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**Democracy and External Shock  
Resilience in Developing Countries**

Evidence from the Great Recession

Dennis **Essers**

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Evidence from the Great Recession

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January 2012

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## ABSTRACT

While some developing countries appear to have been largely unaffected by the Great Recession that originated in advanced economies, others took a severe blow in 2008-2009. A number of recent studies have attempted to explain the observed heterogeneity of developing country growth performances during the latest global financial and economic crisis by linking it to pre-crisis macro-economic and financial country features - with rather mixed success. In this newly emerging body of research, surprisingly little attention has, however, been paid to institutional differences between countries, and the variation in political institutional arrangements more particularly. The current paper takes a first shot at bridging this hiatus by gauging the impact of democracy on the crisis growth of developing countries. From a theoretical point of view, and as suggested in the political economy literature, democracy could be either growth-retarding or growth-enhancing in times of economic crisis, the overall effect ultimately being an empirical question. Using a cross-section sample of more than 100 non-advanced countries and controlling for a range of macroeconomic, financial and standard institutional factors as well as pre-crisis trends, we find evidence suggesting that, on the whole, democratic country features are negatively correlated with growth performance during the 2008-2009 global crisis. Our findings are seemingly robust to the use of various sets of controls, different estimators, several country subsamples and alternative measures of democracy and crisis growth.

**Keywords:** global financial crisis; growth; external shocks; democracy

**JEL codes:** F30; O11; O43; P59

## 1. INTRODUCTION

'[T]he lesson [from the global crisis] for ruling elites in many low-income countries is likely to be that executive discretion should not be too easily forsaken in the name of Western-style democratic accountability. What is likely to dominate as an idea in the developing world following the crisis is that China was succeeding before the crisis and succeeded in managing the pressures of the crisis very well indeed. Whether the right lesson or not, that will be associated with its ability to get things done without the perceived complications of more accountable political systems.' (Birdsall, 2011:14)

Financial sector problems in several advanced economies, triggered by the bursting of the US housing bubble and subsequent increases in subprime mortgage default rates in the summer of 2007, eventually transformed into a full-fledged global economic crisis late 2008. While outside the crisis epicentre, developing countries (both emerging and non-emerging) shared in the burden, being affected by a wave of external financial and real shocks, most notably a global flight-to-safety of capital and faltering world trade (see e.g. IMF, 2009; ODI, 2010). In its latest World Economic Outlook Report the IMF estimates overall 2009 real GDP growth in the developing world at around 2.8 percent, down from 6.0 a year earlier and 8.9 in 2007 (IMF, 2011).<sup>1</sup> Importantly, these aggregate growth figures mask large variation across developing countries. Whereas China kept growing at more than 9 percent in 2009 (again in real terms), Latvia's economy shrunk by almost 18 percent in the same year. For low-income Zambia and Cambodia, growth rates of more than 6 and nearly -2 percent, respectively, were recorded in 2009.

A number of recent papers have attempted to explain the observed heterogeneity of developing country growth performances during the latest global crisis by linking it to pre-crisis macro-economic and financial conditions - with rather mixed success, as will be shown. Perhaps somewhat surprisingly, these studies have largely overlooked the potential role played by various types of institutions; this in spite of a copious literature that emphasises that these 'rules of the game' matter for growth.<sup>2</sup> In fact, none of the mentioned studies have considered the potential importance of *political* institutional arrangements for crisis severity.

In the current paper we take a shot at bridging this hiatus by gauging the impact of democracy, or its defining characteristics, on the growth of *developing* countries during the 2008-2009 crisis. To our best knowledge the paper represents the first attempt to do so in an earnest manner.

As the above quote from Center for Global Development President Nancy Birdsall points out, China's recent accomplishments could be expected to serve as an example of how autocracies, next to achieving impressive growth in booming times, may also have advantages over more accountable regimes in withstanding the negative impact of global shocks on economic performance. We think it is an interesting undertaking to see whether such inductive reasoning finds any resonance in cross-country data on the latest crisis and survives in a multivariate setting; to be sure, even if China benefitted from its autocratic governance during the crisis, one cannot simply extend that logic to other developing economies without taking into account various other country-specific features.

Previewing our conclusions, for a sample of more than 100 non-advanced countries,

[1] The corresponding growth figures for the group of advanced (i.e. 'developed') countries are 2.8 percent in 2007, 0.1 in 2008, and -3.7 in 2009 (IMF, 2011).

[2] See North (1990), Knack and Keefer (1995), Mauro (1995), Hall and Jones (1999), Acemoglu et al. (2001; 2005) and Rodrik et al. (2004), among numerous others. For alternative, somewhat deviant perspectives on institutions and growth, see e.g. Glaeser et al. (2004) and Chang (2006).

this paper finds econometric evidence suggesting that, indeed, democracy is negatively correlated with growth performance during the 2008-2009 global crisis. These findings are seemingly robust to the use of various sets of control variables, different estimators, several country subsamples and alternative measures of democracy and crisis growth.

The structure of the paper is as follows. Section 2 first reviews the recent body of studies that have sought to explain cross-country differences in GDP growth during the global crisis. Section 3 is devoted to the relevant theoretical and empirical political economy literature on the links between democracy on the one hand, and growth, volatility and crisis on the other. Our methodological approach and the data used are introduced in Section 4. Section 5 presents baseline results, subjects them to a series of robustness tests and considers possible interaction effects. Section 6 concludes and highlights some of the remaining caveats, as well as further avenues of research.

## 2. EXPLAINING DEVELOPING COUNTRY GROWTH IN THE GREAT RECESSION

The great disparities among countries in growth performances during the global financial and economic crisis of 2008-2009 has initiated a growing body of research attempting to link initial, pre-crisis conditions to such cross-country variation in crisis growth trajectories.<sup>3</sup> As will be made clear below, these empirical studies vary substantially in terms of country samples, methodological set-up, explanatory variables included, crisis measures and their time-frame.

Most of this research (that has considered non-advanced countries) has focused on a smaller group of 'emerging market' economies only.<sup>4</sup> An early exploratory exercise by Berkmen et al. (2009) finds, for a core sample of 40 emerging markets, that higher domestic leverage, faster cumulative credit growth and fixed exchange rates prior to the onset of the crisis are all related to downward revisions in growth forecasts after the Lehman collapse. Blanchard et al. (2010) identify trade and financial exposure variables and trading partner country growth as having much explanatory power for cross-country differences in *unexpected* growth, i.e. actual GDP growth rates minus earlier IMF forecasts, during the height of the crisis (between 2008Q4 and 2009Q1). Because of data limitations, however, their sample is limited to 29 emerging markets. Including advanced countries in the analysis, Claessens et al. (2010) present evidence suggesting that the larger the house price appreciation, credit growth and the current account deficit in an economy, the greater the *duration*, *severity* and *adversity* of the crisis - defined as the number of consecutive quarters of negative growth, the cumulative decline in GDP from start to end of the recession, and the decline in average growth between 2003-2007 and 2008-2009, respectively. Llaudes et al. (2010) take a somewhat different approach; they use *country-specific* peak-to-through percent changes in quarterly GDP as their preferred measure of crisis impact. For a sample of 57 emerging markets it is shown that higher external sector vulnerability, as proxied by a subindex of the IMF's (unpublished) VEE<sup>5</sup>, is positively correlated with their crisis impact indicator. In contrast with the foregoing studies, Llaudes et al. also find a dampening effect of countries' pre-crisis reserve holdings on output declines during the crisis, although the protection offered through reserves seems subject to diminishing returns. Frankel and Saravelos (2010) browse the extensive 'early warning indicators' literature and conclude that the two leading indicators extracted from this literature, i.e. international reserves and real exchange rate overvaluation, again stand out as most useful in explaining 2008-2009 crisis incidence. Tsangarides (2010), which looks at the role of exchange rate regimes into more detail, finds that emerging markets with pegged regimes fared no worse than those with floats during the crisis, although the former appear to have recovered more slowly than the latter in subsequent years. Finally, in a rare attempt to consider institutional factors, Giannone et al. (2011) use Bayesian model averaging to establish a negative link between market-friendly credit regulation and crisis growth in 102 advanced and (mostly middle-income) developing countries. They suggest that the detrimental impact of credit market liberalisation may capture unobserved risk-taking

[3] Other, related empirical research on developing countries inspired by the crisis includes studies that consider linkages and crisis contagion between countries (e.g. Rose and Spiegel, 2009a; Drummond and Ramirez, 2009), examine business cycle synchronisation for country pairs (e.g. Imbs, 2010), or place countries' crisis experiences in historical perspective (e.g. Reinhart and Rogoff, 2009; Gourinchas and Obstfeld, 2011).

[4] This is, of course, understandable, as these countries are typically more integrated in the world economy (and hence more exposed to a global crisis) than other, 'non-emerging' developing economies. Also, much more (and arguably more reliable) data is available for the former.

[5] The acronym VEE stands for 'Vulnerability Exercises for Emerging Markets'.



behaviour, especially that associated with foreign and privately-owned banks in an economy.

Other cross-country research including emerging markets exhibits a much more conservative stance. Most notably, Rose and Spiegel (2009b) contend that, out of more than 60 candidate crisis correlates, not one presents itself as a robust predictor of crisis incidence in 107 countries, with the possible exception of pre-crisis equity market appreciation. These sobering results may, however, hinge on the authors' particular choice of trying to explain output growth jointly with other indicators<sup>6</sup> and their use of pre-March 2009 data estimates only. An extensive update of the analysis by the same authors largely corroborates the original findings; Rose and Spiegel (2010) show that almost none of the variables found to be statistically significant crisis predictors by other researchers survive simultaneous inclusion in regressions or sample changes.

Only a few recent studies on crisis growth differences have widened their scope to include *non-emerging* developing countries. Employing larger samples of up to 162 economies, Lane and Milesi-Ferretti (2011) trace back lower output and domestic demand growth during the crisis to pre-crisis factors such as rapid private sector credit growth, current account deficits, trade openness, the manufacturing share of output and, to a lesser extent, pegged exchange rate regimes. In a similar fashion, Didier et al. (2011) demonstrate that advanced and developing countries more open to trade, with larger current account deficits and higher pre-crisis domestic credit growth experienced more severe growth collapses between 2007 and 2009. The strongest post-crisis growth recovery, on the other hand, is recorded in countries that suffered larger 2007-2009 growth collapses and held more international reserves prior to the crisis. Lastly, Berg et al. (2011) focus on growth collapses in a core sample of 49 non-fuel exporting low-income countries in particular; they find such collapses to be correlated with changes in external demand growth, i.e. the export-weighted average output growth in export partner countries, and private sector credit growth in the boom years. According to Berg et al., cross-country differences in the pre-crisis structural environment of low-income economies, apart from those in reserve coverage and labour market flexibility perhaps, explain little of total variation in crisis growth.

Our paper is most closely related to the three latter studies in terms of methodology, sample, crisis measures and control variables (see section 4.1 for details). Importantly, however, we complement the existing empirical cross-country research on the crisis by bringing political institutions, one potentially valuable dimension overlooked by existing studies, more explicitly into the analysis. In particular, the paper examines whether democracy, or typical features thereof, can explain part of developing country variation in economic growth declines during the 2008-2009 crisis period.

So, what should one *a priori* expect? Given a series of macroeconomic, financial and other institutional country factors, are democratic countries more likely to be successful in preventing growth from faltering during a global economic crisis than their autocratic counterparts? It seems that the existing political economy literature, both in its theoretical and empirical guises, is far from conclusive on this. Nevertheless, generally speaking (and perhaps unsurprisingly so), democracies seem to be given somewhat more credit than autocracies. In the following section, we review selected political economy studies, we think, are most relevant here, before moving to a description of our empirical model (section 4).

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[6] To this end, Rose and Spiegel (2009b) construct what they denote as a non-structural Multiple Indicator Multiple Cause (MIMIC) model of the crisis.

### 3- DEMOCRACY, GROWTH, VOLATILITY AND CRISIS

The enquiry on whether and how political constraints, embodied by different regime types and other, more specific political institutions, influence policy choice and ultimately determine economic outcomes, constitutes the heart of much of the (new) political economy research agenda (see Drazen, 2000:3-19). In this section we highlight three subareas of interest for the purpose of our paper.<sup>7</sup> First, by means of introduction, the contentious relation between democracy and economic growth is shortly explained. Second, we devote some attention to the links between democracy and growth volatility (or its inverse, economic stability). Emphasis will be on the third political economy subfield we consider, i.e. democracy and crisis (management), as it is logically closest to the paper's research question.

#### 3.1. Democracy and growth

The existence and precise nature of a democracy-growth nexus has been the subject of a vast theoretical and empirical literature whose results are, on the whole, remarkably inconclusive.<sup>8</sup> An oft-cited survey by Przeworski and Limongi (1993) summarises the classic arguments that relate political regime types to long-term growth as follows: first, the idea that democracies are more successful in protecting property rights, which in turn are necessary to foster growth; second, the view that democracies give rise to pressures for immediate consumption, thereby deterring investment and, ultimately, growth; and third, the view that authoritarian regimes are predatory, have no interest in acting according to general interest and hence allocate resources inefficiently. Przeworski and Limongi show that each of these arguments contains loopholes and conclude that, while politics may indeed matter for growth, thinking in terms of 'regimes' does not fully capture the relevant political diversity.<sup>9</sup>

Another issue which complicates interpreting a positive correlation between democracy and long-term growth (if any) as causal is the possibility that some level of economic development may also be a necessary condition for democracy to sprout (and persist). This is in fact one of the central tenets of much of the post-war modernisation literature that followed Lipset's (1959) seminal work on the requisites for democracy (for an overview of that literature, see Leftwich, 1996).<sup>10</sup>

[7] Rather than being exhaustive in our treatise of each of these three subareas, we aim at presenting some theoretical and empirical substance that could inform our *ex ante* expectations about the relation between democracy and growth performance during the latest global crisis.

[8] A recent meta-analysis of the democracy-growth literature by Doucouliagos and Ulubasoglu (2008), however, challenges this 'consensus of an inconclusive relationship'. After reviewing 84 previous studies and subjecting them to various meta-level evaluation techniques, the authors claim that, whereas democracy has a zero direct effect on economic growth, there are a number of indirect channels (including human capital accumulation, lower political instability and economic freedom) through which democracy positively and significantly impacts on growth (and other channels that exert a negative influence). It is concluded that, at the minimum, the net effect of democracy on the economy is *not* detrimental to growth.

[9] Such observations have motivated researchers to move beyond the simple democracy-autocracy divide and explore the impact on (long-term) growth and other outcomes of, for example, 'the character and capacity of the state' (see Leftwich, 1996), 'political settlements' (see Khan, 2010) or 'political parties' (see Keefer, 2011). A review of these and many other concepts falls outside the scope of the current paper, the purpose of which is to provide a first empirical analysis of the impact of democracy on crisis growth at a cross-country and hence highly aggregated level.

