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Explaining the African food riots of 2007–2008: An empirical analysis

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ABSTRACT

A sharp escalation in worldwide commodity prices precipitated the global food crisis of 2007–2008, affecting the majority of the world's poor, causing protests in developing countries and presenting policymakers with the challenge of simultaneously addressing hunger, poverty, and political instability. These food price shocks fomented violent civil responses in some countries, but not others, offering a unique opportunity to assess the factors that contributed to these disturbances. We explore this question empirically with specific reference to Africa, where "food riots" occurred in at least 14 countries. By examining the socio-economic and political conditions facing African countries, we attempt to answer why only some countries in Africa witnessed food riots in late 2007 and early 2008, while others did not. Our empirical analysis demonstrates that higher levels of poverty (as proxied by the Human Poverty Index), restricted access to and availability of food, urbanization, a coastal location, more oppressive regimes and stronger civil societies are associated with a higher likelihood of riots occurring. We also examine three country cases (Egypt, Mozambique, Niger) which represent different circumstances and responses to the food crisis, and identify specific factors that were associated with food protests in each case. Our study highlights the importance of pro-poor policies and investments and improved governance in addressing the problems facing the poor and in helping secure political stability. As the frequency and variability of natural disasters increase in response to climate change, such policies can serve to protect the poor from the debilitating consequences of the resulting shocks.

Bad harvests and rising prices caused the purchasing power of a large social group to collapse. The first to suffer were the peasantry... because they had precisely nothing to sell... On the other hand, the purchasing power of day laborers, who constituted the mass of agricultural consumers, collapsed because wages did not rise as fast as the cost of grain... Imagine the effect of stopping up the outlets of the rural market on industrial markets entirely dependent on them.

C. Ernest Labrousse, describing France in 1788–1789.[1]

Introduction

Between 2006 and 2008, the international prices of a wide range of food, oil and other primary commodities increased in dramatic fashion, in some cases more than doubling within a few months (Demeke et al., 2009). An estimated 74 low income and 71 middle income countries were significantly affected by oil and food price increases. The resulting crisis and its lingering effects in many countries had a profound impact on the incidence and depth of global food insecurity (Headey and Fan, 2008). Some estimates suggest a 3–5% increase in global poverty rates, equivalent to as many as 100 million people (World Bank, 2008). The impacts of rising food prices on poverty and food insecurity are complex (Ivanic and Martin, 2008; World Bank, 2009a); while rising prices benefit food producers, many farm households are in fact net food consumers and are adversely affected by rising prices. Rising prices also had impacts on macroeconomic stability, economic growth and the political situation in many countries, often fueling violent street protests in late 2007 and early 2008. In Africa, food riots swept across the continent, from Egypt and Tunisia in the North, to Burkina Faso and Senegal in the West, and Madagascar and Mozambique in the South (Fig. 1). The crisis reaffirmed the inherent volatility of international commodity markets, reinforced the extent to which oil and food markets have become highly interdependent, and highlighted the relative inability of national governments and the international community to adequately deal with dramatic surges in food prices.

The multiplicity of causes of the 2007–2008 food price increases, and the relative contribution of each cause to food price outcomes, have been widely discussed by researchers and policy analysts (for example, Headey and Fan, 2008, 2010; Trostle,

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[1] Labrousse, C.E., 1969. 1848-1830-1789: How revolutions were born. In: Crouzet, F., Chaloner, W.H., Stern, W.M. (Eds.), *Essays in European Economic History, 1789–1914*. London, 1969 (originally published 1948), pp. 3–5. Cited in Tilly (1983).

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Fig. 1. African food riots 2007–2008.

2008; von Braun et al., 2008; Abbott and Borot de Battisti, 2011; Lee et al., 2011a). Yet the analysis of why only some of the countries affected by food price shocks experienced civil unrest and rioting deserves more focused attention. Why did civil strife, food riots and violence occur in some countries and not in others? What socio-economic and political conditions contributed to mass civil protests? Why did many poor countries manage to avoid these riots? Questions such as these are of significant relevance to policymakers. This paper examines these issues empirically with specific reference to Africa. The global food price shocks experienced in 2007–2008 offer a unique opportunity to assess the economic, demographic, political and institutional factors that contributed to political instability and civil strife on the world's poorest continent. By examining the socio-economic and political conditions facing African countries, we attempt to answer why only some countries in Africa witnessed food riots in late 2007 and early 2008, while others did not. Our empirical analysis of the factors behind food riots contributes to both an understanding of their causes and consequences, as well as ways to avoid the conditions causing future such events.

