IMF Staff Papers
Vol. 53, Special Issue

Who Adjusts and When? The Political Economy of Reforms

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Why do countries delay stabilizations of large and increasing budget deficits and inflation? And what explains the timing of reforms? We use the war-of-attrition model to guide our empirical study on a vast sample of countries. We find that stabilizations are more likely to occur when times of crisis occur, when new governments take office, when governments are "strong" (that is, presidential systems and unified governments with a large majority of the party in office), and when the executive branch faces fewer constraints. The role of external inducements like IMF programs has at best a weak effect, but problems of reverse causality are possible. [JEL H11, H61, H62]

Why do certain countries implement economic reforms relatively promptly and swiftly, whereas others delay them, letting significant economic costs accumulate? This issue puzzles economists and policymakers, and it is part of an even broader question: why do certain societies follow for long periods policies that are clearly costly and unsustainable? In many ways, this is the key issue at the core of political economics.[1]

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[1]See Drazen (2000) and Persson and Tabellini (2000) for two excellent broad treatments of this field.

The subject of the "political economy of reform" has received much attention.[2] The term "reform" generally refers to a major change in policy that goes beyond day-to-day policy management. Some reforms are stabilizations; others involve structural changes. A stabilization is normally interpreted as a major fiscal adjustment that significantly reduces a large budget deficit and/or stops a large inflation. Often but not always, large inflations and large deficits go together, especially in developing countries. Structural reforms may involve liberalization of goods markets, changes in the regulatory environment, labor market reforms, or trade liberalizations.[3]

Some of the reasons that reforms are delayed apply to both types of reforms, but in this paper we focus on stabilizations in Organization for Economic Cooperation and Development (OECD) countries and in developing countries. We consider the model of "war of attrition" applied to delayed reforms by Alesina and Drazen (1991)[4] and derive from it a series of empirical implications that encompass many of the hypotheses tested in the empirical literature on this topic. We show how the war-of-attrition model can be a useful tool to guide the empirical analysis on the political economy of stabilizations. In fact, the war-of-attrition model has two advantages: it allows the organization into a coherent framework of many empirical hypotheses investigated in the literature and offers some more, but also it explains why sometimes the evidence may be murky. We do not present any novel theoretical result; the contribution of the paper is empirical.

The key assumption of this model is that the political conflict over what type of stabilization to implement, in particular on the distribution of costs of the adjustment, leads to delays. A stabilization occurs when one of the competing groups can impose its desired policies on others that have exhausted their ability to resist the undesired stabilization. The nature of political institutions influences the distribution of political power between competing social groups, and this is the connection between the model and testable implications on institutional variables we investigate in this paper.

First of all, the war-of-attrition model is consistent with the "crisis hypothesis"—namely, with the idea that it is easier to stabilize more decisively in times of crisis than in times of more moderate economic problems. We find support for this hypothesis, for both inflation and budget deficits. In addition, and perhaps more interestingly, we examine under which political conditions a crisis is more likely to lead to a stabilization. As predicted by the war-of-attrition model, we find that stabilizations are more likely to happen when a crisis occurs with a "strong" government, which, presumably, can overrule political opposition to policy changes. For instance, stabilizations are more successful and easier to come by in presidential systems, in systems in which the executive faces fewer institutional veto

[2]Several influential contributions are in the volume edited by Williamson (1994). Tommasi and Velasco (1996), Rodrik (1996), and Drazen (2000) have also provided useful surveys of this literature.

[3]For a recent discussion of the political economy of structural reforms in the labor and product markets, see Boeri (2005). A special branch of the reform literature analyzes postcommunist transformations, but, by now, ex-communist countries are very much like other countries; therefore a special treatment of them does not seem necessary any longer (see Shleifer and Treisman, 2000).

[4]For extensions, see Drazen and Grilli (1993), Laban and Sturzenegger (1994), Casella and Eichengreen (1996), and Hsieh (2000).

points, in periods of unified government in which the same party holds the executive and the legislature, and in systems in which the majority of the ruling party (or parties) is large. We also find that a stabilization is more likely to occur immediately after an election, presumably when the new government enjoys a mandate and when new elections are a long time away. External inducements, such as IMF conditionality programs, have at best a moderate effect, even though problems of reverse causality abound in this paper. Results on stabilizations of budget deficits and inflation are relatively similar, but we also discuss some small differences. We should make clear that these results do not imply that certain types of government are inherently superior to others: the ability to stabilize is only one of the features that a society may require in a government, but there are certainly others, such as fairness, responsiveness to changes in society's preferences, and checks and balances. Spolaore (2004) and Aghion, Alesina, and Trebbi (2004) have recently discussed this kind of trade-off in a context related to that of the present paper.

The paper is organized as follows. In section 2 we describe the war of attrition model of delayed stabilizations and we derive several empirical implications from it. In section 3 we review existing evidence on these empirical implications. In section 4 we present our data set and the methodology of our tests. In section 5 we test various implications of the war of attrition model on budget deficits. In section 6 we consider similar evidence on inflation. The last section concludes.

I. Delayed Stabilizations: The War-of-Attrition Model

The Structure of the Model

The model considers an economy that, after a negative permanent shock (not explained by the model itself), is on an unstable fiscal path—imagine a permanent fall in tax revenues for given tax rates or a permanent increase in spending. Consider, in particular, an economy running a budget deficit financed in part with foreign borrowing and in part by printing money, that is, by the inflation tax, which is especially distortionary.[5]

A stabilization is an increase in revenues (or a cut in spending, but for the sake of exposition, we will talk only of increasing revenues and will hold spending constant) so that the debt stops growing and inflation disappears; thus, the budget is balanced with a noninflation tax such as an income tax (which is assumed to be less distortionary than inflation), and there is no more external borrowing. The government continues to pay interest on the accumulated debt, and no default is allowed. In this economy, a social planner would stabilize immediately because delaying a stabilization is costly for two reasons: it accumulates the distortionary costs of inflation and increases the interest burden for the government because external debt is accumulating.[6]

[5]For the generic war-of-attrition model, see Bliss and Nalebuff (1984). The adaptation to a monetary and fiscal stabilization problem is by Alesina and Drazen (1991). Drazen (2000) offers a simplified exposition of this model.

[6]As Drazen and Grilli (1993) point out, accumulation of debt is unnecessary as long as the inflation tax is more distortionary than the income tax.

Delays in the stabilization emerge from political conflict between two different groups in this society (there could be *N* groups, but we focus on the simpler case). These could be social groups and could be represented by different political parties. Each group acts as a single agent, and there is no analysis of its internal organization. The groups disagree on how to allocate the cost of the stabilization; each group would like to charge to the other a large fraction of the additional taxes needed to stabilize the budget. By assumption, one of the groups has to pay more than half of the costs of stabilization; we will represent this as follows: a share α with $\frac{1}{2} < \alpha \leq 1$ and α is a given parameter.[7]

The question is which group will accept to pay a fraction α of the cost of the stabilization. Each group has a veto power on the stabilization, and each group is uncertain about the other group's evaluation of the costs, that is, each group knows how costly it is for it to wait but does not know how costly it is for the other group to delay the stabilization.[8]

The essence of the war of attrition is the following: the passage of time will reveal which of the two groups is the weaker, that is, which group must pay a higher cost for waiting. At any given time, a group will choose to wait if the marginal cost of waiting is lower than the marginal benefit of waiting. The marginal cost is given by the cost of not having the stabilization for another instant—that is, of living in an unstable economy for another instant. The marginal benefit is given by the probability that in the next instant the opponent group concedes, multiplied by the difference in lifetime utility of the winner group (which pays a fraction $(1 - \alpha) < \frac{1}{2}$ of the stabilization costs) and the utility of the loser (which pays a fraction $\alpha > \frac{1}{2}$).[9]

The game ends when, for one of the groups, the marginal benefit becomes less than the marginal cost, and this will occur sooner for the group with the higher cost of waiting. So, in the end, the weaker group (that is, the one that suffers more from the delays) will concede. But resolution is in general not immediate because the passage of time is needed to reveal which of the groups is the weaker. Delaying a stabilization is costly for society as a whole, and it is Pareto inferior to immediate stabilization, but it is individually rational for each of the two groups to wait because of the potential benefits of being the winner rather than the loser.