[10] Barro (1996), among others, finds empirical evidence for the Lipset hypothesis that prosperity promotes democracy. More recently however, Acemoglu et al. (2008) have shown that the positive relationship between per capita income and democracy disappears from the data when one introduces country fixed effects or instruments income with past savings rates or weighted average income of a country's trading partners. They suggest that per capita income and democracy evolve simultaneously and are driven by underlying historical factors.

### 3.2. Democracy and growth volatility

Somewhat less contentious is the link between democracy and economic stability. Contrasting Lee Kwan Yu's Singapore and Chung Hee Park's South Korea with Idi Amin's Uganda, Sah (1991) famously noted that, because of human fallibility, centralised societies (like those marked by dictatorship) will typically have more volatile performances; in societies where many people are involved in decision-making (like democracies) the risk coming from such fallibility is much better diversified, it was argued. Likewise, Rodrik (2000) asserts that participatory political regimes induce greater willingness for cooperation and conciliation, translating into economic stability. Almeida and Ferreira (2002) corroborate Sah's and Rodrik's conjectures empirically, showing that autocracies exhibit greater growth rate volatility than democracies, both in cross-country and within-country time series terms. They argue that autocracies are also more diverse in selected institutional and policy measures such as government spending on education, property rights protection and business regulation. Further empirical evidence comes from Mobarak (2005) who shows that democracy significantly lowers growth volatility, which indirectly increases average long-term growth. A negative direct effect of democracy on growth however counteracts the positive impact via the volatility channel, hence making the net effect on growth insignificant. Yang (2008) uses dynamic panel analysis to test the robustness of the democracy-stability link; he demonstrates that the dampening effect of democracy on growth volatility is strongly apparent in ethnically fragmented societies only, where reaching compromise is harder because of collective action problems (as argued by Rodrik, 2000).

While the foregoing is certainly informative, it does not tell us explicitly how different political regimes in developing countries are expected to perform when faced with crisis and/or external shocks, like those triggered by a global economic downturn. This will be the subject of the remainder of this section.

### 3.3. Democracy and crisis / external shocks

From a theoretical point of view, democracy could be either *growth-retarding* or *growth-enhancing* in times of economic turbulence. We identify at least five arguments that have been touted in the political economy literature on crisis and crisis management, of which the first two seem to speak in favour of autocratic (i.e. less or non-democratic) regimes and the latter three are in support of democracy.<sup>11</sup>

First of all, democracies have (almost by definition) more 'checks and balances' in place, which could slow down their reaction to an unfolding economic crisis; autocracies may exhibit more flexibility and decisiveness in crisis management, due to a greater concentration of legislative and executive power (*if a separation of powers exists at all*). Such reasoning is, for example, implicit in the work of Tsebelis on the role of 'veto players', individual or collective actors whose agreement is necessary for policy change, in decision making processes in various political systems. Tsebelis (1995:294) contends that the potential for changing the status quo in policy decreases with the number of such veto players (which is larger in democracies), and that this could be possibly harmful when 'an exogenous shock disturbs a desirable process'. Comparable propositions can be deducted, albeit more indirectly, from Alesina and Drazen's (1991) famous 'war-of-attrition' model; these authors suggest that countries with political institutions limiting

[11] Most of the following arguments rely on the (plausible) assumption that the content and implementation of a country's policy responses to crises and/or external shocks are conditioned by its overall (politico-) institutional set-up (see e.g. Tommasi, 2004; Stein et al., 2005; and more recently, Foresti et al., 2011). For a contrary view on the importance of political institutions for public policy, see Mulligan et al. (2004).

the veto rights of groups that could oppose policy changes face less delays in the adoption of (perhaps urgently needed) reforms. Similarly, Aghion et al. (2004), who construct a model of endogenous political institutions, show theoretically that the optimal degree of ‘insulation’ of a country’s leadership, defined as the threshold majority of individuals (read: voters) required to block reform, is higher during crises.

Second, the same mechanisms that are credited with overcoming possible policy stalemates, i.e. fewer checks and balances, also enable autocracies to overrule the populist demands one can anticipate when the economy comes under pressure. To the extent that these populist demands lead to the adoption of suboptimal reforms weakening economic growth (much in the same way as touted in the classic literature on democracy and *long-term* growth; see before), autocracies may more successfully adjust. Democracies, where politicians are held accountable by their electorate (and seek re-election), might be unable to counter the general public’s antagonism to tough decisions.

Other arguments point in the opposite direction. First, it has often been contended that the view that institutional constraints on a country’s executive are a major impediment for reform is too simplistic and neglects the importance of ‘credibility’ for the actual implementation and maintenance of reform efforts (Pitlik, 2005). Only when a regime can credibly commit to a proposed reform programme (including e.g. compensations schemes for prospective losers), it will be able to get the cooperation of its citizens and convince the markets. Autocracies are generally assumed to have a harder time than democracies in building such credibility, as the typical lack of checks and balances in the former undermines the belief that the executive will not renege on its previous (reform) commitments.<sup>12</sup> This may put autocracies at a disadvantage in dealing with crises. Cox and McCubbins (2001) hence see a trade-off between decisiveness, which *decreases* with the number of veto players, and the credibility of commitment to policy (or what they call ‘resoluteness’), which *increases* in the number of vetoes. Pitlik (2005) thinks such a trade-off may be overstated; he theorises that a situation of more veto players, and thus greater credibility, also increases decisiveness, since regimes that know in advance that their commitments are not credible may shy away from policy changes that require the public’s belief in them to be successful in the first place.

A second important argument in favour of, or at least not against democracy is that autocratic leaders may well be not as ‘enlightened’ as hoped for in their (perhaps more determined) reaction to a crisis. Easterly (2011) explains that the nowadays popular narrative of the ‘benevolent autocrat’ naively assumes its omniscience about what policy drives growth, next to its omnipotence in translating this into practice. He rightly argues that there is simply no plausible reason why autocrats would hold the magic formula to economic success, something that has left economists scratching their heads for centuries. Certainly, democracies suffer from similar knowledge gaps, but at least they ensure that more voices are heard and that the room for arbitrary decisions is restricted.<sup>13</sup>

Third, while not accountable to the general public, autocracies are certainly not immune to rent-seeking by interest groups. Research on political survival by Bueno de Mesquita et al. (2002) puts forward the size of the ‘winning coalition’, i.e. the number of people whose support is needed to keep the executive in office, as one of the distinguishing features of political regimes and shows that it matters for policy. The theory goes that regimes with small coalitions,

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[12] The classic reference here is the work of North and Weingast (1989) on 17th century England.

[13] One could think of this as the popular dictum that ‘many know more than one’.

such as most autocracies, will focus on serving the desires of their narrow clique of supporters, at the expense of public good provision. When the demands of that clique do not coincide with those of the economy as a whole, autocracies may end up promoting policy that is bad for growth. For the specific context of a financial crisis, Keefer (2007) presents a model where the presence of multiple veto players reduces the pay-offs to rent-seeking by special interest groups, thereby offsetting any delays in crisis response these extra checks and balances may cause.

Empirical cross-country studies on the topic of democracy and shock resilience are relatively scant, at least in the context of global, synchronised external shocks and crisis. One notable exception is Rodrik (1999a) who uses the turbulent second half of the 1970s as a test case to probe why some countries suffered greatly from adverse changes in their external environment while others did not, or hardly so. Above all, Rodrik's study emphasises the importance of the interplay between external shocks (terms-of-trade deteriorations in particular) and 'latent social conflict', proxied by measures of income inequality and ethnic and linguistic fragmentation, as well as the interaction of shocks with domestic institutions of conflict management. Included in the latter category are composite indices of the institutional quality of government and democracy. It turns out that more democratic countries did a better job in fending off economic troubles brewing in the world economy during the 1970s. Applying the same logic to 1970-1997 panel data, Acemoglu et al. (2003) uncover that when the world economy slows down, 'institutionally weak' societies, such as those with less constraints on the executive (i.e. less democratic), suffer more in terms of growth than other, 'institutionally stronger' societies. No such democratic advantage is found for the impact of slowing world growth on the growth volatility of individual countries. Collier et al.'s (2006) explorative 1960-2004 panel analysis of country factors of exposure and resilience to various external (and domestic) shocks reveals that democracy has a mixed effect; democratic features seem to reduce the consequences of both favourable and unfavourable export price shocks (hence working like insurance), but amplify oil import shocks.

Extending our scope beyond purely external shocks that are global in nature, we find further evidence on the role of political institutions in crisis management coming from three related strands of literature: applied research on (idiosyncratic) banking, currency and twin crises (which can have domestic and/or external origins) (e.g. Keefer, 2002; 2007; Montinola, 2003; Faust, 2003; Cavallo and Cavallo, 2010); small-N studies of regional crises such as the Latin American debt crisis of the 1980s (e.g. Remmer, 1990) and the East Asian crisis of the late 1990s (e.g. Haggard and MacIntyre, 1998); and the extensive literature on economic policy reform and structural adjustment (e.g. Lindenberg and Devarajan, 1993; Haggard and Webb, 1993; Alesina et al., 2006). In general terms, most of these empirical accounts suggest, if anything, that (established) democracies have been more resilient to various kinds of shocks and crises than autocracies.<sup>14</sup>

Recent descriptions of China's growth experience during the 2008-2009 crisis seem to defy the main conclusions of the aforementioned empirical studies, as indicated by the opening quote to this paper. Without downplaying important macroeconomic and financial factors such as China's comfortable current account position, relatively closed capital account, the large fiscal space available, and its huge 'war chest' of foreign exchange reserves, Wolf (2009), Andronova Vincelette et al. (2010), Schmidt and Heilmann (2010) and Pei (2011), like many other commentators, have emphasised the extraordinary size and swiftness of fiscal and

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[14] The study of Alesina et al. (2006), showing that countries where the executive is less constrained adjust more rapidly and drastically from inflation and budgetary crises, is clearly an exception.

monetary measures taken by Chinese authorities.<sup>15</sup> Arguably, such bold actions would have been harder to pull off in a multi-party state fully accountable to the general public's demands.

Of course, whether democratic features, on average, have helped or retarded growth during the latest global crisis in a broader sample of developing countries remains to be empirically tested. Does the actual data from around the 2008-2009 crisis support the results of earlier analysis such as Rodrik (1999a)'s, or is it more in line with the popular interpretation of China's story? In the next section we outline our methodological approach to find out and describe the different variables used.

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[15] In November 2008, the Chinese government announced a two-year fiscal stimulus package amounting to Y4 trillion (or nearly US\$590 billion; over 12 percent of 2009 GDP), most of it under the form of new and front-loaded infrastructure investment. All this was coupled with an enormous increase in new bank lending, supported by a radical easing of monetary policy (lifting credit quotas and a repeated slashing of interest rates). For more details on China's response to the global crisis, see Andronova Vincelette (2010), Schmidt and Heilmann (2010) and references therein.

## 4. METHODOLOGY AND DATA

### 4.1. Baseline model set-up, sample and variables

To evaluate the impact of democracy on crisis growth we will use simple OLS, estimating a multivariate cross-sectional model of the following form:

$$\hat{Y}_{i,0809} - \hat{Y}_{i,0607} = \beta_0 + \beta_1 Y_{i,07} + \beta_2 \hat{Y}_{i,0407} + \beta_3 \hat{Y}_{i,trend} + \beta_4 X_i + \beta_5 Democ_i + \varepsilon_i$$

where the left-hand side is the percentage point difference in real GDP per capita growth<sup>16</sup> between 2009 and 2007<sup>17</sup> for country  $i$ ;  $Y_{i,07}$  is the logarithm of GDP per capita in 2007 (in current US\$);  $\hat{Y}_{i,0407}$  is average real GDP per capita growth over 2004-2007, a measure of the growth run-up in the period immediately preceding the crisis;  $\hat{Y}_{i,trend}$  is average real GDP per capita growth over 1990-2007 (or 1995-2007 in the case of some CEE and former Soviet countries with missing data, conform Lane and Milesi-Ferretti, 2011);  $X_i$  is a vector that includes a range of macroeconomic, financial and institutional control variables (see further);  $Democ_i$  is a measure of democracy for country  $i$ ; and  $\varepsilon_i$  is a well-behaved error term. To reduce endogeneity concerns we take 2007 values for our control and democracy variables (thereby following the majority of studies reviewed in section 2).

Our sample consists of the 150 non-advanced countries that are classified by the IMF as ‘emerging and developing countries’ in its October 2010 World Economic Outlook (WEO) database (see Appendix, Table A1 for a list by income class).<sup>18</sup> We choose to exclude the group of most advanced economies from our analysis, as the crisis impacted (most of) these countries in very particular ways (e.g. the role of real estate bubbles and busts and cross-holdings of toxic assets), which would complicate comparison. For many advanced countries, the crisis of 2008-2009 cannot be regarded as an exogenous event.

Figure 1 shows the distribution of the dependent variable of our choice for the full sample. Around 71 percent of developing countries experienced real GDP per capita growth in 2009 that was between 10 and 0 percentage points lower than in 2007; the growth of 16 percent of countries collapsed with more than 10 percentage points; and only 13 percent saw an increase in real GDP per capita growth between 2007 and 2009. Even within the -10 to 0 percentage point change interval there appears to be substantial variation.

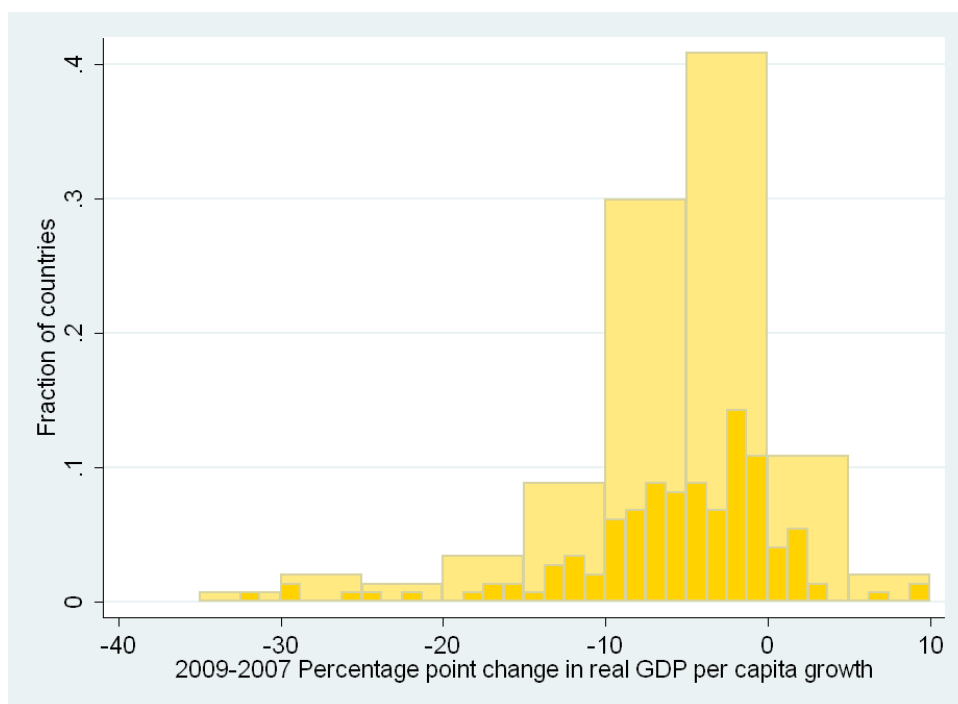
[16]  $\hat{Y}_{i,0809}$  is defined as  $\log((2009 \text{ GDP per capita in constant LCU}) / (2008 \text{ GDP per capita in constant LCU})) \times 100$  and  $\hat{Y}_{i,0607}$  similarly. Since we deal with developing countries, where population growth is often substantial, we opt to rely on per capita growth rather than total growth as our preferred output measure. We aim to explain changes in growth rather than growth per se to take into account that countries were growing at very different rates before the crisis (see Didier et al., 2011).