The questions above are not just of historical interest; the risks of food price volatility remain a current concern. In 2010, numerous climate-related disasters again demonstrated the vulnerability of African nations to food insecurity. A longstanding drought in Niger was followed by unprecedented heavy rains, killing livestock and creating what was described by the United Nations as the worst food crisis in the country's history (Thomson, 2010a, 2010b; Hirsch, 2010). Late in the year, unseasonably heavy rains triggered the overflow of the Oueme and Mono Rivers, flooding two-thirds of the West African nation of Benin (BBC, 2010a). A

Table 1
African food riots 2007–2008 (presented in chronological order). *Sources*: FAO, IFPRI, Harsch, 2008, IRIN, and miscellaneous international media.

Location	Date	Description
Guinea	January–February 2007, Spring 2008	A series of riots and other unrest in Conakry, primarily related to food prices, and other economic and governance issues
Mauritania	November 2007	Protests triggered by sharp rises in the prices of grains and other basic foodstuffs in southeastern towns and later in Nouakchott. The first popular challenge to the policies of President Sidi Mohamed Ould Cheikh Abdallahi's government
Morocco	September 2007, February 2008	Two waves of sit-ins to protest high food prices in March and September 2007. Clashes in front of Morocco's parliament in Rabat in 2008 led to sentencing of 34 people
Senegal	November 2007, March–April 2008	After demonstrations in late 2007, several consumers' associations called a march and sit-in in March 2008 in Dakar. Street clashes with police led to at least 24 arrests. More protests followed in April
Cameroon	February 2008	Anti-government violent riots in Douala, Yaoundé, Bamenda and other major cities as popular anger exploded over high fuel and food prices and a bid by President Paul Biya to extend his 25-year rule. 24–100 reportedly killed
Mozambique	February 2008	Clashes in response to increased local bus fares and food prices between police and rioters killed at least four people and seriously injured more than 100. Crowds looted shops, destroyed vehicles and burned tires and electricity poles
Burkina Faso	February–April 2008	Following violent riots in February prompted by high food prices and increased government efforts to collect taxes from small-scale merchants, a general strike was called by unions in April 2008
Côte d'Ivoire	March–April 2008	Some 1500 protesters marched in the Cocody and Yopougon districts of Abidjan. Riot police moved in to disperse the crowds and one person was reportedly killed and at least 10 others injured
Ethiopia	March–April 2008	Riots due to drought and increased food prices in some areas in the Southern Nations, Nationalities and Peoples Region (SNNPR)
Egypt	April, June 2008	Rising prices for bread and other staples and alleged corruption sparked clashes at bakeries in poorer neighborhoods, leading to several deaths and multiple arrests
Madagascar	April 2008	Reported riots in April. The government banned rice exports to cushion Madagascar against spiraling global food prices
Somalia	May 2008	Security forces killed at least five people in the Somali capital Mogadishu as they cracked down on riots sparked by rising food prices and record inflation
Tunisia	June 2008	The protests over rising costs of living and unemployment took place in Redeyef in the Gafsa mining region, with one person shot dead, 22 injured, and union leaders arrested in a clash with security forces
Zimbabwe	Spring 2008	Civil strife in response to soaring inflation, worsening economic situation, spread of cholera epidemic, and presidential elections

30% leap in the cost of bread in Mozambique in September ignited street clashes and left 10 people dead and 300 people injured (MacFarquhar, 2010). Beyond Africa's borders, intensifying soil erosion in northwest China, aquifer depletion in the Middle East and other climate-related trends around the world are among the supply-side factors – along with rising oil prices – that contributed to sharp food price increases in late 2010 and early 2011, in turn prompting widespread global speculation about the "great food crisis" of 2011 (Brown, 2011).

