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On the Determinants of Fiscal Adjustment

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ABSTRACT This paper examines the role that fragmentation of the government's fiscal policymaking process plays in determining the size (or performance) of deficit reductions during periods of fiscal adjustment. The results show that the fiscal target is effective for reducing public deficits during periods of fiscal adjustment in European countries. However, in non-European countries the political leadership of single-party majority governments is the key determinant of deficit reduction.

KEY WORDS: Politics, budgetary institutions, fiscal adjustments, test for selectivity bias in panel data, Hausman–Taylor estimation
JEL CLASSIFICATIONS: E61, E63, H61, H62

1. Introduction

Many OECD (Organization for Economic Co-operation and Development) countries have run government deficits since the mid-1970s. Policymakers experiencing fiscal problems have had to reduce their budget deficits to consolidate government budgets. As a result, in some cases, the public financial position has recovered.

However, once governments implement fiscal adjustments, the size of deficit reductions during periods of fiscal adjustment is not always sufficiently large. For example, the Italian government has implemented fiscal adjustments since 1989. However, Alesina and Perotti (1996) show that the size of the adjustment is much smaller than in other countries analyzed in their study, with the debt to GNP ratio reaching 125% in 1994. Moreover, European countries meeting

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European Monetary Union entry requirements have had different levels of success in improving their government budget balances.[1] The foregoing indicates that even if fiscal authorities attempt to reduce deficits during the fiscal adjustment period, the size of the reductions may sometimes be small.

Differences in the 'size (or performance)' of deficit reductions during periods of fiscal adjustment may be due to the differing strength and durability of the government and the budget process. In support of this, Ihori and Itaya (2001) examine the dynamic properties of fiscal reconstruction by a differential game among interest groups. They show that the steady state level of government debt under the Pareto efficient (cooperative) outcome chosen by a benevolent government is smallest among all strategies. In other words, Ihori and Itaya (2001) show that debt accumulation under a benevolent government, which may correspond to a government with strong leadership, is smallest during periods of fiscal adjustment.[2] These results suggest that a government with a unified governance structure can reduce budget deficits successfully during periods of fiscal adjustment; whereas a government without numerical targets for the budget balance and procedural rules to be used in the budget negotiation process, or a coalition government, is unlikely to significantly reduce budget deficits.

However, to the best of our knowledge, there has been no rigorous empirical study of the influence of government decision making on the size of deficit reductions during periods of fiscal adjustment. Empirical research on the relationship between fiscal adjustment and the government decision-making process has focused on the credibility of fiscal adjustment, that is, on how sustainable the initial change in the deficit is believed to be among nations. Relevant studies include Tavares (2004), Lavigne (2006), and Mierau *et al*. (2007). However, these studies did not explicitly deal with the 'size (or performance)' of the deficit or the spending cut when the government continues efforts to consolidate its budget.

On the other hand, some case studies, such as Alesina and Perotti (1996) and Alesina *et al*. (1998) considered the relationship between the size of deficit reductions and political institutions or situations, while undertaking case studies on the fiscal adjustment of each country. However, case studies alone cannot identify which government factors exert a great influence on the size of the deficit reduction.

The objective of this paper is to provide empirical evidence regarding the effect of political and budgetary institutional factors on the performance of deficit reductions during fiscal adjustment periods in OECD countries. On the theoretical aspects, the arguments proposed by Ihori and Itaya (2001) imply that the 'fragmented government,' which may be a coalition or a government without 'good' institutions, tends to be influenced by interest groups and cannot reduce the government's budget deficits. Hence, 'fragmentation' refers to the influence of two factors: political fragmentation is the number of governing parties and their ideologies, and procedural fragmentation refers to numerical targets for government

[1]See von Hagen *et al*. (2001) for an analysis of the adjustment experience of individual European Union (EU) member states during the Maastricht convergence process.

[2]The case of local governments is investigated theoretically in Ihori and Itaya (2004).

expenditure and procedural rules in the budget negotiation process.[3] Our analysis focuses attention on the effects of these two factors and we investigate how they influence deficit reductions during periods of fiscal adjustment.

