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WHO ADJUSTS AND WHEN?  
ON THE POLITICAL ECONOMY OF REFORMS

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**ABSTRACT**

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 as a guidance for our empirical study on a vast sample of countries. We find that stabilizations are more likely to occur when time of crisis occur, at the beginning of term of office of a new government, in countries with "strong" governments (i.e. presidential systems and unified governments with a large majority of the party in office), and when the executive faces less constraints. The role of external inducements like IMF programs has at best a weak effect, but problem of reverse causality are possible.

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# 1 Introduction

Why do certain countries implement economic reforms relatively promptly and swiftly, while others delay them, letting significant economic costs accumulate? This issue puzzles economists and policy makers and it is part of an even broader question, namely why certain societies follow for even long periods of time policies that are clearly costly and unsustainable. In many ways this is the key issue at core of what political economics is all about.<sup>1</sup>

The subject of the “political economy of reform” has received much attention.<sup>2</sup> With the term “reform” one generally means a major change in policy which goes beyond day to day policy management. One can think of two types of reforms: stabilizations and structural changes. A stabilization is normally interpreted as a major fiscal adjustment which reduces significantly 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 are liberalization of goods markets, changes in the regulatory environment, labor market reforms, trade liberalizations.<sup>3</sup>

Some of the reasons why reforms are delayed apply to both types of reforms but in this paper we focus upon stabilizations in both OECD and developing countries. We consider the model of “war of attrition” applied to delayed reforms by Alesina and Drazen (1991)<sup>4</sup> and derive from it a series of empirical implications that encompass and nest 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 in 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 the other(s) which 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.

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<sup>1</sup>See Drazen (2000) and Persson and Tabellini (2000) for two excellent broad treatments of this field.

<sup>2</sup>Several influential contributions are in the volume edited by Wilimanson (1994). Tommasi and Velasco (1996), Rodrik (1996), and Drazen (2000) have also provided useful surveys of this literature.

<sup>3</sup>For a recent discussion of the political economy of structural reforms in the labour and product markets see Boeri (2004). A “special” branch of the literature on reforms analyzes specifically the issue of post communist transformations, but by now, ex communist countries are more and more similar to any other country, therefore a special treatment of them does not seem necessary any longer; see for instance Shleifer and Treisman (2000).

<sup>4</sup>For extensions see Drazen and Grilli (1993), Casella and Eichengreen (1996), Laban and Sturzenegger (1994), and Hsieh (2001).

We find support for this hypothesis, both for 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 occur with a “strong” government, that, presumably, can overrule political opposition to policy changes. For instance, stabilizations are more successful and easier to come by in presidential systems, in those where the executive faces fewer institutional veto points, in periods of unified government in which the same party holds the executive and the legislature and when 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 a new government enjoys a mandate and it is also far from new elections. External inducements, like the presence of IMF conditionality programs, has at best a moderate effect, even though problems of reverse causality abounds here. Results on stabilizations of budget deficits and inflation are relatively similar but we also find some small differences which we discuss. 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 the features that a society may require in a government, but there are certainly others like fairness, responsiveness to changes in society’s preferences, checks and balances etc. Spolaore (2004) and Aghion, Alesina and Trebbi (2004) for instance have recently discussed this kind of trade-off in a context related to that of the present paper.

The paper is organized as follow. 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.

## 2 Delayed stabilizations: the war of attrition model

### 2.1 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 parts with foreign borrowing and by printing money, i.e. by the inflation tax which is especially distortionary.<sup>5</sup>

A stabilization is defined as an increase in revenues (or a cut in spending, but for sake of exposition we will talk of increasing revenues and hold spending constant) so that the debt stops growing and inflation disappears; thus the budget is balanced with a non inflation tax, say an income tax, (which is assumed to be less distortionary than inflation) and there is no more external borrowing. The government continues to pay interests on the accumulated debt, no default is allowed. In this economy a social planner would stabilize

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<sup>5</sup>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.

immediately since delaying a stabilization is costly for two reasons: it accumulates the distortionary costs of inflation, and increases the interest burden for the government since external debt is accumulating.<sup>6</sup>

Delays in the stabilization emerge from political conflict between two different groups in this society (there could be  $N$  groups, but let's 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 their 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 need to stabilize the budget. By assumption one of the groups has to pay more than half of the costs of stabilization, say a share  $\alpha$  with  $1/2 < \alpha \leq 1$  and  $\alpha$  is a given parameter.<sup>7</sup> The question is which group will accept to pay a fraction  $\alpha$  of the cost of the stabilization. Each group has a veto power on the stabilization.

The two groups are 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 how costly it is for the other group to delay the stabilization.<sup>8</sup> The essence of the war of attrition is the following: the passage of time will reveal which of the two groups is the weakest, i.e. it has the highest costs of waiting. In each instant each group chooses 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  $(1-\alpha) < 1/2$  of the stabilization costs) and the utility of the loser (which pays a fraction  $\alpha > 1/2$ ).<sup>9</sup> 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 (i.e. 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 group is the weakest. 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.

