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Crises, Economic Integration and Growth Collapses in African Countries

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Abstract

The objective of this paper is to explore the effects of crises and openness on a large sample of African countries. Focusing on sudden stops, currency, twin and sovereign debt crises, the paper shows that crises are associated with growth collapses in Africa. In contrast, openness is found to be beneficial to growth. More specifically, consistent with standard Mundell-Flemming type models, greater openness to trade and financial flows is found to mitigate the adverse effects of crises. These findings are robust to various measures of both openness and crises as well as to endogeneity concerns.

1 Introduction

It is largely accepted that trade and financial openness can increase the propagation of business cycle fluctuations among countries, making them more vulnerable to contagion. However, notwithstanding the potential risks associated with globalisation, an increasing number of African countries have embarked on policies of trade and financial liberalisation under the auspices of IMF and World Bank sponsored stabilisation programmes (Zagha and Nankani, 2005). As a result, Africa is more integrated into the global economic system today than it was few decades ago. Yet, like developing countries in other regions, African economies have also encountered their share of economic and financial crises (Laeven and Valencia, 2008).[1] As recent global events illustrate, crises can have devastating effects on economic activity and can hit countries with weak, and even sometimes those with strong, macroeconomic fundamentals. Thus, economists and policy-makers are increasingly concerned with understanding the genesis,

[1] In fact, during 1970 to 2007, the African region has, in absolute numbers, encountered more systemic banking and currency crises than any other region (Laeven and Valencia, 2008).

evolution and consequences of economic crises.

The objective of this study is to explore how crises and openness to both trade and financial flows affect economic growth in Africa. More specifically, we examine whether greater openness to trade and financial flows exacerbates or lessens the adverse effects of financial crises. To our knowledge, ours is the first paper to explore the effects of both crises and openness on growth performance in the context of African countries, while the existing literature has focused mainly on emerging markets or has used cross-country data covering a smaller number of African countries (e.g. Aguiar, 2005; Joyce and Nabar, 2009). As far as we are aware, no paper has examined the interactive effect of crises and openness on economic growth. We also distinguish between four different types of crises, namely, sudden stops, currency, twin and sovereign debt crises.

A 'sudden stop' in capital inflows is a type of crisis in which access to foreign capital is abruptly and severely curtailed, precipitating large swings in the capital account of the balance of payments. It is closely associated with current account reversals (from large deficits to smaller deficits/ surpluses), reserve depletion, growth collapses as well as currency and sovereign debt crises (Calvo, 1998)[2]. A currency crisis, on the other hand, occurs when investors substitute away from a particular country's assets in anticipation of a potential depreciation of the currency, while a sovereign debt crisis involves a default or restructuring of debt obligations. Twin crises, first coined by Kaminsky and Reinhart (1999), arise when currency crises are followed by banking crises. As shown by, for instance, Bordo et al. (2001), twins tend to have much more

[2] Sudden stops and the accompanying liquidity constraints imply that the current account must be abruptly adjusted (i.e. the deficit should be reduced or reversed). This can be avoided by drawing down or depleting the reserve holdings of the central bank, provided there are enough reserves and the central bank is willing to do so (however, reserve depletion may initiate currency crises) or, alternatively, by seeking emergency funding from international financial institutions. In any case, a current account reversal can be very painful, as labour and goods markets tend to be inflexible in the short-run.

harmful effects on the economy relative to either currency or banking crises on their own. The different types of crises may hit simultaneously, as they may be triggered off by common underlying factors, and one crisis may also help precipitate another.

The results of this study show that financial crises are associated with growth collapses in Africa. In contrast, economic openness is found to be beneficial to growth. More specifically, we find that, consistent with standard Mundell-Flemming type models, greater openness to trade and financial flows tends to mitigate the adverse effects of crises.

The paper is organised as follows. Section 2 contains a brief overview of the openness-crisis relationship. Section 3 presents the data and methods used. Section 4 reports and discusses the results, while the main findings are placed in a broader context in Section 5. Section 6 offers concluding remarks.

2 The openness-crisis interaction

One can identify two opposing hypotheses as to whether economic and financial integration mitigate or exacerbate the adverse effects of financial crises. On the one hand, some have argued that openness can be an important crisis amplifier, in that it can expose countries to external shocks, while others suggest that it can act as a crisis buffer insofar as it can help accommodate external shocks.

Openness as a crisis amplifier

As summarised by Cavallo and Frankel (2008), a number of arguments have been put forward in support of the view that openness to trade can trigger or exacerbate crises. In particular, countries that are more integrated into the global economy are more likely to be subject to external shocks

emanating from, for example, trading partners. As a result, these economies are more prone to export collapses and/or diminishing trade credits which in turn can trigger sudden stops and other types of crises. Empirical findings by Milesi-Ferretti and Razin (2000) and Easterly et al. (2001) suggest that openness to trade is closely linked to output volatility and a higher likelihood of external crises.

With respect to capital account openness, economists such as Stiglitz argue that it can aggravate pre-existing market distortions caused by informational asymmetries, credit market imperfections, poor institutions and moral hazards, increasing the likelihood of crises (Stiglitz, 2000). While the overwhelming majority of economists, including Stiglitz, remain in favour of long-term private capital inflows (e.g. foreign direct investment), many point to the destabilising effects of volatile and pro-cyclical surges in inflows. Hence, it has been argued that capital account openness may lead to increased inflows of short term capital and a higher risk of abrupt reversals (Agenor, 2004). Others assert that capital movements, as a result of financial openness, may increase macroeconomic instability (e.g. upward pressures on the exchange rates, asset price bubbles, credit booms, higher inflation, consumption growth volatility) and lead to the presence of more short-term, high risk speculative capital in the economy (Arestis, 2005).

Openness as a crisis buffer

The idea that openness to trade can lower the probability of crises or, alternatively, lessen the adverse effects of external crises is not new in economics. For instance, a number of studies have postulated that there is an inverse relationship between trade openness and default probabilities (Schimmelpfennig et al. 2003; Borensztein and Panizza, 2009). More precisely, countries with higher trade activities are less likely to default on their international obligations since their

trading partners could impose harsh sanctions on them in the event of a default (Rose, 2005).

An alternative argument suggests that trade openness lessens the adjustment costs associated with external crises. In particular, it has been suggested that open economies are more likely to 'export their way out of a crisis'. This was first noted by Sachs (1985) who observed that in the early 1980s Latin American countries were subject to numerous debt crises, in spite of having similar levels of debt to GDP ratios to those of Asian countries, precisely because of their lower trade openness and hence their inability to generate foreign exchange to service their debt. Focusing on Latin American and Asian countries, Guidotti et al. (2004) have also shown that countries with open trade regimes tend to have better growth performance and quicker recoveries in the face of sudden stop crises than those with closed economies.

How trade openness reduces the adjustment costs of external shocks has been elaborated by, among others, Edwards (2004), Cavallo and Frankel (2008), Calvo et al. (2003) and Ripoll-i-Alcon (2010). Suppose that an economy has to abruptly adjust to a shock of a given percentage of GDP (e.g. a sudden stop episode). In the first instance, assume that expenditure-switching policies are not possible (i.e. the exchange rate is fixed). In this case, the country must implement spending cuts to satisfy its intertemporal resource constraint and thus run a current account surplus. In the standard Keynesian and Mundell-Flemming type of models, the severity of the adjustment is negatively related to the marginal propensity to import, with a higher propensity implying lower adjustment costs. Thus, more open economies would, *ceteris paribus*, suffer a less severe contraction.[3]

Similar conclusions can be reached if one uses traditional tradable/nontradable models. To illustrate this, assume that it is now possible for the country to implement

[3] Output losses would be inevitable if wages and prices are rigid. This is more likely to be the case in the short-run.

expenditure-switching policies. In this case, to improve the trade balance, the relative price of non-tradables must fall. Hence, the needed adjustment can, at least in part, be achieved through a nominal and real depreciation of the exchange rate. This would in turn, following sticky-price open economy models and conventional Mundell-Fleming type models, improve the recovery of the economy through increased competitiveness.[4] It is noted that, as emphasised by Cavallo and Frankel (2008), the required devaluation may not be large for countries with higher trade to GDP ratios and, in turn, the balance sheet effects need not be large. However, openness tends to require more nominal devaluation for the same real devaluation because of the greater weight of imports in consumption. Consequently, the prediction is that, *ceteris paribus*, more open countries can mitigate the adverse effects of external shocks better than closed economies, which are more likely to end up in a recession due to the need to implement more severe adjustments. Recent experiences from emerging markets, however, show that the effect of depreciation on output can in fact be contractionary particularly when there is a currency mismatch brought about by the so-called "original sin".[5] As shown by a number of theoretical (see for example, Aghion et al. 2001) and empirical contributions (see for example, Aguiar, 2005 on Mexico), the balance sheet effects of a depreciation can cause output contraction as a result of dwindling firm net worth.