Incidentally, most of the empirical literature as to fiscal adjustments only deals with political factors and neglects the effect of budgetary institutions. The reason why previous work does not consider the effect of institutions could be that countries with good institutions probably need smaller fiscal adjustments because they may not run large deficits in the first instance. Lavigne (2006) has statistically proven this point. However, on a practical level, countries that have procedural rules for negotiation and numerical targets for government expenditures sometimes suffer from large government deficits that they have to reduce. For example, European countries such as Denmark and Ireland set limits based on numerical targets. However, the public financial condition of Denmark deteriorated rapidly starting in the late 1970s, so that Denmark reached its highest deficit in 1982 and then had to reduce its government budget deficits. In Ireland, although the government has employed specific quantitative targets since the beginning of the 1980s, the fiscal balance continued to deteriorate from the early to mid-1980s, and it needed to launch an adjustment program in 1987 that was of different character to the earlier failed program.[4] Furthermore, in the UK and Germany, the Prime Minister or Finance Minister strongly influences his or her government's budget negotiation processes. However, it is difficult for German governments to meet the targets established by the Maastricht Treaty because fiscal authorities in Germany have had some difficulty in reducing their budget deficits. Among non-European countries, such as Canada and the US, there are limits or targets imposed on ministerial spending before ministers submit their requirements. However, the US suffered from large budget deficits from the mid-1980s to the mid-1990s and the government was obliged to consolidate its budget. During the sample period in this paper, we confirmed that fiscal conditions may sometimes plague countries with good institutions and strong fiscal authorities and this situation requires a reduction in the budget deficit. Hence, we should also consider the effects of institutional arrangements.

The paper is structured as follows. In Section 2, we present an empirical specification and the variables used in the estimation. Section 3 details the empirical strategies and the results. Section 4 concludes.

2. Empirical Framework

The following set of variables determines budget deficits:

$$\Delta DEF = f(X, POL, Z) \tag{1}$$

where ΔDEF is the change in the budget deficit and X, POL, and Z are vectors of institutional variables, political variables, and economic variables, respectively.

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[3]See Perotti (1998) and Perotti and Kontopoulos (2002) for detailed discussion of fragmentation in the fiscal policy decision-making process.

[4]For a case study of these countries, see Alesina and Perotti (1996). On the fiscal targets in Ireland, see De Haan *et al*. (1999).

DEF is measured as a difference in order to specify the outcomes of the efforts for deficit reduction during periods of fiscal adjustment. *X* is a variable that indicates 'procedural fragmentation,' while *POL* is related to 'political fragmentation.' In other words, both *X* and *POL* indicate the strength of fiscal authorities.

From equation (1), the basic regression specification is as follows:

$$\begin{aligned}\Delta PB_{it} = {} & \alpha_1 D_{EU} \times X_i + \alpha_2 D_{EU92} \times X_i + \alpha_3 D_{NEU} \times X_i \\ & + \alpha_4 D_{EU} \times PC1_{it-1} + \alpha_5 D_{EU92} \times PC1_{it-1} + \alpha_6 D_{NEU} \times PC1_{it-1} \\ & + \alpha_7 D_{EU} \times Left_{it-1} + \alpha_8 D_{EU92} \times Left_{it-1} + \alpha_9 D_{NEU} \times Left_{it-1} \\ & + \alpha_{10} D_{EU} \times Right_{it-1} + \alpha_{11} D_{EU92} \times Right_{it-1} \\ & + \alpha_{12} D_{NEU} \times Right_{it-1} + \beta_1 \Delta UNE_{it} + \beta_2 \Delta CPI_{it} \\ & + \beta_3 \Delta GDP_{it} + d_t + \gamma_i^{EU} + \varepsilon_{it} \end{aligned} \tag{2}$$

where *i* and *t* are country and year indices, respectively; d_t is a set of year dummies; γ_i^{EU} is a set of the country dummies indicating the European countries; and ε_{it} is an error term.

For the change in the budget deficit, we use the difference in the cyclically adjusted primary government balance as a ratio of potential GDP, ΔPB_{it}, instead of using budget deficits directly.[5] The cyclically adjusted primary government balance is calculated by subtracting government expenditures from government revenues. Thus, if the government financial conditions improve, the value of ΔPB_{it} becomes positive. We use primary government balance by excluding interest payments so that the interest rate is not under the direct control of the government. Furthermore, in estimation the cyclically adjusted primary government balance is scaled by potential GDP.

To reflect country-specific factors in the estimated coefficients, we employ three regional dummies, D_{EU}, D_{EU92}, and D_{NEU}. D_{EU} is a dummy variable that takes a value 1 for European countries from 1980 to 1991 and 0 otherwise; D_{EU92} takes a value 1 for European countries after 1992 and 0 otherwise; and D_{NEU} takes a value 1 for countries outside Europe and 0 otherwise. We multiply these by the institutional and political variables. The reason for dividing the sample period for EU countries is that most European countries have striven to reduce government deficits to meet targets established by the Maastricht Treaty concluded in 1992. It is therefore necessary to account for foreign pressure in bringing about compliance.[6]

[5]Both our cyclically adjusted primary government balance and potential GDP are taken from the OECD Economic Outlook database. We use cyclically adjusted data because we can identify the outcome of efforts for deficit reduction during periods of fiscal adjustment, while non-cyclically adjusted data contain the improvement of government budget thanks to the economic recovery as well as the efforts for deficit reductions. Then, to make these compatible with the data source of a numerator, we employ the potential GDP as a denominator. Moreover, if we estimate equation (1) by using non-cyclically adjusted government balance to actual GDP as a dependent variable, the results are not favorable in comparison to the ones that we report in the paper. Therefore, in terms of the estimation results, the use of the cyclically adjusted primary government and potential GDP are also recommended.