## 2.2 Expected delays: comparative statics and testable implications

Stabilization is in general delayed.<sup>10</sup> It is not only if  $\alpha = 1/2$ ; in fact if there is no gain in winning or losing, hence, there is no gain in waiting and both groups would "concede" immediately. Also, there would be immediate stabilization with full knowledge of costs: the weakest group would know that in the end it

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<sup>6</sup>As Drazen and Grilli (1993) point out one actually does not even need accumulation of debt as long as the inflation tax is more distortionary than the income tax.

<sup>7</sup>See Hsieh (2000) for an extension of the model on this point.

<sup>8</sup>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 parameter is drawn by the same distribution.

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

<sup>10</sup>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.

would be the loser; therefore, it may as well concede immediately and save itself the costs of delays.

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 for one of the two groups it becomes too costly to wait and it concedes, i.e.: it accepts to pay the fraction  $\alpha$  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 has resolved the uncertainty about the relative strength (i.e. the relative marginal cost of waiting) of the two groups. The longer the period of instability of the economy, the more likely it is to observe a stabilization. However, there could be a countervailing effect: in certain cases, societies may develop institutions that reduce the cost of the economic instability. Think for instance of indexation to reduce the costs of inflation.

2) **Crises can generate reforms.** A crisis, namely a turn for the worst of the economy, 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 makes one group particularly weak so that it brings it to a quick concession since this group soon realizes to be the weakest of the two. 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, reducing the waste of the costs of waiting. If the second effect dominates on 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 the pre-stabilization economy, one may also think that there are political costs of delays. These are the costs of blocking the other group's attempt to impose a stabilization favorable to itself; where blocking can occur with lobbying or active political participation (e.g. strikes). This interpretation of the costs makes especially clear the connection with 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 contrary, costs are lower if the executive can easily be kept in check. Imagine a situation where one group solidly holds control of policymaking, and it is very costly or impossible for the opponent to effectively exercise a veto power. Then, a stabilization would occur very soon (if not immediately) because the group which holds power would impose it on the other. Therefore, political systems that make it difficult for the opposition to veto a policy should see earlier stabilizations. So, for example, stabilizations should occur sooner in presidential systems with a powerful executive. However, these same systems, precisely because of the uneven distribution of political power and lack of veto power may generate 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 either a weak pre-existing government gains strength, or it is replaced by another one with a

strong majority or mandate. Thus, stabilizations may be more likely immediately after an election, precisely because it may reveal which group is the strongest. As a result, in the election one group may give up the fight and concede. On the contrary, right before an election the uncertainty about who is stronger may not be about to be resolved so both groups have an incentive to hold on.

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 it is not binding in terms of committing the country to any particular set of policies may delay the stabilization, because, in practice, it reduces the cost of delay by providing easier access to borrowing. Similar considerations apply to foreign aid. Certain type of foreign aid, if disbursed in ways that makes all fighting groups better off, may delay stabilization by making life easier, a point made by Casella and Eichengreen (1996). However, certain types of foreign aid may 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 on some of these hypotheses, we briefly review the existing empirical literature that relates to these arguments.

### 3 The empirical evidence: review and new tests

#### 3.1 Review of the existing literature

The only paper we are aware of that is explicitly testing the “war of attrition” model of stabilizations is Hamman 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.** An indirect effect of this implication is that a stabilization may occur after several failures even when nothing observable has changed, except, precisely the passage of time. Interestingly this may complicate the test of other hypotheses based on the fact 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 and no change seems to have occurred in the meantime except, precisely the passage of time.<sup>11</sup> Hamman and Prati (2002) in their study of stabilizations of high inflation (defined as higher than 40 per cent per year) do not find that the passage of time increases the probability of a stabilization. They argue, correctly in our view, that this may be due to the existence of institutions like indexation that may reduce the costs of inflation and therefore prolong the war of attrition.

2) **Crisis can generate reforms.** Tommasi and Velasco (1996) go as far as saying that this hypothesis is part of the “conventional wisdom”.<sup>12</sup> This is perhaps a bit premature given the difficulty of testing the hypothesis that crises generate reforms for obvious reasons of reverse causality. Without a crisis, there would be no need for stabilization. Hence, we could not observe the latter. The authors testing for this hypothesis

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<sup>11</sup>See also Alesina (1988) for a discussion of several historical cases of debt reduction in line with the war of attrition model.

<sup>12</sup>See also Nelson (1990) and Williamson (1994).

are of course aware of this problem and do their best at addressing it; in particular see Bruno and Easterly (1996) and Drazen and Easterly (2001). The latter use the concept of “ranking reversal”. They consider countries in the worst decile in terms of a certain variable, say 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 worst is your ranking before the stabilization, the higher is your ranking after it. They find evidence of crises inducing ranking reversal for inflation and the black market premium on exchange rates, but they fail to find evidence on budget deficits and growth. Hamman and Prati (2002) also offer strong supporting evidence of the crisis hypothesis on inflation. They show that the higher is 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 are those that occur in “bad times”, i.e. those when the public debt is high and growing fast. Alesina and Ardagna (1998) also present some evidence consistent with this hypothesis. Incidentally, since 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 vastly motivated by the crisis of that year (exclusion of Italy from the fixed exchange rate area, and risk of default).

