

# Are crises good for long term growth? The role of political institutions

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## Abstract

This paper provides empirical evidence for the importance of institutions in determining the outcome of crises on long-term growth. We show that once unobserved country-specific effects and other sources of endogeneity are accounted for, political institutions affect growth through their interaction with crises. In particular, we find that the effect of a crisis on long-run growth is conditioned by the prevailing institutional environment. In countries with democratic institutions, the negative effect of crises is mitigated, while in countries with autocratic institutions, the negative effect is exacerbated.

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## **Introduction**

Are economic crises good or bad for long term growth? Broadly speaking there are two opposing views: while some authors believe that crises have adverse consequences for long run growth because of increased volatility,<sup>1</sup> others believe that they are good because they allow important reforms to take place.<sup>2</sup> Moreover, a strand of the literature finds that certain type of crises may even be good for long term growth if they are side-effects of growth-enhancing policies such as financial liberalization.<sup>3</sup> However, recent empirical estimates suggest that while short term growth may temporarily pick-up in the aftermath of financial crises, long term growth seldom recovers to pre-crisis trends.<sup>4</sup> This paper seeks to provide a unified empirical answer to these seemingly contradictory views emphasizing the role of political institutions.

Our view is that economic crises do not occur in an institutional vacuum. Crises are, in essence, periods in time when important decisions are made. The ultimate impact of crises on long term growth could depend, among other things, on the type of political institutions prevailing at the time of a crisis and on the kind of political compromises that this institutional set-up delivers. In particular, irrespective of the causes that lead to a crisis, policy responses will be shaped by the incentives and constraints faced by the key political actors during the time of crisis.<sup>5</sup> Our conjecture is that some political systems will be more prone than others to deliver good policy responses that help to correct past policy mistakes.

In this paper rather than testing if certain policy reforms become more likely during crises and whether their implementation and success are conditioned by the institutional environment,<sup>6</sup> we take the alternative approach of exploring if the long run outcome of economic crises is conditioned by the institutional environment. The main

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<sup>1</sup> In general, the economic studies that find a negative effect of crises on growth underscore their short-run destabilizing effects on macroeconomic variables and link these to the adverse effects that output volatility has on long-term growth. See, for example, Ramey and Ramey (1995); Hausmann and Gavin (1996); and Easterly et al. (2001).

<sup>2</sup> Drazen (2002) argues that this view, called the “crisis hypothesis”, has become the new orthodoxy in the political economy literature. In a historical context, Bordo (2007) argues that crises can be “cathartic” when the forces in favor of good economic reforms win over those of the incumbents.

<sup>3</sup> According to this view, as long as crises remain rare, countries that pursue financial liberalizations may end up better off in the long run. For example, (Ranciere, et. al. 2008) show that crises can have beneficial long term effects in credit-constrained countries with medium levels of property rights and bailouts for creditors.

<sup>4</sup> See Bordo and Meissner (2006); and Cerra and Saxena (2008).

<sup>5</sup> See Inter-American Development Bank (2005).

<sup>6</sup> For papers that use this alternative approach see: Giavazzi and Tabellini (2005), Persson (2005) and Persson and Tabellini (2008).

reason why we take this route is pragmatic: our approach does not require taking as stance as to which policies are more conducive to long run growth. However, by focusing on outcome variables like GDP or productivity growth we are able to assess whether the policy decisions (whichever they may have been) taken during a crisis were ultimately conducive to recovery.<sup>7</sup>

Our view is, in essence, very similar to Tommasi (2004). He argues that even though crises might facilitate the introduction of some policy reforms, in general, the quality of the implementation of those policies, and thus their effectiveness in correcting past mistakes, is conditioned by the overall institutional environment of the country. In particular, he argues that whether first-best policies emerge depends on whether the political institutions underlying the policy process lead to cooperative behavior. However, we do not presume to know what the first-best policies are, and let the data speak for itself by focusing on outcome variables.

What specific political institutions can help during crises is a contentious topic. On one hand, democracy could help during crises by ensuring that all voices are heard and that constraints (checks-and-balances) exist on arbitrary decisions that might unduly impose long-run costs on some sectors rather than others.<sup>8</sup> On the other hand, more democracy and public debate could mean that governments are unable to decide quickly, prolonging the duration and negative consequences of crises. In that context, a strong autocratic government with fewer constraints may be desirable to speed up the decision-making process during crises and ensure that reforms are introduced.<sup>9</sup> However, more decisiveness does not guarantee that *good* reforms are implemented. If *bad* reforms are chosen, then the outcome could be worse than under democracy.

Although there is extensive research on the determinants of crises, on how to prevent them, and what policies could help during recoveries,<sup>10</sup> there is, to the best of our knowledge, little empirical research on the role of political institutions in shaping the long-term outcomes of crises. Our main contribution is to employ a dynamic panel

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<sup>7</sup> For our purposes, even if no policy change occurs in the aftermath of a crisis, we are still interested in exploring what is the effect of this “no-reform” outcome on long run growth.

<sup>8</sup> See for example Rodrik (2000), who argues that democracy facilitates intertemporal cooperation through deliberation and rules that prevent excessive redistribution of income.

<sup>9</sup> For example, Aghion et al. (2004) study the optimal level of *insulation* (less constraints on governments) in a model of endogenous political institutions and argue that during times of crises one should observe more insulation (i.e. a stronger, less constrained government). Their implication, however, rest on the assumption that reforms are ex-ante good for the country and that the crisis does not increase the risks of expropriation.

<sup>10</sup> See for example, Calvo et al. (2004), Cavallo and Frankel (2008), Edwards (2004a), Guidotti et al. (2004) and Desai (2003).

growth regression model to assess how various political institutions affect the impact of financial crises on long-term growth.

In this paper we find that, consistent with recent estimates in the empirical literature, banking crises (our preferred crisis measure) are always disruptive in the long run. However, the evidence suggests that stronger democratic institutions can greatly mitigate –and even eliminate— the negative effects of crises on long-term growth, while autocratic governments typically amplify the negative outcome of crises. These results appear closely linked to how decisions are made during times of crises, as evidenced by the fact that higher levels of government constraints (that limit discretionary policy decisions typically linked to vested short-term interests) also have a positive impact on growth through their interaction with crises. Additionally, we find that more regulated political participation, which provides a more structured political discussion during times of crisis, has similar beneficial effects.

The main policy implication is that the commonly held moral-hazard view, which maintains that countries should suffer crises to learn from their mistakes, might be a misleading policy prescription if the role of political institutions is ignored. In particular, crises have particularly detrimental effects on long run growth in more autocratic policy environments.

The structure of the paper is as follows. In section 2 we compare our results to the literature and provide some intuition on a possible theoretical framework. In Section 3 we present the data and estimation methodology. In Section 4 we show our main empirical results and several robustness tests, and in Section 5 we discuss issues of endogeneity. Finally, Section 6 provides some conclusions and suggestions for future research.

## **2. Literature Review and Organizing Framework**

How do these results change our understanding of the relationship between political institutions and growth? An extensive literature studies how democracy and better political institutions can impact growth. Acemoglu et al. (2003) argue that underlying institutional problems are the main cause of poor economic performance. Their view is that bad political institutions lead to distortionary policies, which ultimately reduce growth and increase volatility. Our results are supportive of this view, but we place the focus on the interaction of institutions with crises, which are moments

in time where key decisions are made.<sup>11</sup> In that sense, our results are also in line with those of Rodrik (1999) who maintains that domestic social conflicts (which are typically exacerbated during crises) are important to understanding poor growth performance in many countries.

When dealing with crises, the new political economy literature has emphasized that they facilitate the adoption of superior policy reforms.<sup>12</sup> Drazen (2002) provides a review of some mechanisms by which this process takes place: (1) the reshuffling of interest groups which might weaken anti-reform groups, (2) the perception of the need of change by policymakers, (3) a sufficiently large deterioration of the status quo, (4) the suspension of selfish interest.<sup>13</sup> An important difference with this strand of the literature is that we do not assume that all reforms brought about by crises are necessarily good for growth (or equivalently that the “status quo” policies are necessarily bad). We show empirically that crises have less damaging long run effects in countries with more democratic political institutions, which is in turn consistent with the hypothesis that a better institutional environment may facilitate the implementation of policies during that dampen the negative effects of crises on long run growth (whichever those policies may be).<sup>14</sup>

The results are also related to Acemoglu et al. (2008). They find that there is no correlation between democracy and development when they control for unobserved fixed effects in the regressions. However, this does not mean that institutions do not matter for long run growth. In their view, it suggests that there is a common development path where both democracy and growth are intertwined. So once this path is controlled for via fixed effects in the regressions, there is no positive correlation between democracy and growth. What determines this path? They consider historical factors that may condition the quality of institutions. This hypothesis implies that to understand the relationship between development and democracy, we need to look at the events and factors influencing institutional equilibria at critical junctures. In their paper the critical

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<sup>11</sup> We also use a different methodology to control for the endogeneity of political institutions. Acemoglu et al. (2003) use colonial origins as instruments, while we use internal instruments in a System GMM setting.

<sup>12</sup> In a historical context, Bordo (2007) argues that crises can be “cathartic” when the forces in favor of good economic reforms win over those of the incumbents.