[17] We follow Berg et al. (2011) in choosing 2007-2009 as our ‘crisis time frame’ since 2007 could be seen as the last year where developing country growth was not majorly affected, 2008 being a transitional year. We rely on annual growth figures rather than quarterly data as the latter is only publicly available for advanced and a number of emerging economies (see Llaudes et al., 2010).

[18] For three countries (Kosovo, Montenegro and Trinidad and Tobago) no population figures and therefore no GDP per capita data were available from the IMF WEO database.



**Figure 1: Distribution of crisis growth**



Note: Author's calculations based on IMF WEO database (October 2010 version).

The selection of pre-crisis macroeconomic, financial and institutional controls in our model is informed by the relevant literature (reviewed in section 2) as well as data availability for our specific sample of non-advanced countries: 2000-2007 cumulative growth of domestic credit to the private sector, trade openness, financial openness, financial depth (M2), current account balance (all expressed as percentages of GDP and multiplied by 100), a composite index of overall institutional quality based on the World Bank's World Governance Indicators (WGI), and regional dummies. Detailed definitions and sources of these variables, together with descriptive statistics, are provided in Appendix, Table A2.

For our main variable of interest, the extent of democracy in a country, we initially use an index based on the 2007 (*revised*) combined Polity score (or *polity2* variable) of the Polity IV Project database, a broad measure that is standard in the political economy literature. The Polity score is computed by subtracting an *institutionalised autocracy* from an *institutionalised democracy* indicator, which in turn have been derived as weighted sums of codings for the *openness and competitiveness of executive recruitment, regulation and competitiveness of participation and constraints on the chief executive* (for more information on the construction of these (sub)indices, see Marshall et al., 2010). Our index converts the original score, ranging from -10 (strongly autocratic) to +10 (strongly democratic), to an equivalent 21-point scale from 0 to 1. When testing for robustness of our results, we will also employ several other, often narrower measures of democracy (see section 5.2.5).



## 4.2. Bivariate correlations

Before reporting our regression results it is perhaps informative to have a look at simple bivariate correlations between the regressand and regressors and, in second instance, between pairs of regressors, of the model specified under section 4.1.

Panels (a) to (i) of Figure A1 in Appendix bring together a series of bivariate scatter plots, including a best linear fit, where crisis growth is set out against individual exploratory variables. For presentation purposes we have excluded extreme outliers. The correlation between log GDP per capita and crisis growth is clearly negative (see panel (a)), which reflects the fact that emerging, middle-income countries typically suffered larger growth collapses than low-income countries during the crisis (see e.g. Didier et al., 2011).<sup>19</sup> Countries experiencing higher average pre-crisis and trend growth and cumulative domestic credit growth also did visibly worse (see panels (b)-(c)-(d)); this may point to the dangers of an overheating economy and an excessive build-up of credit.<sup>20</sup> Panel (e) suggests that openness to trade was another factor of crisis exposure, which is again plausible in view of the enormous breakdown in world trade starting end-2008. Bivariate relations between crisis growth, on the one hand, and financial openness, financial depth (defined as M2 as a percentage of GDP) and the current account balance, on the other, appear hard to pin down (see panels (f)-(g)-(h)). Conversely, overall institutional quality, which can be expected to be highly correlated with GDP per capita, is again negatively associated with crisis growth.

Of special interest for the purpose of our paper is Figure 2, plotting the 2009–2007 percentage point difference in real GDP per capita growth against the 2007 (Polity-based) democracy index for all 125 developing countries on which we have both kinds of data. It appears that there could be an overall negative (linear) relation between our baseline measures of crisis growth and democracy, although the slope coefficient is marginally insignificant at the 5 percent level (as evident from the confidence interval). A quadratic relation fits the data somewhat better, but this may well be due to the presence of certain outliers.<sup>21</sup>

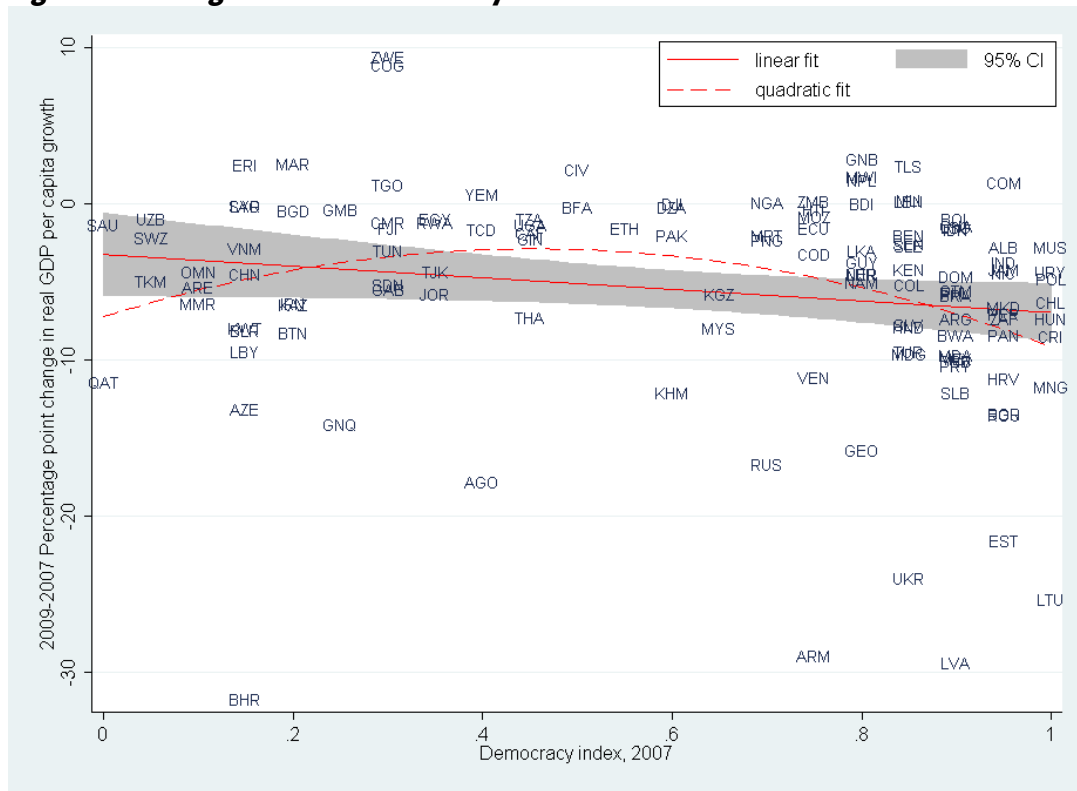
Some democracies, most notably the Baltic states, Ukraine and Armenia, did fare very bad indeed during the crisis, in sharp contrast with more autocratic regimes such as those of Eritrea, Morocco, Zimbabwe and the Republic of Congo that actually *improved* their growth record during the crisis. Clearly, however, there are also a number of countries whose crisis experience flies in the face of an overall negative democracy-crisis growth relation, if any; the Comoros, Timor-Leste and Guinea-Bissau, all classified as relatively democratic, performed better in 2009 than in 2007, whereas autocratic oil-exporting Qatar, Azerbaijan and Bahrain did surely not.

[19] This, in turn, may be due to the ‘industrial country nature’ of the crisis (Lane and Milesi-Ferretti, 2011); richer emerging markets are generally better connected/integrated with advanced economies, the epicentre of the 2008–2009 crisis, than low-income countries. GDP per capita perhaps also proxies the size and complexity of the financial sector of a country. Of course, at least part of the negative correlation between log GDP per capita and crisis growth is due to the particular construction of the latter variable (see footnote 16).

[20] Alternatively, the negative association between pre-crisis growth and crisis growth might proxy for certain country features, such as export concentration in products with a favourable price evolution in recent years (e.g. certain commodities) or overreliance on external finance, that have accounted for rapid growth in the booming years but turned into structural vulnerabilities during the bust. Again, the observed negative correlation between average pre-crisis growth and crisis growth is partly by construction.

[21] The equation of the best linear fit is  $Y = -3.2486 - 3.7026X$  (p-value of F-test: 0.0541;  $R^2$ : 0.0298). The best quadratic fit is the following:  $Y = -7.2336 + 19.1089X - 21.0106X^2$  (p-value of F-test: 0.0084;  $R^2$ : 0.0754).

**Figure 2: Crisis growth and democracy**



Note: for country sample and corresponding country codes, see Table A1 in Appendix.

To be sure, as shown in our literature review in section 2, there is much more to growth differences during the crisis than simply the type of political regime. Additionally, some of these other country-level variables suggested to be impacting crisis growth may also be correlated with the degree of democracy. For one thing, democracies were perhaps better integrated into the world economy when the crisis hit and therefore more exposed to the resulting external shocks such as faltering trade and capital flow reversals. To get an idea of the relations between the exploratory variables used in our model, Table A3 in Appendix gives the lower triangle of the Pearson correlation matrix (with pairwise deletion of missing data) for these variables. The coefficients suggest that only the index for institutional quality is significantly (and positively) correlated (at the 5 percent level) with the Polity-based democracy measure.<sup>22</sup> Other notable, positive correlations are those between log GDP per capita, trade openness, financial openness, financial depth and institutional quality.

Having described our empirical strategy and data in some detail, we will now examine the impact of democracy on crisis growth in a multivariate setting, thereby also considering the possibility of non-linear effects.

[22] If we exclude oil exporters (using the IMF’s classification in its October 2007 WEO report), the positive pairwise correlation between democracy and institutional quality grows stronger, and also the correlation between democracy and log GDP per capita becomes positive and highly significant.

## 5. EMPIRICAL RESULTS

### 5.1. Baseline regressions

Table 1 displays the OLS estimation results for our baseline model (see section 4.1). Below coefficient point estimates we report heteroskedasticity-robust standard errors. Column 1 of this table broadly confirms what we could expect and, to a fair degree, mirrors what earlier studies on cross-country growth differences during the latest crisis have found (see section 2). Countries with a higher per capita income, high average pre-crisis growth, rapid domestic credit to the private sector increases and those that were financially more integrated suffered larger growth declines. For example, a doubling of GDP per capita increases the backlash in growth between 2009 and 2007 with about 2 percentage points.<sup>23</sup> A more comfortable current account position and deeper financial markets (greater monetisation) are on the contrary positively correlated with crisis growth performance. The influences of trend growth and trade openness are negative but not significant. Adding an extra control for the overall quality of a country's institutions does not appreciably alter these outcomes (column 2); nor does the inclusion of regional dummies (bar from the current account balance effect now becoming statistically insignificant), all of which turn out to be of insignificant statistical importance themselves (column 3; coefficients of regional dummies not reported).<sup>24</sup>

Columns 4, 5 and 6 show that the partial correlation between democracy, as measured by our Polity-based index, and crisis growth is negative and highly significant, whether or not institutional quality and regional dummies are included. The coefficients of the other control variables remain qualitatively similar to those in column 1-3, with the exception of the current account balance and trend growth. The point estimates imply that, *ceteris paribus*, an increase in the democracy index with 0.3, which is about one standard deviation in the 102 country sample (or, say, the difference in democracy levels between Angola and Russia) worsens the growth downfall during the crisis by between 1.5 and 1.7 percentage points.

Of course, the (negative) relation between democracy and crisis growth does not need to be linear. Strictly speaking, the democracy index we propose has only an ordinal meaning. Moreover, it is well possible that the true democracy-growth relation is subject to diminishing or increasing effects. In column 7 of Table 1 we therefore follow Barro (1996) in replacing the democracy index by two dummies. The first dummy variable takes the value of 1 if a country could be classified as an 'anocracy', i.e. has a Polity-based democracy index ranging from 0.35 to 0.65, and equals 0 otherwise. The second, 'democracy' dummy equals 1 if the index exceeds 0.65, and 0 otherwise. We see that both dummies come in significantly negative; the p-value for their joint significance is 0.0002. From the point estimates it would seem that the negative effect of democracy on crisis growth is diminishing at the margin. However, a simple Wald test rejects the null hypothesis of linearity, under which the coefficient of the second dummy should be approximately double that of the first, only at the 10 percent significance level. When, instead of using dummy variables, a squared democracy index is entered, its coefficient is positive (the level index itself remaining negative); the p-value for joint significance is then 0.0001. Again it

[23] Since GDP per capita is in log form, this is calculated as  $\Delta Y = \beta \Delta X / X$  or  $\Delta Y = -2.1172 * 100\%$ .