[6]Norway has not joined the EU. Therefore, we re-estimate equation (2) by omitting Norway from the D_{EU92} group but the estimation results are largely unchanged.

We employ institutional index (X_i) based on Perotti and Kontopoulos (2002). To maintain compatibility with theoretical argument in Ihori and Itaya (2001), we modify the indices of Perotti and Kontopoulos (2002) according to the strength of each country's fiscal discipline. First, TARGET 1 takes a value of 1 if there are limits or targets on aggregate spending or on each minister's spending before ministers submit their budget requests and 0 otherwise. Second, TARGET 2 is assigned a score of 2 for each country if the limits or targets are set by the Finance Minister, the Prime Minister, or both, and 1 if they are set by a committee or the entire cabinet, and 0 otherwise.[7] In other words, if some governments have a value of 1 in TARGET 1 or 2 in TARGET 2, they have strong leadership in the government's decision-making process, corresponding to the benevolent government in Ihori & Itaya (2001). The coefficients of X_i are expected to be positive because the stronger is the fiscal discipline, the smaller will be the budget deficits.

The sample period of the indices used in Perotti and Kontopoulos (2002) ends in 1995. In the 1990s, some countries reformed their institutions. In particular, in 1995, Sweden decided to adopt expenditure ceilings, and Australia set limits for annual expenditures based on forward estimates after the Charter of Budget Honesty Act was established in 1998. Because these reforms are related to the issues considered in our study, we exclude these two countries after the first year of institutional reforms when selecting the periods of fiscal adjustment in Section 3. For other reforms, changes to the process are not related to the aspects that we consider here and the trial was temporary.[8] In accordance with these features, we use the indices from Perotti and Kontopoulos (2002) and present these in Table 1.

PC_{it-1} is a dummy variable that equals 1 for a single-party majority government and 0 otherwise, and both $Left_{it-1}$ and $Right_{it-1}$ are variables that indicate the ideology of the government party. We now explain the political variables, PC_{it-1}, $Left_{it-1}$, and $Right_{it-1}$.

First, we use the variable PC_{it-1} because a single-party government is more likely to succeed in its attempts to undertake fiscal adjustment. PC_{it-1} is also a proxy for the degree of parliamentary support for the government party. Incidentally, other possibilities are an index of the political cohesion of national governments, as in Roubini and Sachs (1989) and De Haan and Sturm (1997), or directly specifying the number of government parties (or cabinet size). However, PC_{it-1} is used in this paper in order to emphasize the strength of a single-party government explicitly. We use the one-period lagged value because the government in period $t-1$ will formulate the budget between period t and $t-1$. We expect α_4, α_5 and α_6 to have a positive sign. As assumed in Ihori and Itaya (2001), this indicates a government where the power of interest groups is weak, because

[7]Perotti and Kontopoulos (2002) use the variable 'NEGOT', which takes a value of 0 if the negotiations are conducted by the Finance Minister, the Prime Minister or both, and 1 if they are conducted by a committee or the entire cabinet. However, there are no countries in the sample where the entire cabinet actually participates in the budget negotiations. Therefore, we believe it is inappropriate to attempt to measure the power of fiscal authorities and do not employ it as a variable in this paper.

[8]For example, Japan conducted fiscal reform from 1997 by enforcing the Fiscal Structural Reform Act, but the act was suspended in December 1998. See von Hagen (2006) for a discussion. Further, as mentioned in Perotti and Kontopoulos (2002), the reforms in Belgium and Italy do not relate to the aspects considered here.

Table 1. Institutional Indices

	Target 1	Target 2
Australia	0	0
Austria	1	2
Belgium	0	0
Canada	1	1
Denmark	1	2
Finland	0	0
France	0	0
Germany	1	2
Greece	0	0
Ireland	1	1
Italy	0	0
Japan	0	0
The Netherlands	1	1
Norway	1	1
Portugal	0	0
Spain	0	0
Sweden	0	0
UK	1	1
US	1	1

single-party governments tend not to be influenced as much by interest groups as are coalition governments.

Second, $Left_{it-1}$ and $Right_{it-1}$ are used as explanatory variables because some earlier studies, such as Alesina and Perotti (1996), Alesina *et al*. (1998), and Tavares (2004) show that the ideology of governing parties determines the success or failure of fiscal adjustment. Left governing party seats as a percentage of all legislative seats ($Left_{it-1}$) and right governing party seats as a percentage of all legislative seats ($Right_{it-1}$) are used to indicate ideology. Needless to say, these variables also indicate the degree of parliamentary support for a government just as well as PC_{it-1}, since these are based on the share of governing parties. If these variables take a positive value, the outcome of deficit cuts may be helped by the support of the government parties and their ideologies. We also use their one-period lagged values for $Left_{it-1}$ and $Right_{it-1}$. We expect the coefficients of $Left_{it-1}$ and $Right_{it-1}$ to be positive.

