Review of Development Economics, 10(4), 612–631, 2006
DOI:10.1111/j.1467-9361.2006.00336.x

The Phasing of Fiscal Adjustments: What Works in Emerging Market Economies?

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Abstract

This paper investigates the political and economic determinants of successful fiscal adjustment in 25 emerging market economies from 1980 to 2001. The results show that large and back-loaded fiscal adjustments have the highest likelihood of success. Fiscal consolidations based on expenditure cuts increase the probability of approaching and achieving fiscal sustainability but are insufficient to maintain it unless accompanied by revenue reforms. Adjustment episodes launched in countries where governments enjoy a parliamentary majority and do not face imminent elections, are found to be more successful. Fiscal consolidations undertaken under IMF-supported programs also have a higher probability of success.

1. Introduction

Public debt in emerging market economies has increased sharply since the mid-1990s and at 70% of GDP, exceeds that of industrial countries (IMF, 2003). High levels of public debt have been a recurring problem in many emerging market economies, contributing to economic instability and financial vulnerability. In many instances, the accumulation of large public debts has led to costly defaults and distressed debt restructurings, with dramatic increases in poverty and a deterioration in human development indicators.

In 1981, only five countries—now referred to as emerging market economies—reported a primary fiscal balance consistent with a nonincreasing ratio of public debt-to-GDP in the medium term. In the following two decades, 25 emerging market economies, including these five, undertook more than 100 episodes of fiscal adjustment. By 2001, the number of countries with sustainable public finances had grown to 11, although none of these countries generated primary fiscal balances sufficient to thwart an increase in the debt-to-GDP ratio over the two decade period. This raises the issue of why episodes of fiscal adjustment did not lead to a durable fiscal position consistent with a nonincreasing debt-to-GDP ratio.

Previous studies have focused on the factors affecting the *duration* of fiscal consolidations in emerging market economies (Adam and Bevan, 2003; Gupta et al., 2003). These papers indicate that the probability of ending a fiscal adjustment is affected by the legacy of previous fiscal failures, the size of the deficit, and the composition of public spending. Although these studies deal with the determinants of the duration

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of fiscal adjustment, they only partially answer the question of how governments can *achieve and maintain* fiscal sustainability. In particular, a key policy issue is whether countries are more likely to achieve fiscal sustainability with front-loaded adjustment strategies—where the fiscal adjustment takes place upfront—or more gradual approaches, which may be politically and socially more acceptable. A related issue is whether consolidations based on trimming expenditures are more likely to succeed than those based on a strengthening of the revenue effort. Finally, the role of political and institutional factors in explaining the success or failure of fiscal adjustments in these countries has not been fully explored.

This paper attempts to answer these questions by investigating the fiscal adjustment episodes experienced in 25 emerging market economies between 1980 and 2001.[1] A successful fiscal adjustment is defined as one that brings a country's primary budget balance to the level that ensures debt sustainability (Adam and Bevan, 2003). We assume that the goal of fiscal adjustment is to achieve fiscal sustainability, as defined by a nonincreasing ratio of public debt-to-GDP.[2]

We find that large adjustments increase the likelihood of success. Back-loaded adjustments tend to be more successful in reaching sustainability but are not influential in maintaining it. Expenditure cuts increase the probability of approaching and reaching the threshold, but are insufficient to maintain that state for two years or more. Adjustment episodes launched in countries where the government has a majority in the parliament, and when elections are not imminent, are also more likely to succeed. Finally, those consolidations undertaken during IMF-supported programs tend to preserve a country's fiscal sustainability over a longer time period.

The paper is organized as follows: section 2 defines successful fiscal adjustment episodes, and section 3 discusses potential economic and political institutional factors that could have an impact on fiscal adjustments. Section 4 presents the model specification, and section 5 reports the main empirical findings. Section 6 discusses the policy implications of the econometric results, and section 7 concludes.

2. Defining Fiscal Adjustment

An episode of fiscal adjustment is defined as a year (or set of years) in which the general government primary budget balance improves by at least 0.5 percentage point of GDP per year.[3] This definition, therefore, does not limit us to large fiscal adjustments. A focus on large fiscal adjustments is common in the related literature on the OECD countries (Alesina and Perotti, 1995), and emerging economies (Tsibouris et al., 2006), but such an approach does not allow the inclusion of small, but prolonged adjustments that are prominent in our sample of consolidation episodes. Therefore, our sample includes adjustment episodes that differ in size, as the latter, in itself, could be an important factor for explaining the likelihood of reaching and maintaining fiscal sustainability. This permits a comparison of the relative success attained by front-loaded vs. back-loaded adjustments, and for "big-bang" vs. gradual consolidations, as defined below.

Front-loaded adjustments are defined as those where more than 50% of the total deficit reduction was achieved in the first half of the time period covered by the episode. Otherwise, the adjustment is considered a back-loaded one. *Big-bang episodes* of adjustment are those in which the average annual improvement in the primary balance achieved during the episode (divided by the primary balance in the year before the episode) is greater than the sample mean. Otherwise, the episode is considered a gradual fiscal adjustment. By linking the size of adjustment to the original primary

balance, this approach avoids the problems associated with the use of arbitrary definitions of "big" and "small" adjustment episodes.

The success of fiscal adjustment episodes has been traditionally identified in the literature in terms of the reduction in the public debt-to-GDP ratio in the year(s) immediately after the episode (von Hagen et al., 2001). The problem with this definition is that it does not take into account whether or not the current fiscal position is sustainable. An alternative way of judging the success of fiscal adjustment is whether or not it achieves a sustainable fiscal position, or how much it moves a country towards such a position. In this context, a country's fiscal position is deemed sustainable when its primary balance is such that the debt stock is not increasing as a share of GDP.[4] If p is the ratio of the primary fiscal surplus to GDP, d the ratio of public debt to GDP (assumed to be constant), r the real interest rate, and g the rate of growth of real GDP, this condition can be stated as follows:[5]

$$p \geq d\frac{(r-g)}{(1+g)}. \tag{1}$$

Therefore, *success in approaching* the threshold can be defined as an event in which the initial distance between the primary balance and the primary balance that achieves sustainability is reduced by at least two-thirds during the adjustment episode and/or during the following two years. An episode of adjustment is *successful in reaching* the threshold if the primary balance exceeds the sustainability threshold at least for one year during the adjustment episode or during the following two years. *Success in maintaining* the threshold occurs when a country maintains its primary balance above the sustainability threshold for one or two consecutive years after reaching that threshold.

Finally, fiscal adjustments that are *successful in persisting* are those in which a country maintains its primary balance above the sustainability threshold for more than two consecutive years during the adjustment episode and/or during the following two years.

