Revisiting the Link between Political and Financial Crises in Africa

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Abstract

There is an important information deficit on political and financial risks in Africa. This paper fills this gap by compiling a unique database of financial (sovereign, banking, currency, expropriation) and political crises (regime changes, ethnic and revolutionary wars, genocides, armed conflicts) covering 53 African countries between 1965 and 2008. We employ a new methodological framework to disentangle cross-crisis from temporal contagion effects. This allows us to extend to Africa a number of insights from the literature on financial crises (e.g., the mutual contagion effects between banking and currency meltdowns). Importantly, and critically for a study devoted to Africa, political upheavals are of modest relevance to predict financial crises. These results may be reconciled with previous literature given our original focus on Africa and our event-based approach of financial and political risks.

Keywords: Political crises, financial crises, contagion, Africa

JEL codes: F30*, F3, G01*

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1. Introduction

Over the 1975-2010 period, emerging markets have become significant players in world trade and international capital flows. Developing countries' share of world exports increased by 12 percentage points (from 25% to 37%), and their world share of inward foreign direct investment (FDI) is on the rise.[1] African countries, however, have been left behind – Africa received only 2.7% of the world's total average FDI over the period, and its share of world exports decreased by a staggering 2 percentage points, notwithstanding the fact that countries on the continent hold most of the world's resources for at least ten minerals.[2] International capital flows followed a similar path. Foreign lending to emerging markets took off in the 1970s through syndicated loans, followed shortly after by the issuance of bonds from which Africa was predominantly left out. Africa's access to the international capital market is still extremely limited. In 2010, African external debt totaled US$ 324 billion, a mere 6% of the total for developing economies.[3]

Although investments in Africa have generated comparably high risk-adjusted returns on average, Africa has failed to attract significant investment flows. Warnholz (2008) attributes this puzzle to an information deficit on African markets. Rating agencies' coverage of the African continent has indeed been recent and focused on a limited number of countries. Private companies (e.g., Institutional Investors, or the European Intelligence Unit) and multilateral organizations (e.g., the World Bank and the OECD) assessing country risks in Africa have a more extensive coverage, but cluster rankings at the bottom of their scales, making it impossible to discriminate among countries. The paucity of hard information on the business environment in Africa and several decades of highly mediatized conflicts and political turmoil have certainly weighed negatively on investors' perception about the continent.

This paper helps fill this information deficit by compiling a unique database of political and financial crises in Africa. Our annual data span the political, currency,

[1] Data on exports and foreign direct investments (FDIs) are from the United Nation Conference on Trade and Development (UNCTAD), based on COMTRADE statistics.
[2] Bauxite; cobalt; diamond; phosphate rocks; platinum groups metal; vermiculite; and zirconium.
[3] These data are from the United Nations Economic Commission for Africa (UNECA): Economic Report on Africa 2011.

expropriation, banking, and sovereign debt crises that struck the 53 countries of the African continent from 1965 to 2008.[4] As of today, this is the most comprehensive dataset on the subject, allowing us to draw new insights into the frequency of political and financial crises in Africa.

We bring three additional contributions to the previous literature on conflicts and crises. First, we design a general framework to analyze cross-crisis contagions, leading to parsimonious, robust, and economically-grounded crisis prediction models. We rely on model selection techniques (through Akaike and Bayesian Information Criteria, henceforth AIC/BIC) to select relevant prediction variables. For each type of crisis, we find the univariate prediction model that leads to the best fit and add other predictors one by one, only if this improves the information criterion, thus avoiding multicollinearity issues and overfitted, unstable prediction models. We address the issue of entangled temporal and cross-crisis contagions effects by performing separated estimations, hereby also minimizing the number of variables simultaneously introduced in the regression. We first analyze crisis hysteresis effects and derive a list of *onsets* of crisis for each country and crisis type. This leads us to predict onsets of financial and political crises from the occurrence of other types of crisis in the same country achieving a proper characterization of cross-crisis contagion effects and alleviating issues of auto-correlation in the specification.

Second, our analysis extends to the African continent a number of insights drawn from the financial crisis literature. In particular, we confirm the mutually predictive nature of banking and currency crises (to which Kaminsky and Reinhardt 1999 refer logically as 'twin crises') and the predictive power of banking issues on onsets of sovereign defaults (Reinhart and Rogoff, 2008a and 2008b). We add the insight that sovereign, banking, and currency crises are in fact all mutually predictive in the case of Africa.

Our final contribution relates to the link between political and financial crises: Intriguingly, and critically for a study of financial crises in Africa, political upheavals

[4] We exclude the Republic Arab Saharawi Democratic (or Western Sahara) from our list of African countries as the legal status of the country is still disputed, its sovereignty unresolved and data are barely available.

have a relatively modest forecasting power on financial crises. Only one link is found significant at level 1%, the one running from regime changes to onsets of expropriation. But this effect has lost some relevance today as most expropriation events occurred in the 70s'. The other link, the one from armed conflicts to onsets of sovereign defaults, is only significant at level 5%.[5] We also uncover a significant inverse relationship running from currency and sovereign crises to onsets of revolutionary wars.

The modest predictive power of political crises on financial events could come as a surprise, given the ample literature documenting the impact of political instability (reflected by e.g., the quality and stability of institutions and governments) on various indicators of financial risk (stock market volatility FDI flows, credit spread, investors' or raters' risk perception…) or long-term economic performance.[6] However, our results may be reconciled with previous literature given our original focus on Africa and our strict *event-based approach* of financial and political risks: we restrict our scope to *discrete* outbreaks of political instability (regime changes, ethnic or revolutionary wars, genocides, armed conflicts) and financial turmoil (expropriation, sovereign default, banking/currency meltdowns), which are very different in nature from the *diffuse* indicators of political instability, economic performance, or financial risk commonly encountered in the literature.

The remainder of the paper is organized as follows. Section 2 presents the theoretical background. The following section presents data, measurements and some descriptive statistics on crisis events. Section 4 introduces the empirical strategy used for defining the onsets of crises and analyzing crisis contagions. Section 5 presents and discusses the results on cross-crisis spillover effects. Section 6 concludes.

[5] Note that the predictive power of political crises on financial crises is not retained under the most stringent BIC selection model (Section 4).
[6] See Section 2 for a literature review.

2. Theoretical background

A large body of research examines the frequency and features of financial crises. This literature encompasses currency, banking and sovereign crises and focuses on the determinants of and interconnection between these crises. For decades, tracing world events, this literature has focused on emerging markets and less developed countries, but has paid little attention to Africa.

Banking crises correspond to individual banks' defaults, banks runs, and deposit freezes. These crises affect several types of foreign investors: Foreign banks or individuals that have financial claims on domestic banks in the forms of loans or bonds, entrepreneurs with local deposits (in foreign and/or domestic currency) in the context of foreign direct investment or foreign-based exporters facing payment disruption.[7] Banking crises may also affect foreign investors through the credit channel (Bernanke and Gertler, 1995) as individual banks are less willing to lend and entrepreneurs face steeper liquidity constraints during periods of banking turmoil.

Currency crises affect investors through the depreciation of repatriated profits, raising imported inflation and potential default on foreign currency denominated obligations. A currency crisis is defined as an important depreciation of a currency together with an increase in the rate of depreciation compared to the previous period.

Following the seminal work of Krugman (1979), several generations of models studied the determinants of currency (Eichengreen, Rose, and Wyplosz, 1995; Obstfeld, 1994) and banking crises (Diamond and Dybvig 1983) and highlighted the link between currency, banking and sovereign instability (Krugman, 1999; Chang and Velasco, 1999).[8] The recurrences of banking turmoil at times of currency crashes

[7] Foreign banks could also own equities in local banks and be directly impacted by banking crises. In Argentina in 2001, the foreign shareholders (Chilean Inversora Norte-Sur and French Credit Agricole) of MBK Mercobank lost their entire investment. Indeed, both investors were asked by the Argentinean government to participate in a mandatory US$ 10 million capital increase in MBK Mercobank. Both parties refused to participate and walked away.

[8] In Latin America of the 1980s and Mexico of the 90s, governments' balance sheet currency mismatches forced sovereigns to default on their foreign obligations. During the Asian crisis, in the 1990s, speculative currency runs led to banks' defaults and to massive IMF rescue packages, thus underlining how dangerous intertwined currency and banking crises could be. In Argentina, , the entire

compelled their joint analysis under the label of 'financial crises' (Calvo 1998; Kaminsky, 1999; Kaminsky and Rheinhart, 1999; Sachs et al., 1996; Schneider and Tornell, 2004; Velasco, 1987). Countries experience a vicious circle whereby banking weaknesses lead to pressures on currencies and where currency depreciation renders banks insolvent. While the twin occurrences of banking and currency crises are now well established, the literature is inconclusive on the direction of causality (see Kaminsky and Rheinhart 1999).[9]

The Argentinean collapse of 2001/2002 revived the 1980s literature on sovereign defaults. Such defaults might be triggered by governments' unwillingness to pay (see e.g., Eaton and Gersovitz 1981 and Eaton and Fernandez 1995 for a survey) or their inability to do so because of sudden loss of market access, unexpected external shocks or long-lasting fiscal profligacy (Roubini 2001). The consequences of the 2007 subprime crisis for the banking system, and subsequently for Eurozone governments, illustrate the significant links between banking and sovereign risks. Reinhart (2002), analyzing crisis events in 62 countries, finds that in 85 percent of the cases, currency crises preceded sovereign defaults. Reinhart and Rogoff (2008a, 2008b, 2011), through the analysis of a comprehensive database, widely document the impacts of banking crises and financial crashes on sovereign defaults.

