Abstract

Since the 1990s many OECD countries have adopted fiscal rules. After the adoption of these rules, the ratio of social transfers to government consumption substantially declined, and it recovered following the global economic crisis. Using a sample of 22 OECD countries, we found a negative effect of fiscal rules on the ratio of social transfers to government consumption. This finding implies that fiscal rules are effective, but not necessarily binding. Our examination reveals that the negative effect of fiscal rules on the social transfers to government consumption ratio is particularly evident in countries with relatively weak legal protection to social rights. © 2013 by the Association for Public Policy Analysis and Management.

INTRODUCTION

Following the recent global economic crisis and the resulting high budget deficits, countries are adopting and strengthening fiscal rules (Budina et al., 2012). The main motive for this change is to provide credibility for a fiscal consolidation policy to improve the likelihood of a transition to lower fiscal deficits. In fact, the European Union has recently (February 2012) adopted new fiscal rules requiring governments to run balanced budgets and write these rules into national constitutions. Furthermore, it has established a procedure for taking member states to court if they breach these rules. These latest modifications reflect the benefits of adhering to fiscal rules as European leaders perceive them.¹

However, rising inequality is clearly posing a threat to the sustainability of fiscal consolidation policy. The social discontent that has translated into widespread protests in several developed countries reflects voters’ growing awareness of the social implications of economic policy, which is likely to affect political willingness to follow fiscal rules.

If fiscal rules lead to skewed economic policy against disadvantaged groups, they may generate social instability that would put pressure on governments to revise their policy. In turn, this pressure may eventually undermine the fiscal rules.

¹ Fiscal problems are evident also in the United States. Palmer and Penner (2012) show that without significant changes in revenue and spending policies, the country is headed for a sovereign debt crisis similar to that afflicting countries in Southern Europe.
Examining the effect of such regulations on spending priorities and on the composition of government expenditure in various countries may offer important insights into the current debate on the desired public policy that governments around the world should follow. The current policy debate centers on ways in which to strike a better balance between sustainability and flexibility goals in the design of “next-generation” fiscal rules. By focusing on structural—rather than current budget—deficits, economies may better accommodate economic shocks; however, this approach raises the risk of less prudent behavior, as governments may exploit the complexity of the rules. Moreover, a challenge for reforming fiscal rules is to take social stability into account. Fiscal rules may lead to macroeconomic sustainability in the medium term if it is supported by political willingness to stick to the adopted rules. Political support is influenced by the composition of government expenditure, which may affect important social outcomes, such as the level of economic inequality.

In recent decades, several OECD countries have adopted budget and expenditure rules. The increase from fewer than five countries in the 1970s and 1980s to 30 countries after the 1990s (Calderon & Schmidt Hebbel, 2008) may partially be explained by the effectiveness of numerical fiscal rules in curtailing budget deficits in different parts of the world at different levels of government (for the United States, see Alesina & Bayoumi, 1996; Alt & Lowry, 1994; Poterba, 1994; for Latin America, see Alesina et al., 1999; and for Switzerland, see Krogstrup & Wälti, 2008). Krogstrup and Wälti (2008), using a panel of Swiss subfederal jurisdictions, show that fiscal rules significantly affect budget deficits, even after controlling for voter preferences to exclude the possibility that this correlation is driven by an omitted variable (preferences).

At the same time, both policymakers and researchers are aware of the possible costs of adopting fiscal rules alongside the benefits of budgetary discipline. The main concern, according to the Keynesian view, is that rules for balancing budgets are expected to deepen recessions. Nevertheless, based on a sample of American states, Alesina and Bayoumi (1996) found that fiscal rules have not increased output volatility. More recently, several papers detect no evidence that fiscal rules amplify economic fluctuations (see Gali & Perotti, 2003, for the EMU countries; Fatas & Mihov, 2006, for the United States; and Badinger, 2009, for the OECD countries). Schunk and Woodward (2005) at the states level, and Debrun et al. (2008) at the national level, show that procyclicality can be avoided if rules are originally designed to preserve the operation of automatic stabilizers.

Fiscal rules may also provoke costs as a consequence of an unintentional change in the composition of government expenditure. Fiscal consolidation as a result of adhering to budget rules may take various forms: higher taxes, lower government consumption, lower government investment, lower transfer payments, or a combination of all the above. Ideally, the particular form of fiscal restraint should be selected in accordance with cost-benefit considerations: The chosen tax rate should minimize the excess burden of taxation, and the cut in expenditures should be focused on the items with the lowest (marginal) social welfare. In practice, however, short-term political economy considerations are likely to play an important role in determining cuts in government expenditure.

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2 See also Guichard et al. (2007), who found that both expenditure and budget rules anchor successful fiscal consolidations.
3 Kopits (2001) provides a list of arguments for and against budget rules.
4 From a neo-classical point of view, balance budget rules may impose costs due to a suboptimal path of tax rates (Barro, 1979).
Balanced-budget rules such as the Maastricht-related constraints do not specify in most cases which type of government expenditure should be cut to meet the specified budget targets. This leaves room for governments to execute various policy mixes. Public consumption—and especially, government wages—may be less prone to cuts because of the relative strength of lobbies (e.g., unions). This would be the case if the median voter were protected by unions, or when governments consider wages to be more visible, and consequently less exposed to cuts. In contrast, for the same political economy reasons, governments may choose a suboptimal level of public investment, which may be harmful in terms of long-term economic growth. Transfer payments may also be subject to disproportional cuts as a result of binding budget rules. Unbalanced cuts in monetary aid to disadvantaged groups may drive inequality and poverty to a level that is inconsistent with social preferences. Scholz and Levine (2001) and Birdsall (1998) have raised the fear that fiscal rules may undermine the commitment of the affluent countries to address income inequality.

A simple inspection reveals a clear decline in the ratio of social transfers to government consumption in the 1990s, when many countries implemented expenditure and budget-balancing rules both at the national and super-national levels (Figure 1). In recent years, there has been a recovery in this ratio, related apparently to stimulus plans reacting to the global economic crisis. The change in

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5 The enforcement of the Maastricht Treaty (Treaty on European Union) and the Stability and Growth Pact (SGP) rely upon accounting rules that specify certain types of budgetary and revenue measures that do not count for the purposes of deficit and debt reduction. For example, the revenues derived from the selling of certain assets do not count for deficit reduction. This rule constrains government action in the matter of the privatization of assets; see Savage (2005).

6 Blanchard and Giavazzi (2004) have criticized the SGP for not excluding public investment from the definition of the budget. Balassone and Franco (2000) discuss the application of a “golden rule.”

7 A recent paper focusing on median voter preferences was published by Creedy and Moslehi (2010), following the seminal contribution by Meltzer and Richard (1981).

8 Sanz and Velazquez (2003) show that, for political reasons, governments may choose expenditure composition guided by an impulse of avoiding cuts in “visible expenses.” Clearly, government wages belong in this category, since unions are equipped with such tools as strikes, which can easily ensure that wage cuts are more visible.

9 The consolidations performed in the 1990s are analyzed by Wagschal and Wenzelburger (2012).
direction of this ratio adds an important variation to the data, which helps to identify the role of fiscal rules in shaping the ratio of social transfers to government consumption.

The empirical literature on the costs aspect of fiscal rules has almost overlooked the costs that may be associated with an unintended change in the composition of government expenditure. The goal of the present paper is to fill this gap by exploring the effect of numerical fiscal rules on the composition of government expenditure in developed countries.

We began by examining the effectiveness of fiscal rules in reducing budget deficits and the size of government expenditure. We then examined whether the difference of rates of change between transfer payments and government consumption is significantly different before and after the introduction of fiscal rules, controlling for a standard list of explanatory variables. We would like to emphasize that our paper does not resolve the more difficult question of whether the composition of government expenditure is suboptimal after the introduction of fiscal rules.

The paper is organized as follows: The next section analyzes the effect of fiscal rules on fiscal consolidations. The main results of the paper are presented in the following section. We show that fiscal rules have reduced the growth rate of social transfers more than that of government consumption. In the penultimate section, we discuss two policy issues: first, we test whether the effect of fiscal rules on the social transfers over government consumption ratio is beyond the general adoption of From Welfare to Work (FWTW) policies in OECD countries; second, we analyze whether countries with strong social security legislation cope better with the expenditure composition effect of fiscal rules. The final section concludes. Appendix reports a Hausman test for our main instrumental variable and provides robustness tests for different techniques of clustered standard errors.