3. Brief Review of the Literature on Fiscal Adjustment

Baseline Results

There is considerable evidence to suggest that expenditure cuts (specifically for spending on transfers and government wages) increase the likelihood of success of fiscal adjustment efforts (Alesina and Perotti, 1995, 1996; McDermott and Wescott, 1996; Alesina et al., 1998; Alesina and Ardagna, 1998; Alesina et al., 1999). These studies also found that the composition of adjustment is more important than its size for maintaining a reduction in the stock of public debt and promoting growth. On the other hand, Giavazzi and Pagano (1990), Cour et al. (1996), Giavazzi et al. (2000), and Purfield (2003) conclude that the size and persistence of the consolidation are relevant in determining success.[6]

The positive impact of longer durations of fiscal adjustment in lowering public debt has also been stressed (von Hagen et al., 2001; Maroto and Mulas-Granados, 2002; Adam and Bevan, 2003; Gupta et al., 2003). In addition, many authors (for example, von Hagen et al., 2001; Lambertini and Tavares, 2001) have emphasized the role of initial fiscal conditions, economic growth, monetary policy, and exchange rate changes in influencing the likelihood of achieving fiscal adjustment.

The timing, duration, size, and composition of fiscal adjustment can be influenced by institutional and political constraints. Among the considerations identified are: The cabinet's ideology on fiscal policy (Perotti and Kontopoulus, 2002; Mulas-Granados,

2003); the electoral system and the budget process (Persson and Tabellini, 1999; Hallerberg and von Hagen, 1997; von Hagen et al., 2001); and the proximity of elections (Alesina et al., 1992; Maroto and Mulas-Granados, 2002; Buti and van den Noord, 2003). Finally, the extent to which decision making in the budgetary process is fragmented, has also been widely considered (Roubini and Sachs, 1989; Grilli et al., 1991; Mulas-Granados, 2003). However, there are no studies that analyze both the political and economic determinants of successful fiscal adjustments (defined in terms of achieving and maintaining fiscal sustainability).[7] This paper attempts to fill this gap for emerging market economies.

4. Model Specification

We use the following probit model specification to determine the contribution of economic and political factors in successful fiscal adjustments. Our baseline specification, following the existing literature, is as follows:

$$\begin{aligned} Success(t) = {} & \alpha + \beta_1 PBBal_{t-1} + \beta_2 Exch_{t-1} + \beta_3 Growth_{t-1} + \beta_4 Infl_{t-1} \\ & + \beta_5 Exp_t + \beta_6 NFail_{t-1} + \beta_7 Dur_t + \beta_8 Front_t + \beta_9 Big_t \\ & + \beta_{10} Maj_t + \beta_{11} Elec_t + \beta_{12} Decent_t + \beta_{13} IMF_{t-1} + \varepsilon_t, \end{aligned} \tag{2}$$

where t refers to the time period during the episode of adjustment and $t-1$ refers to the year preceding the beginning of the consolidation.[8] The dependent variable is of a discrete nature, and takes the value of one in the case of success during the episode and zero otherwise. We estimate our baseline model using a truncated panel of adjustment years. The sample is based on the following procedure: From the original panel of 550 annual observations, we select only those years (177) where there has been an improvement in the primary balance of at least 0.5% of GDP—the baseline case. Adjustment years take the value of one if the adjustment episode to which they belong was successful, and the value of zero if it was unsuccessful. From this first sample, we also extract a second sample of 106 adjustment episodes,[9] where all variables take their average values throughout the consolidation episode. To build this second database, adjustment years are grouped together around sets of consecutive years of fiscal adjustment in every country.

A first set of variables in equation (2) controls for initial macroeconomic and fiscal conditions. These variables are similar to the ones used by others (Adam and Bevan, 2003; Gupta et al., 2003) that describe the link between the success of fiscal adjustment and initial vulnerabilities. We include the initial primary budget balance (*PBBal)* in the year prior to the adjustment (a measure of initial (low) fiscal vulnerability that is expected to be positively correlated with the success of adjustment), the initial change in the exchange rate (*Exch)*, with an increase signifying a depreciation, initial real GDP growth (*Growth)*, the initial rate of inflation *Infl* (to control for initial macroeconomic conditions), and the accumulated number of failures (*Nfail),* measured by the number of adjustment episodes that had come to an end in the year previous to the start of a new fiscal consolidation. This latter variable measures the track record of fiscal policy implementation and is expected to be negatively correlated with success. In fact, a high number of previous failures point to the government's inability to maintain sound fiscal policy and the tendency to reverse fiscal consolidations after a few years (Gupta et al., 2003).

We also include in equation (2) variables that have not, to this point, been used in the fiscal adjustment literature. These variables capture the influence of the government's strategy of adjustment and the political constraints within which those decisions

are taken. We include a dummy variable (*Exp*), which takes the value of one if more than 50% of the deficit reduction during the episode was achieved through spending cuts, and takes the value of zero if the adjustment was revenue-based. To account for the influence of large improvements (big-bang episodes) in the budgetary position, we include a dummy (*Big*) that is one if the average annual change in the primary budget balance divided by the initial primary balance is above the sample mean (zero otherwise). We also include two additional variables that account for the duration and the timing of the consolidation episodes. The variable that measures duration (*Dur*) is the number of years that the adjustment episode lasted. The variable that deals with the timing dimension of the adjustment episode (*Front*) takes the value of one if more than half of the total primary balance improvement occurred during the first half of the episode (zero otherwise).

A third set of regressors attempts to capture the accompanying political conditions that have a potential impact on adjustment episodes.[10] To capture the degree of fragmentation in decision making, we include a variable (*Maj*) that measures the fraction of seats in the legislature that are held by the government. The weaker the government is in terms of legislative support, the lower, it is assumed, is the political consensus in favor of fiscal consolidation. We also include a measure of fiscal decentralization (*Decent*) which takes the value of one if the state/provinces of each country have any authority over fiscal policy.[11] In addition, we include a dummy variable (*Elec*) that captures the effect of elections taking place while the adjustment is still ongoing or scheduled for the following year.

We complement these three variables that control for domestic political conditions with a dummy variable indicating whether or not the country was being supported by an IMF-supported program. The existence of an IMF-supported program in the year immediately before the adjustment or during the adjustment is expected to have an influence on the likelihood of success in achieving fiscal adjustment. IMF-supported programs could be viewed as increasing the probability of success with sustaining fiscal adjustment because of the financial support they offer—or will trigger from other sources—on the basis of success in meeting program targets. In this light, the IMF-supported program allows countries to address macroeconomic imbalances over time through both foreign financing and domestic adjustment, rather than adjustment alone. In addition, the existence of an IMF-supported program may signal the resolve of the authorities to achieve fiscal adjustment, with a concomitantly positive reaction from financial markets. In this light, the result for the IMF-supported program dummy should be interpreted with caution, as it may, in effect, be serving as a proxy for this domestic commitment to adjustment, rather than measuring the influence of programs per se.