The financial crises literature also devotes some attention to the link between political and financial risk. The general intuition is that 'political instability' in a broad sense may lead to sudden sovereign debt repudiations or drastic revisions in property rights, and therefore increase the level of uncertainty for investors, resulting in brutal capital reallocations. This intuition is supported by a vast literature documenting a positive association between 'political instability' (defined by the frequency of regime change, the length of tenure of policymakers, veto power and the like) and indicators of financial distress, such as capital flights (Lensink et al., 2000), sovereign debt default/rescheduling (Balkan, 1992), creditworthiness and the level/volatility of

economy defaulted in 2001-2002, due to currency mismatching in the balance sheets of households, corporate entities, banks and sovereigns, after the pesos/dollar peg was removed.

[9] The abundance of financial crises also triggered a rich body of literature on leading indicators of crises and early warning systems (Aziz et al., 2000; Berg and Patillo, 1999; Eichengreen et al., 1995; Frankel and Rose, 1996; Kaminsky et al., 1998).

sovereign credit spreads (Citron and Nickelsburg, 1987, Brewer and Rivoli, 1990, Kohlscheen, 2007, Cuadra and Sapriza, 2008).[10]

It should be noted, however, that none of the above studies specifically tackled the link between *discrete* political and financial events. The former type of events is defined as crises entailing a high level of casualties such as armed conflicts, ethnic and revolutionary wars, genocides and regime changes. The latter category corresponds to sovereign default, expropriation and banking and currency meltdowns. In addition, to our knowledge, no study has so far investigated the particular case of the African continent.[11]

While the African continent is virtually absent from the financial crises literature, it is central to the conflicts and the comparative development literatures. Researchers focus on the conditions leading to conflicts and to the fall of nations (Rotberg, 2003), highlighting the importance of artificial borders (see Englebert et al., 2002 and Alesina et al. 2011 for a counterargument), legal origins (Acemoglu et al., 2001), ethnic-fractionalization (Herbst 2000; Fearon, Laitin 2003; Michalopoulos, Papaioannou, 2011), and the dependence on natural resources (Elbadawi and Sambanis 2000; Collier and Hoeffler 2004, 2005). Political scientists have long known that political institutions strongly influence development, and that political instability implies lower economic growth (Huntington, 1968, Moore, 1966). In the same vein, the comparative development literature posits that political uncertainty and bad institutions are detrimental to growth in African countries (Rodrik, 1999 and Acemoglu et al., 2001 and 2003). In these papers, political instability is proxied by income inequality, ethnic fragmentation or the quality of institutions or governments (i.e., property rights, rule of law, government type).

[10] However, De Haan et al. (1997) find that political risk loses its forecasting power on the risk of debt rescheduling once economic variables are included. Le and Zak (2006) observe that the relation between capital flight and political instability is versatile : unconstitutional government change, internal uprisings, and the variance of policy implementation favor capital flights but collective protests, and major and minor constitutional government changes stimulate capital flight reversals.

[11] Odedokun (1995) stands as a notable exception, analyzing the economic and financial determinants of debt rescheduling events on a sample composed of 39 African countries. As explained in this paper, 'those few studies that happen to cover African countries do so merely by including data for some of the countries in their multi-country data set so that their conclusions can hardly be said to be applicable to Africa.'

We contribute to these different strands of literature by showing that, although 'diffuse' political instability has been shown to undermine long-term growth prospects, degrade investors' sentiment and favor capital flights, 'discrete' political upheavals are only modestly helpful predictors of full-fledged sovereign defaults or financial meltdowns. This insight is important as the seemingly 'frequent', poorly quantified and sensationalized political upheavals in Africa are likely to weigh negatively on investors' perception through the well-known 'dread' and 'unknown factors' (see Slovic, 1987).

3. Data and First Evidence

3.1 Data

We study the incidence of crises by focusing on the 53 countries of the African continent over the 1965-2008 period. In order to investigate in particular the link between political and financial events, we construct a unique database of the crises relevant to foreign investors, i.e., political, currency, expropriation, banking, and sovereign debt crises.

As in Goldstone et al. (2010), most data on political crises come from the Political Instability Task Force (PITF).[12] This database encompasses data on four distinct types of state failure—ethnic wars, revolutionary wars, adverse regime changes, and genocides and politicides—and covers the years 1965 to 2008. Crises are recorded as such if they involve a sudden, large number of deaths (except for adverse regime changes), thus abiding by our definition of *discrete* political events. We complete these data with armed conflict information taken from the UCDP/PRIO Conflict Dataset, as presented in Gleditsch et al. (2002).[13] Political data are further described

[12] The PITF is hosted at George Mason University. The first refined version of the database appeared in Bates et al. (2003). Updates and enhancements were subsequently undertaken. More information can be found on the Political Instability Task Force (PITF) website: http://globalpolicy.gmu.edu/pitf.

[13] We use the UCDP/PRIO Conflict Dataset version 4-2008. The UCDP/PRIO Armed Conflict Dataset is a joint project between the Uppsala Conflict Data Program (UCDP) at the Department of Peace and Conflict Research, Uppsala University and the Centre for the Study of Civil War at the International Peace Research Institute in Oslo (PRIO). Version 4-2008 is updated in accordance with the changes

in the Appendix.[14] In the sequel, we refer to a political 'upheaval' or 'crisis' as a situation in which at least one of the state failure events listed above takes place during a given year. Political crises are listed in Table A1 of the Appendix.

For expropriation, we rely on Tomz and Wright (2010) unique database, which covers the period 1929-2005.[15] Tomz and Wright (2010) embraced Kobrin (1980, 1984)'s definition of expropriation (i.e., (a) a government taking ownership of a firm; (b) a government forcing foreigners to sell all or part of their investments; (c) a government taking control of foreign direct investment without becoming an owner; and (d) a government forcing investors to accept a substantial change in the terms of their contract). Table A1 in the Appendix presents their gathered data for African countries.

For currency crises, we build on Frankel and Rose (1996), who define a currency crisis as a depreciation of a currency by at least 30%, with at least a 10% increase in the rate of depreciation compared to the previous period. We work on quarterly nominal exchange rate data provided by the IMF. Currency crises are computed quarterly, and any year including at least one currency crisis is reported as a year of crisis. Fixed exchange rate regimes are treated in a similar way. A fixed exchange rate country experiences a currency crisis if its nominal exchange rate suffers a devaluation of at least 30% during a given year. Table A1 in the Appendix reports currency crises for African countries for the period 1965-2008.

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listed in Harbom, Melander, and Wallensteen (2008).

[14] Rotberg (2003) proposes criteria to differentiate weak, failed, and collapsed states. Weak states traditionally harbor ethnic, religious, linguistic, or intercommunal conflicts that have not yet become violent, while failed and collapsed states are marked by warring factions. Our definition of political upheaval is close to the criteria of failed and collapsed states, as all our above-defined states of failure (except occasionally adverse regime changes) involve violence and death.

[15] Unfortunately, this database does not cover the last years of our time frame (i.e., 2006, 2007, and 2008). As most expropriations occur at the beginning of the period (see section 3.2), these missing data should not modify our main results. The Tomz and Wright (2010) database includes only countries in which the U.S. invests. Consequently, we lack information on expropriation in Comoros and Sao Tome and Principle. The authors' database also does not include creeping expropriations per se, namely the decision of a government to squeeze businesses through taxes, regulations, and the like.

In order to construct our banking crisis series, we compiled four existing databases: Caprio et al. (2005), Honohan and Laeven (2005), Reihnart and Rogoff (2008a), and Laeven and Valencia (2010).[16] Episodes of banking crises can be classified as isolated events or systemic crises. In isolated events, one or a few banks show signs of stress, whereas, in systemic crises, the entire banking system is shaken. Any bank distress, whether systemic or not, may result in potential losses. Our comprehensive database thus includes both systemic and isolated episodes. In the case of discrepancies across databases or a lack of end dates for banking crises, we refer to the timing of the crisis as it appears in IMF annual country reports (Article IV). Table A2 in the Appendix lists our banking crisis episodes. Our database covers the 1975-2008 period.

A sovereign crisis corresponds to a government's incapacity or near-incapacity to realize payments on principal or interest falling due on its debt. We propose a unique database of sovereign crises which encompasses sovereign defaults on both loans and bonds and which accounts for near-default episodes.[17] For defaults on sovereign bonds issued in local and foreign currency, we rely on Standard and Poor's (2006), which we complement using Reinhart and Rogoff (2008b). Countries' defaults on loans are more difficult to capture because of limited information. We record loan default episodes from the Paris Club and near-default episodes from the International Monetary Fund (IMF) as sovereign defaults on loans. The Paris Club is in charge of renegotiating bi-lateral loans.[18] We scrutinize its debt renegotiation episodes and exclude renegotiations occurring in the framework of the debt reduction of highly indebted countries (HIPC) which do not reflect sovereign defaults. Countries under the HIPC program benefit from a three-stage debt renegotiation, the last one known

[16] These papers define a banking crisis as a banking sector difficulties (e.g., drops in share prices, loss of asset values following bubbles bursting, or bank runs) leading to closures, mergers, takeovers by the public sector, or large-scale liquidity support provided by central banks.As noted by Reinhart and Rogoff (2008b), banking crises are defined through events and not through data. Indeed, the price of bank stocks cannot be used in a cross-country study, as most banks in the developing world are not publicly traded.