A related point concerns the fact that adjustments in bad times may actually bring about an immediate benefit on the economy; this is the case 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 Perotti (1999) on budget deficits in OECD countries.<sup>13</sup>

**3) The nature of political institutions.** The issue of how 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. For our purposes, a few of their results are particularly relevant. One is that they find that presidential systems have lower deficits and smaller size of governments. Also in 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 (Grilli Masciandaro and Tabellini (1990) and Roubini and Sachs (1989)) that in OECD countries coalition governments have larger budget deficits.

More directly related to stabilizations are the result by Hamman and Prati (2002). They find that the larger the number of institutional constraints on the executive the more delayed and less successful are inflation stabilizations.<sup>14</sup> 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.

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<sup>13</sup>For a related literature on expansionary fiscal adjustments see Giavazzi and Pagano (1990), Alesina Perotti and Tavares (1998), Giavazzi et.al. (2005).

<sup>14</sup>With specific reference to Latin America, Lora (1998) finds inconclusive evidence on this point.



Note that this does not mean that certain types of governments are “better” than others. Government that stabilize more easily may create other costs for the economy.<sup>15</sup> Also governments that stabilize sooner may be those which 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 non mutually exclusive assumptions. 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 purposes here is the recent literature on political budget cycles which investigates if budget deficits increase before elections. This literature is rather large and we cannot review it carefully here.<sup>16</sup> Recent results by Akhmed and Zhuravskaya (2004), Brender and Drazen (2005a) and Shi and Svensson (2006) 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 widespread than common perceptions of them. Interestingly, Peltzman (1992) on US states, Alesina, Perotti and Tavares (1998) on OECD countries, and Bender and Drazen (2005b) on a vast sample of both developing and developed ones find that pre-electoral deficits do not help the incumbent to be reelected. Hamman 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.

5) **External inducements.** Many types of external (i.e. 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 and its effect 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 provide a good assessment of the literature. It is fair to say that the evidence that foreign aid has provided good incentive to adopt good policy is mixed at the very best.

A related question is whether or not IMF assisted programs (IMF conditionality) help. A relative upbeat assessment is in Gosh et al. (2005) but this as well is a literature very charged with debates, somewhat similar in nature to those related to foreign aid and with 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) argue that IMF and World Bank adjustment loans have failed to provide the correct incentives for countries to implement long lasting and successful polices.<sup>17</sup> Informal observations

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<sup>15</sup>For instance Persson and Tabellini (2003) suggest that presidential systems follow more procyclical fiscal policies.

<sup>16</sup>For a broad discussion of the literature on political business cycles see Alesina Roubini and Cohen (1997) and Drazen (2000).

<sup>17</sup>IMF conditionality may work better if the country feels like it "owns" the program, i.e. it is not imposed on it. For a recent

suggest that the inducement to being admitted in the European Monetary System created incentives for certain countries (especially Italy and Greece) to reduce quickly their mounting budget deficits.

### 3.2 New tests

What do we add to this rich literature? First we revisit many of the point addressed above in a large sample of countries on both deficits and inflation and on both OECD and developing countries in a unified and coherent way. 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 has to be a crisis to generate a stabilization? What types of governments react more quickly to a crisis? and when relative to the electoral cycle? Can external factors affect the timing? How do crisis 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.

## 4 Data and methodology

### 4.1 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 International Monetary Fund's International Financial Statistics (IFS) database.<sup>18</sup> 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, while data on financial development are from the World Bank database on Financial Development and Structure<sup>19</sup> and 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, Clarke, Groff, Keefer, and Walsh (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. Table A1 in the appendix summarizes definitions and sources of the political variables we use in the paper.<sup>20</sup>

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, discussion of the political economy of IMF conditionality and its relationship with domestic politics see Drazen (2002).

<sup>18</sup>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.

<sup>19</sup>The database is available on line at <http://www.worldbank.org/research/projects/finstructure/database.htm>.

<sup>20</sup>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](http://siteresources.worldbank.org/INTRES/Resources/DPI2004_variable-definitions.pdf)

the relevant definition varying depending on the lhs of interest), 0 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%), and, similarly, an inflation crisis corresponds to inflation levels above the empirical 75th percentile (equal to 14.05%). To avoid that our results are driven by outliers, we have replaced the values in the first and in the ninety-nine 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*) taking value 1 if direct presidential, 0 if either the president is elected by the assembly or parliamentary. This definition corresponds to a rough approximation of the structure of checks and balances within a political system and pivots around the separation of powers among the executive body (the president) and legislative body (the parliament). A measure of the structure of the electoral law is given by the variable *PROP*, taking value 1 if the electoral rule for the Lower House is a form of proportional representation and 0 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* taking value 1 if the party of the executive controls the absolute majority of the legislative; 0 otherwise. We capture the political orientation of the executive with the indicator *LEFT* equal to 1 if the executive belongs to a party of the left and 0 if right-wing or centrist. 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*, counting 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 and is increasing in the number of executive constraints.