5. Econometric Results

Table 1 reports the descriptive statistics of the independent variables and the four definitions of the dependent variable for the 25 countries in our sample between 1980 and 2001.[12] The average success rate in the sample ranges from 37% (based on the definition of success as persistence in adjustment) and 83% (based on the definition of success as approaching sustainability). A large majority of the adjustment episodes can be defined as front-loaded (69%), while, by definition, half of the episodes are classified as "big-bang."

We also report in the same table the results of the subsample averages for the periods in which the countries had IMF-supported programs. Success rates tend to be higher for periods in which countries had a program. Initial macroeconomic conditions

Table 1. Descriptive Statistics: Adjustment Years (In %, Unless Otherwise Specified)

	Initial prim. budget balance (in % of GDP)	*Initial change in the exchange rate*	*Initial real GDP growth*	*Initial inflation (change in CPI)*	*Expenditure-based*	*Episode duration (in years)*	*Front-loaded adjustment*	*Big-bang adjustment*
All countries								
Mean	–1.1	278.8	–2.4	7.9	74.6	2.2	69.4	51.4
St. Dev.	3.1	2754.2	13.0	16.4	43.7	1.3	46.2	50.1
Median	–1.0	0.4	–0.4	2.9	100	2.0	100	100
Obs.	177	172	171	172	177	177	173	173
With IMF								
Mean	–0.5	664.0	–1.7	10.0	79.7	2.5	71.4	54.8
St. Dev.	2.6	4455.9	6.0	17.6	40.6	1.6	45.5	50.2
Median	0.1	0.6	–0.4	3.2	100	2.0	100	100
Obs.	65	65	65	65	64	65	63	62
Without IMF								
Mean	–1.4	44.8	–2.9	6.7	71.4	2.1	67.6	49.1
St. Dev.	3.4	320.3	15.8	15.6	45.4	1.1	47.0	50.2
Median	–1.5	0.3	0.3	2.1	100	2.0	100	0
Obs.	112	107	106	107	113	112	110	111

	Legislative majority	*Executive election*	*Power decentralization*	*Success in approaching*	*Success in reaching*	*Success in maintaining*	*Success in persisting*
All countries							
Mean	67.6	41.8	48.0	82.6	65.2	47.2	37.1
St. Dev.	22.1	49.5	50.1	38.0	47.8	50.1	48.4
Median	66.9	0	0	100	100	0	0
Obs.	175	177	173	177	177	177	177
With IMF							
Mean	63.4	27.7	37.5	83.1	76.9	70.8	58.5
St. Dev.	20.1	45.1	48.8	37.8	42.4	45.8	49.7
Median	63.3	0	0	100	100	100	100
Obs.	65	65	64	65	65	65	65
Without IMF							
Mean	70.7	50.9	54.2	82.1	58.0	33.0	24.1
St. Dev.	22.6	50.2	50	38.4	49.6	47.2	43.0
Median	74.4	100	100	100	100	0	0
Obs.	110	112	109	112	112	112	112

Table 2. Success in Fiscal Adjustments: Adjustment Years (0.5% of GDP Threshold)

Probit estimations	*Success in approaching*[a]	*Success in reaching*	*Success in maintaining*	*Success in persisting*
Initial primary budget balance	0.008	0.017	0.025	0.022
	(0.58)	(1.48)	(1.22)	(1.65)*
Initial change of exchange rate	–0.000	–0.000	–0.000	–0.000
	(0.09)	(0.31)	(0.05)	(0.20)
Initial real GDP growth	–0.020	0.003	0.012	0.005
	(1.45)	(1.02)	(2.33)**	(1.29)
Initial inflation rate	–0.003	0.006	–0.001	–0.002
	(1.25)	(1.18)	(0.33)	(0.48)
Expenditure-based	15.09	0.353	0.073	0.165
	(1.87)*	(2.95)***	(0.50)	(1.83)*
Episode duration	0.176	0.140	0.314	0.178
	(1.55)	(2.88)***	(3.96)***	(3.65)***
Accumulated number of failures	–0.041	–0.089	0.055	0.043
	(0.99)	(2.45)**	(0.98)	(1.17)
Front-loaded adjustments	—	–0.230	–0.116	–0.066
	—	(2.53)**	(0.71)	(0.60)
Big-bang adjustments	25.51	0.361	0.490	0.118
	(2.75)***	(4.02)***	(3.58)***	(1.23)
Legislative majority	0.145	0.503	1.264	0.770
	(1.01)	(2.95)***	(4.26)***	(3.75)***
Executive elections	–2.13	–0.343	–0.547	–0.273
	(2.19)**	(3.42)***	(4.41)***	(3.23)***
Power decentralization	0.011	–0.133	–0.212	–0.040
	(0.14)	(1.48)	(1.34)	(0.38)
Initial IMF-standby arrangement	–0.348	0.135	0.477	0.284
	(1.08)	(1.71)*	(3.50)***	(3.00)***
Observations	106	152	152	152
Pseudo R^2	0.80	0.62	0.53	0.43
Log pseudo-likelihood	–10.65	–37.02	–49.51	–57.66
Prob > χ^2	0.000	0.000	0.000	0.000

Notes: Absolute value of *z*-statistics in parentheses. The reported coefficients are changes in the probability for an infinitesimal change in each independent continuous variable and a discrete change in the probability for dummy variables.

* Significant at 10%; ** significant at 5%; *** significant at 1%.

[a] In this specification, the front-loaded variable predicts perfectly the dependent variable, and thus, this variable is dropped from the equation. Also, the reported coefficients in this column have been multiplied by 1000.

(in terms of growth and the initial primary balance) tend to be worse for periods in which the countries did not have an IMF-supported program. Initial rates of inflation and exchange rate depreciation, however, are higher for countries with IMF-supported programs.

Table 2 shows the results of different probit model estimations for the economic and political determinants of the success in approaching, reaching, maintaining, and persisting with a fiscal stance consistent with fiscal sustainability. The results suggest that longer durations of adjustment episodes significantly increase the probability of

success, whereas better initial primary balances only contribute to increasing the success in persistence and by a small margin. Expenditure-based adjustments are helpful in approaching and reaching the sustainability threshold for the primary balance, but are less clearly related to maintaining public finances in a sustainable position for more than two years. This is consistent with results derived from other studies showing that expenditure reforms are necessary, but not sufficient to achieve sustainable positions. In some instances, revenue increases have contributed to a sustainable fiscal position (Adam and Bevan, 2003; Gupta et al., 2003).[13]

Front-loaded adjustments are negatively correlated with success in reaching sustainability, while big-bang adjustments show a systematic, large positive effect on the probability of approaching, reaching, and maintaining sustainability. As a result, those fiscal adjustments which rely on large deficit reductions and are concentrated in the second half of the adjustment episode have a higher probability of success.