The number of spending ministers may also be specified as another variable to measure the degree of political fragmentation. However, this is less important because institutional arrangements may reduce the number and power of spending ministers.[9]

ΔUNE_{it} is the change in the unemployment rate, ΔCPI_{it} the rate of inflation of the consumer price index, and ΔGDP_{it} the change in GDP.[10,11] ΔUNE_{it}, ΔCPI_{it}, and ΔGDP_{it} are used as explanatory variables representing the economic

[9]We estimate equation (2) including this variable, but the estimated coefficient is not significant.
[10]We can use unemployment data because we use cyclically adjusted fiscal data from the OECD, and OECD cyclical adjustment takes into account only movements in GDP, not unemployment.
[11]We estimate equation (2) by adding outstanding debt to GDP to independent variables. However, the estimated coefficients for this variable are not significant.

environment.[12] These variables have three basic justifications. First, ΔUNE_{it} captures the effects of policymakers' countercyclical discretionary policy. Second, ΔCPI_{it} captures the negative effect of lowering real tax revenue through high inflation and the positive effect of bracket creep on income tax revenue. Finally, ΔGDP_{it} captures long-term tendency toward better fiscal positions in growing economies. Hence, we expect β_1 to have a negative sign. For β_2, both positive and negative signs are expected, and β_3 is expected to be positive.

X_i is time invariant and not separately identifiable from the country dummy variables, although the institutional variable and ε_{it} that may contain country dummies will be correlated. However, because the dummy variables D_{EU} and D_{EU92} divide the sample period for European countries, $D_{EU} * X_i$ and $D_{EU92} * X_i$ become time variant. Hence, in our estimation we can add a set of dummy variables for European countries, γ_i^{EU}.[13]

3. Empirical Results

All economic data sets are from the OECD Economic Outlook database. PC_{it-1} comes from the *Europa Year Book*. $Left_{it-1}$ is the LEFTGS (the left governing party seats as a percentage of all legislative seats) and $Right_{it-1}$ is RIGHTGS (right governing party seats as a percentage of all legislative seats) from the Comparative Parties Data set on Swank's website.[14] This corrected a deficiency in the ideological data on governing parties obtained from the Europa *Year Book*. Our annual panel covers the period 1980–2002 for 18 OECD countries.

In our estimation, we restrict the sample to periods when each government implemented fiscal adjustment. From the fiscal adjustment episodes defined in earlier studies, we select the periods during which the budget surplus is positive and lasts several periods in order to specifically reflect the outcome of strong and deliberate efforts by the government for deficit reductions. Thus, a period of fiscal adjustment is defined as the one in which ΔPB_{it} was positive and improved by at least 1.5 percentage points overall for two years, based on McDermott and Wescott's (1996) definition. The definition of episodes according to some other earlier works may include periods during which the budget surplus is negative. However, since selection methods based on McDermott and Wescott (1996) can avoid this problem, we define the periods based on their work.

In a cross-country sample, the specific circumstances of each country (e.g., wars, natural disasters and so on) are more crucial and these factors may

[12]Equation (2) is also assumed to use these variables with a lag to account for the lags from policymakers in response to the economic environment for ΔUNE_{it} and ΔGDP_{it}, and the simultaneity that the budget deficits induce in inflation for ΔCPI_{it}. However, the coefficient estimates for these variables do not change significantly.

[13]Including all the European country dummies would involve exact collinearity and make estimation impossible. We deal with this problem by removing the dummy for the UK. However, changing the reference or omitted category country may change the estimated coefficient on $D_{EU} \times X_i$. To be certain, we re-estimate equation (2) by omitting the dummy variables for other countries in X_i one by one, while we include the dummy variable indicating the UK in equation (2). However, the results shown in Table 3 are almost unchanged.