As for financial integration, Edwards (2004) and references cited therein postulate that financial openness, as trade integration, tends to reduce the adjustment costs of external shocks and thus enables the economy to recover more quickly.[6]

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[4] For a survey, see Lane (2001). The beneficial effects of the depreciation would depend on a number of factors, including whether the Marshall-Lerner condition holds.

[5] This refers to the situation where developing countries cannot get loans denominated in their own currencies from international financial markets. Thus, a depreciation/ devaluation of their currencies would make the value of their liabilities rise. These balance sheet effects would reduce the net worth of firms.

[6] A careful examination of the existing literature, however, indicates that, under fairly standard assumptions,

As our discussion regarding the two competing hypotheses indicates, the openness-crisis interaction can only be settled empirically. In this study, we examine whether African countries that are more open to trade and financial flows suffer smaller reductions in output *following* external shocks relative to more closed ones. In other words, are open African economies more likely to accommodate external shocks?

3 Data and methodology

3.1 Data

Following Cavallo and Cavallo (2010) among others, we want to explore the medium to long-term effects of crises on output growth. To this end, we construct a panel dataset on a maximum of 41 African countries and 8 non-overlapping 5-year period averages from 1970-74 through 2005-09. In line with the existing literature, the data are averaged to reduce business cycle effects. Table A1 in the Appendix provides full definitions and sources of all the variables. The model we estimate takes the following form:

$$g_{it} = \beta_0 + \beta_1 y_{it-1} + \delta_1 CR_{it} + \delta_2 EO_{it} + \beta_2 X_{it} + \eta_i + \zeta_t + \varepsilon_{it}, \quad (1)$$

where for $i = 1,...N$ and $t = 1,...T$, y_{it} denotes the real GDP per capita for country i at time t, g_{it} is the growth rate (% p.a.) defined as $100 \cdot (y_{it} - y_{it-1})/y_{it-1}$, CR_{it} and EO_{it} denote our measures of crises and economic integration, respectively, η_i is a time invariant country-specific fixed effect, ζ_t is a time specific effect and ε_{it} is the error term. We are interested in testing whether the marginal effects of crisis and openness on growth, δ_1 and δ_2, are statistically significant.

The X_{it} is a set of standard control variables, largely drawn from the existing literature,

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financial openness may in fact result in greater instability (see for example Kim et al. 2012 for a review).

which include inflation. In line with the seminal contribution by Beck et al. (2000), we account for the role of financial development in economic growth. We use the ratio of liquid liabilities to GDP as an indicator of financial development. We include population growth to control for the demographic trends of African countries. As suggested by Barro (1996), high population growth can have a negative effect on growth through its impacts on the dependency ratio and quality of human capital. Finally, we control for the level of indebtedness since it may play an important role in the relationship between crises and growth. In particular, we wish to test whether crises are significantly harmful to growth even after controlling for one of the most important correlates of crises, namely 'debt overhang'.

We then extend our analysis by allowing the growth effect of crises to vary with the level of economic integration. We do this by interacting the crisis measures with indicators of openness, as follows:

$$g_{it} = \beta_0 + \beta_1 y_{it-1} + \delta_1 CR_{it} + \delta_2 EO_{it} + \gamma_1 (CR_{it} \cdot EO_{it}) + \beta_2 X_{it} + \eta_i + \zeta_t + \varepsilon_{it} \quad (2)$$

A good way to understand how growth reacts to external shocks in countries with varying levels of openness is to examine the marginal effect from equation (2):

$$\frac{\partial (g_{it})}{\partial CR_{it}} = \delta_1 + \gamma_1 EO_{it} \quad (3)$$

Thus, we interpret the signs of the coefficients of CR_{it} and the interaction term as follows: if $\delta_1 < 0$ and $\gamma_1 > 0$, this would confirm the hypothesis that openness acts as a crisis buffer, which would suggest that the adverse effects of crises are decreasing with the level of economic integration. On the other hand, if $\delta_1 < 0$ and $\gamma_1 < 0$, this would confirm the hypothesis that economic integration can amplify the negative effects of crises on output growth.

Crisis indicators

To identify episodes of sudden stop crises, we closely follow the work of Guidotti et al. (2004) and Calvo et al. (2004) to define a sudden stop as a fall in the financial account that is at least one standard deviation below the sample mean and more than 5 percent of the country's GDP. However, we impose an additional requirement in that we require the episode to be *disruptive*. One way to do this is to follow the procedure by Hutchison and Noy (2006). They focus on episodes that coincide with other types of crises. Our approach is broader and requires the episode to coincide with, or be followed by, other forms of financial crises, namely, currency and debt crises. In this way, our measure of a sudden stop reflects not only changes in the mood of global capital markets, but also how harmful the episode might be. Hence, we use a dummy variable that takes the value of 1 if there is a sudden stop in a country during a particular year and 0 otherwise.[7]

We also make use of similar dummy variables capturing the incidence of currency and sovereign debt crises. Our currency crisis measure is based on that of Reinhart and Rogoff (2009), who define it as an annual depreciation (local currency vs US dollar) of 15 percent or more. Our sovereign debt crisis measure comes from the same source and is defined as a failure to meet a principal or interest payment on the due date (or specified grace period) including rescheduling of debt agreements irrespective of the nature of any new terms.[8]

Following Kaminsky and Reinhart (1999) and Bordo et al. (2001), we also consider the

[7] Our crisis dummies are defined for each year first and then averaged over five years. That is, they appear as the ratios of crisis years to total years (5 years) to capture the duration aspect of crises. Our results are robust to the use of binary indicators.

[8] A shortcoming of this crisis-measure in the context of many low-income countries is that it does not capture the dynamic nature of external crises. For example, prior to the HIPC initiative, interest arrears were applied to official borrowing which was eventually rescheduled. Moreover, some of the countries that were included in the HIPC process were deemed to have implemented reform measures during the period in which they were accumulating debt arrears. We owe this point to one of the referees.

effects of the joint ('twin') occurrence of banking and currency crises on output growth in Africa[9]. The data on banking crises come from the dataset by Laeven and Valencia (2008). Finally, to capture the severity and intensity of financial crises, we construct a composite crisis index, which can take on a value between 0 and 4, depending on the number of types of crises encountered by a country in a particular year. For example, in 1992 Nigeria simultaneously experienced a sudden stop episode with currency, twin, and sovereign debt crises. Hence, we award Nigeria an index score of 4 for that particular year. We then weigh the index by the share of each country's GDP in world output. A similar procedure has been adopted by Reinhart and Reinhart (2010). The composite index is our preferred indicator as it captures whether simultaneously encountering different types of crises has an additional adverse effect on growth, above and beyond the adverse effect of each crisis individually.

Using the definitions and sources detailed above, we identify - out of 1880 observations - a total of 202 currency crises, 172 sovereign debt crises, 249 sudden stop episodes and 56 twin crises (banking and currency). Figure 1 shows the distribution of currency crises over time. It seems that the highest number of currency crises were recorded in 1994, when the CFA franc was devalued by 50%. The occurrence of sovereign debt crises peaked during the mid to late 1980s (Figure 2), while a significant number of countries experienced sudden stop episodes from the late 1970s onwards (Figure 3). Twin crises were the least frequent type of crisis during the sample period, occurring mostly in the 1990s (Figure 4). Over the sample period, the three countries that have encountered most currency crises are Zimbabwe (21 years out of 40 years), Ghana (20) and Angola (20) while Cape Verde and Liberia have not experienced any. With regards to sudden stops, the top three are Sierra Leone (23), Mali (21) and Swaziland (20), while

[9] We do not consider the effects of banking crises separately since the vast majority of the sample countries experienced a "near-permanent banking stress" throughout most of the study period (Kane and Rice, 2001).

Equatorial Guinea has not experienced any. Finally, the top three sovereign crisis-hit countries are the Central African Republic (28), Cote d'Ivoire (26) and Angola (20) while around a quarter of the countries have not experienced any sovereign debt crises.

(Figures 1 - 4 here)

Openness indicators

We utilise several measures of economic and financial openness. We use the economic dimension of the globalisation index created by Dreher (2006).[10] It is a weighted index of actual economic flows (trade, foreign direct investment, portfolio investment and income payments to foreign nationals each measured as a percentage of GDP) and their restrictions (hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions). This is our preferred indicator since it captures the degree to which economies are connected to the rest of the world. As sensitivity tests, we also employ the actual economic flows sub-index from the same dataset and the share of trade (sum of exports and imports) in GDP, each capturing different aspects of cross border transactions. To measure financial openness, we use the *de jure* index of capital account openness proposed by Chinn and Ito (2008). This measure is the first principal component of four binary dummy variables related to restrictions on cross-border financial transactions.