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 amongst political systems, the relative frequency of occurrence being around 0.3 for all of the categories. Thus deficits crises do not occur especially often in a particular system or another. In the case of inflation (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 this has been traditionally a high inflation region. We return on issues specific to Latin America below. Table 2 shows the average deficit (column 1) and the average inflation (column 3) during crises. Column 2 and 4 report the average response the year after a country enters a crisis. Let's consider budget deficits first. The response in presidential systems is about twice as large as the one in parliamentary systems. Unified government react twice as much as divided governments; majoritarian systems react more than parliamentary systems. In executive election years the deficit reduction is much smaller than in non executive election years. In the case of inflation similar results holds with one interesting exception: in proportional electoral systems the reaction 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.

## 4.2 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 an horizon of interest for a stabilization of  $s$  periods,  $s > 0$ . In the empirical implementation we typically restrict our attention to four years  $s = 1, \dots, 4$ . 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 regressand, determined by the following empirical model:

$$\Delta_s y_{it} = \beta_0 + \beta_1 \frac{1}{s} \sum_{k=1}^s POL_{i,t+k} + \beta_2 CRISIS_{it} + \tag{1}$$

$$+ \beta_3 CRISIS_{it} * \frac{1}{s} \sum_{k=1}^s POL_{i,t+k} + u_{i,t+s}$$

$$CRISIS_{it} = I[ECDF(y_{it}) > \tau] \tag{2}$$

$$\tau = 0.75$$

$$u_{it} = \delta_t + \lambda_i + \varepsilon_{it}. \tag{3}$$

In (1) we indicate the political variable of interest as  $POL_{i,t}$  (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 (2). The specification is completed by a two-way error component (3), accounting for country-level and year fixed effects. We estimate our model defined by equations (1)-(3) by OLS and we correct the standard errors for heteroschedasticity.

Notice that in 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,  $\beta_1$  is not identified in (1). The parameter  $\beta_2$  in (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  $\beta_2 < 0$ . The parameter  $\beta_3$  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 to different political institutions and we analyze them in Sections 5.1 and 5.2.

## 4.3 Empirical model: extensions

Consistency in the estimation of the vector of parameters of interest  $(\beta_2, \beta_3)$  is achieved under the assumption that the process generating the idiosyncratic error component  $\varepsilon_{it}$  is uncorrelated within and across countries to the covariates set, ruling out bias due to omission of relevant variables.<sup>21</sup> A straightforward check in

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<sup>21</sup>This is an issue particularly pressing for the cross-sectional empirical literature on the effects of political institutions. See the discussion in Persson and Tabellini (2003) and in Acemoglu (2005). Clearly misspecification of the interaction term is

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 et al. (2000). All variables included in  $X$  are measured at time  $t$ .

Moreover, we also control for time-invariant covariates by expanding (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 (1) consists of relaxing the condition on the definition of crisis. First, we change the value of  $\tau$  in equation (2)). Second, we estimate:

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

as robustness check for all specifications in which we use (1). Results of extended versions of our benchmark models on fiscal and inflation stabilizations are discussed in Sections 5.3 and Section 6, respectively.

## 5 Empirical results: Budget deficits

In the Tables that follow we present results on budget deficits in Panel A and on inflation in Panel B. We focus first on deficits, thus on Panel A of these Tables; in many cases results on inflation are very similar to those on budget deficits. In section 6 we highlight instances in which the results are different, comparing Panel A and Panel B of these Tables.

### 5.1 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  $\beta_2 < 0$ . 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 whenever the executive relies on a strong majority in the legislature. Stronger executives have more flexibility of policy implementation, since they face a lower number of veto players (for instance, low  $EXECONST$ ), and have higher capacity of shifting the costs of reform onto their opponents. Hence, we expect  $\beta_3 < 0$  when considering the interactions involving  $PRES$  and  $CRISIS$  and  $UNIFIED$  and  $CRISIS$ . Symmetrically, 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  $\beta_2$  is estimated at  $-0.015$ ,  $-0.04$ , and  $-0.016$  for  $PRES$ ,  $EXECONST$ , possible in this panel, but by focusing on the orthogonal components across time and countries, the likelihood of our results to be solely driven by omitted variable bias is smaller than in the cross-section.

and *UNIFIED* respectively (with corresponding t-statistics of  $-6.54$ ,  $-8.78$  and  $-6.85$ ). The estimates of  $\beta_3$  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 crises that gets more than doubled (the deficit/GDP ratio decreases by an additional 1.9 percentage points of GDP) in presidential systems. For  $s = 2, 3, 4$  the variable *CRISIS* tends to induce reductions in deficits up to around 4 percentage points of GDP. The estimates of  $\beta_3$  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  $\beta_1$  is positive and significant at  $s = 2, 3, 4$ .<sup>22</sup> Thus, less constrained government adjust more substantially and this is consistent with our results of Table 3.

In Table 5, we investigate the role of the political variable *UNIFIED* that measures if the party of the executive controls the absolute majority of the legislative. The interaction term  $\beta_3$  loses rapidly significance and assumes the opposite (wrong) sign after 3 periods. This is countered by a progressive reduction in the coefficient  $\beta_1$ , which becomes significant and negative at  $s = 2, 3, 4$ . This seems to suggest that, irrespective of being in a crisis, fiscal adjustments are larger in countries with executives commanding absolute majorities.