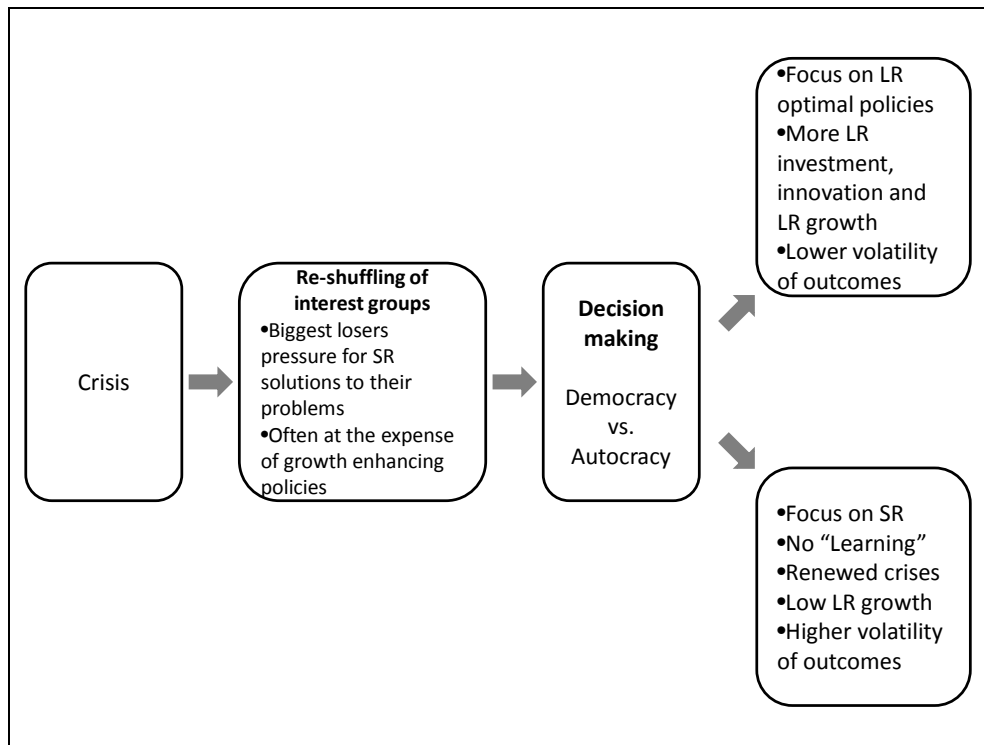
<sup>13</sup> Lora and Olivera (2004) provide some empirical evidence that is consistent with this “crisis hypothesis” by showing that crises tend to lead to optimal trade and labor market reforms.

<sup>14</sup> Overall, the results that we obtain are consistent with Rodrik (2000), who argues that democracy yields better policy outcomes because it facilitates intertemporal cooperation between agents through deliberation, rules that prevent excessive redistribution of income, and procedural rules that facilitate policy compromises.

junctures are during early phases of colonialism. In our paper, it is during episodes of economic crisis.

Our view of the linkage between crises and long run growth is summarized schematically in Figure 1. Building on Drazen (2002), our starting point is that crises are episodes when there is a re-shuffling of interest groups and important decisions can be made. It is possible, as the political economy literature tends to assume, that interest groups that were blocking optimal reforms will be weakened. But the crisis can also provide incentives for interest groups in favor of *wrong* policies and reforms (those that may alleviate their short-run losses at the expense of long-run growth) to increase their influence on the government. The amount of pressure they will exert will depend directly with how much they stand to lose from the crisis or win from its resolution. The outcome will depend on the political institutions present at the time of the crisis, and more specifically, on the ability of the government to resist interest group pressure and make an optimal decision.

Figure 1: Organizing Framework



As an example, consider a banking crisis. Debtors and creditors will tend to have opposing interests and views on how the losses from the crisis should be distributed. Suppose, for the sake of the argument that one group (i.e., debtors to the banks) is smaller but more economically concentrated and powerful, while the other group (creditors) is larger in terms of constituency but less structured. To solve the crisis, the government has to choose between two distinct set of policies. Policy A reduces the burden on debtors at the expense of greater costs on long-term growth –for example, because it destroys creditors’ confidence in the functioning of the financial system and its ability to protect the value of savings, and thus results in lower future financial intermediation and growth. Instead, Policy B redistributes the losses more equitably and is a better policy in terms of its long-run effects because it does not undermine confidence in the operation of the financial system. Debtors, who care more about minimizing short-term losses, will prefer and lobby for policy A.<sup>15</sup> A democracy, where the size of the constituency that supports either policy is important, may be better able to contain these pressures and select superior policies. On the other hand, an autocratic

<sup>15</sup> This would be the case, for example, if they have a sufficiently high discount rate or cannot fully appropriate the higher returns of the growth-enhancing policy.

government may provide a quicker policy reaction that minimizes the duration and negative effects of the crisis. We test these two possibilities in the next section.

### 3. Data and Methodology

Our approach follows the growth methodologies used by Levine et al. (2000) and Aghion et al. (2009), among others. We examine the direct effect of crises on growth and look at their interaction with several political variables.

We use a panel of 78 countries with data for the years 1970-2004. The dependent variables are GDP per capita and GDP per worker. As is now standard in the literature, we transform all variables in our database into five-year averages to eliminate business cycle fluctuations and focus on long-term growth. Thus, the subscript  $t$  designates one of those five-year averages.

We apply the System GMM estimator developed in Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). This estimator allows us to address the joint endogeneity of all explanatory variables in a dynamic formulation, and explicitly controls for potential biases arising from country specific effects. All our regressions include the small sample correction proposed by Windmeijer (2005) in order to obtain robust two-step standard errors.

Specifically, we want to estimate the following equation:

$$y_{i,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta_1 Crisis_{i,t} + \beta_2 Crisis_{i,t} * Pol_{i,t} + \beta_3 Pol_{i,t} + \gamma' Z_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

Where  $y_{i,t}$  is the logarithm of output per capita or worker;  $Crisis_{i,t}$  is a measure of crisis (to be defined below),  $Pol_{i,t}$  is a qualitative measure of political institutions,  $Z_{i,t}$  is a set of control variables which are common in the growth literature,  $\mu_t$  is a time-specific effect;  $\eta_i$  is a country-specific time-invariant effect; and  $\varepsilon_{i,t}$  is the idiosyncratic error term.

Our hypothesis is that  $\beta_1 < 0$  and  $\beta_2 > 0$  so that the direct impact of crises is negative on growth, but the overall effect becomes less negative—and potentially positive—with higher quality of political institutions.

Note that equation (1) is equivalent to



$$y_{i,t} = \alpha y_{i,t-1} + \beta_1 \text{Crisis}_{i,t} + \beta_2 \text{Crisis}_{i,t} * \text{Pol}_{i,t} + \beta_3 \text{Pol}_{i,t} + \gamma' Z_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (2)$$

This is the equation we estimate. It is a dynamic panel specification with endogenous independent variables. Several sources of endogeneity need to be accounted for, in particular omitted variables and simultaneity biases. A key complication is the possible correlation between the independent variables and the unobserved country-specific effect  $\eta_i$ .

The System GMM approach uses a first-difference transformation of (2) to eliminate the unobserved country-specific effect  $\eta_i$ , and internal lagged *level* instruments to replace the endogenous variables in the transformed difference equation. These lagged instruments are valid under the assumption that the independent variables are weakly exogenous. This means that they may be correlated with present and past error terms but not with future errors.<sup>16</sup> This is a reasonable assumption for the crisis and political measures because it means they are uncorrelated with unanticipated shocks even though expected future dynamics may affect them. The problem with this approach is that lagged variables are weak instruments in the presence of serial correlation.<sup>17</sup> This is particularly problematic in the case of political variables which typically show a great deal of persistence. In order to address this problem, system GMM additionally estimates the level equation using lagged *differences* as instruments for the contemporaneous *level* explanatory variables.<sup>18</sup> The inclusion of two equations, one in differences and another one in levels, gives the ‘‘System’’ GMM estimator its name. A more detailed explanation on the System GMM approach is included in the Appendix.

We use several measures for both  $\text{Crisis}_{i,t}$  and political institutions  $\text{Pol}_{i,t}$ . Next we provide some more detail on these key variables.

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<sup>16</sup> So that using a lagged variable as instrument is valid because *past* variables are not correlated to *present* error terms.

<sup>17</sup> A very persistent variable would mean that lags are not correlated with the differenced variable we are trying to instrument. See the Appendix for further details.

<sup>18</sup> This last step rests on the assumption that even though crises and political institutions may be correlated to  $\eta_i$ , *changes* in these variables are not correlated to  $\eta_i$  after controlling for all other included independent variables. Note that since  $\eta_i$  is time-invariant, this assumption means that an unobserved country characteristic which does not change *over time* is assumed uncorrelated with the *change* in crises, political institutions and other variables that occurs over time.