Much of the long-term concern over global food supplies is prompted by the prospect of climate changes that are expected to result in increasing food prices and food price volatility for the world's most important agricultural crops – rice, wheat, maize, and soybeans (Nelson et al., 2009). Higher average temperatures, changing rainfall patterns, rising sea levels, and increases in the frequency, variability and unpredictability of extreme weather events such as droughts, floods and cyclones, are expected to act as a "risk multiplier" in countries where agricultural and other natural resource-based systems are failing to keep pace with the demands placed on them (CGIAR, 2009). Africa is already under pressure from climate stresses and many experts predict further famines and widespread disruption of socio-economic conditions due to the impacts of climate change. Some estimates show that the number of people at risk of hunger globally is projected to increase 10–20% by 2050 as a consequence of climate change with about 65% of the total increase occurring in Africa (Parry et al., 2009). The additional uncertainty and risk associated with climate change has created a sense of urgency among policymakers to understand how to prevent more people falling into poverty, while preserving social stability and minimizing the impacts of high food prices.

The paper is organized as follows. Section 2 describes the African riots of 2007–2008 and places them within the context of literature on rioting and civil strife in general. Section 3 outlines the empirical strategy and the data, while Section 4 presents the main results. Section 5 concludes with policy implications.

Food prices and other determinants of food riots

Nearly every agricultural commodity experienced rising price trends in the mid-to-late 2000s. Between 2004 and 2008, world rice prices shot up by 255%, while wheat and maize prices rose by 80–90% (Headey and Fan, 2008). The extent to which these global price surges were reflected in local markets varied significantly as a result of many factors, including exchange rate movements, trade policies, transportation costs, and domestic market structure (von Braun et al., 2008; Headey and Fan, 2010). For example, the domestic price of imported rice doubled in Niger between the summer of 2007 and 2008, while in Senegal it increased by 112%; meanwhile, the price of maize increased by 87% in Mozambique and by nearly double that (157%) in Malawi (Demeke et al., 2009). In addition to the factors above, the degree of price transmission in local markets depended on the role of different staples as the main source of caloric intake (e.g. 48% of calories come from millet in Niger, 29% from sorghum in Somalia, etc. (World Food Program, 2008)), whether food grains consumed were produced domestically versus imported, and whether major markets were in port cities versus inland rural markets. Despite the variability in the degree of transmission, however, the overall impacts on domestic food prices and food costs were high nearly everywhere across the continent (Headey and Fan, 2010).

Given the costliness of policies aimed at buffering such high and rapid rises in food prices and of social programs to protect vulnerable populations, cash-strapped African governments also varied in their response to the crisis. By December of 2008, 33 countries adopted short-term trade-oriented and market-based policy measures (Demeke et al., 2009). Ethiopia, for example, sold wheat from its grain reserve to the urban poor, while Nigeria reduced duties on rice imports from 100% to 2.7%. Safety net measures were less common – only nine African countries (out of 33 surveyed) increased or introduced cash transfer and/or food access-based programs. Given the constraints on mobilizing the necessary resources for such programs, many African countries do not commonly have any safety net programs in place. Even where such programs existed, it is

not clear to what extent they were successful in increasing transfers in response to the crisis and in accommodating the "new" poor (Lustig, 2009). In many cases, it was the food riots that forced African governments to act (Demeke et al., 2009).

Fourteen of 53 African countries saw mass disturbances following abrupt spikes in food prices in 2007–2008, which became known as "food riots." We define a "food riot" as civil unrest in response to the unavailability of basic food staples following an increase in food prices (in 2007–2008) that led to violence and casualties, as reported by the international media. Table 1 identifies these riots in chronological order and gives a short description of each.[2] The riots differed in location, severity and organization – from demonstrations organized by trade unions in Burkina Faso, to sit-ins organized by consumers' associations in Senegal, to spontaneous store lootings in Egypt and Guinea. In some countries, food riots also became a pretext for airing other grievances, such as dissatisfaction with economic policies, and government ineffectiveness and corruption. However, they all started as a response to the unavailability and unaffordability of food and other staples such as fuel and transportation. It is worth noting that many of these same factors have been cited as among the causes of the recent uprisings in Tunisia, Egypt, Libya and other Middle Eastern countries in late 2010 and early 2011.