Finally, Table 6 reports the results on *PROP*. Estimates of  $\beta_2$  are in line with those of Tables 3, 4, and 5. Concerning  $\beta_3$ , since majoritarian systems tend to offer larger majority premia than proportional representation, *PROP* systems should present lower attitude to stabilize. This would imply  $\beta_3 > 0$  when considering the interactions involving *PROP*. However, the effective seat 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 using the indicator *UNIFIED*. The estimated  $\beta_3$  is positive (and insignificant) for  $s = 1, 2$ , becoming negative and significant at  $s = 4$ .

In summary, this section has provided strong evidence, both statistically and economically, that crises lead to more swift and more drastic adjustments with "stronger" governments, namely when the executive has fewer constraints, the government is unified and in presidential systems.

## 5.2 Elections, timing, and partisan orientation

This section reports the estimates of specification (1) for the number of years left in 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, namely when one group gains political control. On the contrary, right before an election the

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<sup>22</sup>In this instance it is sensible to discuss the role of  $\beta_1$ , since *EXECONST* presents substantially higher within-country variation than *PRES*.

political uncertainty about the relative power of the competing groups may be at a maximum, or in any case about to be resolved. Thus, 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, namely the idea that governments do not reduce deficits close to elections for fear of losing them. As we discussed above, there is indeed some evidence that budget deficits tend to increase right before elections, but not in every country and all the time: political budget cycles (i.e. electorally induced deficits) are not the rule, and are not especially rewarding at the polls. Being as it may, Table 7 presents results confirming the hypothesis that stabilizations are more likely to occur at the beginning of a term of office, i.e. away from future elections. In columns 1-3, we verify that the number of years left in 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 (i.e.  $s = 1$ ). The estimated coefficient  $\beta_1$  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.

Estimates of  $\beta_2$  are in line with those of Tables 3-6, indicating a statistically significant reduction of the LHS variable of at least 1.6 percent. The sign of  $\beta_3$  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 the coefficient  $\beta_1$  is significant at the 10 percent confidence level. Similar (but equally insignificant) results holds 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  $s = 2, 3, 4$  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 one in Ardagna (2004) who 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.

### 5.3 Extensions and Sensitivity

We now report robustness checks of several types for the benchmark model defined by equations (1) - (3). Specifically: i) we add time-varying controls to the rhs of equation (1); ii) we add time-invariant interactions; iii) we experiment with different values of  $\tau$  in equation (2); iv) we estimate equation (4), where the discrete dummy variable *CRISIS* is replaced by the level of deficit over GDP, a continuous regressor, v) we allow for non-linearities in equation (4), and vi) we investigate whether the reduction of the deficit/GDP ratio is increasing in its initial level in a non-linear way. We consider each type of robustness checks separately for both our analysis of political systems and that of electoral timing. Results are not shown but they are

available upon request.

With respect to points i), ii) and iii) 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 et al. (2000). Our results are virtually unchanged.

Second, we let the coefficients  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  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 respectively to 3.11% and 7.95%). Interestingly and consistently with the crisis hypothesis, we find that the size and significance of the coefficients  $\beta_2$ , and  $\beta_3$  are increasing in the value of the deficit/GDP ratio above which a country is experiencing 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  $(\beta_2, \beta_3)$  concord to 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  $\beta_3$  (for the interaction between the initial deficit ratio and *PROP*) are significant at least at the 10% level for  $s = 1, 2$ , but become insignificant for  $s = 3, 4$  and change sign for  $s = 4$ . The results on distance from elections are robust. Regarding the political ideology of the executive, instead, we find that the results in Table 8 for *LEFT* are not particularly robust. Only for  $s = 4$  we report a significant, negative, but quantitatively small effect of *LEFT* ( $\beta_1 = -0.008$ ).

Fifth, we also allow for non-linear effects in the continuous specification in (4) by estimating spline regressions that allow the coefficients  $\beta_2$  and  $\beta_3$  to differ for values of the deficit/GDP ratio below/above the 75th percentile of the deficit/GDP ratio empirical density (equal respectively to 4.75%). 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%, confirming our previous results that differences in the form of governments become particularly important when the country is in times of crisis.

Finally, we investigate whether the reduction of the deficit/GDP ratio increases non-linearly 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, 95th percentile of the deficit/GDP ratio empirical density (equal respectively to 2.27%, 4.75%, 7.9%, 10.6%). 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 statistical significant incremental effect for values of the initial level of the deficit/GDP larger than 10.6%. 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, instead, suggest that governments are able to sharply cut the budget deficit when the latter has reached extreme high values.