[14]http://www.marquette.edu/polisci/Swank.html

Table 2. Periods of fiscal adjustment

Australia	81–82; 82–83; 83–84; 84–85; 93–94; 94–95; 95–96; 96–97
Austria	83–84; 84–85; 95–96; 96–97
Belgium	84–85; 85–86; 86–87; 92–93; 93–94
Canada	85–86; 86–87; 93–94; 94–95; 95–96; 96–97
Denmark	83–84; 84–85; 85–86; 86–87; 95–96; 96–97; 97–98; 98–99
Finland	92–93; 93–94; 97–98; 98–99
France	82–83; 83–84; 94–95; 95–96; 96–97
Germany	80–81; 81–82; 82–83; 90–91; 91–92; 92–93; 93–94
Ireland	80–81; 81–82; 85–86; 86–87; 87–88; 88–89
Italy	89–90; 90–91; 91–92; 92–93; 94–95; 95–96; 96–97
Japan	82–83; 83–84; 84–85
The Netherlands	80–81; 81–82; 82–83; 95–96; 96–97
Norway	92–93; 93–94; 98–99; 99–00
Portugal	80–81; 81–82
Spain	85–86; 86–87; 94–95; 95–96; 96–97
Sweden	82–83; 83–84; 93–94; 94–95
UK	81–82; 82–83; 94–95; 95–96; 96–97; 97–98; 98–99
US	92–93; 93–94; 94–95; 96–97; 97–98

sometimes have an excessive influence on the government budget.[15] On this basis, including outliers will result in the selection of incorrect periods, even though they are not 'true' periods of fiscal adjustment. Therefore, we remove ΔPB_{it} where more than 2σ and less than -2σ from the original datasets.[16] In addition, as discussed earlier, we exclude Australia and Sweden after the first period of reform when selecting the period of fiscal adjustment. We select 95 fiscal adjustment periods and present these in Table 2.[17]

Here we confirm whether the periods selected encompass actual episodes of fiscal adjustment. First, the episodes for the US in this analysis correspond to the Clinton Administration's reforms aimed at deficit reduction. The episodes for Ireland in the 1980s involve fiscal reforms centered on the privatization of public enterprises. The reforms referred to as 'fiscal reconstruction without tax increase' in Japan in the early 1980s and Canadian fiscal reform after 1993 are also included in the selected fiscal adjustment periods. From these and other episodes that we examine, it would be fair to say that the selected periods in this paper almost

[15]For example, in the US from 2001 to 2002, ΔPB_{it} decreased by 3.15 percentage points. The events of September 11 and tax reductions may have worsened the government budget. Moreover, in Germany, ΔPB_{it} decreased by 3.3 percentage points from 1989 to 1990 when East and West Germany were reunified. These episodes are judged as outliers by the procedures used in this analysis.

[16]If we do not remove these data, 112 adjustment episodes are selected. Although we estimate equation (2) based on these 112 episodes, the coefficients of $D_{NEU} \times PC1_{t-1}$ and $D_{EU92} \times Right_{t-1}$ are significant. However, the level of significance of the coefficient of $D_{NEU} \times PC1_{t-1}$ is 10%, while it is 5% as shown in Table 3. Therefore, we conclude that the estimation results obtained by including outliers are unfavorable.

[17]To deal with the fiscal adjustment episodes that one regime carried out, we also examine the cases that were consecutive and conducted by the same regime. Specifically, we select the 74 episodes in which the ideology of the ruling party was the same for two years, determined to be the fiscal adjustment periods. The results are as follows: none of the coefficients of TARGET 1 are estimated significant; for TARGET 2, only the coefficient of $D_{EU} \times TARGET2$ is estimated to be positive and significant. The detailed results can be obtained from the author upon request.

Table 3. The results of testing selectivity bias. Dependent variables: The change in cyclically adjusted primary government balance (percent of potential GDP). Number of observations = 95.

The number of X_i (independent variable)	The case of Target 1	The case of Target 2
Residual of Tobit	0.1257 (0.4649)	0.1638 (0.4585)

Note: The set of other independent variables is not shown for the sake of brevity. Standard errors are in parentheses.

exactly coincide with actual periods of budget deficit reduction during periods of fiscal adjustment.

It is important to note that the data used comprise an incomplete panel because we omit some periods and countries. Moreover, although we assume that the countries implement fiscal adjustment implicitly, the economic conditions and political factors may also influence decision making related to fiscal adjustment, as shown in von Hagen *et al*. (2001), Lavigne (2006), and Mierau *et al*. (2007). Hence, we need to check the presence of selectivity bias. Some earlier studies, including Verbeek and Nijman (1992), Wooldridge (1995), and Vella (1997) deal with selectivity bias in panel data models. To be certain, we check the attrition bias using the method described in Wooldridge (1995).[18] In the first step, we estimate equation (2) by standard Tobit and calculate the residuals for the whole sample ($22 \times 18 = 396$). Here, we omit the year dummies and include the outstanding debt per GDP.[19] The reason why we include outstanding debt to GDP in the selection equation is to show the probability that countries in 'fiscal need' execute programs of fiscal adjustment. In the second step, we add the Tobit residuals and the dummy variables for the European countries to equation (2). In this step, we restrict the sample to the 95 episodes shown in Table 2. We then test the coefficients of the Tobit residuals to check for sample selection bias and the results are shown in Table 3. We conclude that there is no bias resulting from sampling selection because in all cases the estimates of the coefficients of the Tobit residuals are not significant.