Popular uprisings over food prices and shortages have a long tradition. Although civil strife in response to food scarcity and problems in food distribution have been recorded in many societies from Asia to Latin America, they are best documented in Europe. Extending from the mid-16th century to the mid-19th century, the European "classical food riots" became the most widespread form of collective action, reaching their peak during periods of state formation and market expansion[3] (Tilly, 1971; Bentley, 2001). Several historical explanations of the occurrence of European riots exist. Contributing factors have been posited to include conditions of extreme economic and social hardship, social injustice, or some combination of the two (Walton and Seddon, 1994). Despite the different explanations, the social history literature on this topic agrees on the location of, participation in, and objectives of the rioting. European protests occurred mostly in urban settings, and participants in riots generally represented a cross-section of the working population. Riots were not simply chaotic expressions of popular anger but were generally organized and purposeful political actions with the objectives of addressing short-run problems of scarcity and high prices, as well as urging relief measures upon local officials.

A more recent sociological literature on food riots has been directed at the analysis of the widespread civil strife that occurred in response to the austerity measures propelled by the International Monetary Fund (IMF) in the 1980s. For example, Walton and Ragin (1990) examined the conditions underlying the occurrence and severity of austerity protests in debtor countries and found that the principal conditions for these events were "overurbanization" (i.e., urbanization rates, and associated claims on government services, beyond levels expected for the degree of economic development) and the involvement of international agencies in domestic political-economic policy. Walton and Seddon (1994) found that large urban populations not absorbed in formal sector and industrial employment and a strong civil society provided a fertile ground for (and ideological legitimation of) popular protests which often also incorporated other forms of protest, such as strikes, political demonstrations and related grievances (e.g., over unemployment).

Despite the vast literature on riots in social history, there has been limited empirical economic work. This paper aims to address this gap and to analyze the effects of socio-economic and political factors on the recent occurrence of mass protests about food in Africa. To inform our analysis and offer recommendations on how to avoid these outcomes in the future, we turn to the rich body of literature explaining the causes of violence and conflict, including civil war, across countries (for example, see Collier and Hoeffler, 1998, 2004; Fearon and Laitin, 2003). This literature does not agree on a uniformly critical set of determinants of civil conflict and provides mixed empirical support for many hypotheses stemming from individual case studies. However, some explanatory factors are almost always present. For example, Hegre and Sambanis' (2006) often-cited sensitivity analysis of empirical models explaining the onset of civil wars demonstrates that a large population, prevalence of poverty (e.g., low per capita income), a recent history of political instability, and inconsistently democratic institutions are almost always associated with an increase in the likelihood of conflict.

These factors deserve some explanation in light of our analysis here. Controlling for population size in empirical studies stems from the fact that civil wars are more likely to occur in populous countries, since, by definition, armed conflict turns into "civil war" if there is a high threshold of deaths (Hegre and Sambanis, 2006).[4] Per capita income as a predictor of conflict is justified both as a measure of the economic opportunity cost of war (Collier and Hoeffler, 2004) and as a proxy for state institutional capacity and strength (Fearon and Laitin, 2003). However, the recent paper by Blattman and Miguel (2010) cautions against drawing a direct causal line from poverty to conflict as this line can also be drawn in the opposite direction. Others propose using a broader definition of poverty, including health and nutritional status, as underlying causes of the occurrence of armed conflict. Pinstrup-Andersen and Shimokawa (2008), for example, find the poverty headcount index, child mortality and malnutrition rates to be positively associated with the outbreak of conflicts.

A wide range of variables and associated concepts – level of democratic institutions, governmental effectiveness and centralization, extent of political and personal freedoms (MacCulloch and Pezzini, 2004; Hegre and Sambanis, 2006; etc.) – are used in the literature to capture the effects of governance, political regimes and civil liberties on the incidence of (or tendency toward) conflict. While many agree with the conclusion that a "strong, accountable, legitimate state is the best antidote" to conflict (Goodhand, 2003), the empirical evidence is widely mixed, reflecting in part the different variables used. For example, some researchers find civil war to be negatively associated with the level of democracy (Esty et al., 1998), while others argue that institutional inconsistency and political instability are more important determinants (Hegre et al., 2001; Fearon and Laitin, 2003). Some researchers have argued that the early stages of the democratization process may in fact engender conditions favorable to civil conflict[5] (Mansfield and Snyder, 1995; Snyder, 2000; Hegre et al., 2001), in which case so-called "democracy aid" – foreign aid associated with promoting democratic institutions in developing countries – can contribute to the onset of political instability. On the other hand, "democracy aid" has been shown to lead to democratic transitions (Wright, 2009; Kalyvitis and Vlachaki, 2010), which have been argued to decrease the risk of conflict (Savun and Tirone, 2011).