3.2 Methodology

As a benchmark case, we carry out panel estimations without the interaction of crisis and openness based on (i) a pooled OLS model without controlling for country and time fixed effects

[10] This is commonly known as the KOF index as it is hosted by the KOF (Konjunkturforschungsstelle) Swiss Economic Institute.

as well as (ii) a fixed effects model where unobservable country fixed effects and time fixed effects are included. However, a particular issue of concern in estimating our model (equation 1 or 2) is endogeneity bias which may arise from omitted variables, simultaneity or reverse causality in the relationship between crisis or economic integration and economic growth. To overcome this, we use the generalised method of moments (GMM) estimators proposed by Holtz-Eakin et al. (1988) and Arellano and Bond (1991) and further developed by Arellano and Bover (1995) and Blundell and Bond (1998). In particular, we use the system GMM (SGMM) dynamic panel estimator, which has been shown to have superior finite sample properties.[11]

4 Results

4.1 Exploring the data

Before econometric results are presented, this subsection explores the data to give an overview of growth performance during crisis episodes. We first conduct a basic event analysis where we examine whether a crisis event is accompanied by an output loss or growth collapse (e.g. Eichengreen et al. 1995; Frankel and Rose, 1996). The existing literature defines an output loss or growth collapse as the deviation of actual output or its growth from its potential trend (Bordo et al. 2001; Boyd et al. 2005; Gupta et al., 2007). As is standard in the literature, we estimate the output trend based on a 5-year pre-crisis period ending 3 years prior to each crisis event using Hodrick-Prescott smoothed output series. However, in many cases, we end up with negative growth trends (Abiad et al. 2009; Angkinand, 2008).[12] To solve this, Abiad et al. extend the pre-crisis period back until a positive trend is achieved (10 to 20 years back) while Angkinand sets all the negative 3-year pre-crisis growth rates to zero.

[11] See Baltagi (2013) for technical details.
[12] Negative trends would suggest that output falls indefinitely even in the absence of a shock (see Abiad et al. 2009).

In this study, we opt for an alternative strategy which imposes as few restrictive assumptions as possible. In particular, we ask a question: How does output growth behave *before, during,* and *after* the crisis period? A simple way to do this is to compare the actual growth rates in period T (onset of a crisis) to T_{-1},..,T_{-5} (pre-crisis window) and T_{+1},..,T_{+5} (post crisis period). Figure 5 shows that debt crises tend to be associated with greater output collapses in Africa. This is in line with Andersson and Karpestam (2014) who found that debt crises have been more harmful to output growth in Africa than any other types of crisis. Figure 5 suggests that sudden stop episodes tend to be preceded by a boom and output tends to suffer a small contraction. Our finding that sudden stops occur on the back of boom times is consistent with the view that developing countries tend to experience capital inflow bonanzas during good times (or procyclicality) to be driven, for instance, by a strong surge in global commodity prices (Reinhart and Reinhart, 2008). Consistent with Reinhart and Rogoff (2009), the figure indicates that currency crises are, on average, associated with mild contractions. In addition, in the case of currency crises, post-crisis growth tends to be higher than the pre-crisis level. This may be the outcome of the pro-competitive effects of the exchange rates. Unlike in the other cases, growth tends to be poor in the run-up to twin crises, but the onset of crisis itself is not associated with a growth collapse. Despite diversity across different types of crisis in the relationship between crisis and growth performance, Figure 5 implies the overall negative relation between crisis and growth, which will be investigated in detail in Section 4.2.

(Figure 5 here)

However, it should be emphasised that pooling the growth performance around crisis episodes across the sample countries only captures the overall trend and does not represent the experiences of all countries. In an attempt to show how particular countries perform when they

encounter crises, we depict the experiences of selected economies in Figures A1-A4 in Appendix. As can be seen in these figures, financial crises can coincide with growth collapses (e.g. Guinea-Bissau in 2002). Alternatively, they can occur either during a period of sluggish growth (e.g. Niger in 1983) or on the back of a good performance (e.g. Ethiopia in 1998). However, crises can coincide with impressive growth rates (e.g. Mozambique in 1987). It should be thus noted that our econometric estimates for coefficients of key variables show only overall relationships of key variables and do not necessarily reflect the experience of individual countries. Table A1 in Appendix reports the summary statistics of all the variables used in the estimations.

4.2 Baseline regression results

As a starting point to generalise the results on the effects of crisis on growth, we explore the effects of crisis and openness on economic growth in Table 1 without taking account of interaction between crisis and openness. The results in the first five columns are based on the pooled OLS estimator. Across the five regressions, we augment our growth model with the five different indicators of crisis described above, along with our preferred measure of economic integration. The estimated coefficients of economic integration are all positive and statistically significant, suggesting that economic integration is associated with better growth performance. Consistent with the existing literature, a sudden stop crisis is harmful to output growth. Similarly, the rest of the financial crisis indicators are inversely related to growth, the coefficients of these variables being statistically significant at the 5% level. In the last five columns of Table 1, we re-estimate the same models using the fixed effects panel estimator to capture the within-country variation in output growth. The results remain largely the same.

Hence, these findings indicate that crises disrupt economic activity, while openness, perhaps by relaxing credit constraints and thus improving capital accumulation, is beneficial to economic growth performance.

(Table 1 here)

In general terms, all the control variables are consistent with our prior expectations. More specifically, initial income is mostly significant and negative, confirming the conditional convergence hypothesis. In line with the so-called 'debt overhang' hypothesis, we obtain negative and generally significant coefficients of external debt. There is no evidence to support the idea that inflation or population growth has a significant influence on growth, while financial depth is found to be significantly associated with growth in a few cases of pooled OLS.

However, a legitimate concern with these results is that some of the right hand side variables may be endogenously related to growth. A particular source of endogeneity which may plague our baseline model is reverse causality. For example, it is likely that the level of economic integration may change with the growth performance of the economy, so that countries may open up their current and capital accounts precisely because of improved domestic growth performance. To overcome these concerns, we re-estimate the baseline regressions in Table 1 using the two-step SGMM. The results are reported in Table 2.

(Table 2 here)

Even if endogeneity concerns are addressed, economic integration retains its positive and significant effect on growth. Across all specifications, the coefficients of this variable are significant at the 1% level, confirming that openness matters for growth in Africa. The results imply that an increase in trade and investment flows by one percentage point of GDP is, on average, associated with an increase in real per capita GDP growth rate of 0.28 to 0.36

percentage points, which appear to be substantial. On the other hand, the evidence that crises are detrimental to economic performance has been further confirmed in Table 2. The results suggest that currency crisis has a stronger depressing impact on output growth than the other types of crises, closely followed by twin crises, sudden stops and sovereign debt. Interestingly, the coefficient of our composite measure, which captures the intensity with which countries encounter multiple crises, is somewhat lower than the other crisis indicators but, nonetheless, negative and highly significant.

The three specification tests are all well-behaved. The Hansen test of over-identifying restrictions fails to reject the null that the instruments are valid. Similarly, the difference-in-Hansen test fails to reject the null that the orthogonality conditions derived from the levels equation are appropriate. Finally, the regressions pass the second order serial correlation test, confirming that there is no second-order serial correlation in the error term of the first-differenced equation. Hence, these tests support the validity and consistency of the SGMM estimator.

4.3 Varying the impact of crises across levels of openness

In order to investigate whether the level of economic integration influences the relationship between crises and growth, we interact the openness variable with our crisis indicators. The results are summarised in Table 3.

(Table 3 here)

Regression [1] shows that sudden stop episodes have a highly significant negative association with economic growth. On the other hand, openness has a significant beneficial effect on economic performance. The coefficient of the interaction term carries a significant

positive sign, suggesting that economic integration mitigates the adverse effects of a sudden stop crisis. So a highly open economy, such as South Africa with an average openness to GDP ratio of 0.60, would be able to avoid any output losses around sudden stops.[13] On the other hand, in a period of crisis, the output growth of the least open economy (i.e. Rwanda with an average openness to GDP ratio of 0.16) would drop by more than four percentage points.[14]

In regression [2], we consider currency crises, which are found to be inversely related to output growth. When we interact this variable with openness, we find a positive and significant coefficient estimate. This implies that openness tends to attenuate the negative relationship between currency crises and growth. Economic integration itself retains its positive and significant sign. Regression [3] examines how debt crises relate to growth. The coefficient of this type of crisis is negative and highly significant. This suggests that debt crises, similar to the other types of crises, is detrimental to growth. The coefficient of the interaction term is positive and significant, indicating that the more an African economy is integrated with the rest of the world, the weaker the negative association between debt crises and economic performance. The pattern is the same across the remaining specifications, the coefficients of our indicators of twin crisis and composite crisis measures both being negative and significant at the 1% level, with the interaction positive and significant.

To sum up, in line with both theoretical and empirical literature, our results show that financial crises are associated with output losses. Our findings also indicate that the crisis-growth relationship is conditional on the openness of the country to trade. More specifically, in open countries, the harmful impacts of crises are lessened. This is not the case in closed economies.

[13] The overall growth effect following a sudden stop for South Africa would be given by the following equation; $-5.826 + (0.113 * 0.60) * 100 = 0.954$ (%).

[14] Following the marginal effect equation, for Rwanda this is calculated as: $-5.826 + (0.113 * 0.16) * 100 = -4.018$ (%).