## Crisis Variables

Broadly speaking, the crisis literature distinguishes between crises with external origin and crises with domestic origin. Within each of these categories, there is a wide array of definitions. A popular kind of external crisis is based on the concept of “current account reversal” (Milesi-Ferreti and Razin 1998 and 2000; Edwards 2004a and 2004b), which is typically defined as a reduction in the current account deficit of a certain percentage of GDP in one year. A somewhat related concept is the definition of “sudden stops” in capital flows, popularized by Calvo (1998), which is typically defined as an unexpected reduction in net capital inflows.<sup>19</sup> Sudden stops or current account reversals could trigger a currency crisis.<sup>20</sup>

Examples of crises with domestic origin include hyperinflations or balance of payment crises triggered by domestic fiscal imbalances (i.e., Krugman 1979). Other forms of crises, such as “debt crises” are harder to characterize based on their origin, as there might be debt crises triggered by external shocks (i.e., sudden stops), or debt crises triggered by fiscal policy mismanagement. Empirically, one useful definition of “debt crisis” is provided by Manasse et al. (2003). A country is defined to be in a “debt crisis if it is classified as being in default by Standard and Poor’s or if it receives a large non-concessional IMF loan defined as access in excess of 100 percent quota.”

While most of these concepts are closely related, these varieties do not always overlap.<sup>21</sup> We want to use a crisis variable that is more closely correlated with many possible varieties discussed above. In particular, we do not want to limit the analysis to crises of domestic origin because, even when the origin of a crisis is outside the direct control of domestic authorities, there are policies that a country can follow to reduce its

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<sup>19</sup> Guidotti et al. (2004) distinguish between sudden stops that lead to current account reversals and those that do not. When sudden stops are not accompanied by current account reversals, then presumably the country found an alternative source of financing, namely reserve depletion or exceptional funding from an international financial institution. Reserve depletion is feasible only when the Central Bank has sufficient international reserves to spend and is willing to use them. If the sudden stop is persistent (i.e., if capital inflows are not restored promptly), then the strategy of reserve depletion could lead to a *currency crisis*.

<sup>20</sup> See Frankel and Rose (1996), Frankel and Wei (2004), and Frankel (2005) for a discussion on currency crises and the links with other varieties of crises.

<sup>21</sup> More likely than not, a sudden stop, particularly a large and persistent one will eventually lead to a current account reversal if there are no alternative sources of financing. Whether it also entails a currency crisis depends on whether reserves become depleted, and on the exchange rate regime in place before the shock. Milesi-Ferreti and Razin (1998, 2000) study the relation between currency crises and current account reversals. They conclude that they are only tenuously related. Similarly, Cavallo and Frankel (2008) find only weak correlation between sudden stops and currency crises in their sample.

vulnerability to, and the incidence of, those events.<sup>22</sup> As a first approximation, we could build a consensus crisis indicator,<sup>23</sup> but the different time frames available for the various crisis definitions would severely limit the sample. Thus, we follow a different approach. We use banking crisis, a variable that is more closely associated with all the other forms of crises, and show robustness with other crisis indicators.<sup>24</sup> Due to the risky nature of its activity, the banking sector is highly vulnerable to a multiplicity of shocks. Thus, banking crises typically encompass a wide variety of events, some with external origin and some with domestic origin.

Our main crisis variable is calculated using the “banking crisis” dummy of Caprio and Klingebiel (2003).<sup>25</sup> Additionally, as robustness checks, we construct similar crisis measures using a systemic banking crisis dummy from the same source, several sudden stop variables and current account reversals from Cavallo and Frankel (2008), and a debt crisis indicator from Manasse et al. (2003).

All our crisis variables are computed as the ratio of crisis years to total available years in the period, and range from 0 to 1. For example, if the country had a crisis that lasted two years, then our crisis measure is 0.4 for the five-year period. We choose to construct it this way in order to incorporate the duration aspect of crises, which can impact the crisis outcome considerably.<sup>26</sup>

## Political Variables

For the political variable  $Pol_{i,t}$ , we use measures of democracy and institutional quality that are common in the political economy literature. Our main variable is the aggregate indicator of democracy from the Polity IV database (polity2). This index ranges from -10 to 10 (where -10 is high autocracy and 10 is high democracy) and is constructed as the difference between the sub-indexes for democracy (democ2) and autocracy (autoc2). It provides a qualitative measure of *democratic institutions*, defined by the existence of a high level of political participation, civil liberties and

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<sup>22</sup> For example, de-dollarization in Calvo et al. 2004, or openness to trade in Cavallo and Frankel 2008).

<sup>23</sup> See for example Ranciere et al. (2008).

<sup>24</sup> We find that, in our sample, banking crisis is more than twice more correlated with the rest of the crisis definitions, than any of the other variables. Thus, while the average correlation of banking crisis with the rest of the definitions is 0.25, the average correlation between sudden stops and the other crisis variables is 0.12, and for debt crisis the correlation is only 0.10.

<sup>25</sup> See the Appendix for more details on this variable.

<sup>26</sup> It also allows us to avoid having a binary indicator which could invalidate the use of lags as instruments. However, our results are robust to the use of other variations of crisis indicators used in the literature.

institutionalized constraints on the exercise of power by the executive.<sup>27</sup> We also use pure measures of external constraints on the government (exconst2) and political competition (polcomp2) from the same database. Additionally, we perform robustness checks using indicators from the Freedom House database of civil liberties and political rights, and the Polcon database from Henisz (2000).

#### Other Control Variables

As control variables  $Z_{i,t}$  we follow the standard growth literature and include the following: openness to trade (measured as the ratio of exports plus imports over GDP), government spending (government expenditure over GDP), education (years of secondary schooling for the population above 15 years of age) and inflation. It is worth emphasizing that all these regressors are treated as endogenous variables.

Finally, all our regressions include time fixed effects to control for period-specific events that may affect several countries at the same time.<sup>28</sup>

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<sup>27</sup> See the Appendix for more details.

<sup>28</sup> Also, the methodology employed assumes no correlation across countries in the idiosyncratic disturbances. Time dummies make this assumption more likely to hold (see Roodman 2006)

#### **4. Estimation results: How political variables condition the growth outcome of crises**

Table 1 shows the impact of crises on long term growth, both directly and via the interaction with political variables. The first two regressions estimate the effects on output per capita growth, while the next two repeat the analysis for output per worker (labor productivity). Among each set, the first regression estimates the independent effects of crises and political institutions, while the second regression adds an interaction term.<sup>29</sup>

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<sup>29</sup> Table 1 also presents the Hansen over-identification test, where the null hypothesis is that the instrumental variables (internal instruments) are uncorrelated with the residuals (also known as the exclusion restrictions), and the 2<sup>nd</sup> order serial correlation test, where the null hypothesis is that the errors in the differenced equation exhibit no second order correlation (more on these tests below).

**Table 1: Growth effects of Crises and Interaction with Political Institutions**

Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Log GDP per capita		Log GDP per worker	
	(1.1)	(1.2)	(1.3)	(1.4)
Crisis [Systemic BC]	-0.131*** [0.032]	-0.179*** [0.036]	-0.136*** [0.030]	-0.165*** [0.037]
Crisis * Polity2		0.013** [0.005]		0.009** [0.004]
Polity2	0.004 [0.003]	-0.000 [0.003]	0.001 [0.003]	-0.002 [0.003]
<b>Control Variables</b>				
Initial GDP per capita [log]	0.984***a [0.023]	0.986*** [0.020]		
Initial GDP per worker [log]			0.955*** [0.035]	0.954*** [0.032]
Trade openness [X+M/GDP, log]	0.106* [0.060]	0.076 [0.057]	0.058 [0.059]	0.034 [0.048]
Government Burden [Government consumption/GDP, log]	-0.154** [0.064]	-0.145** [0.070]	-0.075 [0.063]	-0.071 [0.053]
Inflation [log [1+inflation]]	-0.054** [0.025]	-0.050** [0.022]	-0.061*** [0.020]	-0.061*** [0.019]
Education [Secondary Enrollment, log]	0.007*** [0.002]	0.005*** [0.002]	0.005*** [0.002]	0.005*** [0.002]
Constant	0.240 [0.357]	0.363 [0.344]	0.587 [0.372]	0.704** [0.315]
Hansen p-value	0.23	0.47	0.19	0.51
AR1 test	0.00	0.00	0.00	0.00
AR2 test	0.08	0.26	0.19	0.26
Observations	419	419	424	424
Number of Countries	78	78	77	77
Number of instruments	75	83	75	83

Time dummies are included in all regressions [coefficients not shown]

Standard errors in brackets

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

a : Note that we are estimating equation (2) in the text, so that the effect on gdp growth for this particular coefficient has to be calculated by subtracting 1.

Regression (1.1) shows that crises generally have a negative impact on long-term growth.<sup>30</sup> This is a robust result across all our specifications and is consistent with most

<sup>30</sup> The results are robust to using financial openness variables as instruments for crisis duration in the regressions. In particular, we re-estimate the specifications in Table 1, using as instruments two widely used financial openness indicators: *de jure* financial openness indicator from Chinn

results in the financial crises literature.<sup>31</sup> The coefficients are economically significant: for example, a country that has two year of banking crises in a 5 year period (i.e., crisis=0.4) grows 5.24 percent less between periods than a country that suffered no crises.<sup>32</sup> Whether this is a small or large effect is debatable, but the fit of the estimation is quite good. In particular, note that the regression satisfies the specification and serial correlation tests. More interesting perhaps is that political institutions per se (in this case measured by the combined democracy index, polity2) do not appear to be significant for growth. This is consistent with results by Acemoglu et al. (2008), who show that the positive correlation between income and democracy disappears once they control for unobserved fixed effects.<sup>33</sup>

The problem with regression (1.1) is that the linear specification could be misleading. Political institutions variables have limited time variation. Thus, they might enter as insignificant in regressions like (1.1) because their effect is absorbed by the fixed effect.<sup>34</sup> This does not mean that they do not matter. One way around this identification problem is to find particular situations where the quality of the institutions might matter most.<sup>35</sup> We believe that one such situation is during times of crisis. During these times, authorities choose policy responses that can either improve on the status quo and set the stage for recovery, or simply redistribute gains and losses without taking corrective actions.

