2005



## Appendix B. Rule Indices by Country

Country	Expenditure Control	Tax Autonomy	Debt Control
Austria	0.0	6.5	0.0
Czech Republic	0.0	6.2	3.8
Denmark	7.5	3.9	7.0
Finland	0.0	3.7	0.0
France	0.0	0.7	7.3
Germany state	7.5	7.0	6.5
Germany local	10.0	4.4	7.3
Iceland	0.0	3.1	2.3
Japan	5.0	4.7	4.8
Netherlands	5.0	3.3	6.3
Norway	0.0	2.9	6.5
Poland	5.0	5.1	6.3
Portugal	10.0	8.0	6.3
South Korea	7.5	5.7	6.8
Spain state	0.0	2.9	7.5
Spain local	5.0	4.3	4.8
Sweden	0.0	3.2	3.0
Switzerland state	7.5	0.0	5.8
Switzerland local	7.5	3.2	6.8
Turkey	7.5	10.0	7.3

Source: Sutherland et al., 2005