Expected Delays: Comparative Statics and Testable Implications

Stabilization is in general delayed.[10] It is delayed not only when $\alpha = \frac{1}{2}$; in fact, if there were no gain in winning or losing, there would be no gain in waiting, and both groups would "concede" immediately. Also, there would be immediate

[7]See Hsieh (2000) for an extension of the model on this point.

[8]More precisely, a cost parameter is drawn from the same well-behaved distribution; one group knows its own parameter and knows that the other group's parameter is drawn by the same distribution.

[9]It is straightforward to compute the lifetime utility of the two groups (winner and loser) because the model assumes that no more crises will occur and the economy will be in the stable equilibrium forever.

[10]More precisely, the expected time of a stabilization is positive—that is, a stabilization does not occur immediately. It would occur immediately if one group had the maximum possible realization of the cost parameter. Also, the analysis focuses on symmetric equilibria.

stabilization with full knowledge of costs: the weaker group would know that in the end it would be the loser; therefore, it would decide that it may as well concede immediately and save itself the cost of delay.

Thus an unresolved political conflict in which the groups agree to share half and half and some uncertainty about relative costs are necessary and sufficient conditions to generate delays. So what makes a stabilization happen?

(1) *The passage of time.* At some point, one of the groups finds it too costly to wait, and it concedes, that is, it agrees to pay the fraction α of the costs. In a symmetric equilibrium, this moment coincides with the one in which one group realizes that it has a higher cost of waiting than its opponent. Note that nothing observable may have occurred in that instant; simply, the passage of time may have resolved the uncertainty about the relative strength (that is, the relative marginal cost of waiting) of the two groups. The longer an economy remains unstable, the more likely it is that a stabilization will occur. However, there could be a countervailing effect: in certain cases, societies may develop institutions that reduce the cost of the economic instability. Consider, for instance, the use of indexation to reduce the costs of inflation.

(2) *Crises.* A crisis—namely, an economic downturn—may anticipate the reforms precisely because the relative costs of waiting and fighting the war tilt in favor of concession. This is more likely to be the case if the crisis weakens one group in particular, causing it to recognize its weaker status and to concede quickly. Drazen and Grilli (1993) show that for this reason a crisis can be welfare improving. In fact, it reduces welfare directly by worsening the economic situation, but it leads to an earlier stabilization, which reduces the costs of waiting. If the second effect is greater than the first one, a crisis can lead to an increase in aggregate benefits.

(3) *The nature of political institutions.* In addition to the economic costs of delaying reforms, there may also be political costs of delays. These are the costs of blocking the other group's attempt to impose a stabilization favorable to itself; blocking may take the form of lobbying or active political participation (for example, strikes). This interpretation of the costs makes especially clear the connection between stabilizations and the institutional characteristics of the country. In political systems where the executive has strong powers and cannot be blocked by the opposition easily, the opposition that does not hold the executive faces high costs of "fighting the war of attrition." On the other hand, costs are lower if the executive can easily be kept in check. Imagine a situation in which one group solidly controls policymaking and it is very costly or impossible for the opponent to effectively exercise veto power. In such a situation, a stabilization would occur very soon (if not immediately) because the group that holds power would impose it on the other. Therefore, political systems (such as presidential systems with a powerful executive) that make it difficult for the opposition to veto a policy should see earlier stabilizations. However, these same systems, precisely because of the uneven distribution of political power and lack of veto power, may generate a very uneven distribution of costs of the stabilization. Spolaore (2004) analyzes the trade-off between early stabilizations and uneven distributions of costs in a related context.

(4) *Political consolidations and elections.* A stabilization may be more likely to occur after a political consolidation in which one of the two groups becomes more powerful and makes it impossible (or too costly) for the opponent to veto a stabilization program. A political consolidation may be the result of an election in which a weak preexisting government either gains strength or is replaced by another one with a strong majority or mandate. Thus, stabilizations may be more likely immediately after elections, precisely because elections may reveal which groups are stronger. As a result of losing an election, weaker groups may concede to stronger groups. On the other hand, right before an election both groups have an incentive to hold on, to see whether the election resolves the uncertainty about which group is stronger.

(5) *External inducements.* The nature of the war of attrition and, therefore, the timing of stabilizations may be affected by external factors. For example, a binding agreement with an international lending organization like the IMF may increase the costs of delaying the adjustment, making the resolution of the war occur sooner. On the other hand, an agreement with the IMF that provides more resources to the country and does not force the country to commit to any particular set of policies may delay the stabilization because, in practice, the agreement reduces the cost of delay by providing easier access to borrowing. Similar considerations apply to foreign aid. Certain types of foreign aid, if disbursed in ways that benefit all competing groups, may delay stabilization by making life easier, a point made by Casella and Eichengreen (1996). However, certain types of foreign aid may also make one group stronger and resolve the war of attrition sooner. In many ways, this is the reverse argument of the crisis hypothesis discussed above.

Before turning to our empirical tests of some of these hypotheses, we briefly review the existing empirical literature that relates to these arguments.

II. The Empirical Evidence: Review and New Tests

Review of the Existing Literature

The only paper of which we are aware that explicitly tests the war-of-attrition model of stabilizations is Hamann and Prati (2002) on inflation. However, many other authors have obtained results more or less directly related to the empirical implications listed above.

(1) *The passage of time.* Sometimes a stabilization may occur after several failures even when nothing observable has changed; in such a case, the passage of time alone may make the stabilization possible. Interestingly, this hypothesis may complicate the test of other hypotheses that certain occurrences generate adjustments. Alesina and Drazen (1991) offer a few examples of successful stabilizations that occurred a few years after identical attempts had failed; in these cases, the passage of time alone seemed to account for the success.[11]

[11]See also Alesina (1988) for a discussion of several historical cases of debt reduction in line with the war-of-attrition model.

Hamann and Prati (2002), in their study of stabilizations of high inflation (defined as higher than 40 percent per year), do not find that the passage of time increases the probability that stabilizations will occur. They argue—correctly in our view—that this may be due to the existence of institutions such as indexation that may reduce the costs of inflation and therefore prolong the war of attrition.

(2) *Crises.* Tommasi and Velasco (1996) go as far as saying that the hypothesis that crises lead to stabilizations is part of the "conventional wisdom" (see also Nelson, 1990; and Williamson, 1994). Considering this hypothesis to be conventional wisdom may be a bit premature, however, given the difficulty of testing it, for obvious reasons of reverse causality. Without a crisis, there would be no need for a stabilization. Hence, we could not observe the latter. The authors testing for this hypothesis are of course aware of this problem and do their best to address it (see Bruno and Easterly, 1996; and Drazen and Easterly, 2001). Drazen and Easterly use the concept of "ranking reversal." They consider countries in the lowest decile in terms of a certain variable (for example, inflation or budget deficits), and they test whether the "worst" countries move up in the ranking when they stabilize. They suggest that the crisis hypothesis holds: the worse a country's ranking is before a stabilization, the higher its ranking after. They find evidence that crises induce ranking reversal for inflation and the black market premium on exchange rates, but they fail to find evidence for budget deficits and growth. Hamann and Prati (2002) also offer strong supporting evidence of the crisis hypothesis on inflation. They show that the higher the rate of inflation before the stabilization, the higher the chance that the stabilization will succeed. Perotti (1999) looks at deficit reduction policies in OECD countries and finds that more successful fiscal stabilizations occur in "bad times," that is, in times when the public debt is high and growing fast. Alesina and Ardagna (1998) also present some evidence consistent with this hypothesis. Incidentally, because the accumulation of public debt requires time, this is also an indirect test that the passage of time increases the probability of a successful fiscal stabilization. Finally, several specific episodes seem to support the crisis hypothesis, and that explains its popularity. For instance, the Italian fiscal adjustment of 1992, which was delayed for many years of mounting deficits, appears strongly motivated by the crisis of that year, which excluded Italy from the fixed exchange rate area and increased its risk of default.

A related point concerns the fact that adjustments in bad times may actually bring about an immediate benefit to the economy; these are cases of "expansionary adjustments." Evidence that in time of crisis stabilizations can be expansionary even on impact can be found in Easterly (1996) on inflation and in Perotti (1999) on budget deficits in OECD countries.[12]

(3) *The nature of political institutions.* The issue of how the different political institutions affect economic outcomes has received much attention; Persson and Tabellini (2003) offer the broadest and most comprehensive empirical treatment of the subject even though they do not directly address the issue of stabilizations per se.

[12]For related literature on expansionary fiscal adjustments, see Giavazzi and Pagano (1990); Alesina, Perotti, and Tavares (1998); and Giavazzi and others (2005).