## 5.4 IMF conditionality

We now investigate if agreements with the IMF play any role in budget deficit stabilizations. We reestimate the benchmark model in (1) - (3) but the variable *POL* now captures countries’ participation to IMF programs. We measure countries’ participation with three different variables: i) a dummy variable equal to 1 in every year in which a country is under an IMF agreement for at least 6 months and 0 otherwise; ii) a dummy variable equal to 1 in the year in which the country signs a new loan agreement with the IMF and 0 otherwise; iii) 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, i.e.: 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 to an IMF program induces reductions of budget deficits. The coefficients  $\beta_1$  and  $\beta_3$  are statistically significant at the 5% level only for  $s = 4$ . The signs of the coefficients imply that participation to an IMF program is associated with increases in budget deficit ( $\beta_1 > 0$ ), but, in periods of crisis, governments reduce the deficit and 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 to 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. While this is beyond the scope of this project (mainly because of lack of yearly data for valid instruments), nevertheless we run some IV 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  $\beta_1$  and  $\beta_3$  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 line. 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 (i.e.: for  $s = 3, 4$ ). These results are consistent with the analysis of Gosh et al. (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.

## 6 Empirical results: Inflation

This section focuses on adjustments of inflation rates. We follow a structure analogous to Section 5 and 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 for inflation stabilizations. In Panel B of Table 3 for  $s = 1$  the estimated  $\beta_2 = -0.037$  and  $\beta_3 = -0.079$  are significant at 1 percent confidence level. The additional reduction due 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  $s = 2, 3, 4$  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, interaction for Latin America and to the additional specification effect we described in section 5.3. 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 at all  $s = 1, 2, 3, 4$ . This seems contrary to the intuition behind the war of attrition model and to previous results concerning the control of the parliament (*UNIFIED* = 1). However, when controlling for our set of additional regressors (i.e. 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  $s = 1, 2$  is lost.

In Table 7's Panel B 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 coefficient  $\beta_1 = 0.003$  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  $s = 2, 3, 4$  the impact of the interaction term between *CRISIS* and *IMFPROGR* is negative, statistically significant and quantitatively sizeable, ranging from -13 percent at  $s = 2$  to -21.1 percent at  $s = 3$ .

## 7 Conclusions

The war of attrition model does reasonably well as a guidance for empirical test of 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 the reviewing one more time 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, namely the distributional consequences of stabilizations. For example certain types of governments 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 how to resolve this. Also we looked only at IMF conditionality, one could consider also 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, those that we labeled structural, like labor market reforms, trade liberalizations, deregulation etc. The war of attrition model may be useful for these reforms as well, even though in these cases unlike inflation or budget deficits, the sense of urgency and crisis may be smaller. While an hyperinflation or an exploding budget deficit cannot last for too 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 (i.e.: forms of governments for instance) may be endogenous to the same type of socio-economic conflict that causes crisis and determines stabilizations. This is a point raised in related literature by Aghion, Alesina, and Trebbi (2004), Trebbi, Aghion, and Alesina (2005) and Alesina and Glaeser (2004). This point also relates to the "normative" question about institutional choice. We have argued above 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, checks and balances. From a normative standpoint the choice of institutions requires a maximization over this trade-off.

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Table 1: Relative Frequency of Crises and Reforms

	(1) Deficit Crises	(3) 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 elect. Years	0.29	0.29
Executive elections years	0.28	0.36
No executive elect. years	0.30	0.28

Notes: Deficit Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75%. 4.75% is the value of the 75th percentile of the deficit/GDP ratio empirical density. Inflation Crises=country-years observations in which inflation is equal or above 14.05%. 14.05% 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 elect years: indicator variable LEGELEC=1/0. Executive elections years/No executive elect. years: indicator variable EXELEC= 1/0. See also Table A1 in the appendix.

Table 2: Politics, Deficit and Inflation Crises– average values

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

Notes: Crises=country-years observations in which the deficit/GDP ratio (inflation rate) is equal or above 4.75% (14.05%). 4.75% (14.05%) 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 elect years: indicator variable LEGELEC=1/0. Executive elections years/No executive elect. years: indicator variable EXELEC= 1/0. See also Table A1 in the appendix. Standard errors of the mean in parenthesis.



Table 3: Stabilizations, Crises and Form of Governments

Panel A	(1)	(2)	(3)	(4)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 2 years after crisis	$\Delta(\text{Deficit/GDP})$ 3 year after crises	$\Delta(\text{Deficit/GDP})$ 4 year after crisis
CRISIS	-0.015 (-6.54)***	-0.026 (-9.38)***	-0.032 (-10.74)***	-0.040 (-12.15)***
Crisis*PRES	-0.019 (-5.23)***	-0.018 (-4.08)***	-0.018 (-3.85)***	-0.013 (-2.52)**
N. of observations	2323	2213	2103	1993
Panel B	(1)	(2)	(3)	(4)
	$\Delta(\text{Inflation})$ 1 year after crisis	$\Delta(\text{Inflation})$ 2 years after crisis	$\Delta(\text{Inflation})$ 3 year after crises	$\Delta(\text{Inflation})$ 4 year after crisis
CRISIS	-0.037 (-2.24)**	-0.067 (-2.94)***	-0.086 (-3.43)***	-0.110 (-4.15)***
CRISIS*PRES	-0.079 (-3.11)***	-0.114 (-3.30)***	-0.141 (-3.59)***	-0.137 (-3.40)***
N. of observations	2622	2503	2387	2273

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (i.e. the value of the 75th percentile of the inflation empirical density). PRES=1 if direct presidential; 0 if either the president is elected by the assembly or parliamentary. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] = 1% (5%) [10%] significance level.