FISCAL RULES AND FISCAL PERFORMANCE

In a typical developed country, decisions regarding the national budget are shaped by the three main components of the budgeting process: procedural rules (such as granting strategic power to the finance ministry or prime minister and a top-down decisionmaking process), numerical fiscal rules, and transparency. Numerical fiscal rules are more likely to characterize a multiparty government system as compared to a regime based on a political majority (Hallerberg, Strauch, & Von Hagen, 2009).

Following Guichard et al. (2007), we define a fiscal rule here as a numerical target that binds and controls budget deficits and expenditure in annual budgeting—for example, a budget-balancing rule, expenditure ceilings and caps, and pay-as-you-go principles. This differs from the International Monetary Fund (IMF) definition (Budina et al., 2012; Kumar et al., 2009) in two main respects: (a) According to IMF, a target qualifies as a fiscal rule only if it is specified for at least three years (or

10 The study by Gali and Perotti (2003) is an exception with regard to public investment, but they have not examined the effect on redistribution policy. In a sample that included the 1990s, they found no empirical support for the claim that fiscal rules reduce public investment.
11 All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher’s Web site and use the search engine to locate the article at http://www3.interscience.wiley.com/cgi-bin/jhome/34787.
12 Hanuschek (1986) analyzes the shift from process rules to allocation rules in federal budgeting.
13 Wehner (2010, chapter 6) analyzes the conditions under which top-down budgeting can play a constructive role in improving fiscal performance.
14 Milesi Ferretti (2004) shows that fiscal rules may lead to a lack of transparency, driving governments to use techniques of creative accounting.
more); and (b) the IMF definition does not include pay-as-you-go targets as a fiscal rule. In our view, the effectiveness of a rule is not necessarily determined by the time limit of the fiscal target, and thus we prefer the definition that Guichard et al. (2007) offer. However, in the empirical analysis, we provide robustness tests for the definition of fiscal rules.

The Data

We used a panel of 22 OECD countries during the period 1960 to 2010 to test the effects of fiscal rules on actual budget deficits and general government expenditure, and their composition according to three components: government consumption, social transfers, and government investment. The source of our data was the OECD. Budget deficit was measured by the ratio of nominal government net balance to nominal GDP. The rates of change of government expenditure and its components were computed as the logarithmic change of government expenditure, deflated by GDP prices. The choice of GDP prices as a deflator is in line with Lane (2003): By using GDP prices, we are able to depict the rise in government wages over domestic prices. Since the matter of wages is one of the main potential political economy forces driving the dynamics of expenditure, it is important to allow it to play a role.

Fiscal rules are represented by dummy variables that take the value of 1 during the period beginning at the adoption date of the rule and lasting until the rule is abandoned (otherwise it continues until the end of the sample), and 0 otherwise. Table 1 shows the implementation years for the different rules and countries. The data for this table is based on an extended version of Table 2 by Guichard et al. (2007), who consider budget and expenditure rules on a broad basis. Their original database reflects fiscal rules that were effective at the time that their paper was written; the extended database also includes past fiscal rules that were later abandoned.

We considered four different definitions for fiscal rules at the federal level: (i) budget-balancing rules adopted at the national level (BTARGET); (ii) expenditure rules adopted at the national level (ETARGET); (iii) participation in the Maastricht Treaty, starting in the year in which the treaty was approved in a national referendum (MAAS); and (iv) participation in the SGP, combined with the adoption of the Euro, which represents a binding commitment.

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15 This list includes all OECD countries except Luxembourg, Mexico, Turkey, and the new members (the Slovak Republic, Poland, Hungary, Korea, the Czech Republic, Chile, Israel, and Slovenia). Our choice of countries, shown in Table 1, is related to data availability.
16 The following items were according to the OECD database: for investment—gross capital formation; for transfers—subsidies + social benefits and social transfers in kind + other current transfers + capital transfers; and for consumption—final government consumption.
17 The data are from the OECD Annual National Accounts database, which includes government expenditure by function. We checked the consistency of our historical data with those used by Philip Lane (2003), to whom we are thankful.
18 We deviate from that database with respect to expenditure rules in the United States during the 1990s, following Auerbach (2008). He stresses that the expenditure rule adopted in the United States does not match our broad definition, since the rule was applied for discretionary spending, excluding social insurance spending for health, social security (retirement and disability pensions), unemployment, and other entitlement programs.
19 Another important dimension is federal vs. state rules. For example, European rules apply to all levels of government. However, learning about the effectiveness of state rules is beyond the scope of the present paper.
20 The years shown in Table 1 are those in which the referendum took place and was approved. Since there are national debates about participating in super-national agreements, it is important to define the beginning date of the binding fiscal rule. We assume that the result of a referendum is binding from the point of view of the policymakers.
Table 1. Fiscal rules implementation in selected OECD countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Expenditure rule</th>
<th>Budget rule</th>
<th>Maastricht Treaty</th>
<th>SGP and EMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1985 to 1990</td>
<td>1985 to 1990 and 1998 +</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Canada</td>
<td>1991 to 1996</td>
<td>1991 +</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Iceland</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Japan</td>
<td>1983 +</td>
<td>2002 +</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1994 +</td>
<td>1994 +</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Norway</td>
<td>–</td>
<td>2001 +</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Portugal</td>
<td>–</td>
<td>–</td>
<td>1992 +</td>
<td>1997 +</td>
</tr>
<tr>
<td>Spain</td>
<td>–</td>
<td>–</td>
<td>2004 +</td>
<td>1992 +</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2001 +</td>
<td>2001 +</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>–</td>
<td>1998 +</td>
<td>1993 +</td>
<td>–</td>
</tr>
<tr>
<td>United States</td>
<td>–</td>
<td>1985 to 1990</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The symbol + means that the rule continues until the end of the sample.

These definitions focus on different variables. Budget-balancing rules usually affect a deficit by setting a balanced-budget target or gradually lowering it, and by cutting expenditure or increasing taxes. Expenditure rules target the rate of increase of government spending; thus, they are more likely to restrain expenditure growth if they are binding. Another dimension relates to national and supra-national levels. The choice of these four different definitions allows for testing the efficacy of the different degrees of rules. Moreover, by using interaction variables (defined as the multiplication of the different dummy variables representing the rules), we can test the effectiveness of a combined application of rules. For example, until the end of the period to which the data relates, Germany implemented all four types of rules, Iceland did not adopt any, and the United States was the only country to abolish an existing budget rule without adopting another.

Our basic approach was to check changes in the different expenditure variables. This is in accordance with budget planning in all industrialized countries, which is based on changes from an existing basis. Such an approach is also consistent with expenditure rules, which are usually defined in rates of change from existing levels. Nevertheless, we estimated the effects of fiscal rule on fiscal performance also measured in levels (not reported). We performed general method of moments

21 Dothan and Thompson (2009) analyze a transparent spending rule governing maximum sustainable rate of spending growth, treating the revenue as given.
22 In fact, zero budgets are rarely applied in practice.
23 The main results of the paper are also significant at 5 percent for levels.
Table 2. Fiscal rules and budget deficits.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>$D$ (government deficit/$Y$) 1963 to 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>977</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1.566</th>
<th>1.378</th>
<th>1.288</th>
<th>1.282</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C$</td>
<td>(3.7)**</td>
<td>(2.5)**</td>
<td>(2.4)**</td>
<td>(2.4)**</td>
</tr>
<tr>
<td>$DlogY$</td>
<td>-34.175</td>
<td>-35.881</td>
<td>-35.274</td>
<td>-35.667</td>
</tr>
<tr>
<td></td>
<td>(−3.5)**</td>
<td>(−3.5)**</td>
<td>(−3.5)**</td>
<td>(−3.5)**</td>
</tr>
<tr>
<td>$DlogPOP$</td>
<td>-22.161</td>
<td>18.236</td>
<td>29.716</td>
<td>26.901</td>
</tr>
<tr>
<td></td>
<td>(−0.6)</td>
<td>(0.3)</td>
<td>(0.4)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>$DlogPOP_{15+DlogPOP_{65}}$</td>
<td>13.610</td>
<td>6.997</td>
<td>3.970</td>
<td>3.562</td>
</tr>
<tr>
<td></td>
<td>(1.5)</td>
<td>(0.5)</td>
<td>(0.3)</td>
<td>(0.3)</td>
</tr>
<tr>
<td>Government deficit/$Y$ ($−1$)</td>
<td>-0.186</td>
<td>-0.171</td>
<td>-0.171</td>
<td>-0.173</td>
</tr>
<tr>
<td></td>
<td>(−5.1)**</td>
<td>(−4.2)**</td>
<td>(−4.0)**</td>
<td>(−4.2)**</td>
</tr>
<tr>
<td>BTARGET</td>
<td>-0.506</td>
<td>-0.305</td>
<td>-0.103</td>
<td>-0.103</td>
</tr>
<tr>
<td></td>
<td>(-2.4)**</td>
<td>(-1.5)</td>
<td>(-0.3)</td>
<td>(-0.3)</td>
</tr>
<tr>
<td>ETARGET</td>
<td>MAAS</td>
<td></td>
<td>SGP</td>
<td>0.128</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.4)</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.35</td>
<td>0.34</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.09</td>
<td>2.09</td>
<td>2.08</td>
<td>2.08</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: $Dlog$(exports in constant U.S.$) in one and two lags, $Dlog(Y)$ in one and two lags, population variables with one and two lags, and past level with two lags.