For our purposes, a few of their results are particularly relevant. One is that they find that presidential systems have lower deficits and smaller governments. Also, among OECD countries, parliamentary systems have larger deficits than majoritarian systems, a result also found by Milesi-Ferretti, Perotti, and Rostagno (2002) using different definitions of proportionality. This is related to earlier findings (Roubini and Sachs, 1989; and Grilli, Masciandaro, and Tabellini, 1990) that in OECD countries coalition governments have larger budget deficits.

More directly related to stabilizations is the result by Hamann and Prati (2002). They find that the larger the number of institutional constraints on the executive, the more delayed and less successful the inflation stabilizations are.[13] Veiga (2000) shows that an index of government fragmentation is a good predictor of the delay of inflation stabilizations. Also, Alesina, Perotti, and Tavares (1998) show that in OECD countries coalition governments are less likely to implement successful fiscal stabilizations.

Note that this does not mean that certain types of governments are "better" than others. Governments that stabilize more easily may create other costs for the economy.[14] In addition, governments that stabilize sooner may be those that are also more able to impose a very uneven distribution of the costs of stabilization.

(4) *Political consolidations and elections.* The idea that adjustments are implemented at the beginning of an electoral cycle is consistent with two assumptions that are not mutually exclusive. One is the idea of political consolidations in a war-of-attrition model, the other is the political business cycles hypothesis. Especially relevant for our purpose here is the recent literature on political budget cycles, which investigates whether budget deficits increase before elections. This literature is rather large, and we cannot review it carefully here.[15]

Recent results by Akhmedov and Zhuravskaya (2004), Brender and Drazen (2005b), and Shi and Svensson (forthcoming) suggest that political budget cycles are present in some democracies but not in others: they are common in new democracies and in those with less freedom of the press. If deficits tend to increase in election years, obviously this implies that fiscal stabilizations do not occur at that time. But, as these papers show, political budget cycles are less drawn out than people perceive. Interestingly, Peltzman (1992) on U.S. states; Alesina, Perotti, and Tavares (1998) on OECD countries; and Brender and Drazen (2005a) on a vast sample of both developing and developed countries find that pre-electoral deficits do not help the incumbent get reelected. Hamann and Prati (2002) show that inflation stabilizations are more likely to occur immediately after a change of leadership, a result consistent with the implications of the war-of-attrition model. Note, however, that an electoral result that increases the majority advantage of an old leader may have the same effect in the war-of-attrition model because it could also be a political consolidation.

[13]With specific reference to Latin America, Lora (2001) finds inconclusive evidence on this point.

[14]For instance, Persson and Tabellini (2003) suggest that presidential systems follow more procyclical fiscal policies.

[15]For a broad discussion of the literature on political business cycles, see Alesina, Roubini, and Cohen (1997) and Drazen (2000).

(5) *External inducements.* Many types of external (that is, foreign to the country in crisis) factors can influence the timing of stabilizations. One of these is foreign aid. As we discussed above, foreign aid can make the adoption of stabilization policies more or less likely, depending on how it is disbursed. The empirical literature on the effect of foreign aid, specifically in creating incentives for good policy, is vast and very politically charged. One of the reasons for the debate is the problem of reverse causality: foreign aid should go to countries in trouble, so a correlation of bad policies and delayed stabilizations with foreign aid can have different causal interpretations. A recent pessimistic view about the effects of foreign aid is in Easterly (2006), who also provides a good assessment of the literature. It is fair to say that the evidence that foreign aid has provided good incentives to adopt good policy is mixed at the very best.

A related question is whether IMF-assisted programs (IMF conditionality) help. A relatively upbeat assessment is in Ghosh and others (2005), but this literature, too, is highly charged with debate, somewhat similar to the debate surrounding foreign aid and with a similar problem of direction of causality. Barro and Lee (2002) provide a critical view on the role of the IMF as promoter of successful macroeconomic policies. Easterly (2006) argues that IMF and World Bank adjustment loans have failed to provide the correct incentives for countries to implement long-lasting and successful polices.[16]

However, there is some evidence that at least some forms of external inducements provide the proper incentives for countries to reform successfully. Informal observations suggest that the inducement to being admitted in the European Monetary System created incentives for certain countries (especially Italy and Greece) to quickly reduce their mounting budget deficits.

New Tests

What do we add to this rich literature? First, we consider in a unified and coherent way how the points addressed above might pertain to both deficits and inflation in a large sample of countries, including both OECD and developing countries. Second, we present new tests. In particular, we investigate the interaction between the crisis and other features of the polity and the economy—that is, a crisis can generate adjustments, but what makes a crisis more likely to do so? How large must a crisis be to generate a stabilization? What types of governments react more quickly to a crisis? And when do they react relative to the electoral cycle? Can external factors affect the timing? How do crises interact with external inducements?

Thus, the key parameter of interest for us will be the interaction term between an indicator of crisis and some institutional variable or some other indicator that we use to test the implications of the war-of-attrition model as sketched above.

[16]IMF conditionality may work better if the country feels that it "owns" the program, that is, if the program is not imposed on the country. For a recent discussion of the political economy of IMF conditionality and its relationship with domestic politics, see Drazen (2002).

III. Data and Methodology

Data

This section describes the data we employ in the empirical analysis. We use yearly data on a large sample of developed and developing countries covering a maximum time span from 1960 to 2003. We use data on total government deficit as a share of GDP and inflation (computed from the consumer price index) from the IMF's International Financial Statistics database.[17]

Data on macroeconomic variables (the real per capita GDP and the ratio of exports plus imports to GDP) are from the Penn World Table 6.1 database, and data on financial development are from the World Bank database on Financial Development and Structure.[18] Data on IMF programs have been provided to us directly by the IMF. Finally, the Database of Political Institutions (DPI) of the World Bank, compiled by Beck and others (2001) and updated in 2004, contains all the political variables employed in the analysis, except for our measure of institutional constraints on the executive, which comes from the data set of political institutions Polity IV. Appendix Table A.1 summarizes definitions and sources of the political variables we use in the paper.[19]

On the basis of the (pooled) empirical density of the deficit-GDP ratios and inflation levels, we define a variable *CRISIS,* a dummy taking value 1 if the country is currently in crisis (of fiscal or monetary nature, the relevant definition varying depending on the left-hand-side variable of interest), zero otherwise. A fiscal crisis for a country corresponds to a deficit-GDP ratio above the 75th percentile of the deficit-GDP ratio empirical density (equal to 4.75 percent); similarly, an inflation crisis corresponds to inflation levels above the empirical 75th percentile (equal to 14.05 percent). To prevent our results from being driven by outliers, we have replaced the values in the 1st and in the 99th percentiles of the empirical distributions of the deficit-GDP ratio and of inflation in the data with their closest values. We have extensively checked (and confirm) that the evidence we show is not unduly sensitive to the particular values chosen to replace extremely high and low values in the data, nor to the choice of the threshold we use to define a crisis.

With regard to form of government, we isolate presidential systems from alternative systems. In particular, we redefine the discrete variable *SYSTEM* in the DPI database into a presidential system indicator (*PRES*), which takes value 1 if the president is elected directly and zero if the president is elected by either the assembly or parliament. This definition corresponds to a rough approximation of the structure of checks and balances within a political system and pivots around the

[17]Deficit over GDP for country *i* at time *t* is computed by redefining surpluses, variable series 80 . . . ZF. The consumer price index series are the variable series 64 . . . ZF. We also checked our results employing the GDP deflator from series 99BIPZF to compute the inflation rate for country *i* at time *t.* Results are robust.

[18]The World Bank database is available online at http://www.worldbank.org/research/projects/finstructure/database.htm

[19]We also refer the reader to the original source book of the DPI database for more information on the variables. It can be found at http://siteresources.worldbank.org/INTRES/Resources/DPI2004_variable-definitions.pdf

separation of powers between the executive body (the president) and the legislative body (the parliament). A measure of the structure of the electoral law is given by the variable *PROP,* which takes value 1 if the electoral rule for the lower house is a form of proportional representation and zero otherwise (that is, all forms of plurality voting). The effective control of the legislative body by the ruling executive is summarized by the indicator variable *UNIFIED,* which takes value 1 if the party of the executive controls the absolute majority of the legislative and zero otherwise. We capture the political orientation of the executive with the indicator *LEFT,* which is equal to 1 if the executive belongs to a party of the left and zero if the executive belongs to a right-wing or centrist party. The electoral dummies that indicate if, in a given year, legislative or presidential elections are held are *LEGELEC* and *EXELEC,* respectively. We employ these variables in our analysis of political cycles together with another discrete variable, *YRCURNT,* which counts the number of years left in the current term. Finally, the variable *EXECONST* measures the institutional constraints on the executive. This indicator ranges from 1 to 7, with 1 representing the fewest executive constraints and 7 representing the most.