The results also suggest that fiscal adjustments undertaken by governments with a majority in parliament are more likely to succeed. However, in pre-election periods, fiscal adjustment is less likely to be sustained. Decentralization does not seem to play a significant role in achieving and maintaining sustainability under any definition of success.

In addition, the results show that fiscal adjustments implemented under an IMF-supported program are more likely to succeed in reaching, maintaining, and persisting in fiscal sustainability. At the same time, adjustment under IMF-supported programs is not associated with success in *approaching* fiscal sustainability (that is, generating two-thirds of the improvement in the primary balance needed to achieve fiscal sustainability). This latter result is consistent with the existing empirical literature on the impact of IMF-supported programs. Bulíř and Moon (2003), among others, used the Generalized Evaluation Estimator (GEE) technique to measure the impact of the IMF-supported program on the composition and the economic impact of fiscal adjustments and, in line with previous studies, did not find any effect.[14]

Robustness Tests

The robustness of the above findings is tested by the following measures: (1) accounting for heterogeneity across countries (panel heterogeneity), (2) accounting for the endogeneity of some regressors, (3) using alternative definitions of fiscal adjustment, (4) estimating the effects of averaging observations by adjustment episode, and (5) excluding potential outliers from the sample.

Panel heterogeneity can be a problem if countries with considerable economic and institutional differences have been pooled together. The fact that these characteristics are country-specific and constant over time may result in autocorrelation in the error term. To address this, all probit regressions were rerun using nonzero between-cluster error terms. This allows us to specify that observations are independent across groups (clusters), but not necessarily independent within groups. Table 7 in the Appendix shows that in general all results are robust.

A second potential problem could come from the inclusion of the IMF dummy on the right-hand side of the equation.[15] A country may enter into an IMF-supported program only after its macroeconomic imbalances are unsustainable. This problem is dealt with by estimating the following system of two simultaneous equations:

$$\begin{aligned} Success(t) = {} & \alpha + \beta_1 PBBal_{t-1} + \beta_2 Exch_{t-1} + \beta_3 Growth_{t-1} + \beta_4 Infl_{t-1} \\ & + \beta_5 Exp_t + \beta_6 NFail_{t-1} + \beta_7 Dur_t + \beta_8 Front_t + \beta_9 Big_t \\ & + \beta_{10} Maj_t + \beta_{11} Elec_t + \beta_{12} Decent_t + \beta_{13} IMF_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$

$$\begin{aligned} IMF(t-1) = {} & \alpha + \beta_1 Success_{t-1} + \beta_2 PBBal_{t-1} + \beta_3 Exp_{t-1} + \beta_4 Growth_{t-1} \\ & + \beta_5 Infl_{t-1} + \beta_6 Dist_{t-1} + \beta_7 NFail_{t-1} \\ & + \beta_8 Maj_{t-1} + \beta_9 Elec_{t-1} + \beta_{10} Decent_t + \varepsilon_t. \end{aligned} \quad (3)$$

As can be observed in equations (2) and (3), the initial IMF-supported program is instrumented with the following variables: the success in reaching the threshold, all initial budgetary and economic conditions and all political constraints, the initial distance from the threshold, and the accumulated number of failures (which may motivate a country to seek IMF support). We apply a two-stage least squares estimation procedure with fixed effects (instead of cluster-specific error terms) to the panel of adjustment episodes.[16] Results are reported in Appendix Table 8. These show that our baseline results hold. Nonetheless, some country-specific variables lose part of their predictive power. This is particularly the case for the accumulated number of failures, meaning that a history of poor fiscal behavior is completely captured by the country-specific effect and the history of IMF programs.

Furthermore, we test the model using alternative thresholds. Appendix Table 9 reports results using a threshold of 1.5% of GDP.[17] Again, the results are broadly consistent with the baseline model. However, there are some changes in the statistical significance of a few variables. For example, the impact of an initial primary balance on the probability of success gains statistical significance. Also, the big-bang adjustment variable becomes significant for success in persisting in the consolidation effort. Legislative majority of the ruling party remains the dominating institutional variable, but the decentralization dummy also becomes significant, reducing the probability of reaching and maintaining fiscal sustainability.[18]

We further tested the robustness of the baseline model on the adjustment episodes sample. While the size of most coefficients tends to be smaller (Appendix Table 6), the results of the baseline model are broadly confirmed.[19]

We also sought to test the potential impact of large countries on the results. To this effect, we ran regressions that iteratively excluded large countries such as Argentina, Brazil, China, Indonesia, and Russia from the sample. There was no significant change in results.[20]

6. Policy Implications

The following lessons can be gleaned from the above results.

First, expenditure-based adjustments are not in themselves sufficient to maintain healthy public finances over the medium term; an effort on the revenue side is also needed (Gupta et al., 2003). Second, back-loaded adjustments are more successful in achieving fiscal sustainability than front-loaded consolidations; this may owe to the fact that they spread out the social costs of adjustment over time, and thus help keep at bay the political resistance to "staying the course." Third, majoritarian governments that implement adjustments in fiscally centralized countries after elections are the most likely to be successful, reflecting the higher degree of political consensus enjoyed by these governments in the post-election era. And finally, there is some evidence that points toward a positive effect of IMF-supported programs on the maintenance of

Table 3. The Characteristics of Fiscal Adjustments

	Dependent variable			
Probit estimations	*Expenditure-based*	*Front-loaded*	*Big-bang*	*Episode duration*
Expenditure based	—	–0.323	0.978	0.309
	—	(1.10)	(3.92)	(1.53)
Front-loaded	–0.354	—	–0.237	–1.147
	(1.24)	—	(0.93)	(6.34)***
Big-bang	0.954	–0.296	—	–0.629
	(3.98)***	(1.17)	—	(3.61)***
Episode duration	0.160	–0.597	–0.340	—
	(1.52)	(5.50)***	(3.45)***	—
Initial IMF arrangement	0.230	0.563	0.234	0.532
	(0.94)	(2.12)**	(1.06)	(3.06)***
Observations	165	165	165	165
Pseudo R^2	0.12	0.20	0.12	0.29
Log likelihood	–82.69	–82.62	–100.64	—
Prob > χ^2	0.0000	0.0000	0.0000	—

Notes: Absolute value of *z*-statistics in parentheses. Constants not reported.
The reported coefficients under Episode duration are from OLS regression. See notes under Table 2 for interpretation of the other coefficients.
*Significant at 10%; **significant at 5%; ***significant at 1%.

fiscal sustainability, but not necessarily on the likelihood of moving toward a sustainable fiscal position. This suggests that IMF-supported programs matter most in cases where countries are close to the sustainability threshold and are committed to achieving it, but are less influential in countries with large fiscal imbalances.

The mechanisms that lie behind the first three results are clear and supported by evidence in other studies (Gupta et al., 2003). With respect to the impact of IMF-supported programs, this may reflect, as noted above, a proxy for the commitment of the authorities to restore fiscal sustainability that would also positively affect market sentiment. Therefore, caution is needed in interpreting these findings and drawing policy implications.