[17] Note that numerous indicators (such as debt over GDP, central banks foreign assets, etc.) could be used to define a sovereign crisis. We rely on an event-based definition, which is more appropriate in our context.

[18] The London Club handles renegotiations between countries and private banks holding their loans. Unfortunately, London Club data are not publicly available and could not be included in our database.

as the "Cologne term" allowing for up to 90% debt cancellation. We infer that all renegotiation episodes other than HIPC correspond to post-sovereign defaults.[19]

We also include near-default episodes as defined by Manasse and Roubini (2009). Near-default episodes are crisis episodes during which an IMF Standby or Extended Fund Facility (EFF) programs prevent a full-fledged government default—the crisis did happen but did not actually lead to sovereign default.[20] We only include Standby and Extended Fund Facility program data with amounts higher than the country's IMF quota.[21] As for the Paris Club HIPIC program, IMF's poverty alleviation programs (i.e., the Structural Adjustment Facility (SAF) and the former famous Poverty Reduction and Growth Facility Program (PRGF), recently replaced by the Extended Credit Facility (ECF)) are excluded from our database. Our definition of a sovereign crisis is particularly extensive. By including Paris Club renegotiations, regardless of the amount of debt rescheduling, we account for far more crises than the previous literature on the subject. For example, we uncover four crises in Algeria, against one in Manasse and Roubini (2009) or Reinhart and Rogoff (2008b), or nine crises in Nigeria, against five in Reinhart and Rogoff (2008b). All our additional crisis events correspond to Paris Club renegotiations. Table A3 in the Appendix reports our sovereign crisis episodes over the 1965-2008 period.

[19] The date of renegotiation may not perfectly match the timing of the crisis. The crisis event (i.e., incapacity to provide debt payments) may occur in the year prior to the Paris Club renegotiation. We carefully compared the Paris Club dates with reported crisis dates from other sources when they exist. We did not find any consistency in the Paris Club dates' bias. In many cases, dates coincide. We thus decided to keep renegotiation dates as proxies for sovereign crises.

[20] As argued by Reinhart and Rogoff (2008b), referring to Thailand and Korea in the late 1990s, countries that avoid sovereign default through massive loans from the IMF usually suffer traumas similar to those of defaulting countries.

[21] The Standby program is an IMF lending facility established in 1952 through which a member country can use IMF financing up to a specified amount to overcome short-term or cyclical balance of payments difficulties. Instalment releases are conditional upon members meeting performance criteria, such as monetary and budgetary targets. The EFF program is an IMF lending facility established in 1974 to assist member countries in overcoming balance of payments problems which stem largely from structural problems and require a longer period of adjustment than is possible under a Stand-By Arrangement.

3.2 African Crises: First Evidences

In this section we provide evidence on the number and frequency of crises in the African continent (per year and country). Table 1 presents the number of crises by type and country, while Table 2 provides an overview of crises' frequency. Unsurprisingly, the average number of political upheavals is high and varies greatly across countries. An average country experiences more than 11 years of political turmoil between 1965 and 2008, with a maximum (resp. minimum) of 43 (resp. 0) crisis years over the period. The GDP-weighted mean presents an even larger coefficient, suggesting that bigger countries are more crisis-prone. Such findings may reflect the higher instability of resource-rich countries evidenced in the natural resource curse literature. Gylfason (2011) finds that, in most African countries, 80% of tangible capital is related to natural resources, while Collier and Hoeffler (2004, 2005) argue that natural resources may provide a motive for armed rebellions and find a statistical association between the importance of natural resources and the probability of internal conflicts. For example, civil wars in Angola and Zaire (Congo) have been associated with natural resources, and the oil-rich Nigeria has suffered a civil war (the Nigeria-Biafra '67-70 war) and numerous military coups since its independence.

Banking and sovereign crises occurred quite frequently, with an average of respectively 5.2 and 4.8 years per country over the period. Once again, the situation is very different across countries, with a maximum of 17 years (resp. 23 years) of banking crises (resp. sovereign crises). For these two types of event, country size does not seem to matter much. Finally, expropriations are scarce (about two crisis events on average), and with an average of 2.4 years of crisis, African countries also experienced a limited number of currency dips.

Table 1. Number of Crises by Country (1965-2008)

Country	Expropriation	Currency crisis	Political crisis	Banking crisis*	Sovereign crisis
Algeria	9	2	18	5	4
Angola	1	5	40	6	3
Benin	2	1	2	5	4
Botswana	0	0	0	2	0
Burkina Faso	0	1	3	7	3
Burundi	0	2	29	5	1
Cameroon	1	1	2	11	4
Cape Verde	0	0	0	1	0
Central African Rep.	2	1	7	17	7
Chad	2	1	40	12	3
Comoros	0	1	6	0	0
Congo, Dem. Rep. of	8	6	22	14	10
Congo, Rep. of	5	1	6	11	5
Djibouti	0	0	6	5	2
Egypt	3	4	12	8	3
Equatorial Guinea	0	3	11	3	4
Eritrea	0	2	6	1	0
Ethiopia	2	1	43	2	3
Gabon	2	1	0	1	12
Gambia	2	1	2	8	1
Ghana	5	4	4	9	4
Guinea	3	2	2	3	4
Guinea-Bissau	0	4	12	4	3
Ivory Coast	1	1	7	4	15
Kenya	3	1	7	10	3
Lesotho	1	2	3	1	0
Liberia	2	1	14	5	23
Libya	6	1	1	0	0
Madagascar	5	4	1	1	10
Malawi	3	3	0	0	3
Mali	0	1	9	5	4
Mauritania	2	1	5	10	6
Mauritius	0	0	0	1	0
Morocco	5	3	17	9	7
Mozambique	5	3	27	9	7
Namibia	2	2	0	0	0
Niger	6	1	8	14	8
Nigeria	0	4	17	6	18
Rwanda	0	4	15	1	2
Sao Tome and Principe	0	4	0	14	1
Senegal	1	1	12	4	11
Seychelles	0	1	0	0	0
Sierra Leone	1	8	14	7	9
Somalia	1	7	30	0	2
South Africa	0	2	31	3	3
Sudan	3	4	35	0	5
Swaziland	1	2	1	5	0
Tanzania	5	3	1	11	5
Togo	1	1	1	3	3
Tunisia	0	0	1	5	7
Uganda	4	6	42	3	7
Zambia	8	7	6	4	7
Zimbabwe	1	9	17	5	9

* The banking crises database covers the 1975-2008 period. Source: Authors' calculations.

Table 2: Descriptive statistics – 53 African countries 1965-2008

Variable	Obs	Mean	Std. Dev.	Min	Max	Mean (weighted)
	(1)	(2)	(3)	(4)	(5)	(6)
Expropriation	2332	2.15	2.37	0	9	2.90
Political Crisis	2332	11.23	12.55	0	43	19.56
Currency Crisis	2332	2.41	2.18	0	9	2.66
Banking Crisis	1802	5.21	4.34	0	17	5.31
Sovereign Crisis	2332	4.81	4.73	0	23	4.82

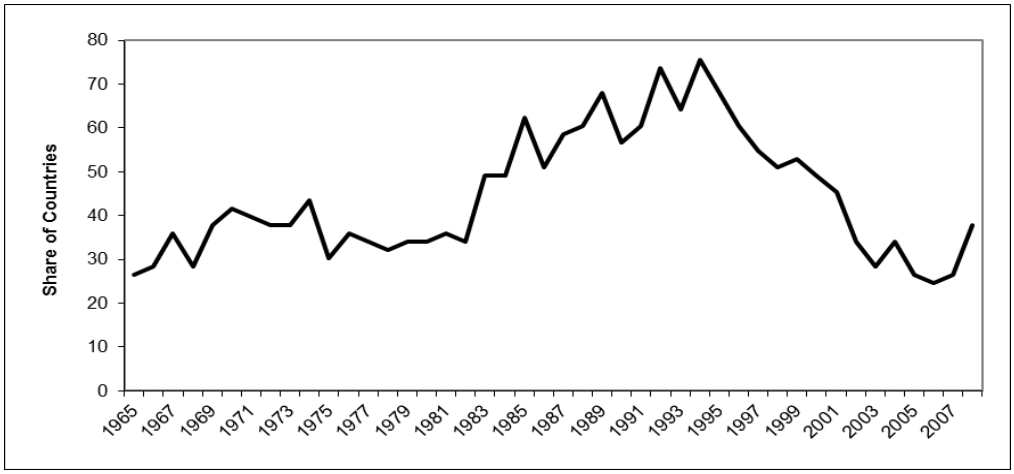
Note: Column (2) provides the average number of crises per country across different years, whereas column (6) exhibits the GDP-weighted average, where weights are defined as the period-average share of a country's GDP in African GDP. Banking crises cover the 1975-2008 period. Source: Authors' calculations.

Figures 1 displays the number of countries in crisis in a given year. A country is said to be in crisis a given year if it is hurt by at least one of the five types of crisis listed above (i.e., political, expropriation, currency, banking or sovereign). Strikingly, in the 1980s and 1990s, the share of countries in situation of crisis reaches 80%. In the last decade, the share of countries in crisis attained a low of 20%.