Table 1 presents some interesting summary statistics on the frequency of crises in different political systems. Column 1 shows that deficit crises are distributed fairly uniformly among political systems, the relative frequency of occurrence being about 0.3 for all of the categories. Thus, deficit crises do not occur especially more often in one particular type of system than they do in any other. In the case of inflation

Table 1. Relative Frequency of Crises and Reforms

	(1) Deficit Crises	(2) Inflation Crises
Presidential systems	0.29	0.37
Parliamentary systems	0.30	0.20
Proportional systems	0.26	0.30
Majoritarian systems	0.30	0.18
Unified governments	0.28	0.32
Divided governments	0.29	0.24
Left governments	0.34	0.28
Right + center governments	0.26	0.30
Legislative elections years	0.33	0.27
No legislative elections years	0.29	0.29
Executive elections years	0.28	0.36
No executive elections years	0.30	0.28

Notes: Deficit crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent, which is the value of the 75th percentile of the deficit-GDP ratio empirical density. Inflation crises = country-years observations in which inflation is equal to or greater than 14.05 percent, which is the value of the 75th percentile of the inflation empirical density. Presidential/parliamentary systems: indicator variable *PRES* = 1/0. Proportional/majoritarian systems: indicator variable *PROP* = 1/0. Unified/divided governments: indicator variable *UNIFIED* = 1/0. Left/right + center governments: indicator variable *LEFT* = 1/0. Legislative elections years/no legislative elections years: indicator variable *LEGELEC* = 1/0. Executive elections years/no executive elections years: indicator variable *EXELEC* = 1/0. See also Appendix Table A.1.

(column 2), there is a bit more variation. Presidential systems have the highest frequency of inflation crises (0.37). This is mostly driven by the experience of Latin America, where many countries have presidential regimes and where inflation has been traditionally high. We discuss other issues specific to Latin America below. Table 2 shows the average deficit (column 1) and the average inflation (column 3) during crises. Columns 2 and 4 report the average response the year after a country enters a crisis. We consider budget deficits first. The response in presidential systems is about twice as large as the one in parliamentary systems. Unified governments react twice as often as divided governments; majoritarian systems react more often than parliamentary systems. In executive election years, the deficit reduction is much smaller than in nonexecutive election years. In the case

Table 2. Politics, Deficit, and Inflation Crises—Average Values

	Crises		Crises	
	(1) Deficit/GDP	(2) Δ(Deficit/GDP)	(3) Inflation	(4) ΔInflation
Presidential systems	6.63	–1.82	45.61	–7.06
	(0.25)	(0.24)	(2.50)	(1.67)
Parliamentary systems	7.73	–0.69	38.29	–2.12
	(0.21)	(0.17)	(3.01)	(2.25)
Proportional systems	8.04	–0.81	49.21	–7.43
	(0.25)	(0.20)	(3.08)	(1.99)
Majoritarian systems	6.07	–1.30	27.86	–4.80
	(0.25)	(0.25)	(2.87)	(2.98)
Unified governments	7.04	–1.40	40.24	–6.39
	(0.25)	(0.25)	(2.57)	(2.05)
Divided governments	7.73	–0.78	47.92	–3.76
	(0.23)	(0.16)	(3.59)	(2.00)
Left governments	8.02	–0.85	45.42	–3.28
	(0.30)	(0.24)	(3.75)	(2.83)
Right + center governments	7.56	–0.96	51.32	–4.77
	(0.27)	(0.22)	(3.78)	(2.10)
Legislative elections years	7.62	–0.92	42.53	–3.42
	(0.34)	(0.29)	(4.24)	(2.81)
No legislative elections years	7.04	–1.36	43.41	–6.00
	(0.18)	(0.17)	(2.20)	(1.53)
Executive elections years	8.22	–0.17	50.65	–3.59
	(0.61)	(0.61)	(6.87)	(3.01)
No executive elections years	7.08	–1.35	42.23	–5.70
	(0.17)	(0.15)	(2.01)	(1.47)

Notes: Crises = country-years observations in which the deficit-GDP ratio (inflation rate) is equal to or greater than 4.75 percent (14.05 percent), which is the value of the 75th percentile of the deficit-GDP ratio (inflation rate) empirical density. Presidential/parliamentary systems: indicator variable *PRES* = 1/0. Proportional/majoritarian systems: indicator variable *PROP* = 1/0. Unified/divided governments: indicator variable *UNIFIED* = 1/0. Left/right + center governments: indicator variable *LEFT* = 1/0. Legislative elections years/no legislative elections years: indicator variable *LEGELEC* = 1/0. Executive elections years/no executive elections years: indicator variable *EXELEC* = 1/0. See also Appendix Table A.1. Standard errors of the mean are in parentheses.

of inflation, similar results hold, with one interesting exception: the reaction in proportional electoral systems is stronger than in majoritarian systems. Much of this impressionistic and preliminary evidence is consistent with the implication of the war-of-attrition model. We now turn to a more careful statistical analysis of the data.

Empirical Model: Adjustments and Political Institutions

We now describe our empirical strategy. For country i at time t, let us define the outcome of interest y_{it}, where y is either the deficit-GDP ratio or inflation. Consider a horizon of interest for a stabilization of s periods, where $s > 0$. In the empirical implementation we typically restrict our attention to four years: $s = 1, \ldots, 4$. The change in y_i over the period $[t, t + s]$ is defined as $\Delta_s y_{it} = y_{i,t+s} - y_{it}$. The variable $\Delta_s y_{it}$ is the regressor and is determined by the following empirical model:

$$\Delta_s y_{it} = \beta_0 + \beta_1 \frac{1}{s}\sum_{k=1}^{s} POL_{i,t+k} + \beta_2 CRISIS_{it} + \beta_3 CRISIS_{it} \frac{1}{s}\sum_{k=1}^{s} POL_{i,t+k} + u_{i,t+s} \quad (1)$$

$$CRISIS_{it} = I\left[ECDF(y_{it}) > \tau\right] \text{and } \tau = 0.75 \quad (2)$$

$$u_{it} = \delta_t + \lambda_i + \varepsilon_{it}. \quad (3)$$

In equation (1) we indicate the political variable of interest as POL_{it} (averaged over $[t, t + s]$) and we define the crisis indicator as $CRISIS_{it}$, setting it equal to 1 in the fourth quartile of the (pooled) empirical cumulative function of y, as indicated in equation (2). The specification is completed by a two-way error component in equation (3), accounting for country-level and year fixed effects. We estimate our model defined by equations (1)–(3) by ordinary least squares, and we correct the standard errors for heteroscedasticity.

Notice that in the presence of highly persistent political covariates, such as form of government (*PRES*) or electoral rule (*PROP*), the average level $\frac{1}{s}\sum_{k=1}^{s} POL_{i,t+k}$ over the adjustment horizon considered is practically constant with respect to t. In the instance of POL_{it} constant over time, β_1 is not identified in equation (1). The parameter β_2 in equation (1) captures the crisis hypothesis—that is, the size of the adjustment $\Delta_s y_{it}$ should depend negatively on the presence of the crisis. This implies that $\beta_2 < 0$. The parameter β_3 on the interaction between the crisis dummy and *POL* indicates an increase or a reduction of the marginal impact of the crisis on the size of the adjustment (again, a negative coefficient indicating a larger adjustment), depending on the specific political feature considered. Different predictions are associated with different political institutions and we analyze them in Section IV.

Empirical Model: Extensions

Consistency in the estimation of the vector of parameters of interest (β_2, β_3) is achieved under the assumption that the process generating the idiosyncratic

error component ε_{it} is uncorrelated within and across countries to the covariates set, ruling out bias owing to omission of relevant variables.[20]

A straightforward check in this direction is to include time-varying covariates X_{it} to the specification. We include in X the natural log of real per capita GDP, trade volume measured by the ratio of exports plus imports to GDP, and the value of credits by financial intermediaries to the private sector divided by GDP. The latter variable is one of the measures of depth of financial markets used by Levine, Loayza, and Beck (2000). All variables included in X are measured at time t.