Does the composition of fiscal adjustment undertaken in IMF-supported programs differ from the sample as a whole? Table 3 shows that having a program does not affect the composition of the adjustment or its size, but rather its timing and phasing.[21] Fiscal adjustment under an IMF-supported program tends to be more front-loaded than in the rest of the sample, and lasts longer. This result is of particular interest, as for the sample as a whole, back-loaded adjustments have a higher success rate. The differences in the results could owe to initial economic conditions, as countries with IMF-supported programs tend to have worse-than-average financial imbalances at the onset of the adjustment period (e.g., large pressures on the currency, lower GDP growth, and higher inflation). Under these circumstances, front-loading of the adjustment could be a result of the need to stabilize monetary aggregates and the exchange rate in a context of extreme vulnerability and limited access to financing. The composition of the adjustment is, however, not affected by the IMF program. Fiscal adjustments under

Table 4. Success in Fiscal Adjustments and the Role of IMF Programs: Adjustment Years (0.5% of GDP Threshold)

		Success in approaching	*Success in reaching*	*Success in maintaining*	*Success in persisting*
	Expenditure based	0.320	0.301	0.154	0.360
		(2.79)***	(2.58)**	(1.24)	(2.93)***
With	Episode duration	0.106	0.133	0.179	0.123
IMF		(3.35)***	(4.13)***	(5.20)***	(3.63)***
program	Front-loaded	0.195	0.154	0.178	–0.164
		(1.73)*	(1.34)	(1.45)	(1.36)
	Big-bang	0.179	0.284	0.168	–0.069
		(2.05)**	(3.19)***	(1.77)*	(0.74)
	Expenditure based	0.281	0.212	–0.076	–0.026
		(4.61)***	(2.47)**	(0.77)	(0.25)
Without	Episode duration	0.195	0.029	0.053	0.077
IMF		(6.22)***	(0.64)	(1.04)	(1.45)
program	Front-loaded	–0.004	–0.231	–0.080	0.017
		(0.08)	(2.79)***	(0.84)	(0.17)
	Big-bang	0.321	0.389	0.429	0.255
		(5.75)***	(4.94)***	(4.72)***	(2.70)***
	Legislative majority	0.332	0.611	0.804	0.660
		(1.41)	(2.55)**	(3.15)***	(2.61)**
With	Executive election	–0.073	–0.205	–0.246	–0.199
IMF		(0.78)	(2.16)**	(2.44)**	(2.00)*
program	Power decentralization	–0.103	0.087	–0.007	0.125
		(1.06)	(0.88)	(0.06)	(1.20)
	High initial target	–0.102	–0.087	–0.144	0.071
		(1.32)	(1.10)	(1.72)*	(0.85)
	Legislative majority	0.320	0.329	0.521	0.367
		(3.14)***	(2.29)**	(3.14)***	(2.13)**
Without	Executive election	–0.094	–0.201	–0.206	–0.073
IMF		(1.83)*	(2.77)***	(2.46)**	(0.84)
program	Power decentralization	0.066	0.036	–0.141	–0.119
		(0.90)	(0.34)	(1.18)	(0.95)
	High initial target	–0.129	–0.330	–0.008	–0.020
		(1.90)*	(3.45)***	(0.07)	(0.18)

Notes: Absolute value of *t*-statistics in parentheses. Constant included but not reported. See notes under Table 2 for interpretation of the coefficients.
*Significant at 10%; **significant at 5%; ***significant at 1%.

IMF-supported program are not based on spending cuts any more than they are in countries without IMF-supported programs.

These results are confirmed when the sample years are split between those under an IMF-supported program and those without, and simple regressions are run on the different definitions of success (see Table 4). For most variables, there are no statistically significant differences[22] in the estimated coefficients in the sample of countries with or without IMF-supported programs.

A final issue that we investigate is the effect of ambitious fiscal consolidation targets on the probability of success. To disentangle the possible influence of large initial fiscal

Table 5. Success in Fiscal Adjustments and the Role of High Initial Targets: Adjustment Years (0.5% of GDP Threshold)

Cluster-probit estimations	*Success in approaching*[a]	*Success in reaching*	*Success in maintaining*	*Success in persisting*
Initial primary budget balance	0.000	0.019	0.020	0.020
	(0.44)	(1.54)	(0.94)	(1.60)
Initial change of exchange rate	–0.000	–0.000	–0.000	–0.001
	(0.02)	(0.13)	(0.14)	(0.24)
Initial real GDP growth	–0.000	0.003	0.013	0.005
	(1.51)	(0.96)	(2.21)**	(1.32)
Initial inflation rate	–0.000	0.004	–0.001	–0.002
	(1.46)	(1.11)	(0.25)	(0.49)
Expenditure based	0.831	0.360	0.015	0.137
	(1.44)	(2.74)***	(0.10)	(1.69)*
Episode duration	0.000	0.167	0.362	0.170
	(1.46)	(3.27)***	(4.31)***	(3.83)***
Accumulated number of failures	–0.000	–0.050	0.125	0.060
	(0.99)	(1.20)	(1.96)*	(1.64)
Front-loaded adjustment	—	–0.250	–0.057	–0.043
	—	(2.48)**	(0.33)	(0.43)
Big-bang adjustment	5.324	0.445	0.583	0.135
	(1.75)*	(4.29)***	(3.84)***	(1.50)
Legislative majority	0.000	0.564	1.468	0.734
	(1.16)	(3.12)***	(4.31)***	(3.85)***
Executive elections	–0.006	–0.409	–0.579	–0.261
	(2.01)**	(3.71)***	(4.52)***	(3.35)***
Power decentralization	0.000	–0.051	–0.082	0.012
	(0.36)	(0.51)	(0.48)	(0.12)
Initial IMF-standby arrangement	–0.0008	0.132	0.512	0.261
	(1.06)	(1.60)	(3.47)***	(2.99)***
High initial target	–0.0006	–0.285	–0.418	–0.133
	(1.60)	(2.55)**	(2.65)***	(1.45)
Observations	106	152	152	152
Pseudo R^2	0.84	0.65	0.57	0.44
Log pseudo-likelihood	–8.54	–33.57	–45.72	–56.58
Prob > χ^2	0.000	0.000	0.000	0.000

Notes: Absolute value of *z*-statistics in parentheses. See Table 2 for interpretation of the coefficients.
* Significant at 10%; ** significant at 5%; *** significant at 1%.
[a] In this specification, the front-loaded variable predicts perfectly the dependent variable. Thus, this variable is dropped from the equation. Also, coefficients in this column are multiplied by 1000.

imbalances relative to the sustainable threshold of the primary fiscal balance, we create a new dummy variable. We first calculate the initial distance between the primary fiscal balance of a country and its debt-stabilizing primary budget balance in the year before the beginning of the adjustment episode.[23] This is equivalent, under our definition of success, to the initial fiscal target of the consolidation episode. If this target is missed, the probability of reaching and maintaining fiscal sustainability is by definition zero. We then create a dummy variable, labeled high initial target, that takes the value of one when the distance from the sustainability threshold was above the sample mean (zero otherwise). The probit results are reported in Table 5 and show that the impact

of high initial fiscal target on the likelihood of success is systematically negative for reaching and maintaining sustainability. For countries with a large initial fiscal imbalance, i.e., a more difficult fiscal consolidation target, the probability of reaching the sustainability threshold is reduced by almost one third, in addition to the effect of the size of their initial fiscal balance. These results show that while countries that adopt *big-bang* adjustments tend to be more successful than other countries, particularly when they spread the cost of the fiscal consolidation over many years, ambitious initial targets tend to make success more difficult.