† Statistic in parentheses, using White cross-section corrected standard deviations.

***Significant at 1 percent; **Significant at 5 percent.

We used the following control variables to reflect higher sources of demand for government expenditure (public services such as education, child allowances, and old-age pensions, respectively): population growth ($DlogPOP$) to account for the demand for public services, GDP growth ($DlogY$) to represent resources, and the growth of the population under 15 years of age ($DlogPOP_{15}$) and over 65 years of age ($DlogPOP_{65}$). In the regressions that include transfer payments, we also controlled for changes in unemployment $D(U)$.

Changes in the dependent variables may reflect a correction for their levels: For example, the reduction in transfer payments over consumption ratio may reflect a

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24 All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's Web site and use the search engine to locate the article at http://www3.interscience.wiley.com/cgi-bin/jhome/34787.
correction for its high level at the beginning of the 1990s. It was crucial, therefore, to control in all the regressions for the lagged level of the dependent variable. To summarize, the estimated panel regression for the 22 countries is

\[ Y_{c,t} = \alpha + \beta FR_{c,t} + \gamma X_{c,t} + \delta_c + \phi_t + \epsilon_{c,t}, \]  

(1)

where the dependent variable, \( Y_{c,t} \), represents the rate of change for one of several fiscal variables (e.g., the growth rate of government consumption) in country \( c \) in year \( t \), \( FR_{c,t} \) stands for fiscal rule dummy variable in country \( c \) in year \( t \), and \( X_{c,t} \) symbolizes the list of control variables including the level of the dependent variable. \( \delta_c \) and \( \phi_t \) are country and year fixed effects, respectively. We are mainly interested in the sign of \( \beta \) and its size.

Equation (1) is in fact a differences-in-differences (diff-in-diff) regression, which provides cleaner estimates for the effect of fiscal rules. The central dependent variables were measured as a difference between the rates of change of two such fiscal variables as transfer payments and government consumption. The main explanatory variable also represents a difference: before and after the introduction of fiscal rules.

We did not examine whether countries violate the fiscal targets that they adopted (as in the cases of Italy, Portugal, and Greece); rather, we examined whether these budgetary rules influence fiscal performance. In particular, the budget deficit or any other fiscal measure may be lower after the introduction of fiscal rules and yet may simultaneously exceed the specified target.

Fiscal Rules and Fiscal Consolidation

Tables 2 and 3 present the estimation results of equation (1) for various fiscal rules. In Table 2, the dependent variable is the first difference of general government budget deficit as a share of GDP, and in Table 3 it is the rate of change in total real government expenditure. Country and year fixed effects are not reported due to lack of space.

As can be seen, budget-balancing deficit rules at the national level are significantly effective in reducing a deficit (change) after taking into account a standard list of control variables. The reduction of the deficit is relatively large, around 0.5 percentage points of GDP (with 5 percent significance). The control variables have the expected signs, and the coefficients of the change in GDP and of the lagged value of government deficit are significant at 1 percent.

A somewhat different picture emerges regarding the effectiveness of fiscal rules in reducing the total growth rate of government expenditure (Table 3). Fiscal rules have a consolidated effect on total expenditures, as implied by their coefficients. The reduction in the growth rate of total government expenditure is quantitatively large—around 1 percent. In contrast to a budget deficit (change), the most effective rule for reducing expenditure is the expenditure rule, which proved to be significant at 5 percent.

In the budget deficit regressions, we used a control variable according to Barro (1979) to capture high and transitory government expenditure. This variable is calculated using high deviations of expenditure (higher in absolute value than 1 standard deviation) from an Hodrick-Prescott filtered trend (Is your readers know what “hp” means? If not, define. Ed.). Employing an index of violent and nonviolent conflicts (CONFLICT), based on the Heidelberg Institute of International Conflict Research, proved to be unproductive. Oddly, we found a negative and significant coefficient for CONFLICT in the regression of the rate of change of government consumption, which is the category that includes defense expenditure.
Table 3. Fiscal rules and total government expenditure.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>( D\log(\text{total government expenditure}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>1963 to 2010</td>
</tr>
<tr>
<td>Number of observations</td>
<td>957</td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.035</td>
<td>0.036</td>
<td>0.037</td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td>(2.9)**</td>
<td>(2.9)**</td>
<td>(3.2)**</td>
<td>(3.1)**</td>
</tr>
<tr>
<td>( C )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( D\log(Y) )</td>
<td>-0.121</td>
<td>-0.134</td>
<td>-0.148</td>
<td>-0.174</td>
</tr>
<tr>
<td></td>
<td>(-0.4)</td>
<td>(-0.4)</td>
<td>(-0.5)</td>
<td>(-0.5)</td>
</tr>
<tr>
<td>( D\log(POP) )</td>
<td>1.290</td>
<td>1.121</td>
<td>1.184</td>
<td>1.108</td>
</tr>
<tr>
<td></td>
<td>(1.5)</td>
<td>(1.3)</td>
<td>(1.4)</td>
<td>(1.3)</td>
</tr>
<tr>
<td>( D\log(POP15+D\log(POP65) )</td>
<td>0.234</td>
<td>0.273</td>
<td>0.264</td>
<td>0.306</td>
</tr>
<tr>
<td></td>
<td>(1.0)</td>
<td>(1.2)</td>
<td>(1.1)</td>
<td>(1.2)</td>
</tr>
<tr>
<td>( D(U) )</td>
<td>-0.001</td>
<td>-0.002</td>
<td>-0.002</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(-0.444)</td>
<td>(-0.5)</td>
<td>(-0.5)</td>
<td>(0.6)</td>
</tr>
<tr>
<td>Total government expenditure (−1)</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td></td>
<td>(-2.0)**</td>
<td>(-1.9)*</td>
<td>(-2.6)**</td>
<td>(-2.5)**</td>
</tr>
<tr>
<td>( BTARGET )</td>
<td>-0.007</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>(-1.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( ETARGET )</td>
<td></td>
<td>-0.008</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.1)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( MAAS )</td>
<td></td>
<td>-0.011</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.9)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( SGP )</td>
<td></td>
<td></td>
<td>-0.011</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-1.8)*</td>
<td></td>
</tr>
<tr>
<td>Adj. ( R^2 )</td>
<td>0.23</td>
<td>0.23</td>
<td>0.22</td>
<td>0.22</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.14</td>
<td>2.14</td>
<td>2.14</td>
<td>2.14</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments:  \( D\log(\text{exports in constant U.S.$}) \) in one and two lags,  \( D\log(Y) \) in one and two lags, population variables with one and two lags, and past level with two lags.  
\( t \) statistic in parentheses, using White cross-section corrected standard deviations.  
***Significant at 1 percent; **Significant at 5 percent; *Significant at 10 percent.

FISCAL RULES AND THE COMPOSITION OF GOVERNMENT EXPENDITURES

Following the adoption of fiscal rules, a utilitarian policymaker should cut expenditure in the items with the lowest social marginal utility. Examining whether fiscal rules induce suboptimal changes in the composition of government expenditure would involve estimating the marginal utility of such broad government items as public consumption, investment, and transfer payments for each country. Here, we have pursued the more modest task of assessing empirically the impact of fiscal rules on the composition of government expenditure, as captured by two variables. The first is the difference between the rate of change of transfer payments and the rate of change of government consumption; the second is the difference between the rate of change of public investment and the rate of change of government consumption.