Figure 2 reports the observed number of crises by type over the sample period. The 1980s-1990s' peak in crisis observed in Figure 1 is mainly due to a surge in banking and sovereign problems. Most banking crises occurred in the late '80s and the '90s. This corresponds to a period of liberalization and deregulation across the board, which entailed a rise in banking crises in developing countries (Demirgüç-Kunt and Detragiache 1999). Sovereign crises are particularly important in the 1980s and early 1990s. Reinhart and Rogoff (2008b) highlight the importance of dropping commodities prices and reduced capital inflows as explanatory variables for the surge in sovereign defaults in this period in Africa and other emerging markets. A large share of countries endured multiple banking and sovereign crises over the period (e.g., 13% of African countries faced 11 to 15 years of banking crises and 23% endured 6 to 10 years of sovereign crises).[22]

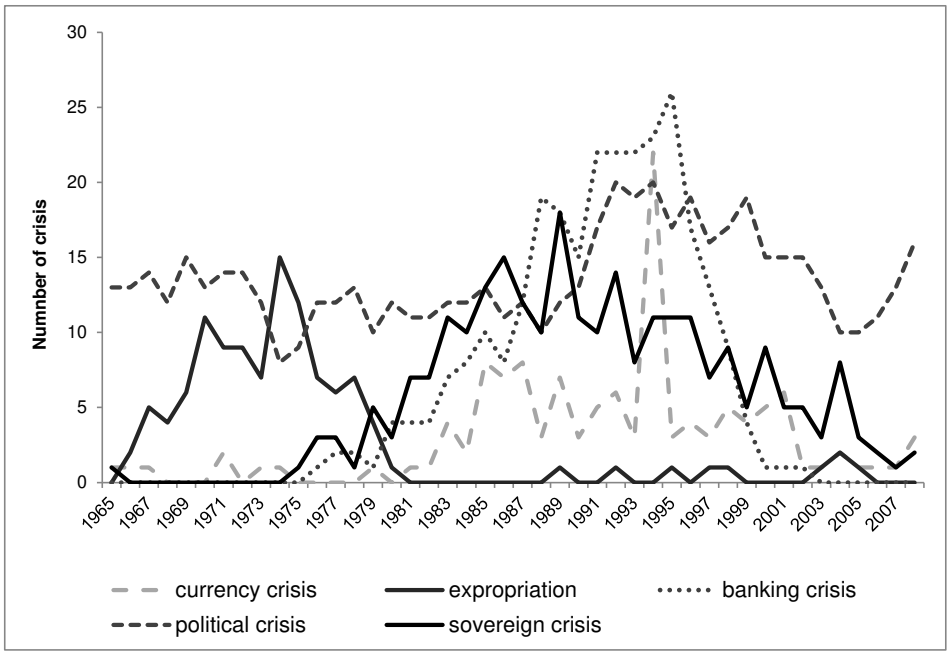
[22] Table A4 in the Appendix provides information on the share of countries experiencing a crisis by number of occurrences. For example,58% of African countries faced between one and five years of expropriation over the period, while very few countries experienced 6 to 10 years of expropriation and

Figure 1: Share of countries facing a crisis (in %)



Source: Authors' calculations

Figure 2: Number of crises by type



Source: Authors' calculations.

As depicted in Figure 2, a peak of currency issues hit Africa in 1994 as the CFA franc was devalued against the French franc, thus affecting almost one-third of African

none more than 10 years. Concerning sovereign crises, 49% of the countries had between one and five years of crisis, 23% faced between 6 and 10 years of sovereign crisis, and 6% experienced 11 to 15 years of sovereign crisis. Note that years may be subsequent or not.

countries. Between 1965 and 2008, most African nations (i.e., 90%) actually faced at least one currency crisis. These crises are however relatively infrequent, with few countries facing more than five crises over the period. Expropriations cluster in the 1970s, with almost no occurrences since the 1980s, as expropriation have progressively disappeared as an instrument for Least Developed Countries (LDC) policy (Minor, 1994). Figure 2 reveals a pattern where sovereign crises stand as a substitute for expropriation. As argued by Tomz and Wright (2010), the possibility to renegotiate debt and/or borrow from the IMF may have reduced the need for revenue through expropriations. Although 68% of the countries went through some expropriation events, most countries (87% of them) experienced less than five years of crisis from 1965 to 2008. Expropriation crises thus appear relatively scarce and outdated.

Finally, the number of political upheavals is quite stable over the period, fluctuating between 10 and 20 occurrences per year.[23] This latter number corresponds to situations where more than a third of the African continent is torn by political turmoil. There is a large pool of countries with almost uninterrupted political crises. Although about 26% of our sample countries experienced less than five years of political upheaval, 19% of the countries have gone through more than 20 years of political crises (see Table A4 in the Appendix).

In sum, expropriation and currency crises do not seem particularly severe in Africa. Sovereign and banking crises used to be frequent but have receded since the beginning of the 21st century. The prevalence of political upheavals is however a genuine specificity of the continent which probably weighs on investors' risk perceptions due to the stigma attached to these highly mediatized events and the important weight granted to political factors in widespread credit ratings and 'country risk' evaluation models. Investigating the forecasting power of political upheavals on 'financial insecurity' in all its dimensions (i.e., expropriation events and banking,

[23] Armed conflicts and ethnic wars are the most frequently observed types of political upheavals with respectively 8 and 4 average occurrences per country over the 1965-2008 period. Then come revolutionary wars (3 average occurrences per country), and finally regimes changes and genocides (2 average occurrences per country).

currency, or sovereign crises) is thus of particular relevance for Africa. The next sections will provide more insights into these cross-crisis contagion effects.

4. Empirical strategy

Our empirical methodology is set out below. We direct our effort toward avoiding multicollinearity and overfitting issues in a framework where potential predictors are numerous and strongly correlated. This is achieved through the use of a 'forward step AIC/BIC procedure', which consists in adding predictors one by one, as long as this leads to a decrease in the selected information criterion. In addition, our study of the cross-crisis contagions faces the problem of entangled cross-crisis and temporal contagion effects. For example, if banking crises are statistically associated to currency crises, we cannot know for sure that a proper contagion effect from currency to banking crises is involved since this effect may be due to lingering banking crises causing currency crises at some stage.[24] On way to solve this issue is to control for past banking crisis occurrences when trying to explain banking crises by currency crises. However, in order to reduce the number of predictors to be simultaneously introduced in the regressions, we separately addressed the problems of temporal and cross-crisis contagions. In a first step, we derive, from the analysis of crisis hysteresis effects, the list of *onsets* of crisis for each country and each type of crisis. In a second stage, we try to predict onsets of crisis from the occurrence of other types of crisis in the same country. By predicting onsets of crisis instead of outright crisis events, we get rid of the problem of serial correlation and are able to identify contagion effects between related types of crisis. To come back to our illustrating example, if the occurrence of a currency crisis predicts a higher conditional probability of observing an *onset* of banking crisis the same or following year, we will consider that an effect of 'contagion' is identified from currency to banking crises.

[24] Assume, for instance, that a banking crisis, lasting from year t to t + 4, degenerates into a currency crisis at year t + 1. In this case, there is contagion from banking to currency crisis at t + 1. The subsequent occurrence of a banking crisis at t + 2 should not lead us to infer however that a contagion effect from currency to banking crisis occurred at t + 2.

4.1 Onsets of crises: Analysis of time-clustering effects

In order to define the onset of a crisis as the 'first event dissociated from previous crisis clusters in a given country', we analyze the way past crisis occurrences predict future crises of the same type in the same country.

4.1.1 Methodology

For a given specification, the conditional probability of observing a crisis in country *i* at year *t* is derived from a logit model of the following type:

$$\ln\left(\frac{p_{it}}{1-p_{it}}\right) = \alpha + \lambda_i + \sum_{j=1}^{N} \beta_j X_{t-1}^{j} \qquad (1),$$

where p_{it} is the probability of observing a crisis in country *i* at year *t*, λ_i is a country-dependent fixed effect, and the variables X_{t-1}^{j} (j=1,2,…,N) are the crisis predictors, which in our setting correspond to past crisis events of the same type. [25]

The associated log-likelihood is:

$$LL = \sum_{i,t}\left[(1-Y_{it})\ln(1-p_{it}) + Y_{it}\ln p_{it}\right],$$

where Y_{it} is the binary variable that equals 1 if there is a crisis in country *i* at time t and 0 otherwise.

The investigation of crisis determinants faces two important issues. First, as model variables are strongly correlated, statistical inference may be fraught with multicollinearity issues. Second, there is a risk of overfitting the model to past data, if too many crisis predictors are simultaneously introduced in the regression. Overfitting leads to unrobust prediction models that are highly sensitive to the inclusion of new

[25] We estimate conditional, instead of outright, logit models to avoid well-known bias due to incidental parameters problems associated with the introduction of fixed-effects in non-linear probability models.

data and which generally perform badly out-of-sample. As recommended by Granger et al. (1995), we thus carry out a model selection approach through the minimization of two different information criteria.