7. Conclusions

This paper identifies factors behind successful fiscal adjustment in emerging market economies.

One important result is that initial financial vulnerabilities and institutional weaknesses may reduce the chance of success of fiscal consolidation episodes, particularly in a context of large initial deviations from a sustainable fiscal position. Furthermore, adjustments that seek to spread out the path of adjustment—that is, back-loaded adjustments—have a higher probability of success in reaching fiscal sustainability. This could be because front-loaded strategies are based on poor quality measures, including across-the-board expenditure cuts and distortionary revenue increases. Back-loaded adjustments provide the opportunity to phase-in adjustment over a longer period of time, and thus allow for the introduction of higher quality, more durable reforms, including measures to limit unproductive spending, expand the tax base, and improve tax administration. The other reason could be political: more gradual fiscal consolidations generate consensus and signal markets that fiscal discipline will be maintained over the medium term. However, there is no support for back-loaded adjustments to maintain fiscal sustainability over time.

Another important finding is that IMF-supported programs can help countries achieve fiscal sustainability. As noted, the results may not indicate the impact of the IMF-supported program per se; rather, they could reflect the fact that countries with such programs are more committed to adjustment than those without. Further research is needed to quantify the effects of other factors that explain why programs may have a salutary effect on success.

A final result of our paper is that the size of the adjustment is important. This confirms previous findings in the literature. Other things being equal, large fiscal adjustments signal the authorities' intention to put fiscal policy on a sound footing and achieve large reductions in the stock of public debt. At the same time, the results suggest those in need of fiscal adjustment are also the ones that are likely to abandon their adjustment efforts, given the significance of the "high initial target" variable. As such, the prospects for "staying the course" and achieving a steady path toward fiscal sustainability in high-debt countries should be judged with due caution.

Appendix

Appendix Table 6. Success in Fiscal Adjustments by Adjustment Episodes (0.5% of GDP Threshold)

Probit estimations	*Success in approaching*[a]	*Success in reaching*	*Success in maintaining*	*Success in persisting*[a]
Initial primary budget balance	0.000*	0.049*	0.000*	0.000*
	(1.81)	(1.86)	(1.94)	(1.69)
Initial change of exchange rate	–0.000	–0.000	–0.000	–0.000
	(0.52)	(0.27)	(0.10)	(1.64)
Initial real GDP growth	–0.000	0.009	–0.000	–0.000
	(0.15)	(0.98)	(0.78)	(1.16)
Initial inflation rate	0.000	0.029**	0.000	–0.000
	(1.47)	(2.27)	(1.26)	(0.43)
Expenditure-based	–0.000	0.180	0.000	0.000
	(0.57)	(0.96)	(0.62)	(1.22)
Episode duration	0.000*	0.197*	0.000**	0.000**
	(1.76)	(1.68)	(2.01)	(2.36)
Accumulated number of failures	–0.000*	–0.336***	0.000*	0.000
	(1.80)	(2.90)	(1.71)	(1.36)
Front-loaded adjustments	–0.000	–0.298	–0.100*	–0.000**
	(0.19)	(1.57)	(1.82)	(2.05)
Big-bang adjustments	0.000*	0.665***	0.629**	0.000***
	(1.67)	(3.68)	(2.34)	(2.88)
Majority	0.000	1.364**	0.000**	0.000**
	(1.43)	(2.42)	(2.06)	(2.39)
Elections	0.000	0.247	–0.000	–0.000*
	(1.35)	(1.27)	(1.54)	(1.65)
Decentralization	—	–0.407**	–0.465*	—
	—	(1.96)	(1.94)	—
Initial IMF-standby arrangements	–0.000	0.076	0.666**	0.000***
	(1.35)	(0.40)	(2.11)	(2.97)
Observations	88	88	88	88
Pseudo R^2	0.85	0.64	0.83	0.69
Log pseudo-likelihood	–7.64	–21.46	–9.97	–15.45
Prob > χ^2	0.000	0.000	0.000	0.000

Notes: Absolute value of *z*-statistics in parentheses. See notes under Table 2 for interpretation of the coefficients.

* Significant at 10%; ** significant at 5%; *** significant at 1%.

[a] In these specifications, the front-loaded variable predicts perfectly the dependent variable. Thus, this variable is dropped from the equation.

Appendix Table 7. Success in Fiscal Adjustments: Panel Heterogeneity Clusters (0.5% of GDP Threshold)