It is also not clear *a priori* to what extent African food riots were

[2] The incidence of riots is based on detailed analysis of international reports and journalistic accounts from 2007 and 2008. Sources are available upon request.

[3] For the historiography of food riots from pre-industrial England and France to the early 20th century immigrant Americas, see Bentley (2001). Tilly (1971) offers a detailed discussion of food riots in France.

[4] Population size is included in Pinstrup-Andersen and Shimokawa (2008) also as a proxy for transaction costs of organizing collective actions.

[5] Specific mechanisms here may include broader civil society participation in voicing grievances, political elites voicing nationalistic views and the weakness of central governments early in the democratization process.

a response to limited food availability or to restricted access to food, or both. While *food access* at the household level is substantially a function of income levels (e.g., affordability) and distributional aspects of food security, *food availability* is heavily dependent on the supply of food (Scanlan and Jenkins, 2001). Domestic food production, although not the only source of food, is a critical determinant of local food availability and prices, especially in countries – as in Sub-Saharan Africa – where infrastructure, trade barriers and other limitations preclude high levels of market integration. Many countries rely on commercial imports of cereals and other foods or they depend, sometimes heavily, on food aid to supplement local production.

Finally, except for three countries (Ethiopia, Zimbabwe and Burkina Faso), all of the African nations that experienced riots have coastal access.[6] If economic development is associated with coastal access as suggested by Gallup et al. (1999), then higher GDP per capita should be associated with a reduced likelihood of riots (as shown by MacCulloch and Pezzini (2004)). On the other hand, if coastal access primarily signals a more rapid transmission of price signals and other measures of economic openness,[7] then coastal access would likely be positively associated with the incidence of these popular protests. We test the coastal location hypothesis empirically.

Estimation method and data

One of the common approaches to the analysis of civil conflict is estimating a cross-country regression that incorporates a dependent variable that indicates the discrete onset or incidence of conflict and a set of independent variables representing possible contributing factors to conflict (e.g., Fearon and Laitin, 2003; Collier and Hoeffler, 2004). We adopt a similar approach in our analysis of African food riots. We analyze the effects of socioeconomic and political status on the incidence of food riots using a logit model of the following form:

$$\begin{aligned} Riot_i = {} & \beta_0 + \beta_1\, Human\ Poverty\ Index_i + \beta_2\, Urban\ Agglomeration_i \\ & + \beta_3\, SSA_i + \beta_4\, Food\ Production\ Index_i \\ & + \beta_5\, \Delta Food\ Production\ Index_i + \beta_6\, Political\ Rights\ Index_i \\ & + \beta_7\, Civil\ Liberties\ Index_i \\ & + [\beta_8\, Ln(Total\ aid\ per\ capita_i)]\ or\ [\beta_9\, Ln(Food\ aid\ per\ capita_i) \\ & + \beta_{10}\, Ln(Government\ aid\ per\ capita_i)] + [\beta_{11}\, Coast_i] + \varepsilon_i \end{aligned}$$

Here, the variable $Riot_i$ is a binary dependent variable (=1 if country *i* experienced a food riot in 2007–2008; 0 otherwise). This variable was constructed from various reports of the Food and Agricultural Organization of the United Nations (FAO), the International Food Policy Research Institute (IFPRI), Harsch (2008), as well as journalistic accounts of riots published by the Integrated Regional Information Networks (IRIN) of the U.N. Office for the Coordination of Humanitarian Affairs and media sources including the BBC, *The Guardian*, Reuters, and *The New York Times*. There is ample precedent for using journalistic accounts in empirical analyses such as this. For example, a data set based on journalistic accounts was used by Walton and Ragin (1990) to analyze riots that followed the implementation of austerity programs in the 1980s. Auyero and Moran (2007) also used an exhaustive analysis of journalistic reports to examine occurrences of food store lootings in Argentina in 2001, referencing a long tradition in the collective action literature of using newspaper archives for the collection of event data.