We use the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) which attempt to strike a tradeoff between model goodness-of-fit and model robustness (how sensitive the model is to an error or an addition in the crisis data). These are computed as weighted averages of the model log-likelihood and the number of model parameters. The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are defined as:

$$AIC = -2\left(LL - (N+1)\right)$$
$$BIC = -2\ LL + \log(T)(N+1)$$

where T is the number of country-years in the sample.[26]

Given that the set of possible models increases exponentially with the total number of potential predictors, we opt for a sequential model search process that includes predictors one by one. More precisely, the "forward step AIC/BIC" methodology starts with the univariate model that carries the highest information and sequentially adds explanatory variables, retaining them if they lead to an increase in the model's quality (i.e., a decrease in the information criterion).[27] The retained threshold for statistical significance is 5%.[28]

We introduce two types of explanatory variables to characterize temporal contagion effects: Rolling windows crisis frequencies and distance to last crisis. The former are continuous variables representing the frequency of crises of the same type in the same

[26] The Bayesian Information Criterion gives more weight to the robustness issue than the Akaike Information Criterion.
[27] Variables are added as long as the improvement in the quality of the fit is sufficient to make up for the loss in robustness due to additional model complexity.
[28] We also tested the "backward step AIC/BIC" method. This method consists in estimating the full model and sequentially removing an explanatory variable if this removal leads to a decrease in the information criterion. Our results are robust to this alternative methodology.

country within a rolling window of n years. Hence, this variable characterizes the "nearby" density of crises over the recent past. The second group of variables characterizes the *distance to last crisis*. These variables carry information on the time elapsed since the occurrence of the last crisis of the same type in the same country. We denote $X^{(n)}$ the dummy variable equal to 1, if a crisis occurred n years or less before the evaluation date and 0 otherwise. We simultaneously introduce the variables $X^{(n)}$ for n=1,2,…,10 in order to capture memory patterns where the conditional probability of observing a crisis gradually decreases non linearly with the time elapsed since the last crisis.

Figure 3
Memory pattern

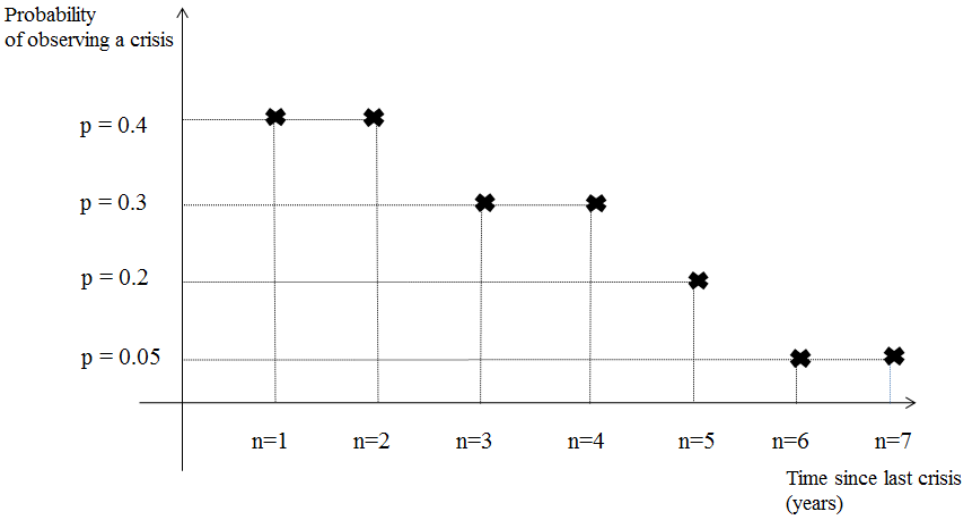


Figure 3 is an example of a memory pattern where the probability of observing a crisis is a linear combination of the variables $X^{(2)}$, $X^{(4)}$ and $X^{(5)}$. The risk is maximal (probability of 40%) when the previous crisis occurred one or two years before. It decreases to 0.3 if the previous crisis occurred three or four years before, and declines further to 0.2 if the previous crisis happened exactly five years before. After six years, the risk remains at a low 5% and no longer depends on the distance to last crisis occurrence.

4.1.2 Defining onsets of crises

Table 3 and 4 report the results of conditional logit estimations on our BIC-selected models for temporal contagions.[29] In these tables, we only report variables that have been selected through the BIC forward selection method (all others have been ruled out of the model based on this criterion).

Hysteresis effects are very strong for banking and political crises events, for which the conditional crisis likelihood markedly increases with the occurrence of a crisis the preceding year. These results reflect the temporal contagion effects present in banking crises: A run on a large bank usually triggers chain reactions across interconnected banking systems. The one-year hysteresis affects all types of political upheavals. Uprisings, armed conflicts or ethnical wars indeed unleash sequences of retaliations, repressions and/or counter-revolutions, which causes a protracted climate of tension before the situation settles down.

Regarding expropriation, currency, and sovereign crises, there is once again evidence of temporal clustering effects, but the lagged occurrence the preceding year is now irrelevant. Expropriation events have the longest memory, with past events predicting future occurrences up to six years ahead. Sovereign crises present an interesting memory pattern, as the conditional probability of observing a crisis only depends on occurrence in any of the past four years. In the years immediately following a debt renegotiation, countries traditionally try to remain current on their obligations. Post-default countries may also see their access to international financing reduced due to a loss of reputation (Eaton and Gersovitz, 1981) or to the legal nature of debt contracts (Bulow and Rogoff, 1989). These patterns help explain the absence of short memory in sovereign crises.

[29] The number of observations differs markedly across regressions. This is because banking crises are recorded only from 1975 onwards and because the 'distance to last crisis' variable becomes known only after at least 10 years have elapsed without crisis or after one crisis has occurred (the date of first crisis being different for each country and crisis type).

Table 3: Temporal crisis contagions (financial crises)

53 African countries from 1965 to 2008

	Currency	Banking	Sovereign	Expropriation
Distance to last crisis				
less than one year		2.44		
		0.17***		
less than two years				0.88
				0.27***
less than three years	1.11			
	0.19***			
less than four years			1.12	
			0.15***	
less than six years				1.93
				0.36***
Country-fixed effects	Yes	Yes	Yes	Yes
Pseudo R2	0.070	0.12	0.076	0.17
Obs.	1878	1348	1863	1939
Countries	53	53	53	53
Period	1966-2008	1977-2008	1966-2008	1967-2008

Notes: Estimation of the temporal contagion logit model with predictive variables relating to past crisis occurrences. The variable "less than n years" equals 1 if a crisis occurred n years or less before the date under consideration. All variables that do not appear in Table 3 have been ruled out of the model based on the BIC forward selection method. Standard errors are reported below the estimated logit model coefficients. *** indicates significance at the level of 1%.

Table 4: Temporal crisis contagions (political crises)
53 African countries from 1965 to 2008

	Reg chg	Genocide	Ethnic war	Rev war	Armed conflict	Any political crisis
Distance to last crisis						
less than one year	2.59	2.86	2.71	2.96	1.40	1.64
	0.23***	0.36***	0.24***	0.27***	0.19***	0.18***
Rolling frequency						
five years					0.61	0.52
					0.25**	0.22**
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R2	0.22	0.33	0.22	0.27	0.078	0.11
Obs.	1895	1844	1918	1864	1913	1948
Countries	53	53	53	53	53	53
Period	1966-2008	1966-2008	1966-2008	1966-2008	1970-2008	1970-2008

Notes: Estimation of the temporal contagion logit model with predictive variables relating to past crisis occurrences. The variable "less than n years" equals 1 if a crisis occurred n years or less before the date under consideration. All variables that do not appear in Table 4 have been ruled out of the model based on the BIC forward selection method. Standard errors are reported below the estimated logit model coefficients. ***, ** indicate significance at the level of 1 and 5% respectively.

4.2 Analysis of cross-crisis contagion

Our aim is to analyze contagion effects across crisis types, investigating in particular whether African crises comply with the well-known contagion mechanisms evidenced in the literature between currency, sovereign, and banking crises. As political upheavals are a salient feature of the African continent, we also explore the cross-predictive power of political and financial crises.

For this purpose, we examine the way in which onsets of crisis in a given country may be predicted from crises of other types in the same country. A crisis event is assumed 'independent of past crisis realizations' if it occurs at least n years apart from the previous crisis event of the same nature in the same country. Here, n is a crisis-dependent time lag related to the memory time of each type of crisis as estimated in Section 4.1. It corresponds to the number of years after which the conditional probability of observing a crisis becomes independent of the time elapsed since the last crisis (n is one for banking crises, five for political upheavals, three for currency crises, four for sovereign crises, and six for expropriation events).

Having properly defined onsets of crisis, we estimate the following logit model:

$$\ln\left(\frac{p_{it}}{1-p_{it}}\right) = \alpha + \sum_{j=1}^{N} \beta_j X_{t-1}^{j} + \sum_{j=1}^{N} \beta_j X_{t}^{j} \qquad (2),$$

where p_{it} is the probability of observing a crisis in country *i* at time *t*, *conditional on observing no crises of the same type in the n years preceding the evaluation date*.

Our purpose is to provide grounded information on the predictive power of crises on other types of crises, which limit concerns related to potential endogeneity issues caused by omitted variables (e.g., observing a banking crisis may infer a higher probability of a sovereign crisis, although we do not assess whether the banking crisis

actually *caused* the sovereign one). In order to capture infra-year contagion effects, this within-country contagion model includes both lagged and contemporaneous crises as predictive variables. The explanatory variables X_{t-1}^{j} and X_{t}^{j} are therefore binary variables representing occurrences of other crisis types in the same country at times (t -1) and t respectively.