Table 4 reports the results of the least squares estimation. The coefficients of X_i are of the expected sign and significant for all cases. PC_{it-1} is found to be significant only in non-European countries. For ideologies, only the coefficient of $D_{EU} \times Right_{t-1}$ is significant but negative. Both ΔUNE_{it} and ΔGDP_{it} are estimated to be negative but insignificant, and ΔCPI_{it} is estimated to be positive and insignificant.

Incidentally, the estimates of $D_{NEU} \times X_i$ may be inconsistent because of the correlation between $D_{NEU} \times X_i$ and ε_{it}. Moreover, despite adding the set of dummy variables for the European countries, the coefficients of $D_{EU} \times X_i$ and $D_{EU92} \times X_i$ may be biased because of other time-variant factors. Hence we also estimate equation (2) by the instrumental variable method of Hausman and Taylor (1981)

[18]For more details, see Wooldridge (1995) and Baltagi (2005).

[19]Detailed results can be obtained from the author upon request.

Table 4. Estimation results of equation (2) by least squares. Dependent variables: The change in cyclically adjusted primary government balance (percent of potential GDP). Number of observations = 95.

Independent variable		
$D_{EU} * TARGET\ 1$	2.3683***	
	(0.8747)	
$D_{EU92} * TARGET\ 1$	2.0776**	
	(1.0567)	
$D_{NEU} * TARGET\ 1$	0.8246*	
	(0.5517)	
$D_{EU} * TARGET\ 2$		2.4095***
		(0.8944)
$D_{EU92} * TARGET\ 2$		2.2592**
		(1.1260)
$D_{NEU} * TARGET\ 2$		0.8488*
		(0.5070)
$D_{EU} * PC1_{t-1}$	−0.2538	−0.2397
	(0.8506)	(0.8402)
$D_{EU92} * PC1_{t-1}$	−0.8846	−0.9091
	(0.8022)	(0.7766)
$D_{NEU} * PC1_{t-1}$	0.7291**	0.7412**
	(0.3375)	(0.3198)
$D_{EU} * Left_{t-1}$	−0.0116	−0.0121
	(0.0079)	(0.0077)
$D_{EU92} * Left_{t-1}$	−0.0009	−0.0009
	(0.0085)	(0.0086)
$D_{NEU} * Left_{t-1}$	0.0096	0.0099
	(0.0114)	(0.0109)
$D_{EU} * Right_{t-1}$	−0.0143*	−0.0133*
	(0.0098)	(0.0093)
$D_{EU92} * Right_{t-1}$	−0.0092	−0.0087
	(0.0089)	(0.0088)
$D_{NEU} * Right_{t-1}$	−0.0037	−0.0036
	(0.0068)	(0.0067)
ΔUNE_{it}	−0.0356	−0.0294
	(0.1155)	(0.1123)
ΔCPI_{it}	−0.0779	−0.0793
	(0.1187)	(0.1181)
ΔGDP_{it}	−0.0338	−0.3403
	(0.0687)	(0.0621)

Note: The set of dummy variables representing European countries and years is included in the regressions (not shown for the sake of brevity). Standard errors based on White's (1980) heteroskedasticity-consistent covariance matrix are in parentheses. Levels of significance are indicated by asterisks: * = 10%, ** = 5%, and *** = 1%.

because $D_{NEU} \times X_i$ is a time-invariant variable. As an instrumental variable for $D_{NEU} \times X_i$, we specify the variable 'two-party.' This assigns a value of 1 for countries with a two-party system (Canada, Portugal, Spain, the UK, and the US) and 0 elsewhere.[20] We also note that Canada and the UK are not strictly two-party

[20]Both two-party and $PC1_{t-1}$ appear to take on very similar values and if we use this variable as an instrumental variable, problems with multicollinearity may arise. However, the correlation may

Table 5. Estimation results of equation (2) by the instrumental variable method of Hausman and Taylor's (1981) random effects model. Dependent variables: The change in cyclically adjusted primary government balance (percent of potential GDP). Number of observations = 95.