This suggests that open countries tend to experience a smoother adjustment following an external shock, perhaps driven by the performance of the tradable goods sector. It could also be the case that countries more integrated with the rest of the world have more room to manoeuvre by international partners (e.g. trade credits). These opportunities may not be available to more closed economies.

4.4 Alternative measures of openness

To ensure that our results are not sensitive to the choice of openness indicator, we use various other measures that capture the degree to which economies are integrated with the rest of the world. For the sake of brevity, Table 4 contains only the results for our variables of interest (i.e. measures of openness, crises and their interaction terms)[15]. As can be seen in Panel A of Table 4, our previous findings remain largely robust when we use 'cross border transactions' as a measure of openness. Our measures of crises retain their expected negative signs and are statistically significant. More importantly, the interaction effects remain positive and generally statistically significant.

(Table 4 here)

In panel B of Table 4, we apply trade openness as an indicator of economic integration and the results are broadly in line with our previous findings. The coefficients of trade openness and crises carry the expected signs and are significant in all specifications. Similarly, crisis has a negative and significant effect on economic growth. The coefficient of the interaction term is positive and generally significant. Overall, these findings tend to support the view that openness can mitigate the negative effects of crises.

We also consider other openness measures that exclusively focus on the capital account.

[15] The regressions include all the control variables.

Interestingly, when we use the Chinn and Ito measure of capital account openness (Panel C) we find that it is statistically insignificant. This is perhaps not too surprising since this indicator is a *'de jure*' measure, solely focusing on restrictions on the capital account. However, the coefficient estimates of financial crisis and its interaction term with capital account opnness are in line with our previous results, that is, the former is ngative and significant and the latter is positive (and significant in Columns [11] and [12]). In line with theoretical predictions, financial openness is found to reduce the negative impact of crises on econmic growth.[16] [17]

4.5 Further robustness checks

As a further robustness check, we have re-estimated the model either by (i) including a further control variable, (ii) estimating quantile regressions, (iii) repeating the main regressions for sub-samples, and (iv) including the lag of crisis, or multiple crisis dummy to test the stability of coefficient estimates of our key explanatory variables. In these cases, we use our preferred measures of openness and crisis, namely, economic integration (proxied by the economic dimension of the KOF index) and the composite crisis indicator as well as sudden stops. First, our main results are found to be mostly robust to inclusion of an additional control variable, such

[16]Given that the within-country variation in openness is likely to be smaller than the cross-country variation and it may reflect other factors, such as real exchange rate changes (Bleaney and Tian, 2014), we have re-estimated the same models by pooled OLS. The overall pattern of the results is similar, but we have found only for sudden stop and currency crisis that openness becomes statistically insignificant, while the interaction is positive and significant in Panels A and B and the interaction of capital account openness and crisis becomes statistically insignificant in Panel C (Appendix Table A2).

[17]As a further extension, we have used, as an alternative to the Chinn-Ito index, (i) the financial openness indicator of Lane and Milesi-Ferretti (2007) - measuring the external assets and liabilities of economies as a share of GDP- and (ii) FDI liabilities (Kose et al., 2009). In case of the former, positive and mostly significant coefficients are found for openness across different specifications, while crisis remains negative and significant, except in the case where 'currency crisis' is used. The interaction term is positive in all the five cases, but statistically significant only for 'sudden stop' and 'composite index'. The latter (using FDI liabilities as an alternative openness measure) suggests that, while crisis exerts a statistically significant negative effect on growth, openness is positive and significant, with their interaction positive and mostly significant. These results are broadly consistent with the results in Table 4, but will have to be interpreted carefully as both variables are rather poor proxies for financial openness in the context of our study.

as political or institutional variables.[18] [19] Second, there could be parameter heterogeneity across the conditional growth distribution, so that countries in the higher growth quantiles may respond differently to both crises and economic integration than do countries whose growth rates are in the lower quantiles. To explore this, the first two columns of Table 5 are based on quantile regressions using composite index of crisis where we report both the 25th quantile (low growth) and the 75th quantile of the growth distribution (corresponding to "the high growth group"). Interestingly, we find that high growth performers tend to benefit significantly from openness while poor performers do not as much. In addition, the coefficient estimate of openness for the high growth group is more than twice as large as that for the low growth group. The results also suggest that the adverse impact of crises on output growth is significantly different from zero for both groups. More importantly, the coefficient of the interaction term is positive and significant for both groups. Overall, our main results remain unchanged. With regard to other results, initial GDP is negative and significant for both groups with a coefficient estimate much larger in an absolute term for the high growth group. The speed of convergence is thus observed generally stronger among the high growth group countries than among the low growth group countries.

Thirdly, we have carried out a number of sensitivity test by estimating the same model for various subsets of countries (columns [3]-[6]). The negative link between crises and growth

[18]More specifically, we have included (i) political and institutional variables, such as regime type, polity, or political rights (e.g. Acemoglu et al. 2003; Cavallo and Cavallo, 2010), (ii) reserve holdings or terms of trade on growth (Li and Ouyang, 2011) , (iii) government size, or (iv) consumption volatility, but these are statistically insignificant except in the case of reserve holdings. The pattern of our main results is unchanged, though in the case where reserve holdings or terms of trade is added, economic integration gets statistically insignificant (though its interaction with crisis is positive and significant). Details will be provided on request.

[19] Another potentially important issue is that our currency crisis variable may capture high inflation when genuine currency crises were accompanied by rapid currency depreciation. To test this effect, we have added a dummy variable for high-inflation cases defined based on various cut-off points (e.g. 7%; 10%; 15%) or country-specific historical benchmarks. The results indicate that inclusion of high inflation dummies does not change the results significantly. We have also tested whether the 1994 CFA devaluation has different effects from other crises, but we have found that the 1994 CFA devaluation dummy is statistically insignificant. These results will be furnished on request.

that we have found so far could be due to the presence of resource-rich countries since these may be more prone to crises but also more integrated with the rest of the world. Hence, we examine whether our central findings survive if we focus on resource-poor countries (column [3]), or resource-rich countries (column [4]). In the former, we have removed the countries whose exports are dominated by oil (Equatorial Guinea, Congo Rep., Angola, Gabon, Chad and Nigeria) and minerals (Mauritania and Zambia), and in the latter only these countries are used.[20] Because of the small sample size, the result for resource-rich countries will have to be interpreted with caution as this case passes specification tests only marginally. It is noted, however, that the main results are unchanged for both resource-rich and resource-poor countries - with a negative and statistically significant coefficient estimate for crises and a positive and significant estimate for openness as well as for the interaction term. Economic integration has a relatively larger effect on growth of resource-rich countries, while their integration to the rest of the economy will mitigate the negative effect of crisis to a larger extent as those countries tend to have closer links with trade partners. Initial GDP carries a more negative and significant coefficient, suggesting a generally faster convergence for resource-rich countries than for resource-poor countries.

As previously emphasised by a number of studies (e.g. Loayza and Ranciere, 2006), one of the most important transmission channels between crises and output growth is the financial system. Accordingly, it could be the case that our results are driven by countries with more developed financial systems. The regression result reported in column [5] is based on a sub-sample of countries with relatively weak financial systems. Again, the interaction term between crises and openness is positive and significant, implying that openness tends to lessen the disruptive effects of crisis on output growth, even in the absence of sophisticated financial systems. We also examine whether our findings are true for those countries with greater

[20] We owe this point as well as the selection of sub-groups of countries to one of the referees.

restrictions on trade. This sample of 'closed' economies is selected based on levels of tariffs (column [6]). As the result shows, the main results remain unchanged. It should be noted that the size of coefficient of the interaction term is relatively larger for both countries with "weak finance" and those with "closed economies". That is, the relative advantages of opening up the economy to the rest of the world in mitigating the negative effects of external shocks will be larger for these countries.[21]

An important question is whether crises were caused by withdrawals of official lending to African governments, or by periodic deteriorations of confidence in private international financial markets. It should be noted, however, that due to data limitations, we cannot distinguish crises associated with official, as opposed to private international finance. Given data limitations, we have carried out sensitivity analyses for 'sudden stops' as these are likely to be associated mainly with private international finance that would normally be pertinent to relatively rich or resource-rich countries (columns [7]-[9]). As expected, richer countries benefit more from economic integration, but sudden stops affect more negatively low growth groups than high growth groups with the interactive effect larger for the former in the absolute term ([7] and [8]). Resource poor countries tend to be hit severely by sudden stops. If sudden stops are mainly associated with private international finance, it will be safe to conclude that low-growth countries or resource poor countries tend to be negatively affected by crises and economic integration will mitigate the negative effects regardless of whether the crises originted from public or private finance. The pattern of the coefficient estimates of initial GDP is also unchanged. For instance, faster convergence is found for the high growth group, than for the low

[21] We have also divided our sample countries into two groups, based on the prevailing exchange rate regime as the exchange rate regime of a country may influence the relationship between crises and output (e.g. Esaka, 2010). The main results are unchanged for countries with 'semi flexible' regimes (i.e. those with either crawling/managed floated or pure floated). The interaction term loses its significance for those with 'fixed/pegged' exchange rates, while crisis is negative and significant.

growth group. Hence, our main conclusion appears to be robust regardless of the sources of finance and the definitions of crisis.