Moreover, we also control for time-invariant covariates by expanding equation (1) with an appropriate set of interactions. In particular, we checked that our results are not driven by the Latin American countries, and we allow the coefficients to vary across developed and developing countries.

A final extension of equation (1) consists of relaxing the condition on the definition of crisis. First, we change the value of τ in equation (2). Second, we estimate

$$\Delta_s y_{it} = \beta_0 + \beta_1 \frac{1}{s}\sum_{k=1}^{s} POL_{i,t+k} + \beta_2 y_{it} + \beta_3 y_{it} \frac{1}{s}\sum_{k=1}^{s} POL_{i,t+k} + u_{i,t+s}, \quad (4)$$

as a robustness check for all specifications in which we use equation (1). Results of extended versions of our benchmark models on fiscal and inflation stabilizations are discussed in Sections IV and V, respectively.

IV. Empirical Results: Budget Deficits

In the tables that follow, we present results on budget deficits in panel A and on inflation in panel B. In many cases, results on inflation are very similar to those on budget deficits. In Section V, we highlight instances in which the results are different by comparing panel A and panel B of these tables.

Political Systems

This section reports the estimates of specification (1) for form of government ($POL = PRES$), executive constraints ($POL = EXECONST$), unified government ($POL = UNIFIED$), and electoral rule ($POL = PROP$), when the variable of interest y_{it} is the deficit-GDP ratio. The crisis hypothesis implies that $\beta_2 < 0$. We also investigate whether stronger governments adjust more swiftly and aggressively when they are in a crisis. We "proxy" strength of governments with presidential systems, where the absence of the assembly's confidence motion insulates the president from legislative control or where the executive relies on a strong major-

[20]This is an issue particularly pressing for the cross-sectional empirical literature on the effects of political institutions. See the discussions in Persson and Tabellini (2003) and in Acemoglu (2005). Clearly, misspecification of the interaction term is possible in this panel, but by focusing on the orthogonal components across time and countries, the likelihood that our results would be solely driven by omitted variable bias is smaller than in the cross-section.

ity in the legislature. Stronger executives have more flexibility of policy implementation because they face fewer veto players (that is, low *EXECONST*) and have a higher capacity to shift the costs of reform onto their opponents. Hence, we expect $\beta_3 < 0$ when considering the interactions involving *PRES* and *CRISIS* and *UNIFIED* and *CRISIS.* At the same time, we expect *EXECONST* and *CRISIS* to have a positive interaction, $\beta_3 > 0$.

The results support these hypotheses. Panel A of Tables 3, 4, and 5 show the baseline regression (1) for $s = 1$ in column 1. The coefficient β_2 is estimated at –0.015, –0.04, and –0.016 for *PRES, EXECONST,* and *UNIFIED,* respectively (with corresponding *t*-statistics of –6.54, –8.78, and –6.85). The estimates of β_3 are –0.019 in Table 3 (with a *t*-statistic of –5.23), 0.004 in Table 4 (with a *t*-statistic of 5.01), and –0.011 in Table 5 (with a *t*-statistic of –3.25). Given the dichotomous nature of the regressors—*CRISIS, PRES,* and *UNIFIED*—the estimated coefficients relative to these variables and the interaction terms also correspond to incremental effects. For example, in Table 3, panel A, $\beta_2 = -0.015$ and $\beta_3 = -0.019$ indicate an average deficit cut of 1.5 percentage points of GDP in times of crisis that more than doubles (the deficit-GDP ratio decreases by an additional 1.9 percentage points of GDP) in presidential systems. For $s = 2$, 3, and 4, the variable *CRISIS* tends to induce

Table 3. Stabilizations, Crises, and Forms of Government

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 2 Years After Crisis	(3) Δ(Deficit/GDP) 3 Years After Crisis	(4) Δ(Deficit/GDP) 4 Years After Crisis
CRISIS	–0.015	–0.026	–0.032	–0.040
	(–6.54)***	(–9.38)***	(–10.74)***	(–12.15)***
*CRISIS*PRES*	–0.019	–0.018	–0.018	–0.013
	(–5.23)***	(–4.08)***	(–3.85)***	(–2.52)**
Number of observations	2,323	2,213	2,103	1,993
Panel B	**(1) ΔInflation 1 Year After Crisis**	**(2) ΔInflation 2 Years After Crisis**	**(3) ΔInflation 3 Years After Crisis**	**(4) ΔInflation 4 Years After Crisis**
CRISIS	–0.037	–0.067	–0.086	–0.110
	(–2.24)**	(–2.94)***	(–3.43)***	(–4.15)***
*CRISIS*PRES*	–0.079	–0.114	–0.141	–0.137
	(–3.11)***	(–3.30)***	(–3.59)***	(–3.40)***
Number of observations	2,622	2,503	2,387	2,273

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent (i.e., the value of the 75th percentile of the deficit-GDP ratio empirical density). In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent (i.e., the value of the 75th percentile of the inflation empirical density). *PRES* = 1 if direct presidential; 0 if the president is elected either by the assembly or parliament. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parentheses. *** 1 percent significance level; ** 5 percent significance level.

Table 4. Stabilizations, Crises, and Constraints on the Executive

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 2 Years After Crisis	(3) Δ(Deficit/GDP) 3 Years After Crisis	(4) Δ(Deficit/GDP) 4 Years After Crisis
CRISIS	–0.0413	–0.0463	–0.0548	–0.0568
	(–8.78)***	(–8.40)***	(–8.76)***	(–8.89)***
EXECONST	0.0001	0.0013	0.0023	0.0032
	(0.24)	(1.92)*	(3.11)***	(3.99)***
*CRISIS**	0.0039	0.0028	0.0030	0.0022
EXECONST	(5.01)***	(3.06)***	(2.86)***	(2.09)**
Number of observations	2,674	2,546	2,423	2,301

Panel B	(1) ΔInflation 1 Year After Crisis	(2) ΔInflation 2 Years After Crisis	(3) ΔInflation 3 Years After Crisis	(4) ΔInflation 4 Years After Crisis
CRISIS	–0.1017	–0.1594	–0.1569	–0.1701
	(–3.65)***	(–4.45)***	(–3.69)***	(–3.54)***
EXECONST	0.0018	0.0030	0.0057	0.0059
	(0.62)	(0.72)	(1.06)	(0.91)
*CRISIS**	0.0052	0.0089	0.0044	0.0033
EXECONST	(0.94)	(1.22)	(0.53)	(0.36)
Number of observations	2,949	2,812	2,680	2,549

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent (i.e., the value of the 75th percentile of the deficit-GDP ratio empirical density). In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent (i.e., the value of the 75th percentile of the inflation empirical density). *EXECONST:* institutional constraints on the executive; ∈ [1,7] and increasing in the number of executive constraints. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parentheses. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

reductions in deficits up to around 4 percentage points of GDP. The estimates of β_3 remain negative and significant in Table 3 (*POL* = *PRES*) but do not increase in absolute terms as *s* increases.

In Table 4, the measure of executive constraints (*POL* = *EXECONST*) has a positive and significant multiplicative effect on the *CRISIS* dummy at every *s*. Moreover, the coefficient β_1 is positive and significant at $s = 2$, 3, and 4.[21] Thus, less constrained governments adjust more substantially, and this is consistent with our results in Table 3.