	By adjustment years				*By adjustment episodes*			
Probit estimations	*Success in approaching*[a]	*Success in reaching*	*Success in maintaining*	*Success in persisting*	*Success in approaching*[b]	*Success in reaching*	*Success in maintaining*	*Success in persisting*[b]
Initial primary budget balance	0.001	0.017	0.025	0.022	0.000***	0.049	0.000***	0.000
	(1.10)	(1.10)	(0.92)	(1.30)	(5.38)	(1.41)	(3.33)	(1.54)
Initial change of exchange rate	–0.000	–0.000*	–0.000	–0.000	–0.000***	–0.000***	–0.000	–0.000*
	(0.97)	(1.83)	(0.20)	(0.20)	(3.19)	(2.67)	(0.17)	(1.67)
Initial real GDP growth	–0.020	0.003	0.012***	0.005*	–0.000	0.009	–0.000	–0.000
	(1.56)	(1.34)	(3.61)	(1.77)	(0.30)	(1.49)	(1.31)	(1.25)
Initial inflation rate	–0.003	0.006	–0.001	–0.002	0.000***	0.029**	0.000**	–0.000
	(1.57)	(1.50)	(0.45)	(0.56)	(5.32)	(2.45)	(2.49)	(0.38)
Expenditure based	15.1**	0.353***	0.073	0.165	–0.000	0.180	0.000	0.000
	(2.51)	(2.68)	(0.39)	(1.09)	(0.96)	(0.95)	(0.67)	(1.42)
Episode duration	0.176***	0.140***	0.314***	0.178***	0.000***	0.197*	0.000***	0.000***
	(3.50)	(2.81)	(3.11)	(3.10)	(5.80)	(1.82)	(3.09)	(3.05)
Accumulated number of failures	–0.041*	–0.089*	0.055	0.043	–0.000***	–0.336***	0.000**	0.000**
	(1.73)	(1.90)	(0.91)	(1.11)	(7.07)	(3.43)	(2.00)	(2.09)
Front-loaded adjustments	—	–0.230**	–0.116	–0.066	–0.000	–0.298*	–0.100***	–0.000
	—	(2.45)	(0.56)	(0.48)	(0.36)	(1.72)	(2.62)	(1.37)
Big-bang adjustments	25.5***	0.361***	0.490***	0.118	0.000***	0.665***	0.629***	0.000***
	(3.17)	(6.09)	(4.65)	(1.37)	(7.53)	(3.63)	(3.43)	(3.44)
Legislative majority	0.145	0.503***	1.264***	0.770***	0.000***	1.364**	0.000***	0.000***
	(1.14)	(3.02)	(4.01)	(4.15)	(4.64)	(2.45)	(2.87)	(2.59)
Executive elections	–2.13	–0.343***	–0.547***	–0.273**	0.000***	0.247*	–0.000**	–0.000*
	(1.62)	(2.99)	(3.62)	(2.16)	(3.23)	(1.80)	(2.43)	(1.87)
Power decentralization	0.012	–0.133	–0.212	–0.040	—	–0.407**	–0.465***	—
	(0.19)	(1.28)	(1.43)	(0.33)	—	(2.03)	(2.82)	—
Initial IMF-standby arrangement	–0.348**	0.135	0.477***	0.284***	–0.000***	0.076	0.666***	0.000***
	(1.98)	(1.63)	(3.43)	(2.70)	(2.99)	(0.39)	(3.37)	(3.71)
Observations	106	152	152	152	88	88	88	88
Pseudo R^2	106	152	152	152	0.85	0.64	0.83	0.64
Log pseudo-likelihood	0.80	0.62	0.53	0.43	–7.64	–21.46	–9.97	–21.13
Prob > χ^2	–10.65	–37.02	–49.51	–57.66	0.000	0.000	0.000	0.000

Notes: Absolute value of *z*-statistics in parentheses. See notes under Table 2 for interpretation of the coefficients.
*Significant at 10%; **significant at 5%; ***significant at 1%.
[a]In this specification, the front-loaded variable predicts perfectly the dependent variable. Thus, this variable is dropped from the equation. Also, the reported coefficients in this column have been multiplied by 1000.
[b]In these specifications, the decentralization variable predicts perfectly the dependent variable. Thus, this variable is dropped from the equation.

Appendix Table 8. Success in Fiscal Adjustments: Endogeneity Tests (0.5% of GDP Threshold)

	By adjustment years				*By adjustment episodes*			
Two-stage least square with fixed effects	*Success in approaching*	*Success in reaching*	*Success in maintaining*	*Success in persisting*	*Success in approaching*	*Success in reaching*	*Success in maintaining*	*Success in persisting*
Initial primary budget balance	0.029	0.013	–0.000	0.025	0.012	0.023	0.042	0.026
	(1.73)*	(0.67)	(0.01)	(1.11)	(0.28)	(0.99)	(2.08)**	(1.22)
Initial change of exchange rate	0.000	–0.000	–0.000	–0.000	–0.000	–0.000	–0.000	–0.000
	(0.44)	(0.76)	(0.31)	(0.79)	(1.12)	(2.34)**	(1.03)	(0.62)
Initial real GDP growth	0.003	0.003	0.001	0.001	0.001	0.005	0.004	0.002
	(0.37)	(0.32)	(0.12)	(0.13)	(0.09)	(0.85)	(0.83)	(0.37)
Initial inflation rate	–0.000	0.008	0.001	–0.001	0.038	0.031	0.003	–0.002
	(0.02)	(2.38)**	(0.22)	(0.18)	(2.31)**	(3.33)***	(0.36)	(0.29)
Expenditure based	0.220	0.356	–0.015	0.132	0.340	0.235	0.047	–0.025
	(2.14)**	(2.93)***	(0.11)	(0.93)	(1.59)	(1.93)*	(0.43)	(0.23)
Episode duration	0.160	0.076	0.144	0.175	0.223	0.121	0.140	0.154
	(3.77)***	(1.52)	(2.47)**	(2.98)***	(2.03)**	(1.92)*	(2.53)**	(2.71)***
Accumulated number of failures	0.022	–0.047	0.048	0.063	0.037	–0.039	0.044	0.082
	(0.37)	(0.68)	(0.60)	(0.77)	(0.26)	(0.49)	(0.62)	(1.13)
Front-loaded adjustments	–0.080	–0.106	–0.001	–0.035	0.124	–0.132	–0.174	–0.301
	(0.76)	(0.86)	(0.01)	(0.24)	(0.42)	(0.78)	(1.17)	(1.96)**
Big-bang adjustments	0.207	0.245	0.197	0.022	0.188	0.408	0.451	0.472
	(2.23)**	(2.23)**	(1.54)	(0.17)	(0.88)	(3.37)***	(4.22)***	(4.28)***
Legislative majority	0.206	0.956	1.295	0.221	–0.613	0.223	0.840	0.231
	(0.72)	(2.84)***	(3.30)***	(0.56)	(0.82)	(0.52)	(2.25)**	(0.60)
Executive elections	–0.033	–0.188	–0.400	–0.344	0.182	0.045	–0.161	–0.061
	(0.42)	(2.05)**	(3.72)***	(3.19)***	(0.78)	(0.34)	(1.37)	(0.50)
Power decentralization	0.000	0.000	0.000	0.000	–0.772	–0.391	–0.577	–0.327
	(·)	(·)	(·)	(·)	(1.36)	(1.21)	(2.02)**	(1.11)
Initial IMF-standby arrangement	–0.112	0.082	0.162	0.135	–1.706	–0.643	0.374	0.558
	(1.37)	(0.86)	(1.45)	(1.20)	(2.44)**	(1.61)	(1.06)	(1.53)
Constant	0.191	–0.416	–0.743	–0.175	1.074	0.306	–0.354	–0.217
	(0.66)	(1.21)	(1.86)*	(0.44)	(1.33)	(0.66)	(0.87)	(0.52)
Observations	88	88	88	88	87	87	87	87
Overall R^2	0.40	0.48	0.48	0.32	0.13	0.32	0.54	0.43
Wald χ^2	722.14	363.07	155.91	90.68	115.57	232.84	178.25	105.06
Prob > χ^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Absolute value of *z*-statistics in parentheses.
*Significant at 10%; **significant at 5%; ***significant at 1%.