Our hypothesis is that authorities, like any other economic agent, respond to incentives and that their incentives structure is, in turn, determined by the nature of political institutions and by the availability of checks and balances.<sup>36</sup> In strong democracies policymakers are ultimately accountable to voters, while in less democratic regimes special interests have more power. Therefore, it is more likely that the correct policy choices during crises are going to be made in more open and democratic societies.

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and Ito (2006), and *de facto* financial globalization indicator, computed as the total of a country's foreign assets and liabilities as percentage of the GDP (Lane and Milesi-Ferretti, 2007).

<sup>31</sup> See Bordo and Meissner (2006) and Cerra and Saxena (2008).

<sup>32</sup> This number comes from multiplying the corresponding coefficient by 0.4. (i.e., -0.131\*0.4=0.0524).

<sup>33</sup> Furthermore, Acemoglu et al (2005) find that the positive correlation between democracy and education usually found in studies that exploit cross-sectional variation in the data is also not robust to controlling for country fixed effects.

<sup>34</sup> While we do not explicitly have fixed-effects in the regression, our estimation methodology deals with them by first-differencing.

<sup>35</sup> Paper that focus on democratic "transitions" as the explanatory variable (i.e. Persson 2005, Giavazzi and Tabellini 2005 or Persson and Tabellini 2008) rather than "levels" as we do here do not face this identification problem because by definition (and also by virtue of using higher frequency data) they have more time series variation in the right hand side variable.

<sup>36</sup> For a comprehensive study on how political institutions affect the policymaking process, and this, in turn, the quality of public policies, see Inter-American Development Bank (2005).

We try to capture these effects of political institutions during times of crisis through the use of interaction terms in our regressions.

Regression (1.2) adds the interaction between crises and political institutions and shows that this is both economically and statistically significant. The positive coefficient of the interaction indicates that more democratic political institutions can mitigate the negative effect of crises on growth. Note that the coefficient of the crisis variable itself remains negative and significant, while the coefficient for polity2 is still insignificant. The magnitude of the coefficients shows the interaction effect is also economically significant. A very strong democracy like the United States, with a polity score of 10, can completely neutralize the negative effects of crises.<sup>37</sup> In contrast, in a country with particularly poor democratic institutions like Egypt, with an average polity score of -6 for recent years, the overall negative effect of a crisis is magnified by over 40 percent compared to a country with a neutral political score of 0, or 424 percent compared to a country like the United States.<sup>38</sup>

This shows that political institutions play a key role during times of crisis. The importance of our results is strengthened when looking at the case of China, a country that has not suffered major financial crises in recent decades—presumably due to its closed capital account and the underdevelopment of the financial system—but may well face such crises in the near future as it continues to grow and loosen restrictions. China’s combined polity score currently averages -7, which according to our results, means that China could have a hard time *learning* from a financial crisis. Therefore, it would make sense for China to avoid reforms that can increase the incidence of crises without first improving democratic institutions. In other words, the sequence of reforms is key, with democratic institutions preceding financial deepening in order to improve the chances of success.<sup>39</sup>

The last two regressions in Table 1, in columns (1.3) and (1.4), show that our results are robust when we use productivity growth as the dependent variable. This provides evidence that the identified interaction between crises and political institutions

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<sup>37</sup> For example, if the United States suffers one year of crisis during a five-year period (our crisis measure is equal to 0.2), then the overall effect on growth is only -0.0098 or -0.98 percent [ $-0.179*0.2+(0.013*0.2*10)$ ],

<sup>38</sup> These numbers are computed as follows:  $-0.0514=-0.179*(0.2)+(0.013*(0.2)*(-6))$  vs only -0.0358 if it had a polity score of 0. If compared to the results of -0.0098 for a country like the United States, with a polity score of 10, then the effect of crises is magnified by a factor of 5.24 (an increase of 424 percent).

<sup>39</sup> Note that this debate is akin to an old debate in the economic literature on the right sequencing of structural reform. See, for example, Edwards (1990).



must work through a mechanism that enhances labor productivity.<sup>40</sup> For concreteness, throughout the rest of the paper we use GDP per capita growth as the dependent variable, but we show in the Appendix that all our results apply to productivity growth as well.

In an attempt to further pin down the kind of political institutions that can help to mitigate the negative effects of crises, in Table 2 we decompose the Polity index into the sub-indexes for democracy (democ2), autocracy (autoc2), external constraints on the government (extconst2) and political competition (polcomp2). All these regressions are variations of regression (1.2), with a different political sub-index.

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<sup>40</sup> We can safely reject mechanisms that affect only the labor participation rate (workers/population). For example, it can be argued that more democratic institutions facilitate emigration of previously unemployed people who lose all hope of finding a job after a crisis.

**Table 2: GDP per capita growth effects of Crises and Interaction with Democracy, Autocracy, External Constraints and Political Competition.**  
 Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Log GDP per capita			
	(2.1)	(2.2)	(2.3)	(2.4)
Crisis [BC]	-0.248*** [0.053]	-0.077* [0.040]	-0.359*** [0.093]	-0.295*** [0.084]
Crisis * Democracy	0.020** [0.008]			
Democracy [democ2]	-0.000 [0.007]			
Crisis * Autocracy		-0.028** [0.011]		
Autocracy [autoc2]		-0.001 [0.007]		
Crisis * External Constraints			0.044** [0.017]	
External Constraints [exconst2]			-0.004 [0.009]	
Crisis * Political Competition				0.023** [0.010]
Political Competition [Polcomp2]				0.002 [0.008]
<b>Control Variables</b>				
Initial GDP per capita [log]	0.984*** [0.027]	0.992*** [0.022]	0.985*** [0.018]	0.978*** [0.024]
Trade openness [X+M/GDP, log]	0.077 [0.058]	0.087 [0.059]	0.086 [0.063]	0.063 [0.056]
Government Burden [Government consumption/GDP, log]	-0.145** [0.068]	-0.167** [0.067]	-0.155** [0.071]	-0.146** [0.068]
Inflation [log [1+inflation]]	-0.039 [0.025]	-0.053*** [0.017]	-0.036* [0.021]	-0.049** [0.020]
Education [Secondary Enrollment, log]	0.006** [0.002]	0.005** [0.002]	0.006*** [0.002]	0.006*** [0.002]
Constant	0.316 [0.346]	0.352 [0.326]	0.290 [0.401]	0.451 [0.306]
Observations	419	419	419	419
Number of Countries	78	78	78	78
Number of instruments	83	83	83	83
Hansen p-value	0.39	0.50	0.53	0.34
AR1 test p-value	0.00	0.00	0.00	0.00
AR2 test p-value	0.24	0.23	0.23	0.21

Time dummies are included in all regressions [coefficients not shown]  
 Standard errors in brackets  
 \*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Regression (2.1) uses democracy (*democ2*) as the political variable and shows that, as expected, higher levels of democratic institutions mitigate the negative effects of crises. In the Polity IV database, *democ2* is a qualitative sub-index constructed on the basis of three interdependent elements: i) the presence of institutions and procedures through which citizens can express effective preferences on alternative policies and leaders, ii) the existence of institutionalized constraints on the exercise of power by the executive and iii) the guarantee of civil liberties to all citizens. Other aspects of plural democracy, such as the rule of law, systems of checks and balances, freedom of the press, and so on, are specific manifestations of these general principles.

Similarly, regression (2.2) uses autocracy (*autoc2*) as the political variable and shows that having a autocratic government makes crises worse for growth. In the Polity IV database, the *autoc2* sub-index is operationally defined as a government that sharply restricts or suppresses competitive political participation, with a chief executive that is chosen by a political elite and exercises power with few institutional constraints. This regression is important because it shows that the two components of *polity2*, democracy and autocracy, work in opposite directions in terms of their interaction effect with crises.

Furthermore, regression (2.2) provides evidence against the view that an authoritarian government, able to make rapid and strong decisions, is better able to deal with the chaotic environment of crises. Less autocratic countries that go into a crisis might well take longer to recuperate because of deliberative politics and the time-consuming policy-making process of democratic regimes, but the resulting policy responses are probably going to be better equipped to resolve the vulnerabilities that led to the crisis, instrument appropriate reforms, and avoid future crises (i.e., reduce growth volatility).<sup>41</sup>

Both *democ2* and *autoc2* are in turn constructed from other more specific indicators. The first indicator, external constraints on governments (*xconst2.*), is a measure of the level of checks and balances in the political system. Operationally, it measures the extent of institutionalized constraints on the decision making powers of chief executives, whether individuals or collectivities. Regression (2.3) shows that more checks-and-balances play a positive role, once again, via their interaction with crises, and supports our view that political institutions affect the decision process in times of crisis.

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<sup>41</sup> The fact that democracy helps to lower growth volatility has already been documented in the literature. Mobarak (2005) studies the interrelationship between democracy, volatility and growth. He explores the determinants of average growth and its volatility in a two-equation system, finding that higher levels of democracy lower volatility, while volatility itself reduces growth.