[24] We use dummies for five of the six World Bank regions: East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa and South Asia. Sub-Saharan Africa is the reference region. Results are very similar when choosing alternative reference regions.

appears that there are diminishing effects at play<sup>25</sup>, although high collinearity between the level and squared index makes it difficult to draw firm conclusions.<sup>26</sup>

**Table 1: Baseline regression results**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita (log), 2007	-2.1172*** [0.2797]	-1.7775*** [0.3898]	-1.5765*** [0.5010]	-1.7951*** [0.3141]	-1.6705*** [0.3998]	-1.4129** [0.5470]	-1.8001*** [0.3973]	-1.9172*** [0.4049]
Av. GDP pc growth, 2004-2007	-0.7573*** [0.1828]	-0.7499*** [0.1839]	-0.7010*** [0.1999]	-0.6290*** [0.1906]	-0.6281*** [0.1913]	-0.6002*** [0.1965]	-0.5998*** [0.1797]	-0.6339*** [0.1797]
Av. GDP pc trend growth	-0.2000 [0.1616]	-0.2146 [0.1653]	-0.2146 [0.1783]	-0.3655** [0.1702]	-0.3672** [0.1704]	-0.4116** [0.1780]	-0.3947** [0.1723]	-0.3402** [0.1626]
Dom. credit growth, 2000-2007	-0.0215** [0.0098]	-0.0222** [0.0098]	-0.0220* [0.0117]	-0.0258** [0.0101]	-0.0259** [0.0101]	-0.0251** [0.0115]	-0.0260*** [0.0099]	-0.0261** [0.0101]
Trade openness, 2007	-0.0027 [0.0102]	-0.0013 [0.0102]	0.0000 [0.0103]	-0.0089 [0.0100]	-0.0078 [0.0107]	-0.0046 [0.0120]	-0.0071 [0.0100]	-0.0074 [0.0102]
Financial openness, 2007	-0.0102*** [0.0007]	-0.0101*** [0.0007]	-0.0107*** [0.0007]	-0.0108*** [0.0007]	-0.0108*** [0.0006]	-0.0108*** [0.0007]	-0.0109*** [0.0006]	-0.0106*** [0.0005]
M2 (% of GDP), 2007	0.0458*** [0.0121]	0.0489*** [0.0113]	0.0459*** [0.0128]	0.0491*** [0.0110]	0.0500*** [0.0107]	0.0612*** [0.0130]	0.0524*** [0.0097]	0.0515*** [0.0101]
CAB (% of GDP), 2007	0.0870*** [0.0299]	0.0739** [0.0308]	0.0545 [0.0375]	0.0155 [0.0440]	0.0129 [0.0435]	0.0167 [0.0495]	0.0184 [0.0418]	0.0139 [0.0436]
Institutional quality, 2007		-1.0722 [0.8057]	-1.1006 [0.8590]		-0.4233 [0.8159]	-0.4491 [0.8591]	-0.5994 [0.7911]	-1.0483 [0.8884]
Polity index, 2007				-5.0346*** [1.2668]	-4.8527*** [1.2122]	-5.7131*** [1.6679]		-20.1297*** [6.9069]
Anocracy dummy, 2007							-3.3091*** [0.9785]	
Democracy dummy, 2007							-3.9213*** [0.9386]	
Polity index squared, 2007								14.1820** [6.3529]
Regional dummies	No	No	Yes	No	No	Yes	No	No
Observations	115	115	115	102	102	102	102	102
R <sup>2</sup>	0.6804	0.6852	0.6949	0.7150	0.7157	0.7263	0.7280	0.7271
Adjusted R <sup>2</sup>	0.6562	0.6582	0.6522	0.6871	0.6844	0.6785	0.6948	0.6937
p-value (F-test)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

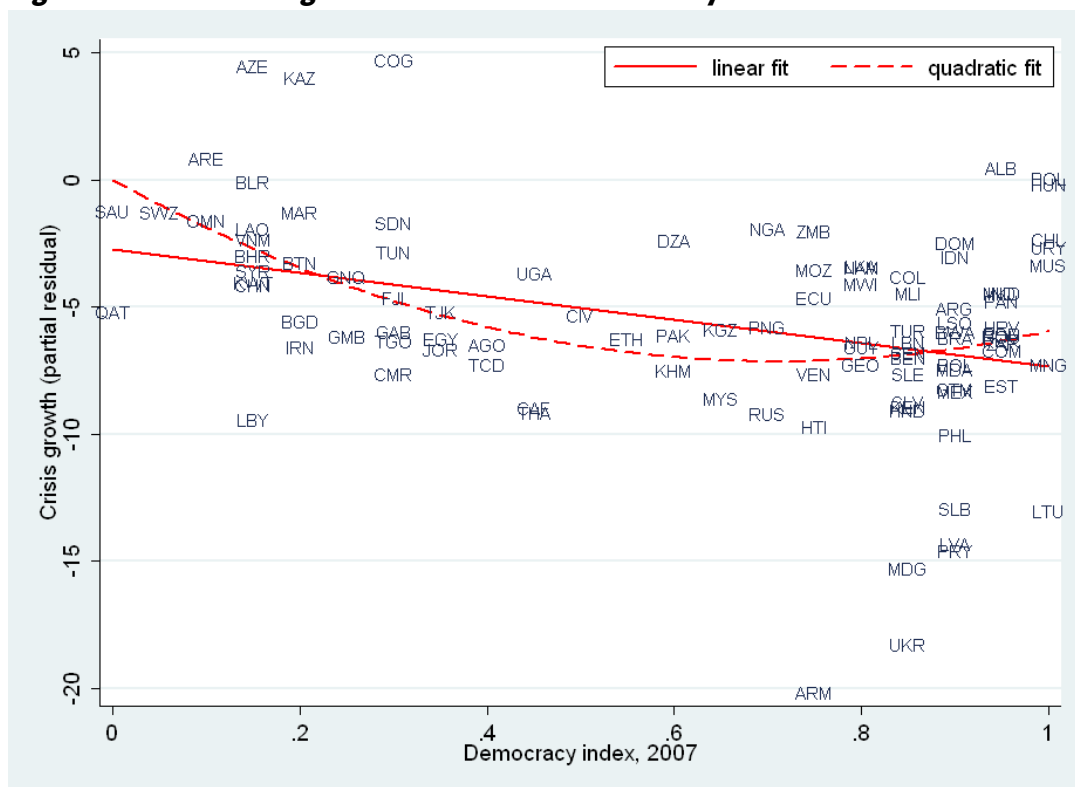
Notes: Dependent variable is the 2009-2007 percentage point change in real GDP per capita growth. All models are estimated using OLS and include a constant term (coefficient not reported). Heteroskedasticity-robust (Huber-White) standard errors in brackets. Significance levels: \*\*\*1% \*\*5% \*10%.

[25] The turning point, after which democracy starts to improve crisis growth, lies at a democracy index of around 0.70 for this model (corresponding to levels of democracy in Russia, Nigeria and Papua New Guinea).

[26] If we, alternatively, insert centred versions (around the sample mean) of the level and squared democracy index (to reduce structural collinearity), the level index loses its significance.

Figure 3 plots the partial residuals of the regression in column 8 (omitting contributions of the democracy index and its square) against the level democracy index.<sup>27</sup> As is shown once more, the choice between a linear and quadratic functional relationship is not straightforward, with the latter fitting the data perhaps only marginally better than the former. Indeed, a number of countries with relatively high Polity scores, most notably Armenia and Ukraine, continue to have very large negative crisis growth residuals.

**Figure 3: Partial crisis growth residuals and democracy**



Note: for country sample and corresponding country codes, see Table A1 in Appendix.

Our results up to now suggest that, on average, democratic country features were negatively correlated with economic growth performance during the 2008-2009 crisis (whether or not with diminishing effects at the margin). As evident from section 3.3, this bucks the trend of most earlier studies that have examined countries' resilience against external shocks and crisis, but, on the other hand, seems to give some credence to the popular story of Chinese autocrats' successful crisis management.

In the following subsection we attempt to shine some light on the robustness of our baseline model findings. We experiment, in turn, with five categories of robustness checks: changes in the set of controls, other estimators, the use of different country subsamples, alternative definitions for crisis growth (our dependent variable), and various alternative democracy measures (our variable of interest). For reasons of brevity we restrict ourselves to testing the specific set-up in Table 1, column 5 (including institutional quality; no regional dummies or non-linear effects), the results of which are reproduced for comparison in the first column of each of the robustness results tables in Appendix (Table A4-A8). Above all, our focus will be on what happens to the statistical and economic significance of the democracy coefficient when switching between specifications.

[27] The partial residuals are calculated using the estimated coefficients from a regression that incorporates all variables, including the level and squared democracy index, i.e. the regression coefficients in column 8. Logically, the contributions from the democracy variables themselves are not taken into account in the calculation of these partial residuals (see Barro, 1996:14-15, footnote 16).

## 5.2. Robustness tests

### 5.2.1. Changes in control variables

Table A4 in Appendix collects the results of specifications in which we have altered the original set of control variables. First of all, one potential problem with our baseline model, as already alluded to in section 4.2 (footnotes 19 and 20), is the inherent bias caused by the overlap in time periods between the dependent variable, on the one hand, and explanatory variables log GDP per capita, average pre-crisis growth and average trend growth on the other. Column 2 of Table A4 shows that our main findings also hold when replacing the original controls in question by log GDP per capita for 2005, average pre-crisis growth for 2002-2005 and average trend growth for 1990-2005 (or 1995-2005 in the case of some CEE and former Soviet countries); the negative correlation of democracy with crisis growth is still highly significant and actually slightly stronger.

Second, an alternative measure for institutional quality is constructed with data from the Political Risk Services (PRS) Group's International Country Risk Guide (ICRG). We average three (annual) ICRG scores that evaluate countries on their protection of property and contract rights and their efficiency in public good allocation (see Knack and Keefer, 1995): *law and order*, *corruption* and *bureaucratic quality*.<sup>28</sup> This leaves us with a composite index ranging from 0 to 6, with higher values signalling superior institutional quality. As is noticeable from column 3 of Table A4, substitution of the original WGI-based index for institutional quality by the new ICRG index only further increases the size of the estimated democracy coefficient.

Third, we try a number of variations on the financial openness variable, which we defined very broadly as the sum of total external assets and liabilities over GDP. In view of its skewed cross-sectional distribution, we replace the original financial openness variable by its logarithmic transformation (column 4). The transformed variable still exerts a negative influence on crisis growth, although its statistical significance is much lower now. Next we look at the impact of the *net foreign assets* (NFA) position instead of the mere size of a country's international balance sheet (column 5). The NFA coefficient is negative and significant, but this significance disappears if we exclude the current account balance variable from the model (which is highly collinear with NFA; see also Lane and Milesi-Ferretti, 2011). Splitting financial openness in its FDI, portfolio equity, debt and foreign reserves components learns that the effect of openness on crisis growth may differ according to the specific component one considers (column 6).<sup>29</sup> None of these alterations seems to have any discernable effect on the democracy coefficient. When including reserves measured in months of imports next to financial openness (from which we naturally leave out the reserves asset component), or substituting financial openness altogether by the ratio of international bank claims of BIS-reporting banks to GDP from the Bank of International Settlements' consolidated banking statistics (a proxy for countries' vulnerability to banking credit shocks), the coefficient of our democracy variable somewhat changes; its negative sign and high statistical significance level however remain (column 7-8).

[28] Knack and Keefer (1995) originally also included scores on *expropriation risk* and *repudiation of contracts by government* in their composite ICRG index. These latter two scores are, to our knowledge, not available for recent years (see PRS Group, 2011).

[29] We make abstraction of the financial derivatives component of financial openness since this typically constitutes only a marginal (if not zero) percentage of all assets and liabilities for our sample of developing countries. Further investigation of the respective importance of FDI, portfolio equity, debt and reserves positions for crisis growth falls outside the scope of this paper.

Lastly, in column 9 and 10, we add two more variables that could possibly have a bearing on crisis growth, stock market capitalisation and the general government's fiscal balance, respectively. Again the results are very similar to those of our baseline model.

Altogether, none of the changes in controls we have just presented appears to detract from the negative correlation between democracy and crisis growth we found earlier.

### 5.2.2. Other estimators

Table A5 in Appendix shows our results when employing other estimators. First, in column 2, we use Stata's 'robust regression' algorithm (*rreg* command), which provides an iteratively reweighted alternative to simple OLS. After estimating OLS, this algorithm calculates for each observation Cook's D (a measure combining information about its leverage and residual) and drops all observations with D larger than 1. Then, an iterative process begins in which observation weights are derived from absolute residuals (using first Huber, and then Tukey bisquare weighting functions); this process stops when the maximum change in the weights of one iteration to the next falls below a certain threshold. While such 'robust regression' yields less efficient results than OLS, it weighs down outliers and other excessively influential observations, which could be an important problem in our rather limited sample (see also Figures 2 and 3). From column 2 of Table A5 it can be seen that, although the coefficient of our baseline democracy index becomes smaller, the index retains its statistical significance; and so do all other regressors, apart from trend growth (trade openness, on the other hand, gains significance). A one-standard-deviation increase in the democracy index now lowers crisis growth by about 1.1 percentage points. Outliers may indeed have an effect on our findings, but at first sight do not drive the negative democracy-crisis growth relation we uncover.<sup>30</sup>

Certainly, all the foregoing does not necessarily imply that democracy has a negative *causal* effect on the differences in growth between 2009 and 2007. As is well-established in the econometrics literature, correlation does not equate causation. Indeed, the possibility of spurious correlation, whereby the negative democracy-crisis growth relation in our model merely reflects the correlation of both these variables with a third, unobserved factor, is non-negligible. With such third factors omitted, the OLS estimator would be biased and inconsistent. One (popular) way to mitigate these and other potential problems, such as measurement error, in a cross-country setting as ours is by means of instrumental variable (IV) estimation. The IV estimator is consistent, although never unbiased and less efficient than OLS, when employing variables (instruments) that are both uncorrelated with the error term of the model (instrument exogeneity) and correlated with the assumingly endogenous variable being instrumented (instrument relevance). Finding valid instruments that satisfy these two conditions is however always a daunting task.

Here we have experimented with two types of instruments: first, variables linked to historical Western influence in developing countries, more specifically the fraction of a country's population having one of five primary Western European languages as mother tongue and the average temperature in degrees Celsius; and second, earlier values of Polity measures for democracy, in particular an index averaging combined Polity scores for the years 2000-2006.<sup>31</sup>

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[30] In our model, the robust regression algorithm ultimately results in Armenia being assigned a weight of zero. Also the influences of Ukraine, Latvia and the Republic of Congo are heavily discounted, with respective weights of 0.014, 0.099 and 0.112.

[31] For more on definitions and sources of these instruments, see Table A2 in Appendix.



The logic underlying the language instrument (originally from Hall and Jones, 1999) is that it proxies the extent to which Western Europe, mainly through colonisation, exerted influence on a country's 'social infrastructure', including the transmission of ideas and practices of democratic government. In a related manner, much has been written (most famously by Acemoglu et al. 2001) about how Western European colonisers were more likely to settle and replicate, among other institutions, systems of checks and balances in climates similar of their own, i.e. with a similar disease environment and, perhaps also, similarly moderate temperatures. This would suggest that, through an historical lock-in of more participatory political institutions, both language and mean temperature are correlated with current democracy levels (the former positively and the latter negatively) but, conditional on the control variables included in our model, not directly with crisis growth. Additionally, earlier values of (Polity-based) democracy measures could instrument for current values if one assumes that earlier states of democracy do not affect crisis growth beyond their effect on current states of democracy.

Columns 3-6 of Table A5 present the outcomes of the above-described IV approach using two-stage least squares (2SLS). In column 3 we instrument democracy only by the Western European language variable. The coefficient of democracy is now very imprecisely estimated, making it difficult to say something about the direction of democracy's net effect, if any, on crisis growth. This impreciseness could be due to the relatively low explanatory power of the language instrument in the first-stage regression, which is apparent from the reported partial  $R^2$  statistic. Column 4 adds mean temperature as an extra instrument; we find that the IV-estimated democracy coefficient is negative, although economic and statistical significance are lower than those of the OLS estimate. The partial  $R^2$  is improved but the first-stage F statistic falls to 12.45, only just above the oft-suggested rule-of-thumb critical value of 10 (e.g. Stock et al., 2002). This points at the possibility of our instruments being 'weak', i.e. not sufficiently relevant, which has been shown to lead to substantial asymptotic bias in the IV estimator, especially in small samples (Nelson and Startz, 1990; Bound et al., 1995).<sup>32</sup> On the positive side, however, the Hansen J test (a generalised, heteroskedasticity-robust version of the Sargan test) indicates that the null hypothesis of valid overidentifying restrictions cannot be rejected. Therefore, if we assume one of our two instruments to be uncorrelated with the error term, the other is exogenous too. Since the two instruments used fit into a similar story of historical Western influence we could deduct that they are both likely to be true sources of exogenous variation.<sup>33</sup> A standard Wu-Hausman test<sup>34</sup> fails to reject at conventional significance levels the null of our exploratory variable of interest, the Polity measure of democracy, being exogenous for the model set-ups in column 3 and 4; an OLS estimator, which is more efficient, would thus be more appropriate. Of course, the possible 'weakness' of our instruments casts some doubts about the validity of such an endogeneity test.