In Table 5, we investigate the role of the political variable *UNIFIED,* which measures whether the party of the executive controls the absolute majority of the legislative. The interaction term β_3 rapidly loses significance and assumes

[21]In this instance, it is sensible to discuss the role of β_1 because *EXECONST* presents substantially higher within-country variation than *PRES.*

Table 5. Stabilizations, Crises, and Control of the Legislative Body

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 2 Years After Crisis	(3) Δ(Deficit/GDP) 3 Years After Crisis	(4) Δ(Deficit/GDP) 4 Years After Crisis
CRISIS	−0.016	−0.029	−0.040	−0.047
	(−6.85)***	(−9.24)***	(−10.95)***	(−11.52)***
UNIFIED	−0.0001	−0.005	−0.011	−0.013
	(−0.22)	(−1.99)**	(−3.49)***	(−3.81)***
*CRISIS**	−0.011	−0.006	0.003	0.005
UNIFIED	(−3.25)***	(−1.39)	(0.69)	(0.88)
Number of observations	2,032	1,909	1,791	1,677

Panel B	(1) ΔInflation 1 Year After Crisis	(2) ΔInflation 2 Years After Crisis	(3) ΔInflation 3 Years After Crisis	(4) ΔInflation 4 Years After Crisis
CRISIS	−0.052	−0.094	−0.139	−0.180
	(−2.87)***	(−3.78)***	(−4.83)***	(−5.87)***
UNIFIED	−0.012	−0.021	−0.032	−0.043
	(−1.12)	(−1.43)	(−1.70)*	(−1.97)**
*CRISIS**	−0.050	−0.064	−0.064	−0.038
UNIFIED	(−2.15)**	(−1.95)*	(−1.73)*	(−0.95)
Number of observations	2,294	2,164	2,038	1,919

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent (i.e., the value of the 75th percentile of the deficit-GDP ratio empirical density). In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent (i.e., the value of the 75th percentile of the inflation empirical density). *UNIFIED* = 1 if the party of the executive controls the absolute majority of the legislature; 0 if otherwise. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parentheses. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

the opposite (wrong) sign after three periods. This is countered by a progressive reduction in the coefficient β_1, which becomes significant and negative at $s = 2$, 3, and 4. This seems to suggest that, despite whether there is a crisis, fiscal adjustments are larger in countries with executives who command absolute majorities.

Finally, Table 6 reports the results on *PROP*. Estimates of β_2 are in line with those of Tables 3, 4, and 5. Concerning β_3, because majoritarian systems tend to offer larger majority premiums than proportional representation, *PROP* systems should be less inclined to stabilize. This would imply that $\beta_3 > 0$ when considering the interactions involving *PROP*. However, the effective composition of the assembly and not the formal rule for assignment of the seats should matter in approximating the executive's strength. Therefore, it is not surprising that we find weaker results than when we use the indicator *UNIFIED*. The estimated β_3 is positive (and insignificant) for $s = 1$ and 2 but becomes negative and significant at $s = 4$.

Table 6. Stabilizations, Crises, and Electoral Rules

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 2 Years After Crisis	(3) Δ(Deficit/GDP) 3 Years After Crisis	(4) Δ(Deficit/GDP) 4 Years After Crisis
CRISIS	−0.023	−0.034	−0.031	−0.030
	(−6.90)***	(−7.96)***	(−7.46)***	(−7.64)***
*CRISIS*PROP*	0.007	0.005	−0.006	−0.018
	(1.60)	(1.01)	(−1.11)	(−3.10)***
Number of observations	1,707	1,600	1,496	1,394
Panel B	**(1) ΔInflation 1 Year After Crisis**	**(2) ΔInflation 2 Years After Crisis**	**(3) ΔInflation 3 Years After Crisis**	**(4) ΔInflation 4 Years After Crisis**
CRISIS	−0.044	−0.093	−0.124	−0.119
	(−1.75)*	(−4.62)***	(−6.18)***	(−6.09)***
*CRISIS*PROP*	−0.066	−0.074	−0.091	−0.116
	(−1.82)*	(−2.31)**	(−2.65)***	(−3.30)***
Number of observations	1,958	1,840	1,725	1,615

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent (i.e., the value of the 75th percentile of the deficit-GDP ratio empirical density). In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent (i.e., the value of the 75th percentile of the inflation empirical density). *PROP* = 1 if the electoral rule for the Lower House is a form of proportional representation; 0 if otherwise. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parentheses. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

In summary, this section has provided strong evidence, both statistically and economically, that crises lead to swifter and more drastic adjustments with "stronger" governments, that is, in countries in which the executive has fewer constraints, the government is unified, and the system of government is presidential.

Elections, Timing, and Partisan Orientation

This section reports the estimates of specification (1) for the number of years left in the current term for the executive (*POL* = *YRCURNT*), the timing of legislative elections (*POL* = *LEGELEC*), and the political orientation of the ruling government (*POL* = *LEFT*). Executive elections are not reported but discussed.

The war-of-attrition model implies that a stabilization should be more likely to occur after a political consolidation, that is, when one group gains political control. On the other hand, right before an election the political uncertainty about the relative power of the competing groups may be at a maximum or, in any case, about to be resolved. Thus, groups may decide it is worth waiting in the hope of winning the election. However, it is difficult to distinguish this implication of the war-of-attrition model from a more traditional one of opportunistic fiscal behavior, that is,

the idea that governments do not reduce deficits close to elections for fear of losing the election. As we discussed above, there is indeed some evidence that budget deficits tend to increase right before elections, but not in every country and not all the time—political budget cycles (that is, election-induced deficits) are not the rule and are not especially rewarding at the polls. However, Table 7 presents results confirming the hypothesis that stabilizations are more likely to occur at the beginning of a term of office, that is, a long time from future elections. In columns 1–3, we verify that the number of years left in the current term tends to increase the size of the adjustment (hence the negative effect) measured as change in deficit-GDP one year after the crisis (that is, $s = 1$). The estimated coefficient β_1 is −0.002 in columns 1 and 2 and −0.001 in column 3, with a *t*-statistic of −3.22, −3.16, and −1.99, respectively.

Table 7 estimates of β_2 are in line with those of Tables 3–6, indicating a statistically significant reduction of the left-hand-side variable of at least 1.6 percent. The sign of β_3 shows that the response to crisis immediately after elections is amplified, but the coefficient is not statistically significant and it is small. In columns 4–6, we consider the effect of legislative elections in a specification of form (1) with $s = 1$. Fiscal adjustments are smaller in years of legislative elections but not significantly so. Only when the interaction term is excluded is the coefficient β_1 significant at the 10 percent confidence level. Similar (but equally insignificant) results hold for executive elections.

We conclude this section by focusing on the partisan orientation of the executive. In panel A of Table 8 we find that, for $s = 2$, 3, and 4, governments on the left cut budget deficits more, but they do not do so in times of crisis. This evidence, which, however, as we discuss below, is not extremely robust to specification checks, is consistent with the evidence in Ardagna (2004), which shows that, in developed countries, left-wing governments are more likely to implement fiscal stabilizations associated with a persistent reduction of the debt-to-GDP ratio. One possible explanation for this evidence is that left-wing governments face less resistance to reform than right-wing ones; for example, unions or pensioners—groups that in many countries influence the implementation of governments' economic policies—can be more willing to offer their support to left-wing governments and allow them to cut government spending and/or increase tax rates.

Extensions and Sensitivity

We now report the following robustness checks for the benchmark model defined by equations (1)–(3). First, we add time-varying controls to the right-hand side of equation (1). Second, we add time-unvarying interactions. Third, we experiment with different values of τ in equation (2). Fourth, we estimate equation (4), where the discrete dummy variable *CRISIS* is replaced by the level of deficit over GDP, a continuous regressor. Fifth, we allow for nonlinearity in equation (4). Sixth, we investigate whether the reduction of the deficit-GDP ratio is increasing in its initial level in a nonlinear way. We consider each type of robustness check separately for both our analysis of political systems and that of electoral timing. Results are not shown, but they are available upon request.

Table 7. Stabilizations, Crises, and Political Business Cycles

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 1 Year After Crisis	(3) Δ(Deficit/GDP) 1 Year After Crisis	(4) Δ(Deficit/GDP) 1 Year After Crisis	(5) Δ(Deficit/GDP) 1 Year After Crisis	(6) Δ(Deficit/GDP) 1 Year After Crisis
POL	–0.002	–0.002	–0.001	0.002	0.003	0.001
	(–3.22)***	(–3.16)***	(–1.99)**	(1.26)	(1.77)*	(0.92)
CRISIS		–0.020	–0.016		–0.026	–0.026
		(–8.92)***	(–5.25)***		(–12.27)***	(–11.47)***
*CRISIS*POL*			–0.002			0.004
			(–1.49)			(1.03)
Number of observations	1,898	1,898	1,898	2,331	2,331	2,331
Panel B	**(1) ΔInflation 1 Year After Crisis**	**(2) ΔInflation 1 Year After Crisis**	**(3) ΔInflation 1 Year After Crisis**	**(4) ΔInflation 1 Year After Crisis**	**(5) ΔInflation 1 Year After Crisis**	**(6) ΔInflation 1 Year After Crisis**
POL	0.001	0.0001	0.003	0.005	0.005	–0.002
	(0.18)	(0.001)	(1.87)*	(0.51)	(0.51)	(–0.53)
CRISIS		–0.088	–0.070		–0.087	–0.092
		(–6.42)***	(–3.27)***		(–7.35)***	(–6.51)***
*CRISIS*POL*			–0.009			0.024
			(–0.94)			(0.77)
Number of observations	2,168	2,168	2,168	2,627	2,627	2,627