Transfer Payments vs. Government Consumption

Table 4 documents the impact of fiscal rules on the first aspect of the composition of government expenditure: transfer payments relative to government consumption. Fiscal rules have a negative effect on transfer payments relative to government consumption. The negative coefficient of the fiscal rules dummy variable is significant.
Table 4. Fiscal rules and expenditures composition: Transfer payments vs. government consumption.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Dlog(transfer payments)-Dlog (government consumption)</th>
<th>Dlog(transfer payments)-Dlog (government wages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>920</td>
<td>883</td>
</tr>
<tr>
<td>Period</td>
<td>1963 to 2010</td>
<td>1963 to 2010</td>
</tr>
<tr>
<td>C</td>
<td>0.027</td>
<td>0.0270</td>
</tr>
<tr>
<td></td>
<td>(1.2)</td>
<td>(1.3)</td>
</tr>
<tr>
<td>DlogY</td>
<td>-1.066</td>
<td>-1.282</td>
</tr>
<tr>
<td></td>
<td>(-2.0)**</td>
<td>(-2.0)**</td>
</tr>
<tr>
<td>DlogPOP</td>
<td>-0.906</td>
<td>-2.79</td>
</tr>
<tr>
<td></td>
<td>(-0.4)</td>
<td>(-1.2)</td>
</tr>
<tr>
<td>DlogPOP15+DlogPOP65</td>
<td>0.659</td>
<td>1.011</td>
</tr>
<tr>
<td></td>
<td>(1.5)</td>
<td>(2.3)**</td>
</tr>
<tr>
<td>D(U)</td>
<td>0.002</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.3)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Log(transfer payments(-1))-log(government consumption(-1))</td>
<td>-0.123</td>
<td>-0.127</td>
</tr>
<tr>
<td></td>
<td>(-6.3)**</td>
<td>(-6.4)**</td>
</tr>
<tr>
<td>Log(transfer payments(-1))-log(government wages(-1))</td>
<td>-0.123</td>
<td>-0.127</td>
</tr>
<tr>
<td></td>
<td>(-6.3)**</td>
<td>(-6.4)**</td>
</tr>
<tr>
<td>BTARGET</td>
<td>-0.004</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(-0.5)</td>
<td>(-3.0)**</td>
</tr>
<tr>
<td>ETARGET</td>
<td>-0.014</td>
<td>-0.016</td>
</tr>
<tr>
<td></td>
<td>(-2.3)**</td>
<td>(-2.5)**</td>
</tr>
<tr>
<td>MAAS</td>
<td>-0.021</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(-1.9)</td>
<td>(-0.5)</td>
</tr>
<tr>
<td>SGP</td>
<td>-0.005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.005</td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.12</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.15</td>
<td>1.92</td>
</tr>
<tr>
<td></td>
<td>2.15</td>
<td>2.14</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: Dlog(exports in constant U.S.$) in one and two lags, Dlog(Y) in one and two lags, population variables with one and two lags, and past level with two lags. $t$ statistic in parentheses, using White cross-section corrected standard deviations. ***Significant at 1 percent; **Significant at 5 percent; *Significant at 10 percent.

At 5 percent only for the expenditure rule. For the Maastricht rule, it is significant at a 10 percent level.

As we expected, the coefficient of expenditure rule (ETARGET) is significant: Complying with such a rule leaves fewer degrees of freedom than a budget rule, in which governments could also impose higher tax rates to reach their target.

One possible explanation for the results concerning expenditure composition is that, under sticky wages, complying with the rule implies a need for cuts other than a public wage bill (other things being equal). In order to test this hypothesis, we ran the same regressions using real government wages instead of government consumption.

As Table 4 (column 5) shows, the adoption of an expenditure rule negatively affects the difference between the change in log transfer payments and that in the log public wage bill. We were interested to note that the coefficient of the expenditure
Table 5. Fiscal rules and expenditures composition: Public investment vs. government consumption.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Dlog(public investment) - Dlog(government consumption)</th>
<th>Dlog(public investment) - Dlog(government wages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>983</td>
<td>983</td>
</tr>
<tr>
<td>C</td>
<td>-0.081</td>
<td>-0.084</td>
</tr>
<tr>
<td></td>
<td>(-4.3)**</td>
<td>(-3.7)**</td>
</tr>
<tr>
<td>DlogY</td>
<td>0.698</td>
<td>0.617</td>
</tr>
<tr>
<td></td>
<td>(1.416)</td>
<td>(1.3)</td>
</tr>
<tr>
<td>DlogPOP</td>
<td>4.449</td>
<td>5.692</td>
</tr>
<tr>
<td></td>
<td>(2.57)**</td>
<td>(5.2)**</td>
</tr>
<tr>
<td>DlogPOP15+DlogPOP65</td>
<td>-0.019</td>
<td>-0.413</td>
</tr>
<tr>
<td></td>
<td>(-0.0)</td>
<td>(-0.8)</td>
</tr>
<tr>
<td>Log(public investment) - log(government consumption(-1))</td>
<td>-0.019</td>
<td>-0.022</td>
</tr>
<tr>
<td></td>
<td>(-3.1)**</td>
<td>(-2.7)**</td>
</tr>
<tr>
<td>Log(public investment) - log(government wages(-1))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTARGET</td>
<td>0.009</td>
<td>(0.5)</td>
</tr>
<tr>
<td>ETARGET</td>
<td>0.010</td>
<td>(1.0)</td>
</tr>
<tr>
<td>MAAS</td>
<td>-0.003</td>
<td>(-0.2)</td>
</tr>
<tr>
<td>SGP</td>
<td></td>
<td>-0.007</td>
</tr>
<tr>
<td>dum United Kingdom and Germany</td>
<td>0.073</td>
<td>(1.4)</td>
</tr>
<tr>
<td>dum Japan</td>
<td>-0.003</td>
<td>(-0.1)</td>
</tr>
<tr>
<td>Adj. R^2</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.02</td>
<td>2.01</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: Dlog(exports in constant U.S.$) in one and two lags, Dlog(Y) in one and two lags, population variables with one and two lags, and past level with two lags. t statistic in parentheses, using White cross-section corrected standard deviations. ***Significant at 1 percent; **Significant at 5 percent.

We cannot reject, therefore, the hypothesis that the composition effect is partially related to the explanation used in the political economy literature.

Public Investment vs. Government Consumption

We used the same diff-in-diff technique in Table 5 to explore the effect of fiscal rules on the second important aspect of the composition of government expenditure: public investment relative to government consumption. Public investment should
not be affected by budget rules in countries that have adopted a “golden rule” type (i.e., a rule in which its target excludes investment), such as in the United Kingdom. To address that, a dummy variable—with a value of 1 for United Kingdom and for Germany during the years of the golden rule and 0 otherwise—has been added to the investment regressions. We used a similar dummy variable for Japan in the regression of the expenditure rule, which has had specific provisions for investment since 1983 (Von Hagen, 2006).

Unlike the results regarding the effect of fiscal rules on the compositional shift toward less social transfers, the finding regarding public investment is not significant. Table 5 shows that fiscal rules at the national level have a positive, but not significant, effect. This result does not confirm the concern raised by several authors (e.g., Blanchard & Giavazzi, 2004) regarding the negative effect that the Maastricht Treaty-related rules may have on public investment.

We received the same unstable result as before, when replacing government consumption with a public wage bill (last column in Table 5). An interesting phenomenon to note is that Japan’s adoption of a golden rule helped the investment vs. wages ratio (significant at 5 percent).

POLICY PREFERENCES AND THE EFFECT OF FISCAL RULES

How intentional was the change in the composition of government expenditure against social transfers, as documented in the previous section? Put differently, is the change in the composition of government expenditure artificially linked to fiscal rules? One alternative explanation is that this compositional shift reflects the wish of countries to cut the excessive level of transfer payments relative to consumption, a desire translated into fiscal rules. According to this view, the compositional shift due to fiscal rules captures the effect of an omitted variable: the preferences toward a lower level of transfer payments relative to consumption. A second related question is whether OECD countries with better constitutional safeguards for social transfers tend to exhibit weaker change in the composition of government expenditure as a result of adopting fiscal rules.

Is FWTW the Driving Force?

It is more difficult to find variables that encapsulate preferences for a change in redistribution policy than for its level. Nevertheless, we employed the date of the first implementation of the FWTW policy as a variable that may reflect a desire for change. During the 1990s, governments in many OECD countries adopted this policy. After taking into account the effect of FWTW on transfer payments, the following panel regression is estimated in order to assess the partial effect of fiscal rules:

\[
Y_{c,t} = \alpha + \beta \text{ETARGET}_{c,t} + \gamma X_{c,t} + \eta \text{FWTW}_{c,t} + \delta_c + \phi_t + \varepsilon_{c,t},
\]

where the dependent variable, \(Y_{c,t}\), represents the difference between the rate of change of transfer payments and the rate of change of government consumption in country \(c\) in year \(t\). FWTW is the new variable that we added to the previous list of control variables. We will use different versions of FWTW to explore the extent to which the introduction of FWTW affects the size of \(\beta\).