Political competition (`polcomp2`) has a similar positive effect. This variable measures the extent to which alternative preferences for policy can be pursued in the political arena, and the extent to which there are binding rules on when, whether, and how, political preferences are expressed. Both one-party states and western democracies may score highly in this index—the former by channeling participation through only one party, with limited diversity of opinion and the latter, by allowing relatively stable groups to compete nonviolently for political influence. A low value reflects unregulated participation, an environment where there are no enduring political organizations or controls on political activity. The results in regression (2.4) are consistent with the claim that unregulated participation increases the chances of expropriation during times of crises. In states with unregulated participation —with a low `polcomp2` score-, those with more to lose in a crisis might find it profitable to devote more resources to lobby (i.e., bribe the government) and obtain policies that might help them but may hinder long term growth. This effect is limited if there is a stable competitive environment in which all voices are heard, like in modern western democracies. Furthermore, it will also be limited in the case of one-party states, where the party ideology may not always coincide with these short-term interests.

### **Other political variables**

Table 3 shows that our main results are robust to the use of different sources for the political variables, such as the Polcon database obtained from Henisz (2000) and the Freedom House database, “Freedom in the World” (2007).

**Table 3: GDP per capita growth effects of Crises and Interaction with Polcon and Freedom House indicators**

Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Log GDP per capita				
	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)
Crisis [BC]	-0.254*** [0.061]	-0.250*** [0.062]	-0.185*** [0.043]	-0.163*** [0.033]	-0.156*** [0.041]
Crisis * PolconIII	0.411** [0.159]				
PolconIII	-0.004 [0.083]				
Crisis * PolconV		0.265** [0.107]			
PolconV		0.028 [0.083]			
Crisis * FH			0.011* [0.006]		
FH			0.002 [0.006]		
Crisis * FH Political Rights				0.008* [0.005]	
FH Political Rights				0.005 [0.004]	
Crisis * FH Civil Liberties					0.009 [0.006]
FH Civil Liberties					-0.002 [0.005]
<i>Control Variables</i>					
Initial GDP per capita [log]	0.995*** [0.018]	0.982*** [0.024]	0.972*** [0.023]	0.961*** [0.025]	0.982*** [0.022]
Trade openness [X+M/GDP, log]	0.040 [0.036]	0.051 [0.037]	0.055 [0.055]	0.061 [0.046]	0.051 [0.059]
Government Burden [Government consumption/GDP, log]	-0.194*** [0.060]	-0.179*** [0.068]	-0.159** [0.063]	-0.144* [0.079]	-0.156*** [0.056]
Inflation [log [1+inflation]]	-0.065** [0.025]	-0.042 [0.027]	-0.042 [0.026]	-0.050* [0.027]	-0.049** [0.023]
Education [Secondary Enrollment, log]	0.005*** [0.002]	0.005** [0.002]	0.006*** [0.002]	0.006*** [0.002]	0.006*** [0.002]
Constant	0.669*** [0.245]	0.560** [0.267]	0.539 [0.344]	0.583* [0.304]	0.509 [0.362]
Observations	413	413	419	419	419
Number of Countries	77	77	78	78	78
Number of instruments	83	83	83	83	83
Hansen p-value	0.75	0.54	0.35	0.39	0.37
AR1 test p-value	0.00	0.00	0.00	0.00	0.00
AR2 test p-value	0.00	0.01	0.24	0.20	0.20
Time dummies are included in all regressions [coefficients not shown. Standard errors in brackets. *Significant at 10%; ** significant at 5%; *** significant at 1%					

Henisz (2000) provides an alternate measure of political institutions. The Political Constraint Index (POLCON) measures the possibility of a change in policy given the structure of a country's political institutions (number of veto points) and the preferences of the political actors in these institutions (partisan alignment and homogeneity of preferences within each branch). The scale ranges from 0 to 1. There are two versions, PolconIII and PolconV, which are constructed in a similar way, but PolconV includes two additional veto points: the judiciary and sub federal entities. Regressions (3.1) and (3.2) show that these alternative measures of political constraints are also important explanatory variables. A low Polcon score means that there are fewer constraints on sudden changes in policies, and therefore more chances that governments could arbitrarily benefit special interest groups, an idea consistent with our previous results.

In regressions (3.3) to (3.5) we use the Freedom in the World database, compiled annually by Freedom House based on an assessment of political rights and civil liberties. The original indexes have a scale from 1 to 7, where 1 is the freest country and 7 the least free. In order to make it comparable to the PolityIV series, we reverse the scale and standardize the combined index to a scale that varies from -10 to 10, where 10 is the freest rating. We do the same with the sub-indexes of political rights and civil liberties.<sup>42</sup>

Regression (3.3) shows that having a higher rating of "freedom" during crises is good for growth. This is consistent with our previous results. More interesting perhaps, is the decomposition between political rights and civil liberties. Political rights are defined in this index as "the right to elect representatives who have a decisive impact on public policies and are accountable to the electorate", while civil liberties emphasize "the freedoms of expression and belief". Regression (3.4) shows that political rights are driving the main results. The right to elect people who will impact policies and the accountability of the government play a key role during times of crises. By contrast regression (3.5) shows that whether people can freely express their opinions or not, as measured by civil liberties and regardless of their impact on actual decisions, is not equally important.

### **Other crisis dummies**

Table 4 shows that results are also robust to the use of different crisis proxies.

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<sup>42</sup> Data is available from 1972, so we compute the first five-year average using only 3 years.

**Table 4: GDP per capita growth effects of Crises and Interaction with Polity2****Robustness: Additional crisis indicators**

Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Log GDP per Capita				
	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)
SBC Crisis	-0.176*** [0.045]				
SBC Crisis * Polity2	0.015** [0.006]				
SS1		-0.378 [0.258]			
SS1 * Polity2		0.083** [0.041]			
SS4			-0.143 [0.238]		
SS4 * Polity2			0.050 [0.034]		
SS5				-0.498 [0.333]	
SS5 * Polity2				0.095* [0.051]	
Debt Crisis					-0.237** [0.116]
Debt Crisis * Polity2					0.013* [0.008]
Polity2	0.000 [0.003]	0.001 [0.003]	0.001 [0.003]	0.002 [0.003]	-0.008* [0.004]
<i>Control Variables</i>					
Initial GDP per capita [log]	0.989*** [0.019]	1.005*** [0.026]	1.008*** [0.022]	0.987*** [0.025]	0.973*** [0.056]
Trade openness [X+M/GDP, log]	0.060 [0.045]	0.101* [0.053]	0.093* [0.053]	0.072 [0.048]	-0.004 [0.103]
Government Burden [Government consumption/GDP, log]	-0.163*** [0.059]	-0.183*** [0.068]	-0.192*** [0.072]	-0.126** [0.053]	-0.190 [0.162]
Inflation [log [1+inflation]]	-0.051** [0.023]	-0.068*** [0.024]	0.006*** [0.023]	-0.078*** [0.017]	-0.033 [0.085]
Education [Secondary Enrollment, log]	0.006*** [0.002]	0.005*** [0.002]	0.006*** [0.002]	0.005** [0.002]	0.005 [0.003]
Constant	0.438 [0.270]	0.238 [0.378]	0.252 [0.350]	0.401 [0.299]	0.836 [0.734]
Observations	419	401	401	396	183
Number of Countries	78	78	78	78	33
Number of Instruments	83	82	82	82	85
Hansen p-value	0.54	0.59	0.49	0.52	1.00
AR1 test p-value	0.01	0.01	0.01	0.00	0.19
AR2 test p-value	0.05	0.87	0.30	0.10	0.95
Time dummies are included in all regressions [coefficients not shown. Standard errors in brackets. *Significant at 10%; ** significant at 5%; *** significant at 1%					

In regression (4.1), we replace the banking crisis variable from Caprio and Klingebiel (2003) with the systemic banking crisis variable. The difference is that while

the former includes borderline and smaller banking crisis, the latter only includes episodes when much or all of bank capital has been exhausted. Thus, systemic banking crisis is a much more restrictive definition of crisis. Despite the change in the definition, the results reported in (4.1) remain unchanged.

In regressions (4.2)-(4.4), we change the crisis variable to sudden stops, a form of crisis with external origin. Cavallo and Frankel (2008) define different variants of sudden stops. The preferred definition is SS1. This algorithm classifies as a sudden stop a situation where in year  $t$ , the financial account surplus of country  $i$  (prevailing at year  $t-1$ ) has fallen at least two standard deviations below the sample mean for that country; the current account deficit falls by any amount either in  $t$  or in  $t+1$ ; and GDP per capita falls by any amount either in  $t$  or in  $t+1$ . SS5 is equivalent to SS1 but uses the criterion that the sudden stop be accompanied by a loss of reserves rather than a fall in output. SS4 is, instead, equivalent to SS1 but is less restrictive in that classifies as sudden stops events that do not necessarily trigger recessions or a fall in reserves (these events are akin to the “current account reversals” in the array of crises definitions).