Alternatively, we attempt an IV estimator with the average 2000-2006 Polity score as an instrument, either on its own (column 5) or in combination with the language instrument (column 6). In both cases, the democracy coefficient holds its significance. What is more, the negative effect on crisis growth is estimated to be even stronger than indicated by the baseline

[32] More formally we have compared the F statistic of the corresponding model with normal standard errors, 9.30, with the critical values proposed by Stock and Yogo (2005) (only available for IV estimation without heteroskedasticity correction). This suggests that the null of the joint influence of both instruments being zero can only be rejected at the 20 percent level (critical value: 8.75).

[33] That the signs of the coefficients of both instrumental variables in the first-stage regression are as predicted by theory (i.e. positive for the language instrument and negative for mean temperature) further strengthens our case.

[34] We rely on a regression-based version of this test (as described in Wooldridge, 2006:483-484).



OLS estimator; a one-standard-deviation increase in the Polity score corresponds here with a reduction in crisis growth of around 1.8 percentage points. From first-stage F statistics and partial R<sup>2</sup>s we observe that the relevance or ‘strength’ of this alternative instrument is incontestable. Yet, there can be serious reservations about the exogeneity assumption one needs to make; it is not self-evident that, taking at face value that our baseline democracy measure is correlated with the error term, earlier values are not (especially as Polity scores tend to vary relatively little over time). The Hansen J test for column 6, showing that the null of valid overidentifying restrictions is on the verge of being rejected at the 5 percent level, seems to bear out these problems of endogeneity for the earlier values instrument. Endogeneity is found to be an issue for the baseline OLS estimator, according to Wu-Hausman tests based on the models in column 5 and 6, but using earlier Polity values may not be particularly helpful in resolving this.

All in all, the different instruments we have used shed some, but limited additional light on the existence, if any, of a causal relation between democracy levels and growth during the crisis. At a first glance, regression outputs indicate that negative correlations persist in three out of the four IV estimations presented<sup>35</sup>; further scrutiny however learns that these results should be taken with a pinch of salt because of potential problems of instrument irrelevance (in the case of the Western influence instruments) and instrument endogeneity (in the case of earlier value instruments). Clearly, more work, including a search for better instruments, is needed if we are to boost the credibility of any IV estimates.

On the other hand, there are plausibly a number of grounds on which one could defend sticking to an OLS procedure here.<sup>36</sup> First, as stated in the introduction, the main purpose of this paper is to augment the existing body of empirical literature on cross-country determinants of growth during the 2008-2009 crisis by studying the impact of democracy on crisis growth beyond that of other, mostly macroeconomic and financial variables already included in that literature. Since these earlier studies (surveyed in section 2) predominantly employ OLS, doing so too increases the comparability of our results (at least with respect to the variables we take up as controls in our model).<sup>37</sup> And second, related to the preceding point, the influence of our baseline democracy measure appears to be statistically significant in the presence of previously used exploratory variables, including proxies for overall institutional quality, suggesting that the omitted variable bias in our OLS estimations may actually be lower than in other studies.<sup>38</sup> Hence, for the remaining robustness tests we will focus again on the baseline OLS estimator.

### 5.2.3. Country subsamples

In Table A6 in Appendix we verify whether our results differ when restricting ourselves to certain developing country subsamples.<sup>39</sup> It appears that the democracy-crisis growth relation, or at least its overall direction, is largely insensitive to sample changes.

Excluding countries that were classified by the IMF as oil exporters returns a democracy coefficient that is even more negative (column 2). This should not come as a surprise since some of these oil exporting countries seem to defy the negative trend in Figure 2. Omission of the three Baltic states, where democracy and large growth downfalls have gone together

[35] We have tried several variations on the two IV approaches mentioned (e.g. using log settler mortality rates, distance to equator or other lagged Polity measures), yielding comparable results but often even greater problems.

[36] The following reasoning, to some extent, mirrors that of Knack and Keefer (1995).

[37] In fact, only one out of the twelve studies surveyed, Blanchard et al. (2010), uses an IV estimator.

[38] Most studies also include much fewer controls *simultaneously* in their regressions than we do here.

[39] For different country classifications, see Table A1 in Appendix.

(probably also for very specific reasons other than those captured by our control variables)<sup>40</sup>, slightly lowers the point estimate of the democracy coefficient in our model, as expected (column 3).<sup>41</sup> Columns 4-5 demonstrate that financial centres, as identified by Lane and Milesi-Ferretti (2011), or small (mostly island) states with a population of less than one million in 2007 also do not drive our main findings.

Likewise, the statistical and economic significance of the democracy index survives the exclusion of the UN's group of least developed countries (column 6), of high-income developing countries (column 7) or of both high-income and upper middle-income countries (column 8). Only if we limit our sample to low-income countries (column 9), effectively reducing the number of observations to less than 30, the statistical significance of the coefficient of democracy is reduced (as is the case with the coefficients of log GDP per capita and financial depth; conversely, the coefficient of the current account balance turns highly significant).

#### 5.2.4. Other crisis growth measures

In columns 2-4 of Table A7 in Appendix we substitute our preferred dependent variable for crisis growth, the percentage point difference in real GDP per capita growth between 2009 and 2007, in turn by the 2009-2008 percentage point change in real GDP per capita growth, real GDP per capita growth in 2009 and real GDP per capita growth in 2008. In the first two instances the influence of democracy remains significant but is slightly less negative than in our baseline model. So, no matter whether 2009 growth is expressed in relative or absolute terms, pre-crisis democracy levels appear negatively correlated with it. When only 2008 growth is considered, the model loses most of its explanatory power, in line with expectations (see footnote 17).

#### 5.2.5. Other democracy measures

As a last series of robustness tests, a number of alternative democracy measures are tried in Table A8. In column 2 the overall Polity score index is replaced by another 0-to-1 index based on the Polity score's underlying *institutionalised democracy* indicator (see section 4.1 and Marshall et al., 2010); column 3 does the same for Polity's *institutionalised autocracy* indicator (for which there is no overlap in codings with the institutionalised democracy indicator). It turns out that the net negative effect of our baseline Polity index is the result of both a negative correlation of democratic country features with crisis growth and a positive correlation of autocratic characteristics with such growth, the latter being slightly stronger than the former according to point estimates in columns 2-3.<sup>42</sup> In column 4, we draw on yet another oft-used Polity subcomponent, *constraints on chief executive*, which more narrowly measures the extent of institutionalised restraints on the decision-making powers of a country's chief executives, be it individuals or collective bodies, and ranges from 1 ('unlimited authority') to 7 ('executive parity or subordination'). We find that more constraints leads to significantly lower crisis growth.

[40] For the case of Latvia, for example, Blanchard et al. (2010) point to the important role of foreign ownership of the country's banks (especially controlled by Nordic parent banks) and a domestic housing boom/bust in addition to a huge pre-crisis run-up in domestic credit and large current account deficit (two factors which we do capture in our model).

[41] If we exclude both oil exporters and Baltic states, the point estimate of the democracy coefficient becomes -5.1933, remaining highly significant.

[42] If we include both indicators together as regressors (which are, of course, highly collinear), only the institutionalised autocracy indicator's coefficient remains significant (results not reported).

Column 5 of Table A8 replaces our Polity-based measures with the *voice and accountability* score of WGI, the single dimension we left out to construct our baseline index for overall institutional quality and finds it again negatively correlated with crisis growth.

Next, we employ the *democracy dummy* from the Democracy-Dictatorship (DD) dataset (see Cheibub et al., 2010), which is sometimes argued to be more objective (but less comprehensive) compared to Polity scores. The DD dummy reveals that countries classified as non-democracies would outperform democracies with otherwise similar macroeconomic, financial and institutional features by about two percentage points of crisis growth, i.e. a growth difference slightly larger than that corresponding with a one-standard-deviation change in our baseline index (see section 5.1).

Column 7 uses the well-known *checks and balances* variable, counting the number of effective veto points in a country's political system, from the Database of Political Institutions (DPI) (see Beck et al., 2001). Again the results are qualitatively similar to our earlier findings and very much in line with the theoretical arguments we presented in section 3.3.43 The results in column 16 indicate that, on average, one additional veto point in the political constellation of a country reduces crisis growth with almost 0.9 percentage points.

Our last alternative measure for democracy is constructed from Freedom House's Freedom in the World database, which evaluates countries on their *political rights* and *civil liberties* and gives scores from 1 to 7 (with 7 corresponding to the *least free* places) (see Freedom House, 2008). To increase comparability with the baseline, we reverse the original scale and standardise political rights and civil liberties scores to 0-to-1 indices (with 1 meaning completely free); we then take simple averages of the two indices to obtain a combined 'freedom' index. Column 8 in Table A3 shows that also the partial correlation of this freedom index with crisis growth is negative.

In sum, from the preceding battery of tests it very much appears that the negative correlation between democracy and crisis growth we uncovered earlier is robust. The next subsection does some further probing in bringing possible interaction effects into consideration.

### 5.3. Interaction effects

One could now wonder whether the (negative) correlation of democracy with crisis growth is conditioned by the prevailing macro-economic, financial and institutional environment. Perhaps democracy exerts a stronger (or weaker) effect on crisis growth in open economies.

Table 2 gives the regression results of our baseline model when we add multiplicative interaction terms of the Polity score with each of the other regressors (introduced one at a time). To ease interpretation of the coefficients we have centred variables around their sample mean before interacting them; the democracy coefficient then captures the impact of democracy on crisis growth when the variable it is interacted with is fixed at its sample mean.<sup>44</sup>

[43] The regression results reported in column 16 exclude India, which is with 17 checks and balances in place a clear outlier; the next in line, the Solomon Islands, has only 8 veto points. The inclusion of India into the sample causes the coefficient of checks and balances to be not significantly different from zero.

[44] Interacting uncentred variables produces coefficients that measure the effect of one variable when the other is kept at zero, which may not be particularly useful (see Braumoeller, 2004).

**Table 2: Regression results with interaction effects**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variable inter-acted with Polity index (X)	GDP per capita (log), 2007	Av. GDP pc growth, 2004-2007	Av. GDP pc trend growth	Dom. credit growth, 2000-2007	Trade openness, 2007	Financial openness, 2007	M2 (% of GDP), 2007	CAB (% of GDP), 2007	Institut. quality, 2007
X	-1.6495*** [0.4139]	-0.9649*** [0.1782]	-0.6028** [0.2576]	-0.0250** [0.0098]	-0.0060 [0.0107]	-0.0061 [0.0054]	0.0515*** [0.0115]	0.0427 [0.0415]	-0.4131 [0.7758]
Polity index, 2007	-5.0358*** [1.2073]	-5.4767*** [1.1972]	-5.1266*** [1.2345]	-4.8665*** [1.2228]	-4.5388*** [1.2106]	-4.8196*** [1.2003]	-5.2804*** [1.2705]	-5.2918*** [1.1892]	-5.1986*** [1.2837]
Polity index * X	0.7848 [0.9924]	-1.4696*** [0.4602]	-1.2267* [0.6480]	-0.0436** [0.0218]	-0.0426 [0.0268]	0.0101 [0.0111]	0.0737** [0.0358]	0.2355** [0.0990]	3.2705 [2.3034]
Observations	102	102	102	102	102	102	102	102	102
R <sup>2</sup>	0.7173	0.7564	0.7359	0.7311	0.7199	0.7183	0.7238	0.7293	0.7224
Adjusted R <sup>2</sup>	0.6827	0.7266	0.7036	0.6983	0.6856	0.6839	0.6901	0.6962	0.6885
p-value (F-test)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is the 2009-2007 percentage point change in real GDP per capita growth. All models are estimated using OLS and include all (nine) baseline model controls and a constant term. Only coefficients of Polity-based democracy measure, variable interacted with this measure, and multiplicative interaction term are reported. Variables are centred around sample mean before interaction. Heteroskedasticity-robust (Huber-White) standard errors in brackets. Significance levels: \*\*\*1% \*\*5% \*10%.

The first and foremost observation from columns 1-9 of Table 2 is that the overall negative correlation of democracy with crisis growth persists and cannot be fully ascribed to democracy's interaction with one of the control variables of the baseline model (at least not at the sample mean values of these controls). That said, it seems as if the negative effect of democracy is further strengthened in an environment of rapid pre-crisis output and domestic credit growth (columns 2 and 4). Conversely, the negative impact of democracy on crisis growth appears to be somewhat attenuated when financial depth is high or the current account balance is sufficiently positive. The mechanisms that lay behind these possible non-linear relations are not directly clear to us and warrant more attention in future work.

## 6. CONCLUDING REMARKS

This paper has examined whether democratic country features can explain part of the cross-country variation in 2008-2009 crisis growth performances across developing countries, thereby complementing other recent studies on the Great Recession which have looked almost exclusively at macroeconomic and financial variables. Evidence from simple OLS models hints at a statistically and economically significant negative correlation between democracy and crisis growth. We find this relation to be robust to the use of different sets of control variables, an iterative weighting algorithm for estimation, changes in the country sample, and alternative democracy and crisis growth definitions.

Our results seem to be in striking contrast with the conclusions of most earlier empirical studies on country resilience to external shocks and crisis (most notably, Rodrik, 1999), which suggest that democracy helps countries in overcoming shocks and keeping up growth. Consequently, the paper is closer to the 'autocratic advantage' interpretation of China's managing of the latest crisis. It is in line with theoretical hypotheses of checks and balances reducing flexibility and decisiveness in governments' reaction to crisis and leaving room for populist demands to gain ground. That notwithstanding, there are a number of obvious but important caveats here that deserve mention.

First, the paper has not yet been able to fully take away concerns of spurious correlation. Although we have attempted to control for a large number of candidate 'confounding' factors (such as e.g. trade and financial openness), it is still possible that the negative democracy-crisis growth relation is due to the correlation of both these variables with unobserved factors. Our initial experimentation with IV estimation suggests that, even when taking into account endogeneity issues, democracy can still be negatively linked to crisis growth. The relevance and exogeneity of the instruments we have used could however be subject to critique. The search for better, valid instruments thus continues.