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26 One additional reason for the reduction of public investment is the increase of public–private partnerships in the 1990s (OECD, 2008b). Beyond the technical problem of unavailability of consistent international data for controlling for this variable, it is not clear whether it would be an exogenous variable or related—at least to some extent—to the adoption of fiscal rules.
Table 6. Fiscal rules or From Welfare to Work?

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>$D\log$ transfers)−$D\log$ (government consumption)</th>
<th>$D\log$ transfers)−$D\log$ (government wages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>920</td>
<td>883</td>
</tr>
<tr>
<td>Period</td>
<td>1963 to 2010</td>
<td>1963 to 2010</td>
</tr>
<tr>
<td>$C$</td>
<td>0.033</td>
<td>0.032</td>
</tr>
<tr>
<td>(1.6)*</td>
<td>(1.8)*</td>
<td>(1.5)</td>
</tr>
<tr>
<td>$D\log Y$</td>
<td>−1.079</td>
<td>−1.095</td>
</tr>
<tr>
<td>(−1.8)**</td>
<td>(−1.9)**</td>
<td>(−2.1)**</td>
</tr>
<tr>
<td>$D\log POP$</td>
<td>−1.104</td>
<td>−1.092</td>
</tr>
<tr>
<td>(−0.5)</td>
<td>(−0.5)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>$D\log POP_{15+D\log POP_{65}}$</td>
<td>0.714</td>
<td>0.709</td>
</tr>
<tr>
<td>(1.7)*</td>
<td>(1.7)*</td>
<td>(0.9)</td>
</tr>
<tr>
<td>$D(U)$</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>(0.3)</td>
<td>(0.2)</td>
<td>(0.1)</td>
</tr>
<tr>
<td>$\log$ (transfer payments)−$\log$ (government consumption)</td>
<td>−0.124</td>
<td>−0.124</td>
</tr>
<tr>
<td>(−6.6)**</td>
<td>(−6.6)**</td>
<td>(−4.5)**</td>
</tr>
<tr>
<td>$\log$ (transfer payments)−$\log$ (government wages)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ETARGET$</td>
<td>−0.014</td>
<td>−0.014</td>
</tr>
<tr>
<td>(−2.3)**</td>
<td>(−2.3)**</td>
<td>(−2.1)**</td>
</tr>
<tr>
<td>$FWTW_{90}$</td>
<td>0.008</td>
<td>0.014</td>
</tr>
<tr>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>$FWTW_{97}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.15</td>
<td>2.15</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: $D\log$ (exports in constant U.S.$) in one and two lags, $D\log (Y)$ in one and two lag differences, population variables with one and two lag differences, and past level with two lag differences.

$t$ statistic in parentheses, using White cross-section corrected standard deviations.

***Significant at 1 percent; **Significant at 5 percent; * Significant at 10 percent.

One should expect that the coefficient for an expenditure rule would become insignificant as a result of the introduction of $FWTW$, if indeed the adoption of a fiscal rule merely reflects a fundamental preference shift that explains both $FWTW$ and the fiscal rule and, consequently, the decline in the growth rate of transfer payments relative to government consumption. In Table 6, we consider the possibility of a policy change during the 1990s as a consequence of the $FWTW$ policy. This combined active and passive labor market expenditure with a cut in other government transfers is analyzed in many OECD reports, and summarized by Martin (2000), Martin and Grubb (2001), and Brender, Peled, and Kasir (2002).27

27 Martin (2000) and Martin and Grubb (2001) define active expenditure as spending on items targeted at increasing participation in the labor market, and passive expenditure as spending on income transfers, namely unemployment benefits and early retirement pensions.
We considered three different dummy variables in order to account for the lack of general agreement regarding the date of implementing the FWTW policy. We first considered a general adoption of this policy by using a dummy variable that takes the value of 1 from 1990 onward, and 0 otherwise for all countries except Iceland (FWTW_90). Martin and Grubb (2001) show detailed data at the country level for all the OECD countries in our sample, except Iceland. According to the data that they present in their Table 1 and Figure 1, there was a clear jump in FWTW policies, starting in 1990. Banks et al. (2005) also report a change in policy after 1990 in their Figure 1, based on an index of the duration of unemployment benefits.

The second dummy variable, FWTW_C, assumes heterogeneity in the adoption date of the FWTW policy according to total spending on labor market programs, as Martin and Grubb (2001, Table 1) report; these authors show that in Japan, Norway, Greece, and New Zealand, the FWTW policy started even before 1990. Our third variable, FWTW_97, is based on the information that Brender, Peled, and Kasir (2002) report. They summarize FWTW policies in the OECD countries based on country surveys that both the OECD and the IMF published, from 1998 to 2001. Their study reports an acceleration of FWTW policies in many countries since 1997. Accordingly, we used a dummy variable that takes the value of 1 since 1997, and 0 otherwise, for relevant countries (15 out of the 22 countries in our sample).28

We restricted ourselves to the expenditure target, since our analysis concentrates on the expenditure side of the budget. The results that we present in Table 6 show that expenditure rules continue to have a negative and significant effect (at 5 percent) on the composition of government expenditure against social transfers, even after controlling for the FWTW policy in all its different definitions. This is particularly evident for the ratio of government transfers to wages, in which FWTW is significant at 10 percent (column 6).

**Fiscal Rules and Legal Protection**

In Table 7a, we examine whether countries that have legal institutions, which are intended to protect social rights, exhibit different patterns in terms of the composition of government expenditure after the implementation of budget rules. To study the interaction between fiscal rules and legal protection, the following equation is estimated:

\[
Y_{c,t} = \alpha + \beta ETARGET_{c,t} + \gamma X_{c,t} + \eta FWTW_{c,t} + \lambda (ETARGET_{c,t} \times LP_c) + \delta_c + \phi_t + \epsilon_{c,t}.
\]

(3)

As before, \(Y_{c,t}\) symbolizes the difference between the rate of change of transfer payments and the rate of change of government consumption in country \(c\) in year \(t\). \(LP_c\) is the degree of legal protection for social security in country \(c\). The interaction term \(ETARGET \times LP_c\) allows for variation in the effect of fiscal rules on the composition of government expenditure, according to the level of commitment to social security. \(LP_c\) is a variable that has one value for each country and therefore cannot appear in the same estimation together with country fixed effects, \(\delta_c\).

We employed two different variables to capture the degree of legal commitment to social security. The first one is based on Botero et al. (2004), who constructed an index of social security strength built on the coverage of various branches of