Independent variable		
$D_{EU} * TARGET\ 1$	0.5095**	
	(0.3206)	
$D_{EU92} * TARGET\ 1$	0.4208*	
	(0.3237)	
$D_{NEU} * TARGET\ 1$	−0.3826	
	(0.7639)	
$D_{EU} * TARGET\ 2$		0.3958**
		(0.2016)
$D_{EU92} * TARGET\ 2$		0.2496
		(1.1260)
$D_{NEU} * TARGET\ 2$		−0.4541
		(0.7505)
$D_{EU} * PC1_{t-1}$	−0.7956*	−0.0069
	(0.8506)	(0.0065)
$D_{EU92} * PC1_{t-1}$	−0.4524	−0.4104
	(0.5143)	(0.5154)
$D_{NEU} * PC1_{t-1}$	0.5223*	0.5523*
	(0.3833)	(0.3840)
$D_{EU} * Left_{t-1}$	−0.0045	−0.0069
	(0.0064)	(0.0065)
$D_{EU92} * Left_{t-1}$	0.0062	0.0071
	(0.0066)	(0.0067)
$D_{NEU} * Left_{t-1}$	0.0015	0.0017
	(0.0104)	(0.0102)
$D_{EU} * Right_{t-1}$	0.0052	0.0073
	(0.0060)	(0.0058)
$D_{EU92} * Right_{t-1}$	0.0003	0.0003
	(0.0054)	(0.0054)
$D_{NEU} * Right_{t-1}$	−0.0037	−0.0032
	(0.0070)	(0.0070)
ΔUNE_{it}	−0.0561	−0.0557
	(0.0993)	(0.0982)
ΔCPI_{it}	0.0779***	0.2394***
	(0.0586)	(0.0585)
ΔGDP_{it}	0.0204	0.0158
	(0.0435)	(0.0441)

Note: Standard errors are in parentheses. Levels of significance are indicated by asterisks: * = 10%, ** = 5%, and *** = 1%.

systems because of the presence of some small political parties. However, because only one of two major parties usually forms a majority in government, we classify these countries as two-party systems. For $D_{EU} \times X_i$ and $D_{EU92} \times X_i$, we use other time-variant variables as instruments.

not be strong because two-party involves other countries included in $PC1_{t-1}$. In fact, the coefficient of correlation is 0.65. Therefore, we can use two-party as an instrument for $D_{NEU} \times X_i$.

The results of the instrumental variable estimation using the Hausman and Taylor (1981) method are shown in Table 5.[21] The estimation results are almost identical to those in Table 4. The coefficients of X_i are of the expected sign and are significant except for $D_{NEU} \times X_i$ and $D_{EU92} \times TARGET2$, and PC_{it-1} is estimated to be positive and significant only for non-European countries. Both ΔUNE_{it} and ΔGDP_{it} are estimated insignificant, although ΔCPI_{it} is estimated to be positive and significant.[22]

4. Conclusion

This paper investigates how both political factors and budgetary institutions influence the size (or performance) of deficit reductions during periods of fiscal adjustment. For all cases, our empirical findings using OECD data indicate that while countries with a fiscal target are likely to reduce their budget deficits successfully at a time of fiscal adjustment in Europe, the political leadership of a single-party government is the key determinant of fiscal adjustment in non-European countries.

Our results show that countries with a fiscal target reduce budget deficits successfully when the government makes genuine efforts to restore fiscal conditions. In fact, even countries with a fiscal target had to cut budget deficits or expenditures for several years in order to meet their target values. Reflecting this point, the results may also suggest that the set of fiscal targets is effective in supporting temporal efforts for deficit reduction. Above all, in European countries, the effect of a fiscal target is robustly confirmed in all estimations. Many earlier studies of budgetary institutions in European countries have shown that the effectiveness of fiscal rules or the strength of fiscal authorities depends on the political environment.[23] Contrary to the earlier works, our findings show that fiscal target is effective in deficit reductions during periods of fiscal adjustment from the 1980s to the early 2000s, regardless of political factors.

On the other hand, for non-European countries in our sample (Australia, Canada, Japan, and the US) we demonstrate that the government could reduce the budget deficits successfully during the periods of fiscal adjustments. Compared with most European countries, these countries do not tend to have coalition

[21]Hausman and Taylor's (1981) estimation is based on the random effects model. Random effects estimators are more efficient than LSDV estimators (e.g. Baltagi, 2005). Therefore, compared with the results shown in Table 4, standard errors in Table 5 tend to be smaller.

[22]To check the effects of political factors, we re-estimate equation (2) by multiplying PC_{it-1} by $Left_{it-1}$ and $Right_{it-1}$. For the political variables, only the coefficient of $Left \times PC1_{it-1}$ in non-European countries is found to be positive and significant. This may reflect the fact that most of the episodes in non-European countries were fiscal reforms completed under left governing parties, such as the Democrats in the US and the Labor Party in Australia. For another test of robustness, we re-estimate equation (2) by specifying the dependent variable in levels. However, if we estimate the cyclically adjusted primary government balance as a ratio of potential GDP in levels, the coefficients of the Tobit residuals are significant and we reject the null that there is no selectivity bias. Detailed results can be obtained from the author upon request.

[23]For example, see von Hagen and Harden (1995), Hallerberg and von Hagen (1999), and von Hagen *et al*. (2001).

governments. Hence, the strong leadership of a single-party government may be strongly confirmed.