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent (i.e., the value of the 75th percentile of the deficit-GDP ratio empirical density). In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent (i.e., the value of the 75th percentile of the inflation empirical density). *POL* = *YRCURNT* in columns (1)–(3). *POL* = *LEGELEC* in columns (4)–(6). *YRCURNT* = number of years left in the current term. *LEGELEC* = 1 if in a given year legislative elections are held; 0 if otherwise. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parentheses. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 8. Stabilizations, Crises, and Governments' Political Orientation

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 2 Years After Crisis	(3) Δ(Deficit/GDP) 3 Years After Crisis	(4) Δ(Deficit/GDP) 4 Years After Crisis
CRISIS	–0.020	–0.028	–0.037	–0.042
	(–6.91)***	(–7.65)***	(–9.15)***	(–10.15)***
LEFT	–0.001	–0.005	–0.008	–0.011
	(–0.35)	(–1.78)*	(–2.21)**	(–2.60)***
*CRISIS*LEFT*	–0.0001	–0.0001	0.0001	–0.002
	(–0.08)	(–0.01)	(0.04)	(–0.38)
Number of observations	1,509	1,401	1,301	1,208
Panel B	**(1) ΔInflation 1 Year After Crisis**	**(2) ΔInflation 2 Years After Crisis**	**(3) ΔInflation 3 Years After Crisis**	**(4) ΔInflation 4 Years After Crisis**
CRISIS	–0.081	–0.159	–0.216	–0.230
	(–3.24)***	(–4.51)***	(–5.61)***	(–5.60)***
LEFT	–0.001	–0.004	–0.019	–0.027
	(–0.12)	(–0.23)	(–1.01)	(–1.10)
*CRISIS*LEFT*	0.005	0.045	0.051	0.008
	(0.10)	(0.68)	(0.73)	(0.11)
Number of observations	1,686	1,571	1,464	1,365

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent (i.e., the value of the 75th percentile of the deficit-GDP ratio empirical density). In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent (i.e., the value of the 75th percentile of the inflation empirical density). *LEFT* = 1 if the executive belongs to a party of the left; 0 if executive belongs to a right-wing or centrist party. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parenthesis. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

With respect to the first three points, all results presented in Tables 3–8 are robust to the respective changes in specification. More specifically, to control for omitted variables, we begin by including among the regressors the natural log of real per capita GDP, the ratio of exports plus imports to GDP, and the value of credits by financial intermediaries to the private sector divided by GDP, all dated at time *t*. The first two additional regressors are the controls used by Persson and Tabellini (2003); the value of credits by financial intermediaries to the private sector divided by GDP is one of the indicators of financial development used by Levine, Loayza, and Beck (2000). Our results are virtually unchanged.

Second, we let the coefficients β_1, β_2, and β_3 differ for Latin American countries and other countries in the sample and for developed and developing countries. In general, we do not find evidence that one particular group of countries drives the results presented so far.

Third, we reestimate regressions in Tables 3–8 using two alternative definitions of *CRISIS* to check that our results do not hinge on the particular threshold used

to identify periods of large budget deficit. Specifically, we consider the cases in which a fiscal crisis for a country corresponds to a deficit-GDP ratio above the 60th or 90th percentile of the deficit-GDP ratio empirical density (equal to 3.11 and 7.95 percent, respectively). Interestingly, consistent with the crisis hypothesis, we find that the size and significance of the coefficients β_2 and β_3 increase in the value of the deficit-GDP ratio above which a country experiences a fiscal crisis.

Fourth, we estimate equation (4), where the dichotomous *CRISIS* dummy is replaced by the initial level of deficit-GDP. With respect to *PRES* and *EXECONST,* we find that signs and significance of the parameter vector (β_2, β_3) concur with those in Tables 3 and 4. Relative to Table 5 and the role of a unified government (*UNIFIED* = 1), the corresponding continuous models report more statistically significant effects of the expected sign. The same is also true when comparing proportional representation systems in the continuous model. Here, positive estimates of β_3 (for the interaction between the initial deficit ratio and *PROP*) are significant at least at the 10 percent level for $s = 1$ and 2 but become insignificant for $s = 3$ and 4 and change sign for $s = 4$. The results on distance from elections are robust. Regarding the political ideology of the executive, however, we find that the results in Table 8 for *LEFT* are not particularly robust. Only for $s = 4$ do we report a significant, negative, but quantitatively small effect of *LEFT* ($\beta_1 = -0.008$).

Fifth, we also allow for nonlinear effects in the continuous specification in equation (4) by estimating spline regressions that allow the coefficients β_2 and β_3 to differ for values of the deficit-GDP ratio below and above the 75th percentile of the deficit-GDP ratio empirical density (equal to 4.75 percent). We find some evidence of a statistically significant incremental effect from the interaction of the deficit and political variables when the deficit-GDP ratio is greater than 4.75 percent; this confirms our previous results that differences in the forms of government become particularly important when a country is in a crisis.

Finally, we investigate whether the reduction of the deficit-GDP ratio increases nonlinearly in its initial level by estimating spline regressions of the change of the deficit-GDP ratio on its lagged value and allowing the coefficient to differ for values of the deficit-GDP ratio above the 50th, 75th, 90th, and 95th percentiles of the deficit-GDP ratio empirical density (equal to 2.27, 4.75, 7.9, and 10.6 percent, respectively). As expected, the coefficient of the lagged deficit-GDP ratio is negative and statistically significant at any time horizon, implying that the decrease in the budget deficit is increasing in the initial value of the deficit-GDP ratio. Moreover, we find evidence of a statistically significant incremental effect for values of the initial level of the deficit-GDP larger than 10.6 percent. Note that results in Drazen and Easterly (2001) support the "crisis induces reforms" hypothesis for the inflation rate and the black market premium, but not for the budget deficit. Our estimates, however, suggest that governments are able to sharply cut the budget deficit when it becomes extremely high.

IMF Conditionality

We now investigate whether agreements with the IMF play any role in budget deficit stabilizations. We reestimate the benchmark model in equations (1)–(3), but the vari-

able *POL* now captures countries' participation in IMF programs. We measure country participation with three different variables: (1) a dummy variable equal to 1 in every year in which a country is under an IMF agreement for at least six months, and equal to zero otherwise; (2) a dummy variable equal to 1 in the year in which the country signs a new loan agreement with the IMF, and equal to zero otherwise; and (3) a variable measuring for each year the number of months the country is in an agreement with the IMF. We follow Barro and Lee (2002) and focus only on short- and medium-term IMF programs, that is, the Stand-By Arrangements (SBA) and the Extended Fund Facility (EFF) programs.

In panel A of Table 9, we report the results using the first of the three variables just described. We do not find consistent evidence that participation in an IMF program induces reductions of budget deficits. The coefficients β_1 and β_3 are statistically significant at the 5 percent level only for $s = 4$. The signs of the coefficients imply that participation in an IMF program is associated with increases in budget deficit ($\beta_1 > 0$); however, in periods of crisis, governments reduce the deficit, and

Table 9. Stabilizations, Crises, and IMF Programs

Panel A	(1) Δ(Deficit/GDP) 1 Year After Crisis	(2) Δ(Deficit/GDP) 2 Years After Crisis	(3) Δ(Deficit/GDP) 3 Years After Crisis	(4) Δ(Deficit/GDP) 4 Years After Crisis
CRISIS	–0.023	–0.033	–0.039	–0.043
	(–11.85)***	(–14.18)***	(–15.40)***	(–16.11)***
IMFPROGR	–0.0001	–0.001	0.003	0.009
	(–0.02)	(–0.31)	(0.66)	(2.02)**
*CRISIS**	–0.006	–0.002	–0.008	–0.020
IMFPROGR	(–1.49)	(–0.41)	(–1.20)	(–2.41)**
Number of observations	3,192	3,076	2,963	2,852