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28 The countries that accelerated the adoption of FWTW are Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, the Netherlands, New Zealand, Spain, the United Kingdom, and the United States.
Table 7a. Expenditure composition and legal protection for social security.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Dlog(transfers)-Dlog(government consumption)</th>
<th>Dlog(transfers)-Dlog(government wages)</th>
<th>Dlog(transfers)-Dlog(government consumption)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>920</td>
<td>883</td>
<td>847</td>
</tr>
<tr>
<td>Period</td>
<td>1963 to 2010</td>
<td>1963 to 2010</td>
<td>1970 to 2010</td>
</tr>
<tr>
<td>C</td>
<td>0.038</td>
<td>0.034</td>
<td>0.121</td>
</tr>
<tr>
<td></td>
<td>(1.9)*</td>
<td>(1.7)*</td>
<td>(2.8)**</td>
</tr>
<tr>
<td>DlogY</td>
<td>-1.226</td>
<td>-1.104</td>
<td>-1.380</td>
</tr>
<tr>
<td></td>
<td>(-1.9)*</td>
<td>(-1.8)*</td>
<td>(-2.0)*</td>
</tr>
<tr>
<td>DlogPOP</td>
<td>-1.444</td>
<td>-1.300</td>
<td>-2.621</td>
</tr>
<tr>
<td></td>
<td>(-0.5)</td>
<td>(-0.5)</td>
<td>(-1.1)</td>
</tr>
<tr>
<td>DlogPOP15+DlogPOP65</td>
<td>0.755</td>
<td>0.746</td>
<td>0.992</td>
</tr>
<tr>
<td></td>
<td>(1.7)*</td>
<td>(1.7)*</td>
<td>(2.3)**</td>
</tr>
<tr>
<td>D(U)</td>
<td>0.001</td>
<td>0.001</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(0.1)</td>
<td>(0.2)</td>
<td>(-0.3)</td>
</tr>
<tr>
<td>Log(transfer payments)-log(government consumption)</td>
<td>-0.122</td>
<td>-0.127</td>
<td>-0.033</td>
</tr>
<tr>
<td></td>
<td>(-6.0)**</td>
<td>(-6.7)**</td>
<td>(-2.8)**</td>
</tr>
<tr>
<td>ETARGET</td>
<td>-0.041</td>
<td>-0.019</td>
<td>-0.039</td>
</tr>
<tr>
<td></td>
<td>(-3.0)**</td>
<td>(-2.6)**</td>
<td>(-2.4)**</td>
</tr>
<tr>
<td>FWTTW90</td>
<td>-0.005</td>
<td>-0.008</td>
<td>-0.157</td>
</tr>
<tr>
<td></td>
<td>(-0.1)</td>
<td>(-0.1)</td>
<td>(-1.9)*</td>
</tr>
<tr>
<td>SSLAWS × ETARGET</td>
<td>0.036</td>
<td>0.031</td>
<td>0.0195</td>
</tr>
<tr>
<td></td>
<td>(2.5)**</td>
<td>(1.8)*</td>
<td>(1.8)*</td>
</tr>
<tr>
<td>SSCONST × ETARGET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DlogT-DlogY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.11</td>
<td>0.12</td>
<td>0.23</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.16</td>
<td>2.15</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: Dlog(exports in constant U.S.$) in one and two lags, Dlog(Y) in one and two lags; population variables with one and two lags, and past level with two lags. In the regression presented at the last column, we used as an instrument Dlog(T)-Dlog(Y) with one and two lags. $t$ statistic in parentheses, using White cross-section corrected standard deviations.

***Significant at 1 percent; **Significant at 5 percent; *Significant at 10 percent.

Social security laws such as pensions, disabilities, and unemployment benefits. We used a dummy variable (SSLAWSS) that takes the value of 1 for countries with an index higher than the median (as reported for all the countries in the sample), and 0 otherwise. Using this threshold, the list of countries with a strong social security system includes all those in our sample except Belgium, the Netherlands, the United States, and Japan.

The second variable, SSCONST, represents the extent of legal protection for social rights; we borrowed it from Ben Bassat and Dahan (2008), who created an index of social security strength based on the constitutional commitment for seven features of social security. Their index, which ranges between 0 and 3, is characterized by a higher variance among developed countries than Botero et al. (2004) show. Using the same classification as before (i.e., below and above the median), the countries...

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with strong constitutional commitment for social security are Finland, Switzerland, Portugal, Italy, and Spain.

The use of a dummy variable has the advantage of allowing us to characterize the overall policy reaction of countries with strong social security. The overall policy response in such countries is represented by the sum of the coefficients of the fiscal rule and an interaction term of legal protection dummy and expenditure rule dummy.

The coefficient of expenditure rule is negative and significant in all the specifications that appear in Table 7a. The sum of $SSLAWS \times ETARGET$ and $ETARGET$ coefficients is close to zero, implying that fiscal rules do lead to compositional shift against transfer payments, but only in countries with a weak legal commitment to social security. The regression of the difference between the rate of change of transfer payments and government wages corroborates this result. A similar picture emerges when we use the constitutional coverage variable: the introduction of fiscal rules in countries with more comprehensive coverage of social security has not significantly affected the ratio of transfers to government consumption. Finally, the inclusion of the GDP as a control variable accounts for changes in tax revenues as long as statutory tax rates remain invariant. In reality, governments frequently change statutory tax rates, which may affect revenues and, therefore, government expenditure. In order to control for government statutory tax changes, we collected data for tax revenues in real terms ($T$) from the OECD dataset. We ran the central regression of this table after substituting $D\log(Y)$ with the change in statutory taxes, represented by $[D\log(T)-D\log(Y)]$. The results remained robust at 5 percent (last column).

Given the lack of consensus on the definition of budget rules, we checked the robustness of the results for the IMF definition. Both Kumar et al. (2009) and Budina et al. (2012) have published a new IMF dataset for fiscal rules. We adopted the newly updated IMF dataset on fiscal rules as an alternative to our working definitions of expenditure rules (based on Guichard et al., 2007). The observations in the IMF fiscal rules dataset differ from ours in two aspects: (i) the timing of the implementation of the rules and (ii) the interpretation of the rules—a number of expenditure rules are included in one definition and excluded from the other. The countries with substantial differences in implementation dates are Canada and Japan. The United States, New Zealand, and Iceland have not adopted an expenditure rule according to our definition, but do have such a rule according to the IMF database. The opposite is true for Italy, which has not implemented an expenditure rule according to the IMF definition.

In Table 7b, we use our definition of expenditure rules for all countries, except a single country (each time, a different one); for this, we adopt the IMF definition instead. For example, in the second column, we use the IMF definition of expenditure rules for Canada together with our definition for all the other countries. In general, our central result is robust for these changes according to the definition of expenditure rules. When using the IMF definition for the United States and our definition for all other countries, the coefficient of $ETARGET$ is substantially lower, but still significant. This result raises doubts as to whether the Budget Enforcement Act for the United States should qualify as an expenditure rule, as Auerbach (2008) discusses.

In Table 7c, we use the IMF definition for all countries, and each time replace the fiscal rule of a particular country with our definition. Overall, the results remain robust, though with lower $t$ statistics. Using our definition of fiscal rules for the United States, and the IMF definition for all other countries, results in a coefficient for $ETARGET$ that is very similar to our original central result. Note also that the sum of $SSLAWS \times ETARGET$ and $ETARGET$ coefficients is close to zero, implying that
### Table 7b. Expenditure composition and legal protection for social security-robustness test.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>All countries</th>
<th>Except Canada(^a)</th>
<th>Except Iceland(^a)</th>
<th>Except Italy(^a)</th>
<th>Except Japan(^a)</th>
<th>Except New Zealand(^a)</th>
<th>Except United States(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>920</td>
<td>1963 to 2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D\log(\text{transfers}) - D\log(\text{government consumption}))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C)</td>
<td>0.038</td>
<td>0.038</td>
<td>0.038</td>
<td>0.038</td>
<td>0.032</td>
<td>0.038</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>(1.9)(^*)</td>
<td>(1.9)(^*)</td>
<td>(1.8)(^*)</td>
<td>(1.9)(^*)</td>
<td>(−1.6)</td>
<td>(1.9)(^*)</td>
<td>(1.7)(^*)</td>
</tr>
<tr>
<td>(D\log Y)</td>
<td>−1.226</td>
<td>−1.220</td>
<td>−1.270</td>
<td>−1.218</td>
<td>−1.030</td>
<td>−1.215</td>
<td>−1.127</td>
</tr>
<tr>
<td></td>
<td>(−2.0)(^*)</td>
<td>(−2.0)(^*)</td>
<td>(−2.1)(^*)</td>
<td>(−2.0)(^*)</td>
<td>(−1.7)(^*)</td>
<td>(−2.0)(^*)</td>
<td>(−1.8)(^*)</td>
</tr>
<tr>
<td>(D\log POP)</td>
<td>−1.444</td>
<td>−1.437</td>
<td>−1.419</td>
<td>−1.450</td>
<td>−1.472</td>
<td>−1.445</td>
<td>−1.061</td>
</tr>
<tr>
<td></td>
<td>(−0.6)</td>
<td>(−0.6)</td>
<td>(−0.6)</td>
<td>(−0.6)</td>
<td>(−0.6)</td>
<td>(−0.6)</td>
<td>(−0.5)</td>
</tr>
<tr>
<td>(D\log POP_{15})</td>
<td>0.755</td>
<td>0.750</td>
<td>0.738</td>
<td>0.752</td>
<td>0.807</td>
<td>0.760</td>
<td>0.706</td>
</tr>
<tr>
<td>(D\log POP_{65})</td>
<td>(1.7)(^*)</td>
<td>(1.7)(^*)</td>
<td>(1.7)(^*)</td>
<td>(1.7)(^*)</td>
<td>(1.8)(^*)</td>
<td>(1.7)(^*)</td>
<td>(1.6)</td>
</tr>
<tr>
<td>(D(U))</td>
<td>0.001</td>
<td>0.001</td>
<td>0.000</td>
<td>0.001</td>
<td>0.002</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.1)</td>
<td>(0.1)</td>
<td>(0.0)</td>
<td>(0.1)</td>
<td>(0.3)</td>
<td>(0.1)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Log(transfer payments) - Log(government consumption)</td>
<td>−0.122</td>
<td>−0.121</td>
<td>−0.122</td>
<td>−0.122</td>
<td>−0.134</td>
<td>−0.121</td>
<td>−0.120</td>
</tr>
<tr>
<td></td>
<td>(−6.6)(^***)</td>
<td>(−6.6)(^***)</td>
<td>(−6.6)(^***)</td>
<td>(−6.6)(^***)</td>
<td>(−7.3)(^***)</td>
<td>(−6.5)(^***)</td>
<td>(−6.5)(^***)</td>
</tr>
<tr>
<td>(ETARGET)</td>
<td>−0.041</td>
<td>−0.040</td>
<td>−0.039</td>
<td>−0.040</td>
<td>−0.041</td>
<td>−0.041</td>
<td>−0.019</td>
</tr>
<tr>
<td></td>
<td>(−3.0)(^***)</td>
<td>(−3.0)(^***)</td>
<td>(−2.9)(^***)</td>
<td>(−3.0)(^***)</td>
<td>(−4.0)(^***)</td>
<td>(−3.0)(^***)</td>
<td>(−2.1)(^**)</td>
</tr>
<tr>
<td>(SSLAWS \times ETARGET)</td>
<td>0.036</td>
<td>0.036</td>
<td>0.046</td>
<td>0.038</td>
<td>0.037</td>
<td>0.034</td>
<td>0.015</td>
</tr>
<tr>
<td>(FWTW_{90})</td>
<td>(2.6)(^***)</td>
<td>(2.6)(^***)</td>
<td>(3.6)(^***)</td>
<td>(2.7)(^***)</td>
<td>(3.5)(^***)</td>
<td>(2.5)(^**)</td>
<td>(1.6)</td>
</tr>
<tr>
<td></td>
<td>(−0.1)</td>
<td>(−0.1)</td>
<td>(−0.1)</td>
<td>(−0.1)</td>
<td>(−0.2)</td>
<td>(−0.1)</td>
<td>(−0.1)</td>
</tr>
<tr>
<td>Adj. (R^2)</td>
<td>0.11</td>
<td>0.11</td>
<td>0.1</td>
<td>0.11</td>
<td>0.13</td>
<td>0.11</td>
<td>0.12</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.16</td>
<td>2.17</td>
<td>2.16</td>
<td>2.17</td>
<td>2.15</td>
<td>2.17</td>
<td>2.16</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: \(D\log(\text{exports in constant U.S.$})\) in one and two lags, \(D\log(Y)\) in one and two lags, population variables with one and two lags, and past level with two lags.