Second, even if causation would be more firmly established, our results do not at all imply that democracy is detrimental to overall, long-term growth (which would run counter to the conclusions, or better *non*-conclusions, of the vast body of research in this field). Neither should these findings, or any arguments in the paper, be interpreted as a manifesto for more autocracy. Rather, we simply find that, on average, democracy held back growth during one particular spell of global crisis, the Great Recession of 2008-2009. Next to their intrinsic values of accountability and legitimacy, democracies have been found to possess many other advantages over alternative political configurations, including a lower propensity to engage in conflict, a more equal redistribution of any growth dividends, and even higher life expectancy at birth and superior daily calorie intakes for their citizens (see e.g. Halperin et al., 2005; Rodrik, 1999b; Besley and Kudamatsu, 2006; Blaydes and Kayser, 2011). It could well be possible that autocracies more unevenly distribute any costs that come with managing a crisis and keeping up growth temporarily. Autocracies are also generally marked by greater growth volatility (see section 3.2). Indeed, as Pei (2011:128) has noted in the context of China's remarkable resilience during the crisis, 'one should not confuse crisis management with sustainable development'. Likewise, 'authoritarian variants [of capitalism] have more leeway to make large, rapid decisions but may suffer in the long run from problems of accountability and legitimacy' (Fukuyama, 2011:313). As time passes by and more data becomes available, it will be interesting to investigate how political institutions shape the medium- and longer-term growth paths of countries during

global recovery (or, perhaps, renewed bouts of crisis).

Third, this paper has attempted to identify the overall, net effect of democracy on crisis growth, treating the underlying forces as a ‘black box’ yet to be opened. Why is it, for example, that democracy seems to have hindered growth during the latest crisis, whereas it was generally found a blessing during previous economically turbulent times? To borrow from Reinhart and Rogoff (2009), why could it be that ‘this time is different’? For many individual developing countries the Great Recession has been less severe than previous, more idiosyncratic crisis episodes (see Berg et al., 2011 on low-income countries). Perhaps decisiveness and flexibility matter more than the credibility of policy commitments when a crisis is relatively ‘moderate’, as suggested by Montinola’s (2003) study on banking crises resolution. Also, one can expect credibility to be less important in dealing with purely *exogenous* shocks, contrary to when a crisis has *domestic* origins too and the country’s regime, through earlier policy actions, bears (part of) the responsibility for it happening in the first place. All this is, of course, still highly speculative. Much more empirical research will be necessary to provide convincing answers to these questions and disentangle the exact channels through which democracy, in its various aspects, has influenced countries’ crisis growth. We have only just begun to scratch the surface.

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## APPENDICES

Table A1: Country sample by World Bank income group

Low-income			Lower middle-income			Upper middle-income			High-income		
Country name	Code	Region	Country name	Code	Region	Country name	Code	Region	Country name	Code	Region
1 <u>Afghanistan</u>	AFG	SAS	48 Albania	ALB	ECA	100 Argentina	ARG	LAC	137 Antigua and Barbuda	ATG	LAC
2 Bangladesh	BGD	SAS	49 <b>Algeria</b>	DZA	MNA	101 Belarus	BLR	ECA	138 <b>Bahrain</b>	BHR	MNA
3 <b>Benin</b>	BEN	SSA	50 <b>Angola</b>	AGO	SSA	102 Belize	BLZ	LAC	139 Barbados	BRB	LAC
4 <u>Burkina Faso</u>	BFA	SSA	51 Armenia	ARM	ECA	103 Botswana	BWA	SSA	140 Brunei Darussalam	BRN	EAP
5 <u>Burundi</u>	BDI	SSA	52 <b>Azerbaijan</b>	AZE	ECA	104 Brazil	BRA	LAC	141 <b>Equatorial Guinea</b>	GNQ	SSA
6 <u>Cambodia</u>	KHM	EAP	53 <b>Bhutan</b>	BTN	SAS	105 Bulgaria	BGR	ECA	142 Estonia	EST	ECA
7 <u>Central African Republic</u>	CAF	SSA	54 Bolivia	BOL	LAC	106 Chile	CHL	LAC	143 Hungary	HUN	ECA
8 <u>Chad</u>	TCO	SSA	55 Bosnia and Herzegovina	BIH	ECA	107 Costa Rica	CRI	LAC	144 <b>Kuwait</b>	KWT	MNA
9 <b>Comoros</b>	COM	SSA	56 Cameroon	CMR	ECA	108 Croatia	HRV	ECA	145 <b>Oman</b>	OMN	MNA
10 <u>Congo, Dem. Rep. of</u>	COD	SSA	57 <b>Cape Verde</b>	CPV	SSA	109 Dominica	DMA	LAC	146 <b>Qatar</b>	QAT	MNA
11 Côte d'Ivoire	CIV	SSA	58 China	CHN	EAP	110 Fiji	FJI	EAP	147 <b>Saudi Arabia</b>	SAU	MNA
12 <u>Eritrea</u>	ERI	SSA	59 Colombia	COL	LAC	111 <b>Gabon</b>	GAB	SSA	148 Bahamas, The	BHS	LAC
13 <u>Ethiopia</u>	ETH	SSA	60 <b>Congo, Rep. of</b>	COG	SSA	112 Grenada	GRD	LAC	149 <b>Trinidad and Tobago</b>	TTO	LAC
14 <u>Gambia, The</u>	GMB	SSA	61 Djibouti	DJI	MNA	113 Jamaica	JAM	LAC	150 <b>United Arab Emir.</b>	ARE	MNA
15 Ghana	GHA	SSA	62 Dominican Republic	DOM	LAC	114 Kazakhstan	KAZ	ECA			
16 <u>Guinea</u>	GIN	SSA	63 <b>Ecuador</b>	ECU	LAC	115 Latvia	LVA	ECA			
17 <u>Guinea-Bissau</u>	GNB	SSA	64 Egypt	EGY	MNA	116 Lebanon	LBN	MNA			
18 <u>Haiti</u>	HTI	LAC	65 El Salvador	SLV	LAC	117 <b>Libya</b>	LBY	MNA			
19 Kenya	KEN	SSA	66 Georgia	GEO	ECA	118 Lithuania	LTU	ECA			
20 Kyrgyz Republic	KGZ	ECA	67 Guatemala	GTM	LAC	119 Malaysia	MYS	EAP			
21 <u>Lao PDR</u>	LAO	EAP	68 Guyana	GUY	LAC	120 Mauritius	MUS	SSA			
22 <u>Liberia</u>	LBR	SSA	69 Honduras	HND	LAC	121 Mexico	MEX	LAC			
23 <u>Madagascar</u>	MDG	SSA	70 India	IND	SAS	122 Montenegro	MNE	ECA			
24 <u>Malawi</u>	MWI	SSA	71 Indonesia	IDN	EAP	123 Panama	PAN	LAC			
25 <u>Mali</u>	MLI	SSA	72 <b>Iran, Islam. Rep. of</b>	IRN	MNA	124 Poland	POL	ECA			
26 <u>Mauritania</u>	MRT	SSA	73 Iraq	IRQ	MNA	125 Romania	ROU	ECA			
27 <u>Mozambique</u>	MOZ	SSA	74 Jordan	JOR	MNA	126 <b>Russia</b>	RUS	ECA			
28 <u>Myanmar</u>	MMR	EAP	75 <u>Kiribati</u>	KIR	EAP	127 Serbia	SRB	ECA			
29 <u>Nepal</u>	NPL	SAS	76 Kosovo	UVK	ECA	128 Seychelles	SYC	SSA			
30 <u>Niger</u>	NER	SSA	77 <u>Lesotho</u>	LSO	SSA	129 South Africa	ZAF	SSA			
31 <b>Nigeria</b>	NGA	SSA	78 Macedonia, FYR	MKD	ECA	130 St. Kitts and Nevis	KNA	LAC			
32 Pakistan	PAK	SAS	79 <u>Maldives</u>	MDV	SAS	131 St. Lucia	LCA	LAC			
33 Papua New Guinea	PNG	EAP	80 Moldova	MDA	ECA	132 St. Vincent and the Grenadines	VCT	LAC			
34 <u>Rwanda</u>	RWA	SSA	81 Mongolia	MNG	EAP	133 Suriname	SUR	LAC			
35 <u>São Tomé and Príncipe</u>	STP	SSA	82 Morocco	MAR	MNA	134 Turkey	TUR	ECA			
36 <u>Senegal</u>	SEN	SSA	83 Namibia	NAM	SSA	135 Uruguay	URY	LAC			
37 <u>Sierra Leone</u>	SLE	SSA	84 Nicaragua	NIC	LAC	136 <b>Venezuela</b>	VEN	LAC			
38 <u>Solomon Islands</u>	SLB	EAP	85 Paraguay	PRY	LAC						
39 Tajikistan	TJK	ECA	86 Peru	PER	LAC						
40 <u>Tanzania</u>	TZA	SSA	87 Philippines	PHL	EAP						
41 <u>Togo</u>	TGO	SSA	88 <u>Samoa</u>	WSM	EAP						
42 <u>Uganda</u>	UGA	SSA	89 Sri Lanka	LKA	SAS						
43 Uzbekistan	UZB	ECA	90 <b>Sudan</b>	SDN	SSA						
44 Vietnam	VNM	EAP	91 Swaziland	SWZ	SSA						
45 <b>Yemen, Rep. of</b>	YEM	MNA	92 <b>Syrian Arab Republic</b>	SYR	MNA						
46 <u>Zambia</u>	ZMB	SSA	93 Thailand	THA	EAP						
47 Zimbabwe	ZWE	SSA	94 <u>Timor-Leste, Dem. Rep. of</u>	TLS	EAP						
			95 Tonga	TON	EAP						
			96 Tunisia	TUN	MNA						
			97 <b>Turkmenistan</b>	TKM	ECA						
			98 Ukraine	UKR	ECA						
			99 <u>Vanuatu</u>	VUT	EAP						

Notes: Country codes are official ISO alpha-3 codes. Income group classification based on 2007 GNI per capita in US\$ (Atlas method) is the following: low-income ( $\leq 935$ ), lower middle-income (936 - 3,705), upper middle-income (3,706 - 11,455), high-income ( $> 11,455$ ). Since Kosovo only declared independence in 2008 it is ranked based on its 2008 GNI per capita (as a lower middle-income country). Countries in bold were classified as fuel exporters in the IMF's WEO report (October 2007). Countries in italics were classified as financial centres in Lane and Milesi-Ferretti (2011). Countries underlined were listed by the UN as least developed (based on income, human asset and economic vulnerability criteria) in 2007. Regional classification is according to the World Bank: East Asia and Pacific (EAP), Europe and Central Asia (ECA), Latin America and Caribbean (LAC), Middle East and North Africa (MNA), South Asia (SAS) and Sub-Saharan Africa (SSA). See <http://siteresources.worldbank.org/DATASTATISTICS/Resources/OGHIST.xls>.

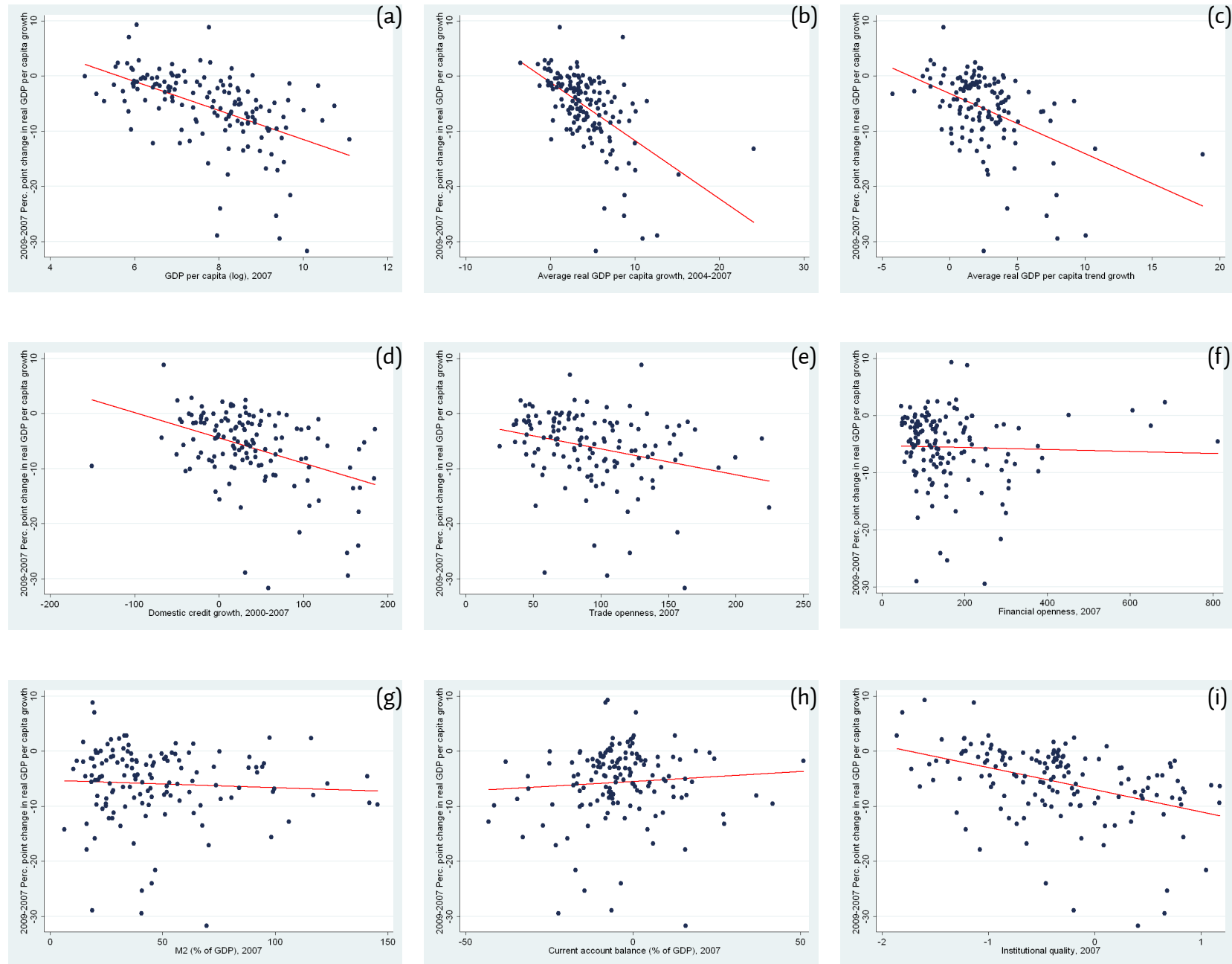
**Table A2: Variable definitions, sources and descriptive statistics**