Furthermore, we have tested whether there is any persistent effect of crisis by inserting a lagged composite crisis index. Column [10] shows that the lagged crisis is positive and significant, suggesting that there is a bounce-back after a crisis, rather than a persistent effect. We have also tested whether having multiple crises has an effect by adding an 'any crisis' dummy (taking the value of 1 if any of the crises occurred) to the composite crisis index (Column [11]). In this case both the composite index and 'any crisis' are negative and significant, suggesting that having multiple crises has an additional negative effect on growth.

In sum, we find that financial crises are associated with output losses. However, this negative effect decreases with the level of openness regardless of specifications, or of selection of sub-samples. Our results also suggest that economic integration, perhaps by relaxing credit constraints, helps economies to overcome the adverse effects of financial crises on economic performance. The beneficial effects of openness on growth in Africa is in line with the findings of Brückner and Lederman (2012) and Chang and Mendy (2012).

With respect to financial openness, Fowowe (2008) shows that there is a significant and robust positive relationship between economic growth and financial liberalisation policies in his sample of Sub-Saharan African countries. Similarly, Ahmed (2011) provides evidence that financial integration has had a positive (albeit not statistically significant) direct impact on output growth in Africa. However, he finds that financial openness in Africa has had a positive and robust effect on African financial markets and thereby indirectly benefitted their growth performance. Lastly, the SGMM diagnostics are satisfactory throughout the sensitivity analysis.

5. The main findings in a broader context

Our first main result is that international economic integration has been beneficial to our sample of African countries. This is in line with long held view in economics that increased international trade can propel countries to a high-growth trajectory. Standard trade theory, for example, postulates that trade openness is associated with static gains as it provides greater scope for the accumulation of human and physical capital. In particular, openness can facilitate economies to allocate their resources more efficiently by providing market platforms which allow economies of scale and division of labour to take place – increasing total factor productivity. Moreover, endogenous growth theories (e.g. Romer, 1994) predict that opening up trade enables countries to acquire new technologies, skills, knowledge and various other positive externalities which can bring about dynamic gains resulting in higher economic growth.

Similarly, an extensive theoretical literature identifies various direct and indirect channels through which financial openness can foster higher productivity and improve economic performance. Kose et al. (2009) contend that financial integration can increase capital accumulation by relaxing credit constraints and augmenting domestic resources. In addition, openness to financial flows can promote more efficient capital allocation as a result of increased risk-sharing opportunities which enables firms to undertake more risky but high-return investments (Obstfeld, 1994). As the volume of capital increases, the cost of capital should fall since the domestic economy becomes more liquid (Prasad et al. 2003).

The second main finding of this paper is that crises have been harmful to output growth in African economies, presumably due to their adverse effects on domestic capital formation, labour market, exchange rates, asset prices, aggregate demand, and total factor productivity. As emphasised, for instance, by Korinek (2011), crises cause self-reinforcing 'financial

amplification' effects in which countries can be caught in a vicious circle of falling prices (exchange rates and asset prices), deteriorating balance sheets and decreasing aggregate demand. More specifically, crises, particularly those that come in the form of capital reversals, sudden stops and currency crises, are associated with sharp falls in the exchange rate and asset prices. This, in turn, worsens domestic firms' balance sheets by undermining their collateral value and net worth, further reducing their ability to borrow and invest owing to reduced access to credit. These effects tend to be amplified in environments where there is credit scarcity, high liability dollarization and financial market imperfections. In crisis-hit countries, lack of credit availability reduces aggregate demand by tightening the budget constraints of agents, so decreasing their consumption and investment levels. The tendency of crises to undermine investor confidence can arise, not only from lack of credit availability, but also from increased risk and uncertainty. In addition, in Keynesian settings where prices/wages are downward sticky, depressed aggregate demand is associated with higher unemployment and output losses (Reinhart and Calvo, 2000). Furceri and Mourougane (2012) highlight that, on the one hand, crises may reduce total factor productivity through their negative impact on innovation and research and development as these tend to be higher in good times. On the other hand, total factor productivity may increase in crisis situations if firms, in an attempt to minimise losses and retain competitiveness, restructure and/or improve their X-efficiency.

Our third and final key result is that openness tends to mitigate the adverse effects of crises in Africa. This is in line with the predictions of standard Mundell-Flemming type models and sticky-price open economy models. Similar findings have been reported elsewhere (e.g. Guidotti et al. 2004; Edwards, 2004; Cavallo and Frankel, 2008). However, our study is the first to investigate the crisis-openness interaction in the context of African economies.

6. Concluding Remarks

In this study, we use a panel dataset covering a large number of African countries to analyse the relationship between crises and growth in a comprehensive manner. Focusing on four different types of financial crisis, we provide evidence showing that external shocks have been detrimental to economic growth of African countries. The central findings of this study are in line with the theoretical view that crises disrupt economic activity. Our empirical results add to the growing empirical evidence that crises undermine economic growth (Cavallo and Cavallo, 2010; Joyce and Nabar, 2009).

In line with the existing literature (e.g. Brückner and Lederman, 2012; Chang and Mendy, 2012), we find a robust positive link between economic openness and growth performance in Africa. Our results can be generalised to measures of financial openness. A variety of mechanisms could rationalise this result - the most plausible being that financial openness may have had a robust beneficial effect on African financial markets and thus indirectly promoted growth (e.g. Ahmed, 2011).

In an attempt to identify the specific channels through which crises affect output growth, we test the hypothesis that the level of economic integration of the crisis-hit country is important. We find that crises have had a more disruptive effect on growth in countries with lower levels of openness. We postulate that openness lessens the adjustment costs associated with external crises. This implies that once an African economy reaches a certain level of financial and economic openness, the negative effects of crises would be minimised, presumably because the country would be in a position to keep the fall in aggregate demand in check.

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Table 1: Crises, Economic Integration and Growth in Africa – Pooled OLS or Fixed-Effects Model
Dependent variable: GDP per capita growth

	Pooled OLS					Fixed Effects				
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Economic integration	0.087	0.083	0.079	0.078	0.082	0.118	0.102	0.111	0.104	0.112
	[0.017]***	[0.017]***	[0.017]***	[0.017]***	[0.017]***	[0.032]***	[0.035]***	[0.032]***	[0.033]***	[0.030]***
Sudden stop crisis	-1.429					-1.498				
	[0.393]***					[0.362]***				
Currency crisis		-1.004					-1.229			
		[0.435]**					[0.425]***			
Sovereign debt crisis			-1.826					-1.709		
			[0.470]***					[0.415]***		
Twins				-1.482					-1.731	
				[0.585]**					[0.589]***	
Composite crisis index					-0.742					-0.844
					[0.169]***					[0.156]***
Controls										
Log (initial GDP)	-0.562	-0.622	-0.432	-0.597	-0.500	-3.760	-3.978	-3.438	-3.686	-3.522
	[0.261]**	[0.265]**	[0.264]	[0.265]**	[0.259]*	[0.858]***	[0.943]***	[0.880]***	[0.883]***	[0.832]***
Log (1+inflation)	0.346	0.494	0.413	0.331	0.573	-0.778	-0.655	-0.585	-0.598	-0.655
	[0.360]	[0.389]	[0.361]	[0.367]	[0.364]	[0.589]	[0.646]	[0.577]	[0.627]	[0.572]
External debt/GDP	-0.012	-0.012	-0.010	-0.011	-0.011	-0.008	-0.007	-0.006	-0.006	-0.006
	[0.003]***	[0.004]***	[0.003]***	[0.004]***	[0.003]***	[0.004]**	[0.004]*	[0.003]*	[0.004]*	[0.004]
Financial depth/GDP	2.105	2.840	2.009	2.743	2.217	-0.373	0.296	-0.439	0.206	-0.686
	[1.230]*	[1.251]**	[1.227]	[1.244]**	[1.211]*	[2.468]	[2.623]	[2.611]	[2.470]	[2.416]
Population growth	-0.189	-0.158	-0.102	-0.192	-0.115	2.425	2.113	2.810	2.003	1.893
	[0.160]	[0.164]	[0.161]	[0.163]	[0.159]	[2.011]	[2.168]	[2.075]	[2.180]	[1.994]
Constant	3.123	2.457	1.423	3.175	1.567	1.154	5.230	-4.918	3.977	4.544
	[2.470]	[2.554]	[2.519]	[2.508]	[2.480]	[19.773]	[21.846]	[20.601]	[21.576]	[19.976]
Observations	240	240	240	240	240	240	240	240	240	240
R^2	0.28	0.26	0.29	0.26	0.30	0.32	0.30	0.30	0.30	0.34

Note: The dependent variable is GDP per capita growth (% p.a.). The estimates are based on the pooled OLS estimator or the fixed-effects estimator with robust standard errors in brackets, *, **, *** indicate significance at 10%, 5% and 1% respectively, time effects included but not reported.