It has been widely hypothesized that poverty is linked to civil conflict. The variable *Human Poverty Index* (*HPI*) is taken from the *Human Development Report 2009* (calculated on the basis of the component indicators using the statistical update in 2007). Rather than measuring poverty by income-based measures alone, this variable captures vulnerability to early mortality (as opposed to a long and healthy life), exclusion from the world of knowledge, and lack of access to adequate economic resources.[8] Although a broader measure, *HPI* is strongly negatively correlated with Gross Domestic Product (GDP) per capita (correlation = −0.44), which is often included in explaining the onset of violent conflict (Hegre and Sambanis, 2006). Moreover, *HPI* serves as a proxy for *food access*, since the child malnutrition rate as a measure of nutritional deprivation and the mortality rate as a measure of health deprivation are both included in the construction of *HPI*.[9] Based on the prior literature recognizing the common urban setting to civil strife (Walton and Seddon, 1994; Esty et al., 1998), and to capture the effects of population size, the extent of urbanization and other features of a large urban area – positive features such as the presence of civil society organizations and universities, on the one hand, and negative features such as lack of social services and high unemployment rates on the other – we include a dichotomous variable, *Urban Agglomeration* (=1 if the country has an urban agglomeration of more than 1 million), constructed from World Development Indicators (WDI) (World Bank, 2011).[10] To reflect the global political clustering of North Africa with the Arab world and to account for historic and cultural differences between the countries in the northern part of the continent and those located south of the Sahara, we include a binary variable (*SSA*) as a control variable. Domestic food production, relative to the base period of 1999–2001, is measured by the per capita *Food Production Index* (*FPI*) for 2007 from FAOSTAT.[11] In addition to accounting for long-term production trends, we try to account for short-term production shocks in the level of domestic food availability by including Δ*Food Production Index*, measuring the percentage change in *FPI* per capita from 2006 to 2007.

As mentioned above, the conflict literature also suggests that a strong, accountable, legitimate state is better able to prevent violent conflict and reduce the incidence and depth of poverty. Thus, states characterized by weak and ineffective governance systems, political instability, and that are unable to address their citizens' grievances should be at higher risk of the onset of conflict

[6] There is another type of geographic clustering: food riots occurred in four out of eleven Sahelian countries, where desertification and neglect of agriculture contributed to the current dependence on food imports and hence on international food prices. We thank Nic van de Walle for pointing this out.

[7] We thank an anonymous external reviewer for highlighting this point.

[8] The construction of *HPI* includes the probability of not surviving to ages 40 and 60, the percentage of adults who are illiterate, and the unweighted average of the percentage of the population without access to safe water and the percentage of underweight children for their age.

[9] Data constraints lead to three African countries being omitted from our empirical analysis. *HPI* data are unavailable for Seychelles and Somalia, a country with riots in 2007–2008. Additionally, the collapse of the federal government in 1991 and consequent political instability in Somalia, and Seychelles' high GDP per capita as compared to other African countries, affirm their outlier status. Preliminary empirical analysis also demonstrated The Gambia to be a consistent outlier in terms of food production trends (see discussion of the *FPI* variable below).

[10] By using this variable, rather than the more conventional percentage of people living in urban areas, we also avoid multicollinearity. Since the level of economic development is a strong determinant of a nation's level of urbanization, the measures of poverty and urbanization are typically highly (and negatively) correlated; the simple correlation coefficient between *HPI* and the percentage of urban population is indeed high in our sample: −0.54.

[11] The variable *FPI* registers the relative level of aggregate agricultural production for 2007 compared to the base period, 1999–2001. Using a readily available index (from FAO) avoids problems of comparability across food groups and allows for international comparisons of medium-term agricultural production growth at the national level (we thank an anonymous external reviewer for highlighting this point). We considered use of alternative measures to incorporate the effects of short-term production shocks (e.g., an aggregate measure of food supply and consumer food price changes), but the lack of consistent data across the sample countries precluded this.