\(^{***}\)Significant at 1 percent; \(^{**}\)Significant at 5 percent; \(^{*}\)Significant at 10 percent.

the result of an unchanged composition for countries with strong legal commitment to a social safety net remains significant.

The central result of the paper is robust to additionally controlling for political structure characteristics (not reported). For this purpose, we used three dummy variables: \(\text{PARLIAMENT}\), which takes the value of 1 for countries and periods with a parliamentary system and 0 otherwise; \(\text{PR}\), which takes the value of 1 for countries and periods with proportional representation and 0 otherwise; and \(\text{RIGHT\_WING}\), which takes the value of 1 for countries and periods in which the majority of the government is of right-wing orientation. The first two variables have a low variation across years, while the third has a higher variation. We ran our main regression including each of these variables, and a fourth regression that includes all four variables. In all four regressions, the coefficients of the main result of the paper are significant at 1 percent. At the same time, the coefficients of political variables are not significant; however, this last result should be read cautiously, since the variation of the political variables is low and competes with country fixed effects.
Table 7c. Expenditure composition and legal protection for social security-robustness test (using IMF data on fiscal rules).

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>All countries</th>
<th>Except Canada*</th>
<th>Except Iceland*</th>
<th>Except Italy 920</th>
<th>Except Japan*</th>
<th>Except New Zealand*</th>
<th>Except United States*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>1963 to 2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period</td>
<td>920</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$C$</td>
<td>0.029</td>
<td>0.029</td>
<td>0.029</td>
<td>0.029</td>
<td>0.032</td>
<td>0.029</td>
<td>0.030</td>
</tr>
<tr>
<td></td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(1.7)$^*$</td>
<td>(1.5)</td>
<td>(1.6)</td>
</tr>
<tr>
<td>$D\log(Y)$</td>
<td>-1.031</td>
<td>-1.035</td>
<td>-0.993</td>
<td>-1.102</td>
<td>-1.121</td>
<td>-1.031</td>
<td>-1.029</td>
</tr>
<tr>
<td></td>
<td>(-1.8)$^*$</td>
<td>(-1.8)$^*$</td>
<td>(-1.7)$^*$</td>
<td>(-1.7)$^*$</td>
<td>(-1.8)**</td>
<td>(-1.8)$^*$</td>
<td>(-1.8)$^*$</td>
</tr>
<tr>
<td>$D\log(POP)$</td>
<td>-0.851</td>
<td>-0.829</td>
<td>-0.870</td>
<td>-0.846</td>
<td>-0.900</td>
<td>-0.854</td>
<td>-1.315</td>
</tr>
<tr>
<td></td>
<td>(-0.4)</td>
<td>(-0.4)</td>
<td>(-0.4)</td>
<td>(-0.4)</td>
<td>(-0.4)</td>
<td>(-0.4)</td>
<td>(-0.6)</td>
</tr>
<tr>
<td>$D\log(Y_{15}+P)$</td>
<td>0.679</td>
<td>0.670</td>
<td>0.706</td>
<td>0.678</td>
<td>0.675</td>
<td>0.677</td>
<td>0.773</td>
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<tr>
<td></td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(1.6)</td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(1.5)</td>
<td>(1.7)$^*$</td>
</tr>
<tr>
<td>$D(U)$</td>
<td>0.002</td>
<td>0.002</td>
<td>0.003</td>
<td>0.003</td>
<td>0.002</td>
<td>0.002</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
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<td>(0.4)</td>
<td>(0.4)</td>
<td>(0.4)</td>
<td>(0.3)</td>
<td>(0.4)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Log(transfer payments) $\log(N_{government})$</td>
<td>-0.122</td>
<td>-0.122</td>
<td>-0.124</td>
<td>-0.122</td>
<td>-0.117</td>
<td>-0.121</td>
<td>-0.131</td>
</tr>
<tr>
<td></td>
<td>(-6.0)$^{***}$</td>
<td>(-5.9)$^{***}$</td>
<td>(-6.3)$^{***}$</td>
<td>(-6.1)$^{***}$</td>
<td>(-5.8)$^{***}$</td>
<td>(-5.9)$^{***}$</td>
<td>(-6.4)$^{***}$</td>
</tr>
<tr>
<td>$ETARGET$</td>
<td>-0.011</td>
<td>-0.011</td>
<td>-0.013</td>
<td>-0.011</td>
<td>-0.018</td>
<td>-0.011</td>
<td>-0.040</td>
</tr>
<tr>
<td></td>
<td>(-2.0)$^{***}$</td>
<td>(-2.0)$^{*}$</td>
<td>(-2.4)$^{***}$</td>
<td>(-2.0)$^{**}$</td>
<td>(-2.0)$^{**}$</td>
<td>(-1.9)$^{*}$</td>
<td>(-3.9)$^{***}$</td>
</tr>
<tr>
<td>$SSLAWS \times ETARGET$</td>
<td>0.019</td>
<td>0.019</td>
<td>0.007</td>
<td>0.017</td>
<td>0.026</td>
<td>0.021</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>(1.7)$^{*}$</td>
<td>(1.7)$^{*}$</td>
<td>(0.9)</td>
<td>(1.7)$^{*}$</td>
<td>(2.1)$^{**}$</td>
<td>(1.9)$^{*}$</td>
<td>(4.3)$^{***}$</td>
</tr>
<tr>
<td>$FWTW_{90}$</td>
<td>-0.011</td>
<td>-0.011</td>
<td>-0.011</td>
<td>-0.012</td>
<td>-0.008</td>
<td>-0.011</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
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<td>(-0.2)</td>
<td>(-0.2)</td>
<td>(-0.1)</td>
<td>(-0.2)</td>
<td>(-0.2)</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.12</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Durbin–Watson</td>
<td>2.15</td>
<td>2.15</td>
<td>2.16</td>
<td>2.16</td>
<td>2.16</td>
<td>2.15</td>
<td>2.15</td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: $D\log(exports in constant U.S.)$ in one and two lag differences, $D\log(Y)$ in one and two lags, population variables with one and two lags, and past level with two lags. $t$ statistic in parentheses, using White cross-section corrected standard deviations.