Table 2: Crises, Economic Integration and Growth in Africa - System-GMM
Dependent variable: GDP per capita growth

	[1]	[2]	[3]	[4]	[5]
Economic integration	0.340	0.279	0.355	0.330	0.299
	[0.066]***	[0.043]***	[0.089]***	[0.072]***	[0.059]***
Sudden stop crisis	-1.396				
	[0.402]***				
Currency crisis		-2.067			
		[0.515]***			
Sovereign debt crisis			-1.148		
			[0.468]**		
Twin crises				-1.422	
				[0.486]***	
Composite crisis index					-0.934
					[0.180]***
Controls					
Log(initial GDP)	-3.460	-2.643	-4.687	-3.533	-2.402
	[1.344]**	[1.121]**	[1.405]***	[1.567]**	[1.144]**
Log(1+inflation)	-1.723	-0.635	-2.034	-1.556	-1.373
	[0.649]***	[0.707]	[0.721]***	[0.728]**	[0.536]**
External debt/GDP	-0.006	-0.007	-0.011	-0.010	-0.002
	[0.008]	[0.008]	[0.007]	[0.007]	[0.007]
Financial depth/GDP	6.177	5.664	7.487	6.903	4.728
	[2.955]**	[2.886]**	[3.555]**	[3.272]**	[3.045]
Population growth	0.094	0.066	-0.128	0.214	0.472
	[0.607]	[0.668]	[0.881]	[0.807]	[0.466]
Constant	11.226	6.228	20.750	10.222	2.370
	[11.700]	[11.421]	[15.106]	[14.732]	[9.469]
Observations	240	240	240	240	240
# Instruments	30	30	30	30	30
# Countries	38	38	38	38	38
Hansen test	0.768	0.669	0.593	0.597	0.802
Diff Hansen test	0.805	0.769	0.650	0.580	0.807
AR (1) test	0.008	0.005	0.012	0.007	0.004
AR (2) test	0.470	0.558	0.534	0.885	0.497

Table 3: Growth effects of crises and interaction with economic integration
Dependent variable: GDP per capita growth

	[1] Sudden stops	[2] Currency	[3] Debt	[4] Twin	[5] Composite
Economic integration	0.222	0.198	0.285	0.094	0.214
	[0.070]***	[0.083]**	[0.090]***	[0.053]*	[0.069]***
Sudden stops	-5.826				
	[2.141]***				
Currency crises		-5.506			
		[2.502]**			
Sovereign debt crises			-5.850		
			[2.611]**		
Twin crises				-11.976	
				[2.401]***	
Composite crises index					-2.624
					[0.872]***
Integration * crisis	0.113	0.104	0.128	0.271	0.047
	[0.045]**	[0.061]*	[0.068]*	[0.055]***	[0.020]**
Controls					
Log(initial GDP)	-3.556	-2.775	-4.225	-2.970	-3.120
	[1.008]***	[1.298]**	[1.125]***	[1.549]*	[1.074]***
Log(1+inflation)	-1.200	-0.121	-1.886	-0.300	-1.102
	[0.720]*	[0.950]	[0.757]**	[1.352]	[0.677]
External debt/GDP	-0.006	-0.011	-0.014	-0.030	-0.005
	[0.006]	[0.008]	[0.007]*	[0.010]***	[0.005]
Financial depth/GDP	8.325	7.451	7.942	6.609	7.538
	[2.626]***	[3.153]**	[2.674]***	[3.724]*	[2.787]***
Population growth	-0.133	-0.222	-0.302	-0.456	-0.053
	[0.609]	[0.802]	[0.670]	[0.980]	[0.519]
Constant	16.655	11.133	22.141	21.579	13.657
	[11.078]	[14.283]	[10.932]**	[16.722]	[10.497]

Observations	240	240	240	240	240
# Instruments	31	31	31	31	31
# Countries	38	38	38	38	38
Hansen test	0.687	0.677	0.826	0.329	0.924
Diff Hansen test	0.704	0.757	0.811	0.329	0.933
AR (1) test	0.003	0.003	0.009	0.007	0.002
AR (2) test	0.516	0.581	0.645	0.892	0.572

Note: Dependent variable is GDP per capita growth (% p.a.). The estimates are based on the two-step System-GMM estimator with Windmeijer finite sample correction. AR(1) and AR(2) are respectively Arellano-Bond's 1st and 2nd autocorrelation tests. The Hansen J-statistic reports the p-values for the null of instrument validity. The Diff-in-Hansen reports the p-values for the validity of the additional moment restriction for the System GMM. Time fixed effects included but not reported. *, **, *** denote significance at 10, 5 and 1%, respectively.

Table 4: Growth effects of crises and interaction with openness
Dependent variable: GDP per capita growth

Panel A:	*Crisis type and interaction of economic integration with*				
Cross border transactions	[1]	[2]	[3]	[4]	[5]
	Sudden stop	Currency	Debt	Twins	Composite
Cross border transactions	0.106	0.080	0.128	0.094	0.080
	[0.035]***	[0.049]*	[0.059]**	[0.042]**	[0.051]
Crisis	-6.282	-4.850	-7.412	-4.729	-2.713
	[1.748]***	[1.592]***	[4.248]*	[1.411]***	[0.790]***
Openness * crisis	0.088	0.069	0.133	0.063	0.035
	[0.035]**	[0.033]**	[0.086]	[0.027]**	[0.017]**
Specification tests					
Observations	237	231	231	237	237
# Instruments/ countries	31/37	33/36	32/36	33/37	31/37
Hansen test	0.613	0.381	0.123	0.584	0.495
Diff Hansen test	0.684	0.326	0.087	0.662	0.460
AR (1) test	0.002	0.002	0.003	0.002	0.001
AR (2) test	0.459	0.518	0.649	0.668	0.413
Panel B:	*Crisis type and interaction of economic integration with*				
Trade openness	[6]	[7]	[8]	[9]	[10]
	Sudden stop	Currency	Debt	Twins	Composite
Trade openness	0.079	0.041	0.050	0.074	0.047
	[0.033]**	[0.021]*	[0.026]**	[0.028]***	[0.028]*
Crisis	-4.413	-6.748	-11.560	-6.255	-2.529
	[2.220]**	[1.866]***	[3.903]***	[2.862]**	[0.705]***
Openness * crisis	0.028	0.074	0.135	0.077	0.021
	[0.025]	[0.025]***	[0.053]**	[0.042]*	[0.008]**
Specification tests					
Observations	264	258	258	264	264
# Instruments/ countries	31/42	31/41	31/41	31/42	31/42
Hansen test	0.274	0.359	0.474	0.215	0.326
Diff Hansen test	0.187	0.218	0.352	0.094	0.168
AR (1) test	0.001	0.001	0.001	0.002	0.000
AR (2) test	0.308	0.376	0.283	0.799	0.318
Panel C:	*Crisis type and interaction of economic integration with*				
Capital account openness	[11]	[12]	[13]	[14]	[15]
	Sudden stop	Currency	Debt	Twins	Composite
Capital account openness	0.150	-0.421	-0.069	0.217	0.155
	[0.347]	[0.446]	[0.361]	[0.333]	[0.369]
Crisis	-1.958	-2.103	-1.481	-2.281	-0.900
	[0.475]***	[0.536]***	[0.495]***	[0.649]***	[0.198]***
Openness * crisis	0.970	1.252	0.251	0.135	0.330
	[0.382]**	[0.418]***	[0.563]	[0.509]	[0.194]*
Specification tests					
Observations	261	255	255	261	261
# Instruments/ countries	32/42	32/41	38/42	38/42	40/42
Hansen test	0.388	0.193	0.311	0.470	0.557

Diff Hansen test	0.361	0.252	0.078	0.471	0.507
AR (1) test	0.001	0.003	0.001	0.001	0.001
AR (2) test	0.670	0.419	0.878	0.495	0.681

Note: Dependent variable is GDP per capita growth (% p.a.). The estimates are based on the two-step System-GMM estimator with Windmeijer finite sample correction. AR(1) and AR(2) are respectively Arellano-Bond's 1st and 2nd autocorrelation tests. The Hansen J-statistic reports the p-values for the null of instrument validity. The Diff-in-Hansen reports the p-values for the validity of the additional moment restriction for the System GMM. Time fixed effects included but not reported. *, **, *** denote significance at 10, 5 and 1%, respectively.