(Sambanis, 2004). To capture the effects of governance and civil and political freedoms we include two indices reported in the flagship annual publication of Freedom House ("Freedom in the World") that reflect, respectively, the quality and effectiveness of political governance, and the extent of civil liberties in African countries. The *Political Rights Index* (*PRI*)[12] (from 2007) incorporates measures of three distinct governance indicators: the extent to which citizens choose their political leaders in free and fair elections, the degree of political pluralism and participation, and the functioning of government – its effectiveness, accountability, and susceptibility to political corruption. The *Civil Liberties Index* (*CLI*) incorporates 14 different measures of personal freedoms at the country level, including freedom of expression and belief, association and organizational rights, rule of law and human rights, as well as personal autonomy and economic rights.[13] Importantly, both indicators exclude GDP per capita, a measure already accounted for in our analysis.[14] One would expect less oppressive regimes (e.g., those with a higher *PRI* score) to possess a better ability to mitigate external shocks to citizens' well-being and thus a smaller probability of rioting. Likewise, a higher likelihood of political activity in 2007–2008 could be expected in countries with more developed civil societies with better functioning media, unions and political organizations, and less censorship (e.g. a higher *CLI* score). In most cases, these personal rights and freedoms are closely associated with governance indicators,[15] thus it is unclear *a priori* whether the effects of the two indices are empirically differentiable, especially with a small sample size.

Additionally, we would like to include food imports and food aid as measures of food availability. However, given a high negative correlation between *HPI* and food imports (and many missing observations), we choose to focus on the effect of foreign aid on the likelihood of riots. We use total development assistance per capita (*Ln*(*Total aid per capita*)), corresponding to (the natural logarithm of) net official development assistance and official aid received in current US dollars in 2007 from WDI, divided by total population. We also test the influence of two specific components of aid that could be expected *a priori* to be associated with food riots: gross aid disbursements for developmental food aid and food security assistance (*Ln*(*Food aid per capita*)), and gross aid disbursement for general government and civil society support (*Ln*(*Government aid per capita*)), which includes aid allocated towards support for such things as legal and judicial development, strengthening civil society, and supporting elections and human rights. Both aid components are in current US dollars and taken from the Africa Development Indicators database (2011). While higher food aid is expected to mitigate food price increases and the likelihood of civil strife, the aid effects for government and civil society support are, as discussed above, more ambiguous.

Finally, to test the geographic location hypothesis proposed above, we include a binary variable, *Coast*, indicating coastal access. It should also be noted that the extent of food price increases in the period in question would also be of great relevance to our analysis. However, reliable estimates of food price changes – and consumer price inflation, more generally – are unavailable for many of our country observations and this precluded inclusion of food prices as an explanatory variable.

We assume the error term, ε_i, to be i.i.d. Robust standard errors are computed to correct for heteroskedasticity.[16] The effects of the explanatory variables on the likelihood of the occurrence of riots are examined by computing marginal effects at the variable levels exhibited in several selected case study countries (explained below).

Table 2 provides detailed summary statistics of the variables used. Overall, these results show that the 13 African countries in our sample that experienced food riots in 2007–2008 had, on average, a greater incidence of poverty (37.40 vs. an index value of 31.19), larger populations, a lower index of domestic food production, a greater decrease of this index between 2006 and 2007, a lower rating on governance and political factors (Political Rights Index), lower levels of civil liberties (Civil Liberties Index), and less foreign aid. Half (three out of six) North African countries included in the sample experienced riots in 2007–2008 – as opposed to only 10 out of 47 Sub-Saharan African countries.

As noted in the literature, country-level analysis has some inherent limitations in this type of empirical work. Individual- and group-level characteristics and geographically or seasonally specific attributes such as poverty levels and food production are imperfectly captured by annualized national statistics and are often incomplete and of questionable quality (e.g. Sambanis, 2004; Collier and Hoeffler, 2007; Blattman and Miguel, 2010). Moreover, as in the case with civil conflict, the food riots in 2007–2008 were localized phenomena and deserve investigation at a sub-national level (Buhaug and Lujala, 2005; Ostby et al., 2009). Nonetheless, country-level analysis examining the contributing factors to the onset of civil conflict and riots can demonstrate the importance of factors such as economic development and respect for political and civil rights as determinants of peaceful conditions and thus is useful to policymakers working to reduce the global incidence of civil violence (Collier and Hoeffler, 2007).

Food riots in Africa: Empirical results

Model 1 in Table 3 presents results from the logit estimation, using the discrete occurrence of food riots in 2007–2008 as the dependent variable and a nearly full specification of independent variables discussed above. In Model 2 we replace total aid with two components – food aid and government aid – expected to be of particular importance. Model 3 tests the geography-related hypothesis linking coastal access with economic development. The three model specifications correctly classify between 80% and 86% of all observations.