The list of predictors used is: currency, banking and sovereign crises, expropriations, regime changes, ethnic wars, revolutionary wars, armed conflicts and genocides (at years t and t -1). We do not include country-fixed effects in this setting because of the limited number of crisis occurrences (only zero to two onsets of specific financial crises per country on average over the 1965-2008 period), which impedes drawing reliable inferences on country effects. As n and the number of onsets of crisis differ across crisis types, the number of observations differs accordingly. We have alternatively used the AIC and BIC criteria in the current analysis to establish a distinction between 'first-order contagion effects' (those passing the more stringent BIC criterion) from 'second-order contagion effects', passing the AIC criterion only. In the following tables, numbers in bold refer to variables that were selected by the BIC criterion.

5. Results

Our results for onsets of financial crises (i.e., cross-crisis contagion) are reported in Table 5. Our findings confirm the 'twin' nature of banking and currency crises (Kaminsky and Reinhart 1999). Everything else equal, the probability of an onset of banking crisis is multiplied by four if the country faced a currency crisis the preceding year.[30] The transmission mechanisms are well known: currency crises may lead to a depositors' bank run and to the deterioration of banks' loan portfolios. Conversely, banking crises may initiate currency runs, as observed in Thailand during the 1997 Asian crisis. This is confirmed in our African dataset since banking crises predict onsets of currency crises at level 5%. Observing a banking crisis multiplies by

[30] The unconditional probability of observing an onset of banking crisis is 4.1%.

2.1 the probability of onset of currency crisis the subsequent year (the unconditional probability being 4.3%). Interestingly, the impact of past currency events on onsets of banking crises appears more significant (statistically and economically) than the other way round. This suggests that contagions are even more powerful when they evolve from currency to banks.

We also find the expected strong association between banking and sovereign crises, particularly from banking problems to onsets of sovereign defaults (Reinhart and Rogoff 2008a, 2008b and 2011). The conditional probability of an onset of sovereign crisis is as high as 19.7% if a banking crisis occurred the same year, up from 5.6% for the unconditional probability. Governments indeed have a tendency to rescue ailing banks due to the systemic nature of banking crises. In so doing, they undermine their financial profile through money creation or additional debt. Moreover, credit crunches are associated to a contraction of economic activity, further impairing government budgets. Conversely, sovereign defaults generally affect the banking system through the depreciation of bank-held sovereign debt and the erosion of the state guarantee accruing to local banks. The probability of a banking crisis conditional on a sovereign crisis the same year jumps to 8.2%, from an unconditional probability of 4.1%.

Currency and sovereign crises mutually predict each other at the infra-year level. Indeed, sharp currency devaluations often entail solvency problems for sovereigns (if sovereign debt was issued in a foreign currency), while sovereign crises may lead to debt monetization and currency debasement. There is evidence of both effects in our sample of African countries, with a statistical significance of 1%. The probability of an onset of currency crisis (resp. sovereign crisis) conditional on sovereign crisis (resp. currency crisis) is 11.2% (resp. 20.7%), up from an unconditional probability of 4.3% (resp. 5.6%). Therefore, banking, currency and sovereign crises are 'triplet crises' -- any type of crisis among the group predicts and is predicted by the two other types of crisis. Contagions involving sovereign crises are always observed at the infra-year level: Whereas onsets of banking (resp. currency) crises are predicted with

a lag, onsets of sovereign defaults are often concomitant with outbreaks of banking or currency meltdowns.

Table 5: Cross-crisis contagions (onsets of financial crises)

53 African countries from 1965 to 2008 [31]

	Currency	**Banking**	**Sovereign**	**Expropriation**
Currency t-1		**1.42**		1.16
		0.35* **		0.57**
Currency t			1.31	
			0.36***	
Banking t-1	0.72			
	0.30**			
Banking t			**1.26**	
			0.31* **	
Sovereign t	**0.97**	0.68		
	0.29* **	0.33**		
Political t-1			0.56	1.55
			0.29**	0.57***
			armed conflict	reg change
Pseudo R2	0.034	0.036	0.068	0.040
Obs.	1475	1473	1142	1664
Countries	53	53	53	53
Period	1978-2008	1976-2008	1979-2008	1971-2008

Notes: Estimation of the cross-crisis within-country contagion logit model using as a dependent variable the onsets of financial crisis and as predictive variables the occurrences of different types of crisis the preceding or same year in the same country. All variables that do not appear in Table 5 have been ruled out of the model based on the forward step AIC selection method. Numbers in bold face indicate that the variable was also selected by the more stringent BIC criterion. Standard errors are reported below the logit model coefficients. *** and ** indicate significance at the level of 1 and 5% respectively.

Finally, currency crises, which go hand by hand with depleting foreign reserves, may give rise to expropriations. This is reflected in the predictive power of currency crises on onsets of expropriation. The conditional probability of an onset of expropriation is

[31] This table only reports the explanatory variables selected through the AIC/BIC information criterion methodology. This explains the low number, and high significance, of dependent variables in the table.

4.1% if there is a currency crisis the preceding year, with an unconditional probability standing at 1.3%.

Let us now turn to the analysis of the relation between political and financial events. The impact of political turmoil on financial risk is often explained in the literature by the fact that wars, or 'coups', may lead to sudden sovereign debt repudiations and drastic revisions in property rights, thereby increasing the level of stress and uncertainty for investors and possibly giving rise to brutal capital flights and banking or currency problems. The contagions unfolding from financial to political turmoil are explained, for their part, by the fact that financial crises create an environment of exacerbated anxiety and chaos that may crystallize the anger of the population, hence providing a fertile ground for riots, ethnic and social conflicts, or assaults of politically organized groups on the authority of the incumbent government.

Two of our results support the existence of contagions from the political to financial spheres (Table 5). First, the contagion observed from regime changes to expropriation may suggest that the 'necessity' or desire to expropriate foreign investors serves as a motive to overthrow an incumbent government perceived as too favorable to foreign interests in periods of crisis. It may also reveal that new regimes feel relieved from the obligations towards foreign companies supported by their predecessors. This finding has however lost some of its relevance today since, as pointed out in Section 3, expropriation is less and less used as policy instruments in the LDC.[32] The second result that supports a link from political to financial risk is the predictive power of armed conflicts on onsets of sovereign defaults (significant at 5% level). The unconditional probability of an onset of sovereign default is 5.6% while this probability conditional on an armed conflict the previous year rises to about 10%. Note however that these results on the predictive power of political crises on financial crises do not pass the most stringent BIC model (only selected by the AIC model).

[32] The probability of an onset of expropriation conditional on observing a regime change the previous year is about 6.1%, up from an unconditional probability of around 1.3%. But the estimations is based mostly on events that occurred in the 70s' (e.g., Ethiopia in 1975 and Swaziland in 1974).

The analysis of political events, presented in Table 6, reveals interesting patterns as regards the links across political events themselves. Outbreaks of revolutionary wars and adverse regime changes are associated from their very definition (see Appendix). Ethnic wars logically erupt together with genocides, as do armed conflicts with ethnic wars and with revolutionary wars. The fact that infra-year contagion effects are systematically at play is noteworthy: Onsets of political crises are often concomitant.

Table 6: Cross-crisis contagion (onsets of political crises)

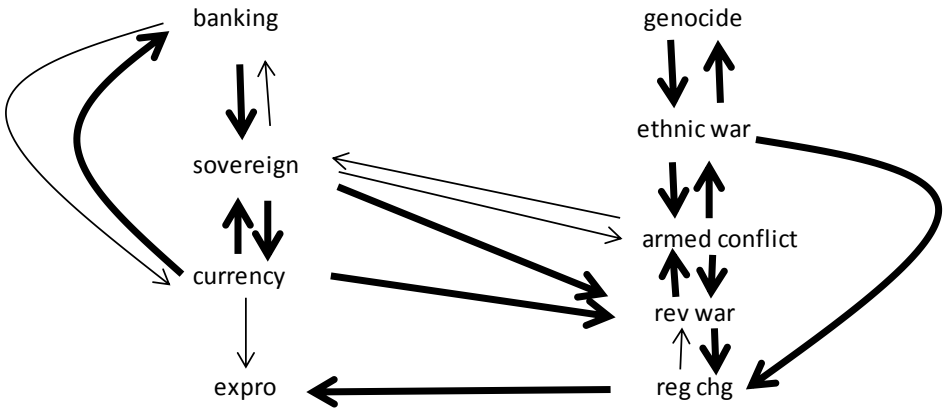
53 African countries from 1965 to 2008

	Reg change	**Genocide**	**Ethnic war**	**Rev war**	**Armed conflict**
Reg chg t				1.38 0.62**	
Genocide t			**3.36** **0.52***		
Ethnic war t	1.06 0.37***	**3.92** **0.78***			**2.6** **0.54***
Rev war t	**1.32** **0.40***				**4.34** **0.65***
Armed conflict t			**2.63** **0.46***	**2.54** **0.54***	
Currency t				1.65 0.57***	
Sovereign t -1				1.42 0.51***	
Sovereign t					0.99 0.41**
Pseudo R2	0.05	0.25	0.29	0.24	0.17
Obs.	2159	2166	1997	2124	1409
Countries	53	53	53	53	53
Period	1966-2008	1966-2008	1966-2008	1966-2008	1970-2008

Notes: Estimation of the cross-crisis within-country contagion logit model using as a dependent variable the onsets of political crisis and as predictive variables the occurrences of different types of crisis the preceding or same year in the same country. All variables that do not appear in Table 6 have been ruled out of the model based on the forward step AIC selection method. Numbers in bold face indicate that the variable was selected by the more stringent BIC criterion. Both lagged and contemporaneous effects are allowed in the model. Standard errors are reported below the logit model coefficients. *** and ** indicate significance at the level of 1 and 5% respectively.