Table 5: Sensitivity analysis
Dependent variable: GDP per capita growth

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
	25th quantile	75th quantile	Resource-poor	Resource-rich	Weak finance	Closed economies	25th quantile	75th quantile	Resource-poor	Lagged Effect	Multiple crises
Economic integration	0.034	0.086	0.134	0.162	0.019	0.067	0.020	0.096	0.172	0.241	0.277
	[0.024]	[0.022]***	[0.065]**	[0.097]*	[0.085]	[0.036]*	[0.025]	[0.031]***	[0.068]**	[0.073]***	[0.054]***
Composite crisis index	-1.628	-1.421	-2.262	-2.614	-3.320	-3.044				-0.578	-0.542
	[0.383]***	[0.382]***	[0.600]***	[0.930]***	[1.016]***	[0.798]***				[0.275]**	[0.212]**
Lagged Composite Crisis										0.504	
										[0.213]**	
Openness * composite index	0.028	0.017	0.034	0.055	0.064	0.047					
	[0.010]***	[0.010]*	[0.014]**	[0.023]**	[0.026]**	[0.020]**					
Any crisis dummy											-1.443
											[0.747]*
Sudden stops							-5.158	-3.041	-4.588		
							[1.115]***	[1.560]*	[1.629]***		
Openness * sudden stops							0.101	0.042	0.075		
							[0.028]***	[0.037]	[0.036]**		
Controls											
Log(initial GDP)	-0.534	-0.893	-1.483	-2.751	-2.722	-1.778	-0.575	-1.078	-0.664	-2.572	-2.365
	[0.294]*	[0.210]***	[0.999]	[1.054]***	[1.414]*	[0.883]**	[0.295]*	[0.347]***	[1.108]	[1.559]*	[1.183]**
Log(1+inflation)	0.523	0.771	-0.354	-0.585	-1.208	0.328	0.398	0.355	-1.184	-1.494	-1.488
	[0.327]	[0.301]**	[0.640]	[0.702]	[0.685]*	[0.889]	[0.347]	[0.476]	[0.710]*	[0.583]**	[0.455]***
External debt/GDP	-0.011	-0.017	-0.008	-0.026	-0.008	-0.019	-0.011	-0.016	-0.008	-0.016	-0.004
	[0.004]***	[0.003]***	[0.008]	[0.010]***	[0.005]	[0.007]***	[0.004]**	[0.005]***	[0.009]	[0.010]	[0.008]
Financial depth/GDP	3.130	2.700	3.912	-27.872	-6.313	1.953	4.038	3.150	2.113	6.325	4.423
	[1.253]**	[1.145]**	[2.262]*	[8.181]***	[10.438]	[3.229]	[1.321]***	[1.844]*	[2.678]	[2.679]**	[2.967]
Population growth	-0.190	-0.094	0.247	-2.249	-0.361	-0.416	-0.311	-0.129	0.879	0.157	0.304
	[0.173]	[0.146]	[0.511]	[1.715]	[1.417]	[0.509]	[0.190]	[0.242]	[0.534]*	[0.762]	[0.555]
Constant	2.715	3.728	3.687	39.248	26.306	13.910	4.718	5.833	-6.089	8.949	5.500
	[2.842]	[2.338]	[9.372]	[20.818]	[20.252]	[7.720]*	[2.970]	[3.622]	[8.977]	[14.690]	[11.535]
Observations	240	240	215	29	121	142	240	240	215	224	240
# Instruments			32	29	22	32			32	32	32
# Countries			33	8	28	35			33	38	38
Hansen test			0.494	0.100	0.668	0.416			0.470	0.769	0.875
Diff Hansen test			0.387	0.100	0.819	0.226			0.405	0.769	0.858
AR (1) test			0.006	0.062	0.007	0.011			0.011	0.004	0.003
AR (2) test			0.455	0.224	0.783	0.629			0.429	0.815	0.319

Note: Dependent variable is GDP per capita growth (% p.a.). The estimates are based on the two-step System-GMM estimator with Windmeijer finite sample correction. AR(1) and AR(2) are

respectively Arellano-Bond's 1st and 2nd autocorrelation tests. The Hansen J-statistic reports the p-values for the null of instrument validity. The Diff-in-Hansen reports the p-values for the validity of the additional moment restriction for the System GMM. Time fixed effects included but not reported. *, **, *** denote significance at 10, 5 and 1%, respectively.

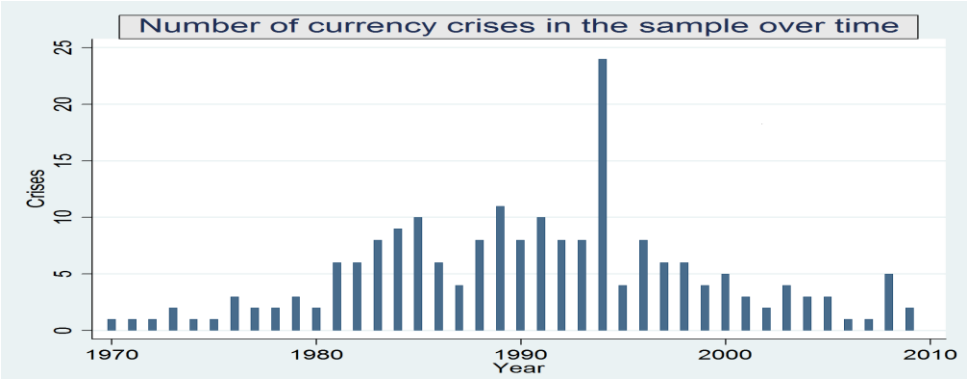

Figure 1a

Figure 2

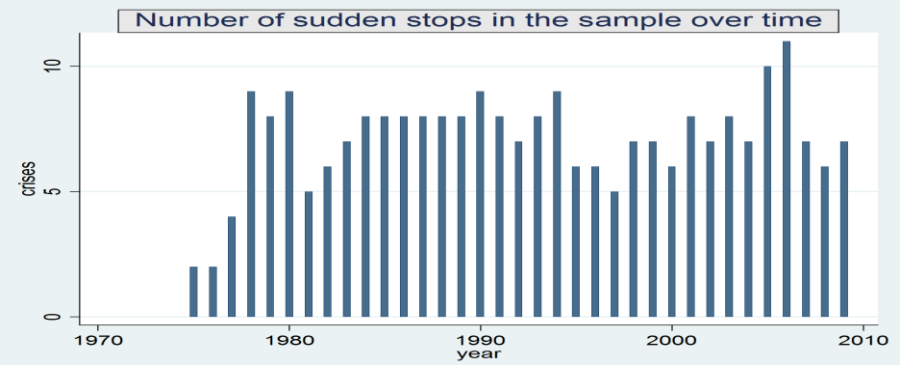

Figure 3

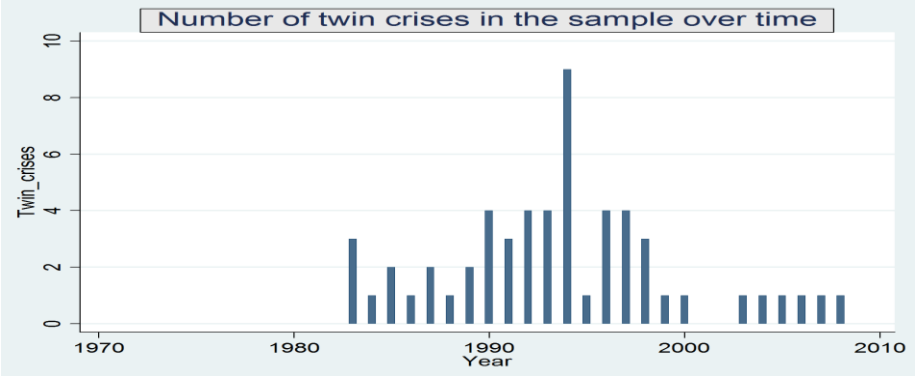

Figure 4

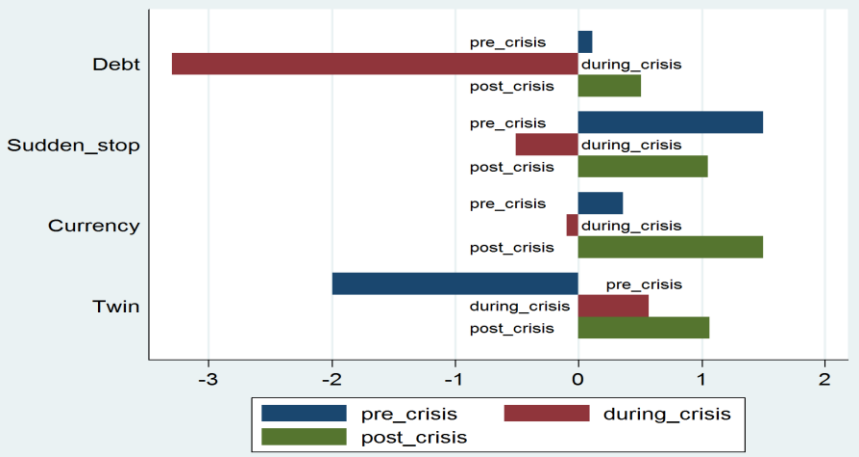

Figure 5 Average growth performance around crisis periods in Africa

Appendix:

Table A1. Variable definitions and sources

Variable	Obs	Mean	Std. Dev.	Definition and Source
Growth	358	1.2	4.46	Real per capita GDP growth rate (% p.a.). World Bank (2011): WDI
Initial income (ln)	354	6.19	1.00	First value of real per capita income for each 5-year period. World Bank (2011): WDI
Population growth	384	2.51	0.05	Population growth (% p.a.). World Bank (2011): WDI
Sudden stop crisis	384	0.33	0.02	Own calculation based on a modified version of Calvo et al. (2004). See text for description
Currency crisis	376	0.33	0.02	Reinhart and Rogoff (2009). See text for description
Sovereign debt crisis	376	0.17	0.02	Reinhart and Rogoff (2009). See text for description
Twin crisis	384	0.13	0.02	Joint occurrence of banking and currency crises. The data on banking crises is from Laeven and Valencia (2008)
Composite crisis index	38	1.05	0.06	Own calculation based on types of crises encountered in a given year, weighted by each country's share in world output.
Debt	343	80.06	103.36	External borrowing as a % of GDP. World Bank (2011): WDI
Financial depth	282	0.29	0.19	Captured by Liquid liabilities as a % of GDP. World Bank (2011): WDI
Inflation	3.58	3.06	0.69	Measured as ln (1+ inflation (%)/100) where inflation is captured by CPI. World Bank (2011): WDI
Trade openness	357	70.44	36.52	Imports + exports as a % of GDP. World Bank (2011): WDI
Economic integration	328	37.62	14.54	Actual flows of trade and investment and their restrictions, expressed as a % of GDP. Dreher (2006, revised 2011)
Cross border transaction	336	44.48	21.01	Actual flows of trade, FDI +portfolio + payments to foreigners) as a % of GDP. Dreher (2006, revised 2011)
Capital acc. openness	358	-0.77	0.96	Chinn-Ito's de jure index (revised 2011)
Financial openness	242	106.25	60.42	De facto fin openness. Lane and Milesi-Ferretti (2007, revised 2011).
FDI liabilities	359	3.10	7.49	Share of FDI liabilities in GDP. Lane and Milesi-Ferretti (2007, revised 2011)
Government size	343	15.89	6.78	Government expenditure as % of GDP. World Bank (2011): WDI
Political rights	377	5.14	1.59	The extent of political rights in a country as calculated by Freedom House. Coded from 1-7 (7 being the worst). FH surveys (2011)
Regime type	375	19.65	33.66	Ranges from Monarchy, Military, One-party, Multi-party system to full Democracy (higher value), Teorell and Hadenius (2007).
Reserves	366	5.07	1.88	FX Reserves minus gold (% GDP). Lane and Milesi-Ferretti (2007, revised 2011)
Terms of trade	275	113.38	41.67	Net barter terms of trade index. World Bank (2011): WDI
Consumption volatility	384	-64.14	1242.18	Standard deviation of consumption. Underlying data from PWT 7.0 (2011)
Polity	356	2.96	1.78	Executive Constraints (Decision Rules): from (1) Unlimited Authority to (7) Limited Authority. PolityIV dataset (2011)

Table A2. Growth effects of crises and interaction with alternative measures of openness (Pooled OLS)

Panel A:	*Crisis type and interaction of economic integration with*				
Cross border transactions	[1]	[2]	[3]	[4]	[5]
	Sudden stop	Currency	Debt	Twins	Composite
Cross border transactions	0.016	0.011	0.036	0.024	0.012
	[0.016]	[0.017]	[0.014]**	[0.014]*	[0.018]
Crisis	-3.547	-3.104	-2.830	-4.347	-1.714
	[0.975]***	[0.994]***	[1.438]*	[1.409]***	[0.403]***
Openness * crisis	0.046	0.048	0.018	0.058	0.021
	[0.020]**	[0.021]**	[0.030]	[0.030]*	[0.008]**
Observations	237	231	231	237	237
R^2	0.22	0.22	0.24	0.21	0.25
Panel B:	*Crisis type and interaction of economic integration with*				
Trade openness	[6]	[7]	[8]	[9]	[10]
	Sudden stop	Currency	Debt	Twins	Composite
Trade openness	0.012	0.004	0.016	0.013	0.003
	[0.009]	[0.008]	[0.008]**	[0.007]*	[0.009]
Crisis	-2.509	-3.108	-2.651	-4.162	-1.492
	[0.793]***	[0.828]***	[1.115]**	[1.151]***	[0.323]***
Openness * crisis	0.016	0.034	0.014	0.042	0.012
	[0.010]*	[0.011]***	[0.016]	[0.017]**	[0.004]***
Observations	264	258	258	264	264
R^2	0.22	0.23	0.23	0.22	0.25
Panel C:	*Crisis type and interaction of economic integration with*				
Capital account openness	[11]	[12]	[13]	[14]	[15]
	Sudden stop	Currency	Debt	Twins	Composite
Capital account openness	-0.258	-0.163	-0.124	-0.154	-0.235
	[0.251]	[0.263]	[0.215]	[0.209]	[0.254]
Crisis	-1.033	-0.886	-2.540	-1.627	-0.649
	[0.465]**	[0.525]*	[0.839]***	[0.819]**	[0.214]***
Openness * crisis	0.349	0.144	-0.691	0.251	0.107
	[0.394]	[0.422]	[0.722]	[0.682]	[0.170]
Observations	261	255	255	261	261
R^2	0.19	0.18	0.22	0.18	0.21

Note: The dependent variable is GDP per capita growth (% p.a.). The estimates are based on the pooled OLS estimator with robust standard errors in brackets, *, **, *** indicate significance at 10%, 5% and 1% respectively, all previously used control variables as well as time fixed effects included but not reported.

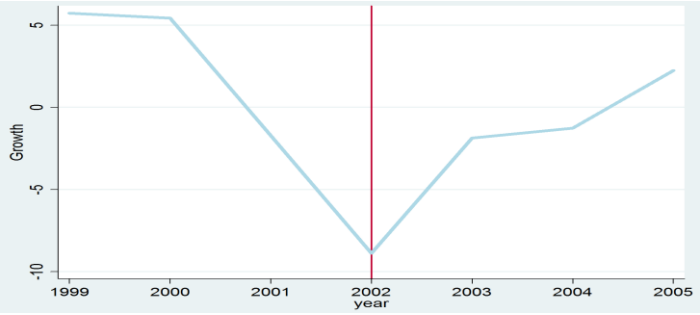

Figure A1: Growth performance around a sudden stop crisis (Guinea-Bissau)

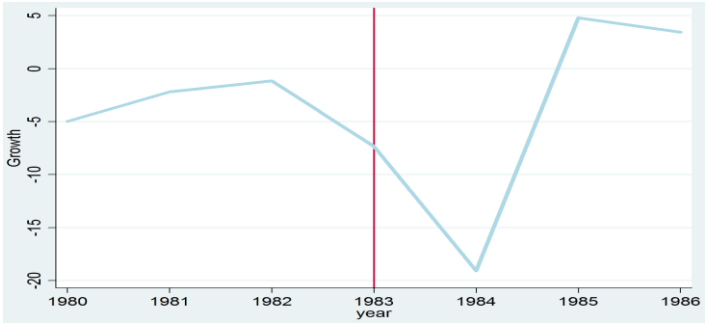

Figure A2: Growth performance around a sovereign debt crisis (Niger)

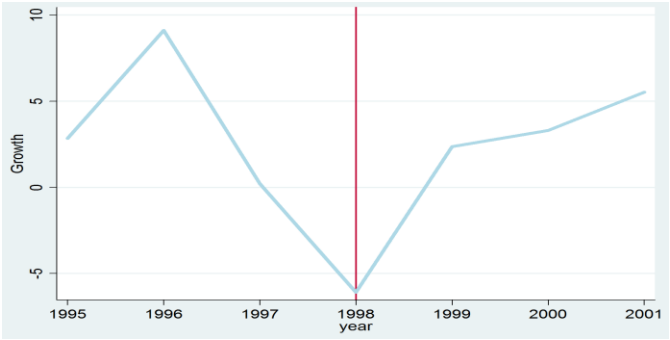

Figure A3: Growth performance around a currency crisis (Ethiopia)

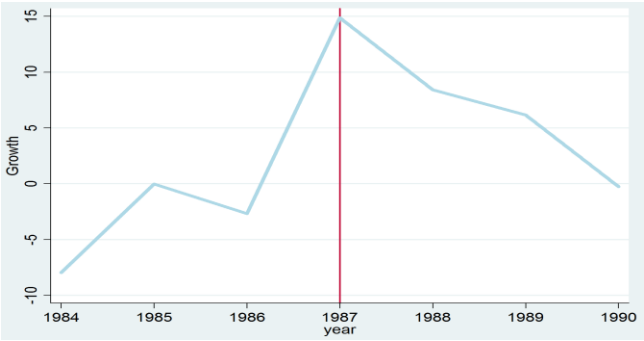

Figure A4: Growth performance around a twin crisis