The results reported in (4.2)-(4.4) are broadly consistent with the previous results. In particular, the interaction between crisis and political institutions is always positive and statistically significant in two of the cases. Interestingly, it is not significant only in the case of SS4. This is reasonable since this is the one variant that, by not conditioning by fall in output or in international reserves, is more likely to identify events that are not really crises.<sup>43</sup> Also, note that the main difference with the previous results is that while the crisis dummy itself remains negative, it is rarely statistically significant in the regressions. This is probably due to the fact that sudden stops are, by definition, very rare events in the sample.<sup>44</sup> Despite this, the fact that the interaction between crisis and political institutions is usually statistically significant with the correct sign is reassuring evidence in favor of the main hypothesis.

Finally, in regression (4.5) we change the crisis variable to the debt crisis indicator of Manasse et. al. (2003). Once again, we find that debt crisis have a negative effect on long-term growth, but that effect is mitigated when crises occur in countries with more democratic institutions.<sup>45</sup>

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<sup>43</sup> For example, a positive terms-of-trade shock might render a fall in net capital inflows and a current account reversal, but it is clearly not a crisis event.

<sup>44</sup> The total number of SS1 episodes captured using the methodology of Cavallo and Frankel (2008) is 86, which is 2.4 percent of total available country/year observations in the dataset

<sup>45</sup> In unreported regressions we also tried “currency crises” from Frankel and Wei (2004) —which is an updated measure based on Frankel and Rose (1996)—and Cerra and Saxena (2008). While the



In unreported regressions we also check that the results are robust to a variety of sample splits, including different time windows (i.e., 1970-1990; 1990-2004) and re-computing regressions using ten year averages for all the variables.

## **5. Endogeneity and other estimation issues**

Although our dynamic panel system GMM methodology is suited to control for the potential endogeneity of all independent variables, the validity of this estimation method depends on the assumption of weak exogeneity of the regressors. This means that they are assumed to be uncorrelated with future realization of the error term. To test this assumption we use the Hansen test of over-identifying restrictions and find in all regressions that the joint validity of our instruments cannot be rejected (p-values reported in all tables).

A potential problem with the proposed estimation procedure is that too many instruments can over-fit the endogenous variables and fail to isolate their exogenous component. At the same time, it also weakens the power of the Hansen test to detect over identification (Roodman, 2009). To deal with these problems we limit the number of instruments to the minimum by using only one lag for each endogenous variable. Alternatively we further limit the number of instruments by treating some of the control variables as exogenous. Finally, we follow Roodman’s suggestion of “collapsing” the instruments. None of these tests change the results.

There still remains the problem that a sub-set of instruments might be not valid. In particular, for the crisis indicators and interactions, it may be the case that lags (from t-2 back) are weak instruments. We therefore perform a difference-in-Hansen test for this subset (crisis and interactions) and find that it also cannot be rejected.<sup>46</sup> Moreover, a necessary condition of the System GMM estimator is that the difference error term is not serially correlated, something which we also confirm in all our regressions by rejecting the Arellano-Bond AR2 test (p-values reported in all tables).<sup>47</sup>

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sign of the interaction term is always positive, in none of these cases we obtained statistically significant results.

<sup>46</sup> The details are available from the authors upon request.

<sup>47</sup> Another potential problem with the estimation procedure is the lagged differences of the left hand side variable can be weak instruments of the level equations, in which case the advantages of system GMM are not longer valid (Bun and Windmeijer, 2009). To check for this problem we compute Bun and Windmeijer’s concentration parameter. While we find evidence consistent with the weak instruments problem, these results should be qualified. First, the properties of the test have not been tested in models that are not panel AR(1). Moreover, in unreported regressions we test that our baseline results are not idiosyncratic to the estimation method, in particular, we tried difference GMM and the within fixed-effect estimators and we obtain similar results. While the alternative estimators have problems of their own, the fact that we obtain similar results

Finally, the level estimator imposes mean stationarity. To check the validity of this assumption we perform a series of panel unit root tests and we find that we can safely reject the null hypothesis of non-stationarity of the GDP per capita and labor productivity series at the conventional significance levels.<sup>48</sup>

## 6. Conclusion

The answer we provide to the question of the title of this paper is that crises are always disruptive in the long run; however the net effect is conditioned by the prevailing institutional environment. In countries with democratic institutions, the negative effect of crises is mitigated or even eliminated, while in countries with autocratic institutions, the negative effect is exacerbated.

We conjecture that this result arises because democracies tend to deliver better policy responses in the aftermath of shocks. This means that, while there might be examples of benevolent dictators that react quickly and pursue good economic policies, on average, autocratic regimes are unable to handle crises well and deliver long-term growth. In other words, *decisiveness*—an attribute oftentimes assigned to autocratic regimes—does not imply that *sound* policies are implemented.

This paper has an important policy implication: crises may not be useful to promote growth-enhancing reforms especially in less democratic institutional environments. More likely than not, special interest might co-opt policy responses and crises will only end up hurting the public at the expense of more powerful interest groups. We view this as an important take-away for the proponents of the moral-hazard view, who argue that countries should “suffer” crises to learn from their mistakes.

Furthermore, our results suggest that political reforms are important prerequisites of any economic reform that increases the likelihood of crises. For that reason, countries like China should be very cautious with the pace of economic liberalizations, at least until more democratic institutions are introduced.

A next step in our analysis would be to further identify precise mechanisms through which political institutions help during times of crises. Our belief is that they aide in the selection and implementation of better policies, those that are growth enhancing in the long run. This will be the main focus of our forthcoming research agenda.

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using different instruments is reassuring. Finally, using external instruments (i.e. financial openness proxies as discussed before) do not change the baseline result either. Details are available upon request.

<sup>48</sup> Details available upon request.

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## APPENDIX

**Table 5: GDP per worker** growth effects of Crises and Interaction with Democracy, Autocracy, External Constraints and Political Competition.

Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Los GDP per worker			
	(A2.1)	(A2.2)	(A2.3)	(A.4)
Crisis [Systemic BC]	-0.210*** [0.044]	-0.078* [0.045]	-0.281*** [0.076]	-0.240*** [0.065]
Crisis * Democracy	0.015** [0.006]			
Democracy [democ2]	-0.001 [0.005]			
Crisis * Autocracy		-0.024** [0.009]		
Autocracy [autoc2]		0.007 [0.006]		
Crisis * External Constraints			0.031** [0.014]	
External Constraints [exconst2]			-0.005 [0.009]	
Crisis * Political Competition				0.018** [0.009]
Political Competition [Polcomp2]				-0.005 [0.006]
Control Variables				
Initial GDP per worker [log]	0.951*** [0.034]	0.956*** [0.029]	0.955*** [0.033]	0.965*** [0.037]
Trade openness [X+M/GDP, log]	0.040 [0.050]	0.032 [0.049]	0.056 [0.050]	0.031 [0.057]
Government Burden [Government consumption/GDP, log]	-0.047 [0.061]	-0.096* [0.056]	-0.089* [0.052]	-0.086 [0.068]
Inflation [log [1+inflation]]	-0.062*** [0.017]	-0.059*** [0.017]	-0.053*** [0.020]	-0.062*** [0.018]
Education [Secondary Enrollment, log]	0.005*** [0.001]	0.005*** [0.002]	0.006*** [0.002]	0.005** [0.002]
Constant	0.650* [0.341]	0.724** [0.319]	0.620** [0.293]	0.697* [0.384]
Observations	424	424	424	424
Number of Countries	77	77	77	77
Number of instruments	83	83	83	83
Hansen p-value	0.69	0.47	0.47	0.47
AR1 test p-value	0.00	0.00	0.00	0.00
AR2 test p-value	0.22	0.31	0.22	0.22

Time dummies are included in all regressions [coefficients not shown]. Standard errors in brackets. \*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 6: GDP per worker** growth effects of Crises and Interaction with **Polcon** and **Freedom House** indicators

Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Log GDP per worker				
	(A3.1)	(A3.2)	(A3.3)	(A3.4)	(A3.5)
Crisis [BC]	-0.231*** [0.052]	-0.250*** [0.053]	-0.146*** [0.034]	-0.139*** [0.033]	-0.141*** [0.035]
Crisis * PolconIII	0.317* [0.162]				
PolconIII	0.005 [0.100]				
Crisis * PolconV		0.258*** [0.095]			
PolconV		-0.012 [0.062]			
Crisis * FH Standardized			0.007 [0.006]		
FH Standardized			-0.000 [0.004]		
Crisis * FH Political Rights				0.005 [0.004]	
FH Political Rights				0.002 [0.003]	
Crisis * FH Civil Liberties					0.005 [0.006]
FH Civil Liberties					-0.003 [0.004]
<i>Control Variables</i>					
Initial GDP per worker [log]	0.950*** [0.041]	0.933*** [0.031]	0.959*** [0.031]	0.939*** [0.032]	0.961*** [0.029]
Trade openness [X+M/GDP, log]	0.038 [0.040]	0.037 [0.038]	0.031 [0.043]	0.040 [0.041]	0.024 [0.043]
Government Burden [Government consumption/GDP, log]	-0.100 [0.077]	-0.074 [0.053]	-0.087 [0.056]	-0.064 [0.057]	-0.073 [0.057]
Inflation [log [1+inflation]]	-0.073*** [0.020]	-0.052** [0.020]	-0.066*** [0.025]	-0.061*** [0.018]	-0.064*** [0.023]
Education [Secondary Enrollment, log]	0.004*** [0.001]	0.005*** [0.002]	0.005*** [0.002]	0.005*** [0.001]	0.005*** [0.002]
Constant	0.876** [0.342]	0.858*** [0.299]	0.747** [0.310]	0.785** [0.335]	0.712** [0.296]
Observations	418	418	424	424	424
Number of Countries	76	76	77	77	77
Number of instruments	83	83	83	83	83
Hansen p-value	0.47	0.49	0.46	0.46	0.48
AR2 test p-value	0.00	0.00	0.00	0.00	0.00
AR2 test p-value	0.14	0.24	0.18	0.21	0.23