$^*$Fiscal rules are defined according to Budina et al. (2012), except for the country that is defined according to Guichard et al. (2007).

***Significant at 1 percent; **Significant at 5 percent; *Significant at 10 percent.

SUMMARY AND CONCLUSIONS

Fiscal rules were a useful tool for reducing general government budget deficits in advanced countries. Our empirical estimations show that both balanced-budget and expenditure rules succeeded at the national level, respectively, in reducing the level of budget deficits as a percent of GDP and the rate of increase in total government expenditure.

In this paper, we found a potentially relatively large compositional effect of implementing fiscal rules: The ratio of social transfers to government consumption (and to government wages) tends to decline more rapidly in countries implementing fiscal rules. We have shown that the negative effect of fiscal rules on this ratio is beyond $FWTW$ Programs, which many OECD countries adopted during the 1990s.
We found the interesting phenomenon that the change in the composition of government expenditure against social transfers vanishes for countries with a strong legal commitment for a social safety net, as measured by the degree of constitutional commitment to social rights and social security coverage in laws. This finding shows that countries can design a policy to avoid an unintended reduction in social transfers relative to government consumption.

The compositional shift due to fiscal rules that we found here should be judged in light of the negative (strong) correlation between the share of social transfers and income inequality measures. Most OECD countries witnessed a rising income inequality in the same period during which fiscal rules became widespread (OECD, 2008b).

The impact of fiscal rules on the composition of government expenditure may reflect a divergence from desired spending priorities. Our paper implies that a more prudent fiscal policy as a result of fiscal rules may not be accompanied by a cut in those government expenditure items with the lowest social utility.

The recent protest on the streets in many developed countries demonstrates an alarming cycle in which certain groups of voters are less tolerant of a further widening of economic gaps or what they perceive as skewed public policy in favor of affluent groups. To the extent that a lower level of assistance is associated with higher income inequality and poverty, a lower ratio of social transfers to government consumption increases voters dissatisfaction with fiscal policy in general, and fiscal rules in particular. Therefore, the change in the composition of government expenditure that we found here may introduce a threat to the sustainability of fiscal rules and, more importantly, to the fiscal discipline of government and macroeconomic stability.

Many countries are reforming or considering a revision of fiscal rules. The findings of our paper suggest that policymakers should take into account the impact of fiscal rules on spending composition in designing the new generation of such rules. In fact, the recent intergovernmental treaty that the members of the European Council signed in March 2012 provides one small example of ways in which policymakers can incorporate a safeguard by excluding unemployment benefits from the specified numerical fiscal target (the annual growth of primary expenditure).

Our suggestion to take into account the composition of government expenditure for designing fiscal rules introduces greater complexity to the fiscal rules framework. Such complexity raises the fear of noncompliance that may result from a lack of clarity with regard to the rules. However, as we have shown, some countries are using their constitutions or laws effectively to address the risk of distracting from spending priorities without breaching fiscal rules.

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ACKNOWLEDGMENTS

We are thankful to the Editor Maureen Pirog and to three anonymous referees for their very helpful remarks. Thanks to Stephanie Guichard and to Eckard Wurzel, from the OECD Economics Department, for sharing with us their data on fiscal rules. We thank also Adi Brender, Davide Furceri, and participants at seminars at the Bank of Israel, OECD Economics Department, and the 2009 Conference of the International Institute of Public Finance (IIPF) for helpful comments, and Polina Dovman, Gila Weinberger, Oren Tirosh, and Kfir Batz for excellent research assistance.
REFERENCES


APPENDIX—ROBUSTNESS TESTS

A Hausman Test for the Instrumental Variable

Ilzetzki and Vegh (2008) discuss the importance of using an instrumental variable when explaining government expenditure by GDP, since causality may also go from the latter to the former. They propose the income of trading partners as an instrumental variable for the GDP. In our case, however, using this instrument substantially reduces the number of available observations. We use exports, therefore, for which information is available for the whole sample. After checking that $\text{Dlog(exports)}$ explains $\text{Dlog(GDP)}$ and does not explain $\text{Dlog(government expenditure)}$, we perform the Hausman test according to the methodology which Davidson and MacKinnon (1993) developed. The test is applied to the regressions that report the main result of the paper, as Table 7a shows. Using this methodology, we first run an ordinary least squares (OLS) regression of exports on all exogenous variables...
## Table A2. Robustness to other methods of clustered standard errors.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>( D\log(\text{transfers}) - D\log(\text{government consumption}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>920</td>
</tr>
<tr>
<td>Period</td>
<td>1963 to 2010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>( C )</th>
<th>( D\log Y )</th>
<th>( D\log\text{POP} )</th>
<th>( D\log\text{POP15} + D\log\text{POP65} )</th>
<th>( \text{Log(transfer payments)} - \log(\text{government consumption}) )</th>
<th>( ETARGET )</th>
<th>( \text{FWTW.90} )</th>
<th>( \text{SSLAWS} \times ETARGET )</th>
<th>Adj. ( R^2 )</th>
<th>Durbin–Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( 0.038 )</td>
<td>( -1.226 )</td>
<td>( -1.444 )</td>
<td>( 0.755 )</td>
<td>( -0.122 )</td>
<td>( -0.041 )</td>
<td>( -0.005 )</td>
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</tr>
<tr>
<td></td>
<td>(1.3)</td>
<td>(−2.8)**</td>
<td>(−1.1)</td>
<td>(2.8)**</td>
<td>(−4.8)**</td>
<td>(−3.5)**</td>
<td>(−0.1)</td>
<td>(2.9)**</td>
<td>(2.16)</td>
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</tr>
<tr>
<td></td>
<td>( 0.038 )</td>
<td>( -1.226 )</td>
<td>( -1.444 )</td>
<td>( 0.755 )</td>
<td>( -0.122 )</td>
<td>( -0.041 )</td>
<td>( -0.005 )</td>
<td>( 0.036 )</td>
<td>( 0.11 )</td>
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<tr>
<td></td>
<td>(1.4)</td>
<td>(−2.9)**</td>
<td>(−1.1)</td>
<td>(3.1)**</td>
<td>(−5.1)**</td>
<td>(−3.7)**</td>
<td>(−0.1)</td>
<td>(3.1)**</td>
<td>(2.16)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 0.038 )</td>
<td>( -1.226 )</td>
<td>( -1.444 )</td>
<td>( 0.755 )</td>
<td>( -0.122 )</td>
<td>( -0.041 )</td>
<td>( -0.005 )</td>
<td>( 0.036 )</td>
<td>( 0.11 )</td>
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</tr>
<tr>
<td></td>
<td>(2.8)**</td>
<td>(−3.3)**</td>
<td>(−1.2)</td>
<td>(3.1)**</td>
<td>(−5.6)**</td>
<td>(−3.4)**</td>
<td>(−0.2)</td>
<td>(2.6)**</td>
<td>(2.16)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: All regressions include country and time fixed effects using the general method of moments (GMM) method. Instruments: \( D\log(\text{exports in constant U.S.$}) \) in one and two lags, \( D\log(Y) \) in one and two lags, population variables with one and two lags, and past level with two lags. \( t \) statistic in parentheses, using White cross-section corrected standard deviations.

***Significant at 1 percent; **Significant at 5 percent.

and compute the residuals. Then we run OLS regressions, using the specifications of Table 7a, while adding these residuals as an additional explanatory variable. As expected, the coefficient of the residuals is not significant at 5 percent, which allows our interpretation that exports can be used as an instrumental variable.

### Clustered Standard Deviations

In Appendix Table A2, we test the robustness of our main result (first regression in Table 7a) to alternative methods for computing clustered standard errors. We start by checking an alternative method (cross-section Seemingly Unrelated Regression) for clustered errors, assuming that the main characterization is that observations are contemporaneously correlated (i.e., cross-section correlation). This test is reported in column 1, which shows that our main result is robust to the alternative cross-section method. Since our sample is composed of 50 time series observations, we additionally check the robustness of results to three methods that allow for time series correlation (White period, period seemingly unrelated regression, and period weights). These tests are reported in columns 2, 3, and 4, respectively. We found that our main result is robust to the computation of errors according to the three methods.