A number of our results support the view that financial crises may diffuse to the political arena (Table 6). The most significant finding is the strong predictive power of sovereign and currency crises on onsets of revolutionary wars, an observation that fits well with the outburst of revolutionary war observed in Somalia in 1988, one year after a Paris club debt renegotiation.[33] The probability of observing an onset of revolutionary war rises to about 3% (resp. 6%) when a sovereign default (resp. currency crisis) is observed the previous (resp. same) year, up from an unconditional probability of less than 1%. We also observe a significant but weaker predictive power of sovereign crises on onsets of armed conflicts.[34]

Figure 5: Links between different types of crisis



Notes: Arrows point towards predicted onsets of crisis (from predicting crisis type). Thick line represents significance at level 1%, plain line at level 5%. *Rev war* stands for revolutionary war, *reg chg* for regime change and *expro* for expropriation.

Overall, we find a low level of contagion from political to financial crises: Political crises predict crises of the same type, but, bar a few exceptions (from regime changes

[33] Somalia suffered in the 1980s' from a period of protracted monetary instability. A first devaluation occurred in 1982 (this episode corresponds to an onset of currency crisis according to our conventions). 'Currency dips' were then observed without interruption from 1984 to 1989. A Paris club sovereign debt renegotiation intervened in July 1987. The 1988 cities bombing marked the beginning of the Somali civil war (an uninterrupted sequence of genocides, ethnic wars, revolutionary wars or armed conflicts has torn Somalia from 1988 onwards). Intriguingly, the currency meltdown of 1989 corresponds to the last full-fledged financial crisis recorded in our database.

[34] The probability of an onset of armed conflict conditional on a sovereign crisis the same year is 7.6%, up from an unconditional probability of 3.2%.

to expropriations, mainly in the 70s', and from armed conflicts to sovereign crises, only selected at 5% by the less stringent AIC model), do not significantly help in predicting crises of financial nature. Figure 5 presents the link between the different types of crises and shows the mutually predictive power of crises within blocks (across financial crises and across political crises). The Figure also illustrates the relatively low predictive power of political crises on financial crises.

6. Conclusion

Africa has been largely overlooked in the literature on financial crises. This paper helps fill this gap and provides several important contributions. First, compiling a unique crisis database covering 53 African countries since 1965 allowed us to assess the intensity of financial crises in Africa. Second, we propose a new statistical framework to disentangle temporal and cross-crisis contagion effects. The model selection procedure used in this paper deals with the multicollinearity issues arising from our framework and yields robust prediction models. Third, this paper confirms several features drawn from the financial crisis literature for Africa, namely the mutually predictive nature of banking and currency crises and the predictive power of banking crises on sovereign defaults. We add the insight that sovereign, banking and currency crises in fact all predict each other in the case of Africa. Finally, we revisit the link between political and financial crises, reaching two important conclusions. On the one hand, we find evidence of contagions running from financial crises to political crises (e.g. currency and sovereign problems predict outbreaks of revolutionary wars). On the other hand, we show that political upheavals have a relatively modest predictive power on outbreaks of financial crises in Africa.

This result may seem at odds with previous literature at first glance. Our findings could be explained by some specificities of the African continent (less open and liquid capital markets, sentiment of 'normalcy' of political crises due to their high frequency etc.). The relatively low development of the African banking and financial sectors is a fair concern. The fact, however, that we retrieve the well-known spillover effects between currency, banking and sovereign crises suggests that the usual

financial contagion channels are at work. An alternative explanation relates to our event-based analysis of political and financial risks (contagions occurring between *outbreaks* of political and financial instability). What we document is that, although Africa is not spared by financial crises, these crises occur somewhat independently of the violent and sensationalized political upheavals that tear the continent apart.

An important implication of our results is that investors should refrain from overreacting to punctual political events when assessing the risk of a near-term sovereign default or banking and currency meltdowns. This message has a particular relevance in Africa given the high prevalence of political conflicts in the continent. The origins of the low level of contagion from political to financial crises should be further investigated, stimulating cross-disciplinary research at the frontier between the political conflicts and financial crises literature.

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Appendix. Databases presentation

The Political Instability Task Force (PITF) dataset provides annual information covering the period 1955 to the most current year, and it compiles information from multiple sources covering ethnic wars, revolutionary wars, genocides and politicides, and adverse regime changes. Sequential events are treated as a single episode if less than five years have elapsed between the end of one event and the start of the next event.

The following definitions are adapted from Marshall, Gurr, and Harff (2009).

Revolutionary wars are episodes of violent conflict between governments and politically organized groups that seek to overthrow the central government, to replace its leaders, or to seize power in one region. Conflicts must include substantial use of violence by one or both parties to qualify as "wars." If the challenging group represents a national, ethnic, or other communal minority, the conflict is analyzed as an ethnic war, below. Political conflicts are considered revolutionary or ethnic wars if each party mobilizes 1000 or more people (armed agents, demonstrators, troops), and there must be at least 1000 direct conflict-related deaths over the full course of the armed conflict with at least 100 deaths for at least one year.

Ethnic wars are episodes of violent conflict between governments and national, ethnic, religious, or other communal minorities in which the challengers seek major changes in their status. As with revolutionary wars, there are the two minimum thresholds for including an ethnic war event in the PITF state failure dataset: each party must mobilize 1000 or more people and there must be at least 1000 direct conflict-related deaths over the full course of the armed conflict and at least one year when the annual conflict-related death toll exceeds 100 fatalities.

Adverse Regime Changes are defined as major, adverse shifts in patterns of governance, including major and abrupt shifts away from more open electoral systems to more closed authoritarian systems; revolutionary changes in political elites and the mode of governance; contested dissolution of federated states or secession of a substantial area of a state by extrajudicial means; and/or near-total collapse of central state authority and the ability to govern. Abrupt transitions from more authoritarian rule to more open, institutionalized governance systems are not included. The main criterion used to identify adverse regime changes is a drop of a minimum six points in the value of a state's POLITY index score, a measure of the institutionalized regime authority characteristics of the central state, over a period of three years or less. Such changes may be accomplished by coup, fiat, or popular referendum.

Genocide and politicide events involve the promotion, execution, and/or implied consent of sustained policies by governing elites or their agents—or in the case of civil war, either of the contending authorities—that result in the deaths of a substantial portion of a communal group or politicized non-communal group. In genocides the victimized groups are defined primarily in terms of their communal (ethnolinguistic, religious) characteristics. In politicides, by contrast, groups are defined primarily in terms of their political opposition to the regime and dominant groups.

We also rely on the UCDP/PRIO Armed Conflict Dataset in order to capture political instability related to violent conflicts with other countries. Uppsala Conflict Data Program (UCDP) built a conflict-year dataset with information on armed conflict where at least one party is the government of a state in the time period 1946-2013.

Armed conflict: As specific in Gleditsch et al. (2002), UCDP defines conflict as "a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths."

Table A1. Crisis Episodes

Country	Political Crisis (1965-2008)	Currency Crisis (1965-2008)	Expropriation (1965-2005)
Algeria	1991-2007	1991, 1994	1966-1968, 1970-1972, 1974, 1976, 1978
Angola	1965-2002, 2004, 2007	1996, 1998-2001	1978
Benin	1965, 1972	1994	1969, 1974
Burkina Faso	1980, 1985, 1987	1994	
Burundi	1965-1973, 1988-2006, 2008	1965, 1983	
Cameroon	1984, 1996	1994	1977
Central African Republic	2001-2003, 2005-2008	1994	1969, 1974
Chad	1965-1994, 1997-2002, 2005-2008	1994	1971, 1975
Comoros	1976, 1989, 1995-1997, 1999	1994	
Ivory Coast	2002-2008	1994	2003
Dem. Rep. of the Congo	1965, 1967, 1977-1979, 1992-2008	1994-1996,1998-2000	1966, 1968-1970, 1974-1975, 1997-1998
Congo, Rep of	1993-1994, 1997-1999, 2002	1994	1970, 1972, 1974-1976
Djibouti	1991-1994, 1999, 2008		
Egypt	1967, 1969-1970, 1973, 1992-1999	1979, 1989-1991	1967, 1989, 1995
Equatorial Guinea	1969-1979	1971, 1974, 1994	
Eritrea	1997-2000, 2003	1992, 2001	
Ethiopia	1965-1993, 1996-2008	1992	1975, 1978
Gabon		1994	1973-1974
The Gambia	1981, 1994	1986	1973, 1979
Ghana	1966, 1972, 1981, 1983	1967, 1971, 1999-2000	1972-1976
Guinea	2000-2001	1986-1987	1972, 1977, 1979
Guinea-Bissau	1965-1973, 1998-1999, 2003	1983, 1987-1988, 1996	
Kenya	1965-1966, 1969, 1982, 1991-1993	1993	1970-1971, 1975
Lesotho	1970, 1998-1999	1985, 2001	1992
Liberia	1980, 1985, 1989-1996, 2000-2003	1998	1972, 1977
Libya	1987	2002	1969-1974
Madagascar	1971	1973, 1987, 1994, 2004	1974-1978
Malawi		1994, 1998, 2000	1968-1969, 1971
Mali	1985, 1990-1995, 2007-2008	1994	
Mauritania	1975-1978, 2008	1992	1974-1975
Morocco	1965, 1971, 1975-1989		1967, 1970-1971, 1974-1975,
Mozambique	1965-1974, 1976-1992,	1987, 1991, 1993	1975-1979
Namibia		1985, 2001	2004-2005
Niger	1992,1994,1996-1997, 2008	1994	1967, 1971, 1973-1974, 1976, 1979
Nigeria	1965-1970, 1980-1985, 1996, 2004, 2008	1986, 1989, 1992, 1999	
Rwanda	1965-1966, 1990-2002	1966, 1990, 1994-1995	
São Tomé and Príncipe		1987, 1991, 1994, 1997	
Senegal	1990, 1992-2001, 2003	1994	1974
Seychelles		2008	
Sierra Leone	1967, 1971, 1991-2002	1983, 1985-1987, 1989-1991, 1997	1970
Somalia	1969, 1973, 1978, 1982-1984, 1986-2008	1982, 1984-1989	1970
South Africa	1966-1996	1985, 2001	
Sudan	1965-1972, 1976, 1983-2008	1992, 1994-1996	1970, 1976, 1978
Swaziland	1973	1985, 2001	1974
Tanzania	1978	1984, 1986, 1989	1967, 1971, 1973-1974, 1978
Togo	1986, 1991	1994	1972
Tunisia	1980		
Uganda	1966-1969, 1971-2008	1981, 1983, 1985, 1987-1989	1970, 1972, 1975, 1977
Zambia	1968-1972, 1996	1985-1986, 1989, 1992-1994, 2008	1968-1973, 1975, 1980
Zimbabwe	1967-1968, 1972-1979, 1981-1987	1997-1998, 2000, 2003-2008	2004