Appendix Table 9. Success in Fiscal Adjustments by Adjustment Episodes: Large Episodes (1.5% of GDP Threshold)

Cluster probit estimations	*Success in approaching*[a]	*Success in reaching*	*Success in maintaining*	*Success in persisting*
Initial primary budget balance	0.020***	0.034***	0.019**	0.003
	(3.92)	(2.74)	(2.43)	(0.82)
Initial change of exchange rate	–0.003***	–0.001	–0.003***	–0.001
	(2.61)	(0.60)	(2.72)	(1.62)
Initial real GDP growth	–0.011	–0.007	–0.002	0.001
	(1.62)	(1.14)	(0.24)	(0.26)
Initial inflation rate	0.005**	0.015	–0.002	0.000
	(2.48)	(1.34)	(0.70)	(0.35)
Expenditure based	0.325***	0.080	–0.070	0.090*
	(2.65)	(0.43)	(0.42)	(1.88)
Episode duration	0.025	0.164	0.222**	0.090**
	(0.64)	(1.53)	(2.28)	(2.04)
Accumulated number of failures	–0.263**	–0.184**	–0.043	–0.048
	(2.29)	(2.49)	(0.54)	(1.38)
Front-loaded adjustments	–0.224**	–0.245	–0.039	0.074*
	(2.46)	(1.07)	(0.18)	(1.89)
Big-bang adjustments	0.443***	0.487***	0.437***	0.170**
	(3.71)	(2.82)	(2.98)	(2.53)
Legislative majority	0.900***	0.518	0.618**	0.199*
	(4.18)	(1.47)	(2.01)	(1.78)
Executive elections	—	–0.355*	–0.331**	–0.153***
	—	(1.72)	(2.55)	(2.58)
Power decentralization	—	–0.259*	–0.265**	–0.004
	—	(1.89)	(2.45)	(0.08)
Initial IMF-standby arrangement	–0.137	0.108	0.352**	0.104
	(1.41)	(0.70)	(2.02)	(1.57)
Observations	61	61	61	61
Pseudo R^2	0.72	0.47	0.45	0.43
Log pseudo-likelihood	–8.77	–20.84	–23.10	–19.36
Prob > χ^2	0.000	0.000	0.000	0.000

Notes: Absolute value of *z*-statistics in parentheses. See notes under Table 2 for interpretation of the coefficients.

* Significant at 10%; ** significant at 5%; *** significant at 1%.

[a] In this specification, the executive election and power decentralization variables predict perfectly the dependent variable, and thus, both are dropped from the equation.

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Notes

1. These countries constitute the J. P. Morgan Emerging Markets Bond Index Global (EMBI), an international benchmark for the risk associated with public debt stocks.
2. Of course, there may be other reasons for a temporary tightening of fiscal policy, including for demand management purposes.
3. Alternative definitions were also used to test the robustness of the econometric results (see section 5).
4. The sustainable primary balance is estimated on the basis of the initial debt-to-GDP ratio and the difference between each country's long-term real GDP growth and long-term real interest rate.
5. The difference between this definition of sustainability and the one traditionally used in the literature can be illustrated by a simple example. Assume that country A's sustainable primary surplus is 3%, with a public debt to GDP ratio of 50%. Country A's pre-adjustment level of the primary surplus is 1% of GDP. As a result of the fiscal consolidation, the country's primary surplus increases to 4% of GDP and public debt falls to 45% of GDP. This country would be considered in a fiscally sustainable condition under both definitions. Now assume that country B has an initial debt to GDP ratio of 100% and a primary surplus of 1%. As a result of the fiscal consolidation the debt to GDP ratio falls to 95% and the primary surplus increases to 4% of GDP. However, based on equation (1), country B requires a primary surplus of 6% of GDP to stabilize the debt to GDP ratio over the medium term. In this case, country B would be considered in a sustainable position according to the traditional definition used in the literature but not according to the definition used in this paper.
6. Note that in all these studies, success is defined in terms of maintaining the reduction in the debt-to-GDP ratio achieved after a fiscal adjustment episode.
7. For a discussion of these issues, see Beck et al. (2001) and Weingast et al. (1981).
8. We omit the subscript *i* to indicate an episode for the sake of simplicity.
9. We take the sample in terms of adjustment years as the baseline, and use the sample by adjustment episodes to test robustness of our conclusions and to compare our results with past research. For example, by using the sample of adjustment years, we replicate the estimation pro-

cedures for the panel probit model used by Alesina, Perotti and Tavares (1998); by using the sample of adjustment episodes, we replicate the original specification of Alesina and Perotti (1996) and subsequent work undertaken using this approach (Purfield, 2003).

10. Data are drawn from several sources. Data on macroeconomic variables, such as inflation, exchange rates, real GDP growth, and fiscal deficit are from the *World Economic Outlook* (WEO); disaggregated data on the budget components are drawn from the *Government Finance Statistics* (GFS); and political variables come from the *Database on Political Institutions* (DPI) by Beck et al. (2001). The coverage of the government accounts is limited to central government in most cases, except where general government data are available. Data on public debt include both domestic and external *gross* debt. To assess the robustness of the results in light of concerns about data quality, we also tested the model using different subsamples, and econometric techniques that control for outliers (see section 5).

11. The variable that measures decentralization is labeled as "Author" in the aforementioned DPI database. If the states/provinces have authority on fiscal policy, the variable takes the value of one. Authority over "cultural affairs," or "planning" in communist systems does not qualify.

12. The countries are: Argentina, Bolivia, Brazil, China, Colombia, Côte d'Ivoire, Ecuador, Egypt, India, Indonesia, Jordan, Lebanon, Mexico, Nigeria, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Thailand, Turkey, Ukraine, Uruguay, and Venezuela.

13. We could not test the relative role of tax reforms in fiscal adjustment owing to the lack of data.

14. For broader evaluation of the impact of IMF-supported programs, see among others, Khan (1990); Conway (2000); Dicks-Mireaux et al. (2000); and Ivanova et al. (2003).

15. The potential endogeneity of other regressors in the equation is controlled for by the use of lagged terms in the specification.

16. This procedure allows us to control for endogeneity bias, since countries tend to access IMF support when they suffer from macroeconomic imbalances. We also assessed whether currency crises had an impact on the success or failure of fiscal adjustments, but found no significant effect.

17. Use of a threshold of 1% of GDP led to similar results.

18. We also used democracy as an alternative indicator of the quality of institutions, but it was not statistically significant in any specifications.

19. As suggested by an anonymous referee, we also estimated a model where the endogenous variable measures the distance between the initial fiscal balance and the sustainability threshold. The findings were similar to those obtained in the baseline model for the most important variables.

20. The results are available from the authors upon request.

21. This confirms the aforementioned findings of Bulíř and Moon (2003).

22. The statistical significance of the difference between regression coefficients was assessed using *t*-tests (at the 5% level).

23. The average distance for the whole sample was 2.7 percentage points.