Time dummies are included in all regressions [coefficients not shown]. Standard errors in brackets. \*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 7: GDP per worker** growth effects of Crises and Interaction with Polity2**Robustness: Additional crisis indicators**

Estimation: 2-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects

Dependent Variable	Log GDP per worker				
	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)
SBC Crisis	-0.155*** [0.034]				
SBC Crisis * Polity2	0.012*** [0.005]				
SS1		-0.149 [0.180]			
SS1 * Polity2		0.055** [0.027]			
SS4			-0.204 [0.335]		
SS4 * Polity2			0.063** [0.030]		
SS5				-0.538 [0.374]	
SS5 * Polity2				0.091 [0.056]	
Debt Crisis					-0.188** [0.082]
Debt Crisis * Polity2					0.008 [0.007]
Polity2	-0.003 [0.003]	-0.001 [0.002]	-0.001 [0.003]	-0.001 [0.003]	-0.006 [0.004]
<i>Control Variables</i>					
Initial GDP per capita [log]	0.984*** [0.037]	0.964*** [0.038]	0.964*** [0.049]	0.936*** [0.037]	0.950*** [0.068]
Trade openness [X+M/GDP, log]	0.040 [0.050]	0.033 [0.053]	0.041 [0.052]	0.013 [0.054]	-0.004 [0.088]
Government Burden [Government consumption/GDP, log]	-0.103* [0.061]	-0.124* [0.068]	-0.107 [0.085]	-0.037 [0.065]	-0.134 [0.149]
Inflation [log [1+inflation]]	-0.060*** [0.016]	-0.085*** [0.023]	-0.085*** [0.020]	-0.096*** [0.017]	-0.044 [0.055]
Education [Secondary Enrollment, log]	0.004*** [0.001]	0.005** [0.002]	0.005*** [0.002]	0.004** [0.002]	0.004 [0.003]
Constant	0.499 [0.385]	0.832* [0.445]	0.741 [0.460]	1.023** [0.391]	1.004 [0.620]
Observations	424	406	406	401	184
Number of Countries	77	77	77	77	33
Number of Instruments	83	82	82	82	85
Hansen p-value	0.56	0.36	0.43	0.49	1.00
AR1 test p-value	0.00	0.00	0.00	0.00	0.19
AR2 test p-value	0.10	0.24	0.20	0.57	0.95

Time dummies are included in all regressions [coefficients not shown. Standard errors in brackets. \*Significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## Countries used in sample: 78

country	ifscode
Algeria	612
Argentina	213
Australia	193
Bangladesh	513
Benin	638
Bolivia	218
Botswana	616
Brazil	223
Cameroon	622
Canada	156
Central African Republic	626
Chile	228
China	924
Colombia	233
Congo, Rep.	634
Costa Rica	238
Denmark	128
Ecuador	248
Egypt, Arab Rep.	469
El Salvador	253
Finland	172
France	132
Gambia, The	648
Germany	134
Ghana	652
Greece	174
Guatemala	258
Hungary	944
India	534
Indonesia	536
Israel	436
Italy	136
Jamaica	343
Japan	158
Jordan	439
Kenya	664
Korea, Rep.	542
Kuwait	443
Lesotho	666
Liberia	668
Malaysia	548
Mali	678
Mauritius	684
Mexico	273
Mozambique	688
Nepal	558
New Zealand	196
Nicaragua	278
Niger	692
Norway	142
Pakistan	564
Panama	283
Paraguay	288
Peru	293
Philippines	566
Poland	964
Rwanda	714
Senegal	722
Sierra Leone	724
Singapore	576
South Africa	199
Spain	184
Sri Lanka	524
Swaziland	734
Sweden	144
Tanzania	738
Thailand	578
Togo	742
Trinidad and Tobago	369
Tunisia	744
Turkey	186
Uganda	746
United Kingdom	112
United States	111
Uruguay	298
Venezuela, RB	299
Zambia	754
Zimbabwe	698

## **Notes on variables used:**

### **Crisis variables:**

Banking Crisis: From Caprio and Klingebiel (2003). They presents information on 117 systemic banking crises (defined as much or all of bank capital being exhausted) that have occurred in 93 countries since the late 1970s. The paper also provides information on 51 borderline and smaller (non-systemic) banking crises in 45 countries during that period. Some judgment has gone into the compilation of this list, not only for countries lacking data on the size of the losses but also for countries where official estimates understate the problem. For instance, at some point in the 1990s nearly every transition economy experienced a banking crisis, but not all of these were excluded to limit the number of countries with missing information.

Debt crisis: From Manasse et al. (2003). A country is defined to be in a “debt crisis if it is classified as being in default by Standard & Poor’s or if it receives a large nonconcessional IMF loan defined as access in excess of 100 percent quota”. They have data for 47 countries, from 1970 to 2002. 33 countries overlap with our sample: Algeria, Argentina, Bolivia, Brazil, Chile, China, Colombia, CostaRica, Ecuador, El Salvador, Guatemala, India, Indonesia, Israel, Jamaica, Jordan, Korea, Rep., Malaysia, Mexico, Pakistan, Panama, Paraguay, Peru, Philippines, South Africa, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela

For other crisis variables definitions used, see referenced papers.

### **Political variables:**

#### **PolityIV**

The PolityIV database contains qualitative measures of political insitutions, constructed in the following way:

- Polity2 = democ2-autoc2
- democ2: Institutionalized Democracy.

Democracy is conceived as three essential, interdependent elements:

1. Presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders.

2. Existence of institutionalized constraints on the exercise of power by the executive.
3. Guarantee of civil liberties to all citizens in their daily lives and in acts of political participation.

Other aspects of plural democracy, such as the rule of law, systems of checks and balances, freedom of the press, and so on are means to, or specific manifestations of, these general principles.

- Autoc2: Institutionalized Autocracy

Operationally defined in terms of the presence of a distinctive set of political characteristics:

1. Sharply restrict or suppress competitive political participation
2. Their chief executives are chosen in a regularized process of selection within the political elite
3. Once in office they exercise power with few institutional constraints.

- Exconst2: Executive Constraints

This variable measures the checks and balances between the various parts of the decision-making process. Operationally, it refers to the extent of institutionalized constraints on the decision-making powers of chief executives, either individuals or collectivities. Such limitations may be imposed by any “accountability group”. In Western democracies these are usually legislatures. Other kinds of accountability groups are the ruling party in a one-party state; councils of nobles or powerful advisors in monarchies; the military in coup-prone polities; and in many states a strong, independent judiciary.

- Polcomp2: Political Competition

Combined from:

1. The competitiveness of participation. The extent to which alternative preferences for policy and leadership can be pursued in the political arena
2. Regulation of Participation: Participation is regulated to the extent that there are binding rules on when, whether, and how political preferences are expressed. One-party states and Western democracies both regulate participation but they do so in different ways, the former by channeling participation through a single party structure, with sharp limits on diversity of opinion; the latter by allowing relatively stable and enduring groups to compete nonviolently for political influence. The polar opposite is unregulated participation, in which there are no enduring national political organizations and no effective regime controls on political activity.

### **Freedom House “Freedom in the World” database**

This is an extract from the description in Freedom House's website<sup>49</sup> “The Freedom in the World survey provides an annual evaluation of the state of global freedom as experienced by individuals. The survey measures freedom—the opportunity to act spontaneously in a variety of fields outside the control of the government and other centers of potential domination—according to two broad categories: political rights and civil liberties. Political rights enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate. Civil liberties allow for the freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state.”

### **Polcon**

Extract from “Measures of Political Risk”, by Henisz and Zelner (2005). “Henisz (2000) provides an alternate measure of political institutions. The Political Constraint Index political constraint index (POLCON) directly measures the feasibility of a change in policy given the structure of a nation's political institutions (the number of veto points) and the preferences of the actors that inhabit them (the partisan alignment of various veto points and the heterogeneity or homogeneity of the preferences within each branch)” Both PolconIII and PolconV are constructed in a similar way, but PolconV includes two additional veto points: the judiciary and sub-federal entities.

### **Other control variables used in regressions**

$Z_{i,t}$  is a set of control variables which are common in the literature:

- Educational attainment = years of secondary schooling for population above 15 years of age.
- Government consumption / gdp: the assumption is that it measures expenditures not affecting productivity directly, but may create distortions of private decisions. These distortions may arise from government measures themselves or from the public finance associated with them.

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<sup>49</sup> <http://www.freedomhouse.org/template.cfm?page=351&ana'page=333&year=2007>

- Openness: This variable reflects the effect of policies on international trade, such as tariffs and trade restrictions.

The use of these policy variables does not invalidate our intention to capture how political institutions may affect growth during periods of crisis, quite possibly through subsequent government policies. Our results show that if the effect of institutions during crises happens because of policy selection, this effect goes beyond just spending, openness and inflationary policies.