Variable name	Definition	Source	Descriptive statistics				
			Obs.	Mean	St. dev.	Min.	Max.
<b>2009-2007 real GDP per capita growth change</b>	Percentage point difference between real GDP per capita growth in 2009 and real GDP per capita growth in 2007	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	147	-5.5344	6.6367	-31.7679	9.3109
2009-2008 real GDP per capita growth change	Percentage point difference between real GDP per capita growth in 2009 and real GDP per capita growth in 2008	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	147	-3.9260	6.0382	-29.8342	26.4237
Real GDP per capita growth, 2009	Real GDP per capita growth in 2009	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	147	-1.0240	5.4058	-25.6972	17.6957
Real GDP per capita growth, 2008	Real GDP per capita growth in 2008	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	147	2.9019	3.8415	-20.8945	11.8105
<b>GDP per capita (log), 2007</b>	Natural logarithm of nominal GDP per capita in 2007 (in current US\$)	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	147	7.7377	1.3113	4.8292	11.0952
GDP per capita (log), 2005	Natural logarithm of nominal GDP per capita in 2005 (in current US\$)	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	147	7.4612	1.2995	4.6717	10.7882
<b>Average GDP per capita growth, 2004-2007</b>	Geometric mean of real GDP per capita growth over 2004-2007	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	145	4.2484	3.4759	-3.5575	24.0325
Average GDP per capita growth, 2002-2005	Geometric mean of real GDP per capita growth over 2002-2005	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	144	3.6625	3.4324	-11.8828	15.3324
<b>Average GDP per capita trend growth</b>	Geometric mean of real GDP per capita growth over 1990-2007 (or 1995-2007 for CEE and CIS countries with missing data)	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	134	2.5471	2.8123	-4.2350	18.7322
Average GDP per capita trend growth (alternative)	Geometric mean of real GDP per capita growth over 1990-2005 (or 1995-2005 for CEE and CIS countries with missing data)	Constructed from IMF World Economic Outlook (WEO) online database (October 2010 version)	134	2.2513	2.8590	-5.1723	20.2330
<b>Domestic credit growth, 2000-2007</b>	Cumulative growth of domestic credit to the private sector as a percentage of GDP over 2000-2007	Constructed from World Bank World Development Indicators (WDI) online database	134	35.4245	59.0231	-150.7920	184.5996
<b>Trade openness, 2007</b>	Sum of exports and imports of goods and services as a percentage of GDP	Constructed from World Bank World Development Indicators (WDI) online database	136	94.0507	39.2336	25.2111	224.6584
<b>Financial openness, 2007</b>	Sum of total assets (portfolio equity, FDI, debt, FX reserves, derivatives) and total liabilities (portfolio equity, FDI, debt, derivatives) as a percentage of GDP	Constructed from External Wealth of Nations (EWN) Mark II database: Lane and Milesi-Ferretti (2007) (online update August 2009)	143	180.4828	217.7390	46.3584	2,335.8710
FDI openness, 2007	Sum of total FDI assets and liabilities as a percentage of GDP	Constructed from External Wealth of Nations (EWN) Mark II database: Lane and Milesi-Ferretti (2007) (online update August 2009)	143	51.5745	53.9760	1.3928	452.5033
Portfolio equity openness, 2007	Sum of total portfolio equity assets and liabilities as a percentage of GDP	Constructed from External Wealth of Nations (EWN) Mark II database: Lane and Milesi-Ferretti (2007) (online update August 2009)	143	8.3848	19.6508	0.0000	129.9197
Debt openness, 2007	Sum of total debt assets and liabilities as a percentage of GDP	Constructed from External Wealth of Nations (EWN) Mark II database: Lane and Milesi-Ferretti (2007) (online update August 2009)	143	95.7561	182.4364	7.4521	2073.7570
Reserves (% of GDP), 2007	Foreign exchange reserves as percentage of GDP	Constructed from External Wealth of Nations (EWN) Mark II database: Lane and Milesi-Ferretti (2007) (online update August 2009)	143	24.6639	49.4179	2.6013	582.7254
Reserves (months of import), 2007	Import coverage in months of foreign exchange reserves	World Bank World Development Indicators (WDI) online database	119	5.3898	5.1573	0.4121	43.6936
BIS international bank claims (% of GDP), 2007	International consolidated claims by BIS-reporting banks (on immediate borrower basis) as a percentage of GDP	Constructed from BIS Consolidated Banking Statistics online database	147	50.5764	279.1818	0.2301	3327.4320
<b>M2 (% of GDP), 2007</b>	Money and quasi-money as a percentage of GDP	World Bank World Development Indicators (WDI) online database	141	48.2033	32.2028	6.3748	225.4625
<b>Current account balance (% of GDP), 2007</b>	Current account balance as a percentage of GDP	IMF World Economic Outlook (WEO) online database (October 2010 version)	150	-1.7493	30.8905	-43.1600	329.0340

Variable name	Definition	Source	Descriptive statistics				
<b>Institutional quality, 2007</b>	Average of five governance indicators that capture perceptions on dimensions of political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption	Constructed from World Bank World Governance Indicators (WGI) database: Kaufmann et al. (2010)	149	-0.3586	0.6894	-1.8615	1.1790
Institutional quality (ICRG), 2007	Average of three political risk (sub)components that cover dimensions of law and order, corruption and bureaucratic quality	Constructed from International Country Risk Guide (ICRG) database: PRS (2011)	103	2.6650	0.7627	0.6667	4.6667
Stock market capitalisation (% of GDP), 2007	Stock market capitalisation of listed companies as a percentage of GDP	World Bank World Development Indicators (WDI) online database	70	65.6718	58.9684	0.6638	291.1429
General government balance (% of GDP), 2007	General government net lending/borrowing, calculated as the difference between total revenues and total expenditures, as a percentage of GDP	IMF World Economic Outlook (WEO) online database (October 2010 version)	149	3.6489	28.5152	-15.9030	315.9870
<b>Polity index, 2007</b>	0-to-1 transformation of the (revised) Polity score, which combines institutionalised democracy and autocracy scores, and captures how a country regime performs on dimensions of competitiveness/openness of executive recruitment, regulation/competitiveness of participation and chief executive constraints	Constructed from Polity IV database: Marshall et al. (2010)	127	0.6280	0.3160	0	1
Average Polity index, 2000-2006	Average of 0-to-1 transformations of the (revised) Polity scores for 2000-2006	Constructed from Polity IV database: Marshall et al. (2010)	122	0.6019	0.3117	0	1
Institutionalised democracy index, 2007	0-to-1 transformation of the institutionalised democracy score, which captures how a country regime performs on dimensions of competitiveness/openness of executive recruitment, competitiveness of participation and chief executive constraints	Constructed from Polity IV database: Marshall et al. (2010)	126	0.4778	0.3690	0	1
Institutionalised autocracy index, 2007	0-to-1 transformation of the institutionalised autocracy score, which captures how a country regime performs on dimensions of competitiveness/openness of executive recruitment, competitiveness/regulation of participation and chief executive constraints	Constructed from Polity IV database: Marshall et al. (2010)	126	0.2198	0.2920	0	1
Executive constraints, 2007	The extent of institutionalised constraints on the decision-making powers of chief executives, whether individuals or collectivities	Constructed from Polity IV database: Marshall et al. (2010)	126	4.5952	2.0047	1	7
Voice and accountability, 2007	Governance indicator capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media	World Bank World Governance Indicators (WGI) database: Kaufmann et al. (2010)	150	-0.3456	0.8453	-2.1859	1.2245
Democracy dummy (DD), 2007	Dummy taking a value 1 if the country regime classifies as democratic based on criteria of executive and legislative election, existence and legal status of (non-regime) parties	Democracy-Dictatorship (DD) database: Cheibub et al. (2010)	149	0.5101	0.5016	0	1
Checks and balances, 2007	Number of veto players in the political system of a country, adjusting for whether these are independent of each other, as determined by the level of electoral competitiveness, party affiliation and electoral rules	Database of Political Institutions (DPI): Beck et al. (2001) (online update December 2010)	136	2.6838	1.8567	1	17
Freedom, 2007	Average of 0-to-1 transformation of political rights and civil liberties scores (with reversed scales)	Constructed from Freedom House Freedom in the World online historical database (January 2011 version)	149	0.5408	0.2938	0	1
% European language	Fraction of the population speaking one of five major Western European languages (English, French, German, Portuguese or Spanish) as a mother tongue (in the early 1990s)	Originally from Hall and Jones (1999): retrieved from Dani Rodrik's homepage	143	0.1855	0.3544	0.0000	1.0000
Mean temperature	Average annual temperature (in degrees Celsius) (in the early 2000s)	Originally from Center for International Development (CID) of Harvard University: retrieved from Dani Rodrik's homepage	94	22.5517	5.3035	0.3000	29.3000

Note: Variables in bold are those of the baseline model; see section 4.1.

**Figure A1: Bivariate scatter plots: Crisis growth and explanatory variables**



Notes: Lines represent best linear fit. Extreme outliers were omitted: panel (f) excludes Bahrain; panel (g) excludes Lebanon; panel (h) excludes Timor-Leste.



**Table A3: Pairwise Pearson correlation matrix of explanatory variables**

	Polity	GDP pc	Av. gr	Av. tr gr	credit gr	tr open	fin open	M2	CAB	inst qual
Polity index, 2007	1.0000 [N=127]									
GDP per capita (log)	-0.0142 [N=125]	1.0000 [N=147]								
Av. GDP pc growth, 2004-2007	-0.0368 [N=123]	0.1450 [N=145]	1.0000 [N=145]							
Av. GDP pc trend growth	-0.1510 [N=117]	0.2746* [N=134]	0.6644* [N=134]	1.0000 [N=134]						
Dom. credit growth, 2000-2007	0.0214 [N=116]	0.0434 [N=133]	0.3696* [N=132]	0.2523* [N=124]	1.0000 [N=134]					
Trade openness, 2007	-0.0682 [N=117]	0.2650* [N=133]	0.0954 [N=132]	0.1768* [N=124]	0.1839* [N=126]	1.0000 [N=136]				
Financial openness, 2007	-0.0838 [N=126]	0.2620* [N=142]	-0.0829 [N=140]	-0.0045 [N=132]	-0.0095 [N=131]	0.3960* [N=131]	1.0000 [N=143]			
M2 (% of GDP), 2007	-0.0652 [N=119]	0.3112* [N=138]	-0.0778 [N=137]	0.0769 [N=126]	-0.1311 [N=134]	0.2421* [N=130]	0.2188* [N=134]	1.0000 [N=141]		
CAB (% of GDP), 2007	-0.0841 [N=127]	-0.0098 [N=147]	-0.1000 [N=145]	0.0098 [N=134]	-0.1866* [N=134]	-0.1995* [N=136]	0.1979* [N=143]	-0.1243 [N=141]	1.0000 [N=150]	
Institutional quality, 2007	0.2561* [N=127]	0.6699* [N=147]	0.0525 [N=145]	0.1200 [N=134]	0.0332 [N=134]	0.3031* [N=135]	0.2479* [N=143]	0.4191* [N=140]	-0.1500 [N=149]	1.0000 [N=149]

Notes: Pearson correlation coefficients calculated with pairwise deletion of missing data. Number of countries with data available for each pair of variables in brackets. \* denotes significance at 5%.

**Table A4: Robustness: Change in control variables**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GDP per capita (log), 2007	-1.6705*** [0.3998]		-1.9466*** [0.4124]	-1.4389*** [0.4605]	-1.9589*** [0.4205]	-1.9214*** [0.4007]	-1.6001*** [0.5059]	-1.8912*** [0.4394]	-2.4503*** [0.5674]	-1.5754*** [0.4110]
Av. GDP pc growth, 2004-2007	-0.6281*** [0.1913]		-0.4886** [0.2369]	-0.6935*** [0.2001]	-0.6881*** [0.1772]	-0.6136*** [0.1667]	-0.6146*** [0.2026]	-0.6257*** [0.2117]	-0.7491*** [0.2346]	-0.6457*** [0.1849]
Av. GDP pc trend growth	-0.3672** [0.1704]		-0.6310 [0.4274]	-0.3037* [0.1774]	-0.2957 [0.1824]	-0.3659** [0.1661]	-0.4696 [0.3591]	-0.2820 [0.1841]	-1.0198*** [0.3294]	-0.3690** [0.1749]
Dom. credit growth, 2000-2007	-0.0259** [0.0101]	-0.0319*** [0.0101]	-0.0244** [0.0118]	-0.0281*** [0.0103]	-0.0223** [0.0093]	-0.0221** [0.0096]	-0.0266** [0.0110]	-0.0256** [0.0103]	-0.0263** [0.0124]	-0.0260** [0.0101]
Trade openness, 2007	-0.0078 [0.0107]	-0.0020 [0.0115]	-0.0139 [0.0117]	0.0022 [0.0149]	-0.0328** [0.0135]	-0.0188 [0.0116]	-0.0205 [0.0125]	-0.0190* [0.0103]	-0.0184* [0.0108]	-0.0052 [0.0112]
Financial openness, 2007	-0.0108*** [0.0006]	-0.0106*** [0.0008]	-0.0107*** [0.0008]				-0.0054 [0.0085]		-0.0098*** [0.0007]	-0.0110*** [0.0008]
M2 (% of GDP), 2007	0.0500*** [0.0107]	0.0443*** [0.0115]	0.0473*** [0.0160]	0.0523*** [0.0123]	0.0361*** [0.0124]	0.0539*** [0.0117]	0.0473*** [0.0153]	0.0449*** [0.0113]	0.0617*** [0.0133]	0.0449*** [0.0113]
CAB (% of GDP), 2007	0.0129 [0.0435]	-0.0106 [0.0454]	0.0036 [0.0572]	0.0026 [0.0450]	0.1086* [0.0624]	0.0664 [0.0475]	0.0438 [0.0619]	-0.0101 [0.0509]	0.0126 [0.0466]	0.0308 [0.0523]
Institutional quality, 2007	-0.4233 [0.8159]	-0.9652 [0.9674]		-0.3821 [0.8712]	0.0943 [0.7937]	-0.5461 [0.8184]	-0.2110 [0.9408]	-0.4461 [0.8515]	1.5598 [1.2098]	-0.3799 [0.8804]
Polity index, 2007	-4.8527*** [1.2122]	-5.0688*** [1.2636]	-5.4322*** [1.6662]	-4.2680*** [1.3537]	-5.0124*** [1.5709]	-5.1336*** [1.2988]	-6.2805*** [1.4917]	-3.6316*** [1.6316]	-4.4797** [1.7955]	-5.1188*** [1.2071]
GDP per capita (log), 2005		-1.2521*** [0.4215]								
Av. GDP pc growth, 2002-2005		-0.7440*** [0.2313]								
Av. GDP pc trend growth (alt)		-0.2258 [0.2275]								
Institutional quality (ICRG), 2007			0.7696 [0.9043]							
Financial openness (log), 2007				-3.9767* [2.0026]						
NFA (% of GDP), 2007					-0.0276** [0.0130]					
FDI openness, 2007						0.0260** [0.0117]				
Port. equity openness, 2007						0.0060 [0.0151]				
Debt openness, 2007						-0.0135*** [0.0012]				
Reserves (% of GDP), 2007						-0.0488* [0.0270]				
Reserves (months of import), 2007							-0.2064** [0.0836]			
BIS int bank claims (% of GDP), 2007								-0.0228 [0.0285]		
Stock market cap. (% of GDP), 2007									-0.0110* [0.0059]	
Gen. gov. balance (% of GDP), 2007										-0.0647 [0.0581]
Observations	102	102	84	102	102	102	85	102	62	101
R <sup>2</sup>	0.7157	0.6746	0.7045	0.6638	0.6400	0.7411	0.6923	0.6297	0.8094	0.7179
Adjusted R <sup>2</sup>	0.6844	0.6389	0.6640	0.6269	0.6005	0.7029	0.6459	0.5890	0.7674	0.6830
p-value (F-test)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is the 2009-2007 percentage point change in real GDP per capita growth. Column 1 reproduces baseline model (cfr. Table 1, column 5). All models are estimated using OLS and include a constant term (coefficient not reported). For definitions of the control variables used, see Table A2. Financial openness variable in column 7 does not include foreign reserve assets. Heteroskedasticity-robust (Huber-White) standard errors in brackets. Significance levels: \*\*\*1% \*\*5% \*10%.