Incidentally, to maintain consistency with Ihori and Itaya's (2001) theoretical hypothesis, we consider both political and institutional factors here. However, another factor such as the potential role of election years (upcoming elections) and the possibility of broad policy reform might also affect the size of fiscal adjustments. Moreover, in selecting the periods of fiscal adjustment, it is necessary to choose periods based on 'successful' fiscal adjustment episodes. This procedure allows us to investigate the relationship between the attributes of fiscal adjustment and political or institutional factors. Finally, for institutional indices, recent studies such as IMF (1998), OECD (2001), and Alt and Lassen (2006) develop a 'transparency index.' We may then need to analyze further the issues arising in this paper in terms of fiscal transparency. Future work should deal with these interesting extensions.

References

Alesina, A. & Perotti, R. (1996) Fiscal adjustments in OECD countries: composition and macroeconomic effects, *NBER Working Paper*, p. 5730.

Alesina, A., Perotti, R. & Tavares, J. (1998) The political economy of fiscal adjustments, *Brookings Papers on Economic Activity*, 1, pp. 197–248.

Alt, J.E. & Lassen, D.D. (2006) Fiscal transparency, political parties, and debt in OECD countries, *European Economic Review*, 50, pp. 1403–1439.

Baltagi, B.H. (2005) *Economic Analysis of Panel Data*, 3rd edn (Chichester, UK: Wiley).

De Haan, J. & Sturm, J.-E. (1997) Political and economic determinants of OECD budget deficits and government expenditures: a reinvestigation, *European Journal of Political Economy*, 13, pp. 739–750.

De Haan, J., Moessen, W. & Volkerink, B. (1999) Budgetary procedures-aspects and changes: New evidence for some European countries, in: J.M. Poterba & J. von Hagen (Eds) *Fiscal Institutions and Fiscal Performance*, pp. 265–299 (Chicago and London: The University Chicago Press).

Hallerberg, M., & von Hagen, J. (1999) Electoral institutions, cabinet negotiation, and budget deficits in the European Union, in: J.M. Poterba, & J. von Hagen (Eds) *Fiscal Institutions and Fiscal Performance*, pp. 209–232 (Chicago and London: The University Chicago Press).

Hausman, J.A. & Taylor, W.E. (1981) Panel data and unobservable individual effects, *Econometrica*, 46, pp. 1251–1271.

Ihori, T. & Itaya, J. (2001) A dynamic model of fiscal reconstruction, *European Journal of Political Economy*, 17, pp. 779–797.

Ihori, T. & Itaya, J. (2004) Fiscal reconstruction and local government financing, *International Tax and Public Finance*, 11(1), pp. 55–67.

IMF (1998) *The Code of Good Practices in Fiscal-Transparency: Declaration and Principles* (International Monetary Fund).

Lavigne, R. (2006) The institutional and political determinants of fiscal adjustment, *Bank of Canada*, Working Paper, 2006-1.

McDermott, J.C. & Wescott, R.F. (1996) An empirical analysis of fiscal adjustments, *International Monetary Fund Staff Papers*, 43(4), pp. 725–753.

Mierau, J.O., Jong-A-Pin, R. & De Haan, J. (2007) Do political variables affect fiscal policy adjustment decisions? New empirical evidence, *Public Choice*, 127(3), pp. 297–319.

OECD (2001) *OECD Best Practices for Budget Transparency*, PUMA/SBO (2000) 6/Final.

Perotti, R. (1998) The political economy of fiscal consolidations, *Scandinavian Journal of Economics*, 100(1), pp. 367–394.

Perotti, R. & Kontopoulos, Y. (2002) Fragmented fiscal policy, *Journal of Public Economics*, 86, pp. 191–222.

Roubini, N. & Sachs, J.D. (1989) Political and economic determinants of budget deficits in the industrial democracies, *European Economic Review*, 33, pp. 903–938.

Tavares, J. (2004) Does right or left matter?: Cabinet, credibility, and fiscal adjustments, *Journal of Public Economics*, 88, pp. 2447–2468.

Vella, F. (1997) Estimating models with sample selection bias: A survey, *Journal of Human Resources*, 33, pp. 127–169.

Verbeek, M. & Nijman, T. (1992) Testing for selectivity bias in panel data models, *International Economic Review*, 33(3), pp. 681–703.

von Hagen, J. (2006) Fiscal rules and fiscal performance in the EU and Japan, *Discussion Paper, Governance and the Efficiency of Economic Systems*, No.147.

von Hagen, J. & Harden, I.J. (1995) Budget processes and commitment to fiscal discipline, *European Economics Review*, 39(3), pp. 771–779.

von Hagen, J., Hallet, A.H. and Strauch, R. (2001) Budgetary consolidation in EMU, *Economic Papers, European Commission*, No. 148.

White, H. (1980) A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, *Econometrica*, 48, pp. 817–838.

Wooldridge, J.M. (1995) Selection corrections for panel data models under conditional mean independence assumptions, *Journal of Econometrics*, 68, pp. 115–132.