Variable Description, Sources and Summary Statistics							
Variable	Description	Source	Obs	Mean	Std. Dev.	Min	Max
gdppccteus	GDP per capita (constant 2000 US\$)	WDI (2007)	528	5411.15	7782.89	44.64	41356.83
rgdpwok	Real output per worker	PWT 6.2	538	16865.10	17370.59	486.74	196172.60
<i>Control Variables</i>							
opetrade_r	Openness to trade X+M/GDP	WDI (2007)	502	0.61	0.34	0.08	2.29
infcpia_r	Inflation, consumer prices	WDI (2007)	482	0.86	7.38	-0.02	117.50
ggfcepgdp_r	General government final consumption expenditures/GDP	WDI (2007)	501	0.15	0.06	0.03	0.43
sec_bl	Secondary attainment as % of population above 15	Barro and Lee extended CID website	541	24.46	15.99	0.10	72.30
<i>Political Variables</i>							
polity2	Combined indicator democ2 - autoc2	Polity4	538	1.75	7.37	-10.00	10.00
democ2	Institutionalized democracy	Polity4	527	4.78	4.21	0.00	10.00
autoc2	Institutionalized autocracy	Polity4	527	2.98	3.39	0.00	10.00
exconst2	Executive constraints concept	Polity4	527	4.39	2.33	1.00	7.00
polcomp2	Political competition concept	Polity4	527	5.80	3.73	1.00	10.00
polconiii	Polcon III	Henisz (2000)	529	0.25	0.22	0.00	0.68
polconv	Polcon V	Henisz (2000)	528	0.38	0.33	0.00	0.87
fh	Freedom House standardized	Freedom House	465	2.49	5.25	-7.14	9.99
fh_pr	Freedom House political rights	Freedom House	465	1.43	6.93	-10.00	10.00
fh_cl	Freedom House civil liberties	Freedom House	465	1.07	5.64	-10.00	10.00
<i>Crisis Variables</i>							
SS1	Sudden Stop		386	0.02	0.12	0.00	1.00
SS4	SS1 without gdp drop		386	0.03	0.16	0.00	1.00
SS5	SS1 with fall in reserves		381	0.01	0.11	0.00	1.00
bc	Banking crises	Caprio and Klingebiel (1999)	381	0.32	0.47	0.00	1.00
sbc	Systemic banking crises	Caprio and Klingebiel (1999)	382	0.23	0.42	0.00	1.00
debt	Debt crisis	Manasse, Schimmelpfennig, and Roubini (2003)	221	0.23	0.42	0.00	1.00

## Econometric Methodology: System GMM

We want to estimate an equation of the form:

$$y_{i,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta' x_{i,t} + \eta_i + \varepsilon_{i,t}$$

This can be transformed to

$$y_{i,t} = \alpha y_{i,t-1} + \beta' x_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

Simple OLS provides biased coefficients because  $\eta_i$  (unobserved) is included in the error term. In particular, we need to allow for the fact that

- $y_{i,t-1}$  and  $x_{i,t}$  may be correlated to  $\eta_i$
- $y_{i,t-1}$  and  $x_{i,t}$  are not strictly exogenous (i.e. they are not uncorrelated to past, present and future error terms)

One possibility is to use the fixed effects (within-groups) transformation, which eliminates  $\eta_i$ . Unfortunately, this is biased for small samples because the new transformed (differenced) variables are correlated to the error term (see Bond 2002).

Our estimation procedure follows a simple idea: first a transformation is used to eliminate the unobserved fixed effect, then instruments are chosen for the endogenous variables in the transformed equation.

The initial step is to first-difference equation (1) to remove the fixed effect  $\eta_i$  and get

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta' (x_{i,t} - x_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$$

or

$$\Delta y_{i,t} = \alpha \Delta y_{i,t-1} + \beta' \Delta x_{i,t} + \Delta \varepsilon_{i,t} \quad (2)$$

Even though this eliminates the fixed effect, we still need to use instruments because:

- $\Delta y_{i,t-1}$  is correlated to  $\Delta \varepsilon_{i,t}$ , since  $y_{i,t-1}$  is correlated to  $\varepsilon_{i,t-1}$
- $\Delta x_{i,t}$  is correlated to  $\Delta \varepsilon_{i,t}$ , since  $x_{i,t}$  is correlated to both  $\varepsilon_{i,t}$  and  $\varepsilon_{i,t-1}$

We can use internal lagged instruments if we make the assumption that even though the independent variables are not “strictly exogenous”, they are “weakly exogenous”. This means that even though they may be correlated with past or current error terms, they are uncorrelated with *future* error terms.

In particular,

- $y_{i,t-1}$  is “predetermined” = correlated to past  $\varepsilon_{i,t-s}$ , but uncorrelated to current  $\varepsilon_{i,t}$  and future  $\varepsilon_{i,t+s}$  for  $s \geq 1$
- $x_{i,t}$  is “endogenous” = correlated to past  $\varepsilon_{i,t-s}$  and current  $\varepsilon_{i,t}$ , but uncorrelated to future  $\varepsilon_{i,t+s}$  for  $s \geq 1$

This means that predetermined and endogenous variables are uncorrelated to unanticipated shocks (future error terms), even though expected future dynamics may affect them<sup>50</sup>.

Given these assumptions, one possible set of instruments is to use lagged values of level variables like  $y_{i,t-2}$  to instrument for  $\Delta y_{i,t-1}$ , and  $x_{i,t-2}$  to instrument for  $\Delta x_{i,t}$ .

These are good instruments because:

- $y_{i,t-2}$  is correlated to  $\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$ , but uncorrelated to  $\Delta \varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$  given our assumption of weak exogeneity.
- $x_{i,t-2}$  is correlated to  $\Delta x_{i,t} = x_{i,t} - x_{i,t-1}$ , but uncorrelated to  $\Delta \varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$  given our assumption of weak exogeneity. Note that here there has to be 2 lags at least, because  $x_{i,t-1}$  may be correlated to  $\varepsilon_{i,t-1}$ .

In fact, we could potentially use as many lags as we want for  $t \geq 3$ .

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<sup>50</sup> Another way to interpret the assumption of weak exogeneity is that a crisis in the past does not have an impact on growth that is independent from the effect through the contemporaneous crisis and all other independent variables included. If true, then we can use a *lagged* value of the crisis variable as an instrument for the contemporaneous crisis, because we do not need to use it as an instrument of itself. Otherwise it would be playing two roles, first as its own instrument to capture the lagged effect and then as an instrument of the contemporaneous endogenous crisis variable.

However, these lagged variables could be invalid if there is high persistence in the series. For example, if a persistent increase in  $y_{i,t-2}$  leads to a similar increase in  $y_{i,t-1}$ , we would have  $\Delta y_{i,t-1} \approx 0$ , which is uncorrelated to  $y_{i,t-2}$ . This is particularly true for variables like political institutions, which have very small time-series variation.

This leads to System GMM, which incorporates more instruments. Here, we need to make one further assumption:

- Even though  $x_{i,t}$  may be correlated to  $\eta_i$ ,  $\Delta x_{i,t}$  is not correlated to  $\eta_i$ .

This allows us to use an extra set of moment conditions and use  $\Delta x_{i,t-1}$  as instruments for  $x_{i,t}$  in the original level regression. This is a “stationarity assumption”, basically saying that deviations from long term trends ( $\Delta x_{i,t}$ ) are not correlated to country *fixed* effects. If we are willing to accept this assumption, we can estimate a System GMM, with both the level and difference equations.

- In the level equation (1) we use  $\Delta x_{i,t-1}$  as instruments for  $x_{i,t}$  (same for  $y_{i,t-1}$ ), which is possible since it is assumed not correlated to  $\eta_i$
- In the difference equation (2) we use  $x_{i,t-2}$  to instrument for  $\Delta x_{i,t}$  (as explained above)

Note that we need to verify that  $\Delta \varepsilon_{i,t}$  is not 2nd order serially correlated, meaning  $\Delta \varepsilon_{i,t}$  is uncorrelated to  $\Delta \varepsilon_{i,t-2}$ , which happens only if  $\varepsilon_{i,t}$  is serially uncorrelated. (By construction,  $\Delta \varepsilon_{i,t} = \varepsilon_{i,t} - \varepsilon_{i,t-1}$  will be negatively serially correlated to  $\Delta \varepsilon_{i,t-1} = \varepsilon_{i,t-1} - \varepsilon_{i,t-2}$ ). For this purpose we use the Arellano-Bond 2nd order serial correlation test

Finally, another important specification test is the Hansen<sup>51</sup> test of overidentifying restrictions. The Hansen test has a null hypothesis of overidentifying restrictions (a difference-in-Sargan test is basically a Hansen test for a subset of instruments). Given that the validity of the instruments (moment conditions) is needed for the assumption of weak exogeneity, then the Hansen test is also a test of this assumption. It is important

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<sup>51</sup> Equivalent to the Sargan test, but under heteroskedasticity.

to note that if there are too many instruments, the Hansen test may have weak power and p-value for this test will be close to 1. It is not an issue in our regressions, since we limit the number of lags used as instruments.

For further reference on this estimators see Bond (2002), Roodman (2006), Roodman (2009), Baum et al. (2003).