Panel B	(1) ΔInflation 1 Year After Crisis	(2) ΔInflation 2 Years After Crisis	(3) ΔInflation 3 Years After Crisis	(4) ΔInflation 4 Years After Crisis
CRISIS	–0.067	–0.099	–0.110	–0.129
	(–5.18)***	(–5.42)***	(–4.99)***	(–5.09)***
IMFPROGR	0.013	0.021	0.030	0.027
	(1.14)	(1.03)	(1.18)	(0.94)
*CRISIS**	–0.052	–0.130	–0.211	–0.201
IMFPROGR	(–1.54)	(–2.32)**	(–2.97)***	(–2.50)**
Number of observations	3,562	3,442	3,325	3,210

Notes: In panel A, crises = country-years observations in which the deficit-GDP ratio is equal to or greater than 4.75 percent, which is the value of the 75th percentile of the deficit-GDP ratio empirical density. In panel B, crises = country-years observations in which inflation is equal to or greater than 14.05 percent, which is the value of the 75th percentile of the inflation empirical density. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroscedasticity are in parentheses. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

the decrease is larger in countries that are under an IMF agreement ($\beta_2 < 0$, $\beta_3 < 0$). This evidence is, however, only suggestive. Given the possible endogeneity of the variables used to measure participation in IMF programs, we would have to follow an approach similar to the one in Barro and Lee (2002) to properly estimate the effect of IMF programs. Although this is beyond the scope of this project (mainly because of lack of yearly data for valid instruments), nevertheless we run some instrumental variable regressions. We instrument the IMF program dummy and its interaction with the variable *CRISIS,* with first or second lags of these same variables. When we do so, the qualitative nature of the results does not change, but the size and significance of the coefficients do. Specifically, both β_1 and β_3 increase in absolute value, and the coefficients are now statistically significant at $s = 3$ and, in one case, also at $s = 2$. Finally, when we measure countries' participation with the other two variables, results (not shown but available upon request) are along the same lines. The evidence on the effect of IMF programs on budget deficit stabilizations is not clear-cut, and, if anything, our estimates indicate an effect only a few years after the country has experienced a budget deficit crisis (that is., for $s = 3$ and 4). These results are consistent with the analysis of Ghosh and others (2005), which shows that IMF targets for deficit reductions of countries under IMF agreements are often and substantially missed. In particular, many countries seem to be unable to control spending as required by IMF target agreements.

V. Empirical Results: Inflation

This section focuses on adjustments of inflation rates. We follow a structure analogous to Section IV; estimates of the benchmark model defined by equations (1)–(3) are in panel B of Tables 3–9. In what follows, we mostly highlight the differences from the results on budget deficit.

Political systems seem to play an important role in inflation stabilizations. In panel B of Table 3, for $s = 1$, the estimated values for β_2 and β_3 (–0.037 and –0.079, respectively) are significant at the 1 percent confidence level. The additional reduction owing to the form of government more than doubles the crisis coefficient, indicating a very substantial reduction in inflation rates for presidential countries facing an inflationary crisis. The estimates for $s = 2$, 3, and 4 are quantitatively higher and remain statistically significant.

The same results are confirmed for the measure of executive constraints, *EXECONST,* in Table 4, where the estimates are again quantitatively substantial, $\beta_2 = 0.0018$ and $\beta_3 = 0.0052$. Table 5 reports the results for *UNIFIED.* Having a unified government produces an extra reduction of the inflation rate between 3.8 and 6.4 percentage points in times of crisis. These results are robust to controlling for initial value of (log) real per capita GDP, trade volume, the measure of depth of financial markets, and interaction for Latin America, and to the additional specification effect we described in Section IV. The results of Table 6 investigating the role of *POL = PROP* for inflation adjustments are more puzzling. We find evidence that, in times of crisis, proportional systems reduce inflation more during every period ($s = 1$, 2, 3, and 4). This seems contrary to the intuition behind the war-of-attrition model and contrary to previous results concerning the control of

parliament (*UNIFIED* = 1). However, when controlling for our set of additional regressors (that is, the natural log of real per capita GDP, the ratio of exports plus imports to GDP, and the value of credits by financial intermediaries to the private sector divided by GDP), significance at $s = 1$ and 2 is lost.

In panel B of Table 7, we find no evidence of election timing. There is no direct effect or interaction effect with *CRISIS* of the number of years left in current term or the legislative election year dummy. Indeed, the signs of the coefficients are the opposite of those for the budget deficit and generally not significant. Particularly, the value for the coefficient β_1 −0.003 in column 3 is only borderline significant and has the "wrong" sign in Table 7 and becomes significant in specification (4). Regarding the political ideology of the executive, Table 8 and results from the specification (4) indicate no statistically significant difference in *LEFT*. Inflation stabilizations do not seem related in any way to the ideological affiliation of the executive.

Panel B of Table 9 presents results concerning inflationary crises and IMF program participation. The main difference between fiscal and inflationary crisis is that IMF programs appear to be more effective in curbing inflation in times of crisis. At s = 2, 3, and 4, the impact of the interaction term between *CRISIS* and *IMFPROGR* is negative, statistically significant, and quantitatively sizable, ranging from −13 percent at $s = 2$ to −21.1 percent at $s = 3$.

VI. Conclusions

The war-of-attrition model does reasonably well as a guideline for testing the timing of stabilization. In this paper we have presented evidence broadly consistent with this model on both inflation and budget deficits for a large sample of countries. Rather than reviewing our results, we conclude by discussing potential extensions.

In this paper, we did not address the question of what causes a crisis. In ongoing research we are looking at the joint determination of a crisis and the subsequent stabilization by making the event of a crisis endogenous to politico-economic factors. Second, an important aspect of the war-of-attrition model is that the costs of the stabilization are distributed unevenly; we did not consider this issue, that is, the distributional consequences of stabilizations. For example, certain types of government may implement stabilizations more quickly than others but may chose more unfair distribution of costs. Third, we need to push forward the discussion of external inducements to stabilizations, a topic that we addressed only imperfectly in this paper. As argued above, this is an issue in which problems of reverse causality abound, and one needs to think carefully of how to resolve this. Also, we looked only at IMF conditionality; one could also consider foreign aid in the same spirit and test more precisely the implications of the war-of-attrition model regarding when foreign aid can be (counter)productive for stabilizations. Fourth, one could analyze different types of policy reforms, such as those that we labeled structural, including labor market reforms, trade liberalizations, and deregulation. The war-of-attrition model may be useful for these reforms as well, even though the sense of urgency and crisis may be weaker than in cases of inflation and bud-

get deficits. Although a hyperinflation or an exploding budget deficit cannot last for very long, trade restrictions can be in place for a long time, creating costly distortions but not a deep crisis. Finally, we have considered institutions as predetermined in this paper, but institutions (for example, forms of government) may be endogenous to the same type of socioeconomic conflict that causes crisis and determines stabilizations. This is a point raised in related literature by Aghion, Alesina, and Trebbi (2004 and 2005) and Alesina and Glaeser (2004). This point also relates to the "normative" question about institutional choice. We have argued that certain types of institutions may stabilize more promptly than others. But this does not mean that these institutions are "superior." There can be (and in fact there probably is) a trade-off between promptness in stabilization efforts and other desirable features, like attention to inequality, control of executive power, and checks and balances. From a normative standpoint, the choice of institutions requires maximization over this trade-off.

Table A.1. Definitions of Political Variables

Variable	Definition	Source	Variable Name in Source Database
EXECONST	Number of executive constraints; ranges from 1 (min constraint) to 7 (max constraint).	Polity IV database, 2005	*XCONST*
EXELEC	1 if in a given year executive elections are held.	Database of Political Institutions 2004 (World Bank)	*EXELEC*
LEFT	1 if the executive belongs to a party of the left and 0 if right-wing or centrist.	Database of Political Institutions 2004 (World Bank)	*EXECRLC*
LEGELEC	1 if in a given year legislative elections are held.	Database of Political Institutions 2004 (World Bank)	*LEGELEC*
PRES	1 if direct presidential, 0 if the president is elected by either the assembly or parliament.	Database of Political Institutions 2004 (World Bank)	*SYSTEM*
PROP	1 if the electoral rule for the lower house is a form of proportional representation and 0 otherwise.	Database of Political Institutions 2004 (World Bank)	*PR*
UNIFIED	1 if the party of the executive controls the absolute majority of the legislative; 0 otherwise.	Database of Political Institutions 2004 (World Bank)	*ALLHOUSE*
YRCURNT	Number of years left in the current term for the executive.	Database of Political Institutions 2004 (World Bank)	*YRCURNT*

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