Table 4: Stabilizations, Crises and Constraints on the Executive

Panel A	(1)	(2)	(3)	(4)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 2 years after crisis	$\Delta(\text{Deficit/GDP})$ 3 year after crises	$\Delta(\text{Deficit/GDP})$ 4 year after crisis
CRISIS	-0.0413 (-8.78)***	-0.0463 (-8.40)***	-0.0548 (-8.76)***	-0.0568 (-8.89)***
EXECONST	0.0001 (0.24)	0.0013 (1.92)*	0.0023 (3.11)***	0.0032 (3.99)***
CRISIS*EXECONST	0.0039 (5.01)***	0.0028 (3.06)***	0.0030 (2.86)***	0.0022 (2.09)**
N. of observations	2674	2546	2423	2301
Panel B	(1)	(2)	(3)	(4)
	$\Delta(\text{Inflation})$ 1 year after crisis	$\Delta(\text{Inflation})$ 2 years after crisis	$\Delta(\text{Inflation})$ 3 year after crises	$\Delta(\text{Inflation})$ 4 year after crisis
CRISIS	-0.1017 (-3.65)***	-0.1594 (-4.45)***	-0.1569 (-3.69)***	-0.1701 (-3.54)***
EXECONST	0.0018 (0.62)	0.0030 (0.72)	0.0057 (1.06)	0.0059 (0.91)
CRISIS*EXECONST	0.0052 (0.94)	0.0089 (1.22)	0.0044 (0.53)	0.0033 (0.36)
N. of observations	2949	2812	2680	2549

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (i.e. the value of the 75th percentile of the inflation empirical density). EXECONST: institutional constraints on the executive;  $\in [1,7]$  and increasing in the number of executive constraints. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] = 1% (5%) [10%] significance level.

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

Panel A	(1)	(2)	(3)	(4)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 2 years after crisis	$\Delta(\text{Deficit/GDP})$ 3 year after crises	$\Delta(\text{Deficit/GDP})$ 4 year after crisis
CRISIS	-0.016 (-6.85)***	-0.029 (-9.24)***	-0.040 (-10.95)***	-0.047 (-11.52)***
UNIFIED	-0.0001 (-0.22)	-0.005 (-1.99)**	-0.011 (-3.49)***	-0.013 (-3.81)***
CRISIS*UNIFIED	-0.011 (-3.25)***	-0.006 (-1.39)	0.003 (0.69)	0.005 (0.88)
N. of observations	2032	1909	1791	1677
Panel B	(1)	(2)	(3)	(4)
	$\Delta(\text{Inflation})$ 1 year after crisis	$\Delta(\text{Inflation})$ 2 years after crisis	$\Delta(\text{Inflation})$ 3 year after crises	$\Delta(\text{Inflation})$ 4 year after crisis
CRISIS	-0.052 (-2.87)***	-0.094 (-3.78)***	-0.139 (-4.83)***	-0.180 (-5.87)***
UNIFIED	-0.012 (-1.12)	-0.021 (-1.43)	-0.032 (-1.70)*	-0.043 (-1.97)**
CRISIS*UNIFIED	-0.050 (-2.15)**	-0.064 (-1.95)*	-0.064 (-1.73)*	-0.038 (-0.95)
N. of observations	2294	2164	2038	1919

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (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 legislative; 0 otherwise. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] = 1% (5%) [10%] significance level.

Table 6: Stabilizations, Crises and Electoral Rules

Panel A	(1)	(2)	(3)	(4)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 2 years after crisis	$\Delta(\text{Deficit/GDP})$ 3 year after crises	$\Delta(\text{Deficit/GDP})$ 4 year after crisis
CRISIS	-0.023 (-6.90)***	-0.034 (-7.96)***	-0.031 (-7.46)***	-0.030 (-7.64)***
CRISIS*PROP	0.007 (1.60)	0.005 (1.01)	-0.006 (-1.11)	-0.018 (-3.10)***
N. of observations	1707	1600	1496	1394
Panel B	(1)	(2)	(3)	(4)
	$\Delta(\text{Inflation})$ 1 year after crisis	$\Delta(\text{Inflation})$ 2 years after crisis	$\Delta(\text{Inflation})$ 3 year after crises	$\Delta(\text{Inflation})$ 4 year after crisis
CRISIS	-0.044 (-1.75)*	-0.093 (-4.62)***	-0.124 (-6.18)***	-0.119 (-6.09)***
CRISIS*PROP	-0.066 (-1.82)*	-0.074 (-2.31)**	-0.091 (-2.65)***	-0.116 (-3.30)***
N. of observations	1958	1840	1725	1615

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (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 otherwise. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] = 1% (5%) [10%] significance level.