Table A2. Banking Crisis Episodes (1975-2008)

Country	Systemic Banking Crisis	All Banking Crisis
Algeria	1990-1994	1990-1994
Angola		1991-1996
Benin	1988-1992	1988-1992
Botswana		1994-1995
Burkina Faso	1990-1994	1988–94
Burundi	1994-1998	1994-1998
Cameroon	1987-1991, 1995-1997	1987-1993, 1995-1998
Cape Verde	1993	1993
Central African Republic	1976, 1995-1996	1976-1982, 1988-1999
Chad	1983, 1992-1996	1980s, 1992-1996
Côte d'Ivoire		1988-1991
Democratic Republic of the Congo	1983, 1991-1992, 1994-1998	80s, 1991-1992, 1994-1998
Congo, Rep off	1992 – 1994	1992– 2002
Djibouti	1991-1995	1991-1995
Egypt	1980	80-81, 90-95
Equatorial Guinea	1983	83-85
Eritrea	1993	1993
Ethiopia		1994-1995
Gabon		1995
Gambia		1985-1992
Ghana	1982-1983	1982–89, 1997
Guinea	1985, 1993	1985, 1993-1994
Guinea-Bissau	1995-1998	1995-1998
Kenya	1985, 1992-1994	1985-1989, 1992-1996
Lesotho		1988
Liberia	1991-1995	1991-1995
Madagascar	1988	1988
Mali	1987-1991	1987-1991
Mauritania	1984	1984-1993
Mauritius		1996
Morocco	1980-84	1980-84
Mozambique	1987 - 1991	1987 - 1995
Niger	1983-1985	1983–96
Nigeria	1991-1995	1991–95, 1997
Rwanda		1991
São Tomé and Príncipe	1992	1980s, 1992-1994, 1997
Senegal	1988-1991	1988-1991
Sierra Leone	1990-1994	1990-1996
South Africa		1977-1978; 1989
Swaziland	1995-1999	1995-1999
Tanzania	1987-1988	1987-1997
Togo	1993-1994	1993-1995
Tunisia	1991	1991-1995
Uganda	1994	1994-1996
Zambia	1995-1998	1995-1998
Zimbabwe	1995-1999	1995-1999

Sources: Capri et al. (2005), Honohan and Leaven (2005), Leaven and Valencia (2010) and Reinhart and Rogoff (2008). We performed further research on IMFarticle IV, letter of intent and memorandum of understanding in order to refine the banking crisis dates.

Table A3. Sovereign Crisis Episodes

Country	Sovereign Crisis	Sources
Algeria	1990-1991, 1993, 1995	Paris Club: 1990 and 1993; R&R (2008): 1991; IMF: 1995-1998.
Angola	1976, 1985, 1989	Paris Club: 1989; R&R (2008): 1985; S&P local currency bond: 1976.
Benin	1989, 1991, 1993, 1996	All Paris Club
Burkina Faso	1991, 1993, 1996	All Paris Club
Burundi	2004	Paris Club
Cameroon	1989, 1992, 1997, 2004	Paris Club except for 2004 which is a default in local currency bond (S&P 2006)
Central African Republic	1981, 1983, 1985, 1988, 1994, 1998, 2007	All Paris Club; 1981 and 1983 are also in R&R (2008)
Chad	1989, 1995, 1996	All Paris Club
Ivory Coast	1983-1987, 1989, 1991, 1994, 1998, 2000-2006	R&R (2008): 1983, 2000 is also in S&P as a default in foreign currency bond which lasted until 2006; The rest is Paris Club.
Dem. Rep. of the Congo	1976-1977, 1979, 1981, 1983, 1985-1987, 1989, 2002	All Paris Club
Congo, Rep of	1986, 1990, 1994, 1996, 2004	All Paris Club
Djibouti	2000, 2008	All Paris Club
Egypt	1984, 1987, 1991	Paris Club: 1987 and 1991; R&R (2008): 1984.
Equatorial Guinea	1985, 1989, 1992, 1994	All Paris Club
Ethiopia	1992, 1997, 2001	All Paris Club
Gabon	1987-1989, 1991, 1994, 1995, 1999-2005	Paris Club: 1987, 1988, 1989, 1991, 1994, 1995, 2000 and 2004; S&P local currency bond: 1999-2005; IMF: 1995-1999.
The Gambia	1986	Paris Club
Ghana	1979, 1982, 1986, 2001	Paris Club: 1986, 2001; S&P, default on local currency bond: 1979, 1982.
Guinea	1986, 1989, 1992, 1995	All Paris Club
Guinea-Bissau	1987, 1989, 1995	All Paris Club
Kenya	1994, 2000, 2004	All Paris Club; 1994 and 2000 are also in R&R (2008)
Liberia	1980-1981, 1983-1984, 1989-2006, 2008	Paris Club: 1980,1981,1983,1984; S&P default on local currency bond: 1989-2006; IMF: 2008-.

Table A3. Sovereign Crisis Episodes (cont'd)

Country	Sovereign Crisis	Sources
Madagascar	1981-1982, 1984-1986, 1988, 1990, 1997, 2000, 2002	All Paris Club except for 2002 whuch is an S&P local currency bond
Malawi	1982-1983, 1988	All Paris Club
Mali	1988-1989, 1992, 1996	All Paris Club
Mauritania	1985-1987, 1989, 1993, 1995	All Paris Club
Morocco	1983, 1985-1988, 1990, 1992	Paris Club: 1983, 1985, 1987, 1988, 1990 and 1992; R&R (2008): 1983 and 1986.
Mozambique	1984, 1987, 1990, 1993, 1996, 1998-1999	All Paris Club
Niger	1983-1986, 1988, 1990, 1994, 1996	All Paris Club
Nigeria	1982, 1986-1989, 1991-1992, 2000-2001, 2004-2005	Paris Club: 1986, 1989, 1991, 2000 and 2005; R&R (2008): 1982, 1986, 1992, 2001 and 2004; S&P default in foreign currency bond: 1986-1988,1992-2005.
Rwanda	1995, 1998	All Paris Club: 1998; S&P default in local currency bond: 1995.
São Tomé and Príncipe	2000	Paris Club
Senegal	1981-1983, 1985-1987, 1989-1991, 1994, 1998	All Paris Club
Sierra Leone	1977, 1980, 1984, 1986, 1992, 1994, 1996, 1997	All Paris Club except for 1997 which is an S&P local currency bond
Somalia	1985, 1987	All Paris Club
South Africa	1985, 1989, 1993	All R&R (2008)
Sudan	1979, 1982-1984, 1991	All Paris Club except for 1991 which is an S&P local currency bond
Tanzania	1986, 1988, 1990, 1992, 1997	All Paris Club
Togo	1990, 1992, 1995	All Paris Club
Tunisia	1979, 1981, 1983-1985, 1988	Paris Club: 1979, 1981, 1983, 1984, 1985, 1988 and 1989; IMF: 1988-1992.
Uganda	1981-1982, 1987, 1989, 1992, 1995, 1998	All Paris Club
Zambia	1983-1984, 1986, 1990, 1992, 1996, 1999	All Paris Club; 1983 is also in R&R (2008)
Zimbabwe	1965, 1975-1980, 1992, 2000	R&R (2008): 1965, 2000; S&P as a default in foreign currency bond: 1975-1980; IMF: 1992

Table A4. Share of countries experiencing a crisis
by types of crisis and number of occurrences—1965-2008

Variable	1 to 5 crises	6 to 10 crisis	11 to 15 crisis	16 to 20 crisis	more than 20 crisis
	(1)	(2)	(3)	(4)	(5)
Expropriation	58%	9%	0%	0%	0%
Political Crisis	26%	19%	13%	8%	13%
Currency Crisis	77%	11%	0%	0%	0%
Banking Crisis	53%	19%	13%	2%	0%
Sovereign Crisis	49%	23%	6%	2%	2%