**Table A5: Robustness: Other estimators**

	(1)	(2)	(3)	(4)	(5)	(6)
Estimator	Baseline	Robust regression algorithm	IV	IV	IV	IV
Excluded instruments	N/A	N/A	% Eur. language	% Eur. language; mean temperature	Average Polity index 2000-6	Average Polity index 2000-6; % Eur. language
GDP per capita (log), 2007	-1.6705*** [0.3998]	-1.8819*** [0.3812]	-1.6328*** [0.4218]	-1.3266*** [0.4798]	-1.7096*** [0.3852]	-1.7075*** [0.3849]
Av. GDP pc growth, 2004-2007	-0.6281*** [0.1913]	-0.6058*** [0.1271]	-0.6980*** [0.2088]	-0.9271*** [0.1442]	-0.5965*** [0.1789]	-0.5980*** [0.1792]
Av. GDP pc trend growth	-0.3672** [0.1704]	-0.1389 [0.1550]	-0.2474 [0.1903]	0.4813* [0.2534]	-0.4228** [0.1643]	-0.4203** [0.1641]
Dom. credit growth, 2000-2007	-0.0259** [0.0101]	-0.0197*** [0.0059]	-0.0238** [0.0108]	-0.0132* [0.0077]	-0.0261*** [0.0095]	-0.0261*** [0.0095]
Trade openness, 2007	-0.0078 [0.0107]	-0.0174* [0.0098]	-0.0002 [0.0115]	-0.0235** [0.0111]	-0.0071 [0.0100]	-0.0069 [0.0100]
Financial openness, 2007	-0.0108*** [0.0006]	-0.0104*** [0.0016]	-0.0100*** [0.0009]	0.0026 [0.0050]	-0.0110*** [0.0006]	-0.0110*** [0.0006]
M2 (% of GDP), 2007	0.0500*** [0.0107]	0.0449*** [0.0112]	0.0517*** [0.0115]	0.0191* [0.0106]	0.0443*** [0.0158]	0.0445*** [0.0158]
CAB (% of GDP), 2007	0.0129 [0.0435]	0.0111 [0.0338]	0.0693 [0.0630]	-0.0385 [0.0458]	0.0029 [0.0412]	0.0040 [0.0412]
Institutional quality, 2007	-0.4233 [0.8159]	0.3780 [0.7383]	-1.3614 [1.0013]	-0.4101 [0.8986]	-0.1807 [0.8541]	-0.2051 [0.8523]
Polity index, 2007	-4.8527*** [1.2122]	-3.7088*** [1.1716]	0.6449 [3.6856]	-3.2286* [1.7752]	-5.7000*** [1.2643]	-5.5846*** [1.2554]
Observations	102	102	102	76	100	100
R <sup>2</sup>	0.7157	0.5143	0.6699	0.6437	0.7174	0.7177
Adjusted R <sup>2</sup>	0.6844	0.4609	0.6336	0.5889	0.6856	0.6859
p-value (F-test)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hansen J statistic	N/A	N/A	N/A	0.523	N/A	3.417
<i>First-stage statistics</i>						
F-test of excluded instruments	N/A	N/A	24.58	12.45	509.73	353.57
Partial R <sup>2</sup>	N/A	N/A	0.1224	0.2251	0.8278	0.8293

Notes: Dependent variable is the 2009-2007 percentage point change in real GDP per capita growth. Baseline model is estimated using OLS (cfr. Table 1, column 5). Model in column 2 is estimated using Stata's robust regression algorithm (*rreg* command). Models in columns 3-6 are estimated with instrumental variable estimator (IV-2SLS). All models include a constant term (coefficient not reported). For definitions of instruments used, see Table A2. Heteroskedasticity-robust (Huber-White) standard errors in brackets (normal standard errors in column 2). Significance levels: \*\*\*1% \*\*5% \*10%.

**Table A6: Robustness: Country subsamples**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sample	Baseline	Excl. oil exporters	Excl. Baltic states	Excl. financial centres	Excl. pop. < 1 million	Excl. UN least developed	Excl. high-income	Excl. high- and upper-middle income	Only low-income
GDP per capita (log), 2007	-1.6705*** [0.3998]	-1.5379*** [0.5678]	-1.5091*** [0.3847]	-1.7482*** [0.4012]	-1.7000*** [0.4469]	-1.9540*** [0.6140]	-1.6831*** [0.4444]	-1.5043** [0.6962]	-1.0700 [1.6338]
Av. GDP pc growth, 2004-2007	-0.6281*** [0.1913]	-0.8412*** [0.1800]	-0.6068*** [0.1828]	-0.6178*** [0.2002]	-0.6050*** [0.2004]	-0.4047 [0.2907]	-0.6737*** [0.1986]	-0.6055*** [0.2122]	-0.7605*** [0.2586]
Av. GDP pc trend growth	-0.3672** [0.1704]	-0.3680 [0.3215]	-0.2966 [0.1823]	-0.3705** [0.1727]	-0.3990** [0.1720]	-0.8486* [0.4390]	-0.2999 [0.3616]	-0.3779 [0.4539]	0.3478 [0.3963]
Dom. credit growth, 2000-2007	-0.0259** [0.0101]	-0.0215* [0.0126]	-0.0231** [0.0099]	-0.0248** [0.0103]	-0.0255** [0.0103]	-0.0227* [0.0127]	-0.0243** [0.0109]	-0.0239 [0.0144]	-0.0338** [0.0136]
Trade openness, 2007	-0.0078 [0.0107]	-0.0220* [0.0132]	-0.0070 [0.0105]	-0.0124 [0.0120]	-0.0080 [0.0130]	-0.0069 [0.0138]	-0.0130 [0.0124]	-0.0220 [0.0195]	-0.0387 [0.0332]
Financial openness, 2007	-0.0108*** [0.0006]	-0.0041 [0.0086]	-0.0107*** [0.0007]	-0.0072 [0.0079]	-0.0090 [0.0076]	-0.0110*** [0.0009]	-0.0101 [0.0090]	0.0047 [0.0147]	0.0066 [0.0251]
M2 (% of GDP), 2007	0.0500*** [0.0107]	0.0472*** [0.0153]	0.0447*** [0.0111]	0.0459*** [0.0130]	0.0483*** [0.0129]	0.0541*** [0.0153]	0.0498*** [0.0161]	0.0400* [0.0230]	0.0292 [0.0369]
CAB (% of GDP), 2007	0.0129 [0.0435]	0.0562 [0.0472]	-0.0156 [0.0429]	0.0140 [0.0435]	0.0100 [0.0469]	0.0053 [0.0550]	0.0283 [0.0483]	0.0742 [0.0513]	0.2316*** [0.0722]
Institutional quality, 2007	-0.4233 [0.8159]	0.3913 [1.1269]	0.0259 [0.8153]	-0.5096 [0.8276]	-0.4744 [0.8853]	-0.0336 [1.1488]	-0.3645 [0.9032]	-0.8357 [1.2360]	1.7236 [2.3044]
Polity index, 2007	-4.8527*** [1.2122]	-5.6182*** [1.6740]	-4.5812*** [1.1806]	-5.0814*** [1.2397]	-4.7975*** [1.2569]	-5.3026*** [1.5445]	-5.2116*** [1.5397]	-5.4810*** [1.7514]	-5.1521* [2.8950]
Observations	102	82	99	99	96	76	93	68	29
R <sup>2</sup>	0.7157	0.6960	0.6702	0.6758	0.6717	0.7033	0.6601	0.6114	0.6620
Adjusted R <sup>2</sup>	0.6844	0.6532	0.6327	0.6390	0.6330	0.6576	0.6186	0.5432	0.4742
p-value (F-test)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015

Notes: Dependent variable is the 2009-2007 percentage point change in real GDP per capita growth. Column 1 reproduces baseline model (cf. Table 1, column 5). All models are estimated using OLS and include a constant term (coefficient not reported). For different country classifications, see Table A1. Heteroskedasticity-robust (Huber-White) standard errors in brackets. Significance levels: \*\*\*1% \*\*5% \*10%.

**Table A7: Robustness: Other crisis growth measures**

Dependent variable	(1)	(2)	(3)	(4)
	Baseline	2009-2008 $\Delta$ in real GDP pc growth	GDP pc growth in 2009	GDP pc growth in 2008
GDP per capita (log), 2007	-1.6705*** [0.3998]	-1.4084*** [0.4137]	-1.8781*** [0.3928]	-0.4697 [0.2877]
Av. GDP pc growth, 2004-2007	-0.6281*** [0.1913]	-0.2469 [0.1892]	0.1108 [0.1758]	0.3577*** [0.1075]
Av. GDP pc trend growth	-0.3672** [0.1704]	-0.0658 [0.1813]	0.0259 [0.2330]	0.0916 [0.1308]
Dom. credit growth, 2000-2007	-0.0259** [0.0101]	-0.0193** [0.0079]	-0.0186* [0.0094]	0.0007 [0.0053]
Trade openness, 2007	-0.0078 [0.0107]	-0.0092 [0.0102]	-0.0117 [0.0107]	-0.0025 [0.0078]
Financial openness, 2007	-0.0108*** [0.0006]	-0.0104*** [0.0009]	-0.0105*** [0.0007]	-0.0001 [0.0007]
M2 (% of GDP), 2007	0.0500*** [0.0107]	0.0418*** [0.0095]	0.0593*** [0.0124]	0.0176** [0.0084]
CAB (% of GDP), 2007	0.0129 [0.0435]	0.0183 [0.0381]	0.0568 [0.0417]	0.0385 [0.0301]
Institutional quality, 2007	-0.4233 [0.8159]	-0.2721 [0.8744]	-0.3524 [0.8787]	-0.0803 [0.6849]
Polity index, 2007	-4.8527*** [1.2122]	-4.1222*** [1.2892]	-4.2897*** [1.1235]	-0.1675 [1.0813]
Observations	102	102	102	102
R <sup>2</sup>	0.7157	0.5801	0.5754	0.2621
Adjusted R <sup>2</sup>	0.6844	0.5340	0.5287	0.1810
p-value (F-test)	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable in the baseline model is the 2009-2007 percentage point change in real GDP per capita growth (column 1; cfr. Table 1, column 5). Other dependent variables as stated. All models are estimated using OLS and include a constant term (coefficient not reported). Heteroskedasticity-robust (Huber-White) standard errors in brackets. Significance levels: \*\*\*1% \*\*5% \*10%.

**Table A8: Robustness: Other democracy measures**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita (log), 2007	-1.6705*** [0.3998]	-1.5835*** [0.4099]	-1.7927*** [0.4045]	-1.6499*** [0.4230]	-1.8139*** [0.3794]	-1.7437*** [0.3805]	-1.4201*** [0.4731]	-1.8219*** [0.3817]
Av. GDP pc growth, 2004-2007	-0.6281*** [0.1913]	-0.6167*** [0.1988]	-0.6488*** [0.1882]	-0.6375*** [0.1984]	-0.7371*** [0.1935]	-0.7122*** [0.1810]	-0.6432*** [0.2131]	-0.7280*** [0.1917]
Av. GDP pc trend growth	-0.3672** [0.1704]	-0.3793** [0.1714]	-0.3316* [0.1707]	-0.3502** [0.1733]	-0.2788* [0.1646]	-0.2668 [0.1628]	-0.4219** [0.1937]	-0.2758* [0.1661]
Dom. credit growth, 2000-2007	-0.0259** [0.0101]	-0.0258** [0.0101]	-0.0257** [0.0101]	-0.0242** [0.0102]	-0.0226** [0.0097]	-0.0217** [0.0094]	-0.0246** [0.0102]	-0.0230** [0.0097]
Trade openness, 2007	-0.0078 [0.0107]	-0.0074 [0.0113]	-0.0074 [0.0106]	-0.0068 [0.0115]	-0.0054 [0.0102]	-0.0074 [0.0101]	-0.0013 [0.0109]	-0.0049 [0.0102]
Financial openness, 2007	-0.0108*** [0.0006]	-0.0108*** [0.0007]	-0.0107*** [0.0006]	-0.0107*** [0.0007]	-0.0104*** [0.0007]	-0.0105*** [0.0007]	-0.0108*** [0.0007]	-0.0104*** [0.0007]
M2 (% of GDP), 2007	0.0500*** [0.0107]	0.0512*** [0.0109]	0.0487*** [0.0103]	0.0549*** [0.0108]	0.0472*** [0.0112]	0.0441*** [0.0110]	0.0437*** [0.0112]	0.0470*** [0.0113]
CAB (% of GDP), 2007	0.0129 [0.0435]	0.0170 [0.0445]	0.0160 [0.0429]	0.0268 [0.0436]	0.0499 [0.0338]	0.0511 [0.0316]	0.0352 [0.0343]	0.0538 [0.0330]
Institutional quality, 2007	-0.4233 [0.8159]	-0.2950 [0.8591]	-0.6905 [0.8632]	-0.4338 [0.8779]	0.0990 [0.8869]	-0.5139 [0.7739]	-1.3187 [0.9130]	-0.0606 [0.9104]
Polity index, 2007	-4.8527*** [1.2122]							
Inst. democracy index, 2007		-3.9038*** [1.1202]						
Inst. autocracy index, 2007			5.3432*** [1.2660]					
Executive constraints, 2007				-0.6671*** [0.2071]				
Voice and accountability, 2007					-1.3215** [0.5766]			
Democracy dummy (DD), 2007						-2.1051*** [0.7552]		
Checks and balances, 2007							-0.8990*** [0.2730]	
Freedom, 2007								-3.3701** [1.6928]
Observations	102	101	101	101	115	115	105	115
R <sup>2</sup>	0.7157	0.7052	0.7140	0.7015	0.6960	0.7036	0.7049	0.6958
Adjusted R <sup>2</sup>	0.6844	0.6724	0.6822	0.6683	0.6668	0.6751	0.6735	0.6665
p-value (F-test)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Dependent variable is the 2009-2007 percentage point change in real GDP per capita growth. All models are estimated using OLS and include a constant term (coefficient not reported). Column 1 reproduces baseline model (cf. Table 1, column 5). For definitions of the variables used, see Table A2. India is excluded from the model in column 7 (extreme outlier). Heteroskedasticity-robust (Huber-White) standard errors in brackets. Significance levels: \*\*\*1% \*\*5% \*10%.