Table 7: Stabilizations, Crises and Political Business Cycles

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 1 year after crisis
POL	-0.002 (-3.22)***	-0.002 (-3.16)***	-0.001 (-1.99)**	0.002 (1.26)	0.003 (1.77)*	0.001 (0.92)
CRISIS		-0.020 (-8.92)***	-0.016 (-5.25)***		-0.026 (-12.27)***	-0.026 (-11.47)***
CRISIS*POL			-0.002 (-1.49)			0.004 (1.03)
N. of observations	1898	1898	1898	2331	2331	2331
Panel B	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta$ Inflation 1 year after crisis	$\Delta$ Inflation 1 year after crisis	$\Delta$ Inflation 1 year after crisis	$\Delta$ Inflation 1 year after crisis	$\Delta$ Inflation 1 year after crisis	$\Delta$ Inflation 1 year after crisis
POL	0.001 (0.18)	0.0001 (0.001)	0.003 (1.87)*	0.005 (0.51)	0.005 (0.51)	-0.002 (-0.53)
CRISIS		-0.088 (-6.42)***	-0.070 (-3.27)***		-0.087 (-7.35)***	-0.092 (-6.51)***
CRISIS*POL			-0.009 (-0.94)			0.024 (0.77)
N. of observations	2168	2168	2168	2627	2627	2627

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (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 otherwise. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] = 1% (5%) [10%] significance level.

Table 8: Stabilizations, Crises and Governments' Political Orientation

Panel A	(1)	(2)	(3)	(4)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 2 years after crisis	$\Delta(\text{Deficit/GDP})$ 3 year after crises	$\Delta(\text{Deficit/GDP})$ 4 year after crisis
CRISIS	-0.020 (-6.91)***	-0.028 (-7.65)***	-0.037 (-9.15)***	-0.042 (-10.15)***
LEFT	-0.001 (-0.35)	-0.005 (-1.78)*	-0.008 (-2.21)**	-0.011 (-2.60)***
CRISIS*LEFT	-0.0001 (-0.08)	-0.0001 (-0.01)	0.0001 (0.04)	-0.002 (-0.38)
N. of observations	1509	1401	1301	1208
Panel B	(1)	(2)	(3)	(4)
	$\Delta(\text{Inflation})$ 1 year after crisis	$\Delta(\text{Inflation})$ 2 years after crisis	$\Delta(\text{Inflation})$ 3 year after crises	$\Delta(\text{Inflation})$ 4 year after crisis
CRISIS	-0.081 (-3.24)***	-0.159 (-4.51)***	-0.216 (-5.61)***	-0.230 (-5.60)***
LEFT	-0.001 (-0.12)	-0.004 (-0.23)	-0.019 (-1.01)	-0.027 (-1.10)
CRISIS*LEFT	0.005 (0.10)	0.045 (0.68)	0.051 (0.73)	0.008 (0.11)
N. of observations	1686	1571	1464	1365

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (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 right-wing or centrist. Country fixed effects and year dummies are always included in the estimation. T-statistics corrected for heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] = 1% (5%) [10%] significance level.

Table 9: Stabilizations, Crises and IMF Programs

Panel A	(1)	(2)	(3)	(4)
	$\Delta(\text{Deficit/GDP})$ 1 year after crisis	$\Delta(\text{Deficit/GDP})$ 2 years after crisis	$\Delta(\text{Deficit/GDP})$ 3 year after crises	$\Delta(\text{Deficit/GDP})$ 4 year after crisis
CRISIS	-0.023 (-11.85)***	-0.033 (-14.18)***	-0.039 (-15.40)***	-0.043 (-16.11)***
IMFPROGR	-0.0001 (-0.02)	-0.001 (-0.31)	0.003 (0.66)	0.009 (2.02)**
CRISIS*IMFPROGR	-0.006 (-1.49)	-0.002 (-0.41)	-0.008 (-1.20)	-0.020 (-2.41)**
N. of observations	3192	3076	2963	2852
Panel B	(1)	(2)	(3)	(4)
	$\Delta(\text{Inflation})$ 1 year after crisis	$\Delta(\text{Inflation})$ 2 years after crisis	$\Delta(\text{Inflation})$ 3 year after crises	$\Delta(\text{Inflation})$ 4 year after crisis
CRISIS	-0.067 (-5.18)***	-0.099 (-5.42)***	-0.110 (-4.99)***	-0.129 (-5.09)***
IMFPROGR	0.013 (1.14)	0.021 (1.03)	0.030 (1.18)	0.027 (0.94)
CRISIS*IMFPROGR	-0.052 (-1.54)	-0.130 (-2.32)**	-0.211 (-2.97)***	-0.201 (-2.50)**
N. of observations	3562	3442	3325	3210

Notes: In Panel A, Crises=country-years observations in which the deficit/GDP ratio is equal or above 4.75% (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 or above 14.05% (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 heteroskedasticity in parenthesis. \*\*\* (\*\*) [\*] significant at the 1% (5%) [10%] level.

Table A1: Political variables definition

Variable	Definition	Source	Variable name in source database
EXECONST	Number of executive constraints; ranges from 1 (min constraint) to 7 (max constraint).	Polity IV, 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 either the president is elected by the assembly or parliamentary system.	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