The results in Table 3 suggest that higher levels of poverty are associated with the incidence of food riots in Africa; the coefficients of *HPI* are significant at the 1% level in all three specifications. Holding other variables constant, for example, a one point increase in the *HPI* is associated with a 18–32% greater odds of riots, on average. Not only the level of income, but people's increased social welfare and their access to food – all incorporated in *HPI* – contribute to the decreased likelihood of political conflict (Pinstrup-Andersen and Shimokawa, 2008). The role of geographic location in Sub-Saharan Africa (vs. North Africa) is demonstrated as a control variable; the much lower proportion of countries with popular protests in Sub-Saharan Africa than in North Africa (23% vs. 50%) explains the negative sign of the SSA variable. In addition, the influence of large urban areas is also demonstrated. According

[12] The title of this index is perhaps a misnomer, in that it primarily measures the effectiveness of governance and political representation, not rights *per se*.

[13] Following MacCulloch and Pezzini (2004), we rescale *PRI* and *CLI* such that the lowest value (1) is assigned to countries with the lowest levels of governance and civil liberties, respectively.

[14] We also considered the Corruption Perceptions Index from Transparency International, the Failed States Index, the State Fragility Index, and the Ibrahim Index of African Governance; all of these include some measure of GDP. The other often-cited indicator of governance effectiveness which excludes GDP – the Polity Score from the Polity IV data base – yielded estimation results similar to the ones presented in the paper.

[15] Indeed, the Political Rights Index and the Civil Liberties Index are very highly correlated (correlation = 0.89).

[16] We follow Miguel et al. (2004) and Ostby et al. (2009), among others, in computing robust standard errors. The model was also calculated without this adjustment.

Table 2
Summary statistics. *Sources*: UNDP, World Development Indicators, FAO, Freedom House, Africa Development Indicators.

	Countries with riots $n = 13$		Countries without riots $n = 37$		Full sample $n = 50$	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Human Poverty Index 2007	37.40	10.94	31.19	11.47	32.80	11.56
Population total 2007 (million)	25.50	24.90	16.80	27.20	19.00	26.60
Food Production Index per capita 2007	96.69	14.52	100.32	15.35	99.38	15.08
% Change in Food Production Index 2006–2007	−5.47	6.74	−1.80	6.61	−2.75	6.77
Political Rights Index 2007, 1 (lowest) to 7 (highest level of freedom)	2.85	1.46	3.86	1.95	3.60	1.87
Civil Liberties Index 2007, 1 (lowest) to 7 (highest level of freedom)	3.46	1.13	4.08	1.57	3.92	1.48
Net total official development assistance and official aid received per capita 2007 (current US$)	50.88	32.51	67.52	64.70	63.19	58.21
Gross aid for developmental food aid/food security assistance per capita 2007 (current US$)	1.55	1.74	1.77	2.51	1.71	2.32
Gross aid disbursement for general government and civil society per capita 2007 (current US$)	4.03	2.95	9.04	19.07	7.74	16.56
	Proportion					
Countries in Sub-Saharan Africa	0.77		0.92		0.88	
Countries with population in urban agglomerations of more than 1 mln	0.85		0.43		0.54	
Countries with coastal access	0.77		0.68		0.70	

Table 3
Logit analyses of food riots in Africa, 2007–2008.

	Model 1	Model 2	Model 3
Human Poverty Index	0.2783***	0.1681***	0.2450***
	(0.0785)	(0.0609)	(0.0743)
Sub-Saharan Africa[a]	−9.9594***	−5.7810**	−5.7294***
	(3.4440)	(2.3487)	(2.2221)
Urban agglomeration[a]	4.7945***	2.5932**	2.5615**
	(1.6347)	(1.1036)	(1.1971)
Food Production Index per capita	−0.1390***	−0.0928***	−0.1001***
	(0.0519)	(0.0328)	(0.0354)
% Change in Food Production Index	5.6242	3.9366	7.2878
	(10.5708)	(6.3792)	(8.5900)
Political Rights Index	−2.9210***	−1.4972**	−1.8379**
	(1.0169)	(0.5962)	(0.7712)
Civil Liberties Index	2.1011**	1.3834*	1.7879**
	(0.9702)	(0.7481)	(0.9082)
Ln(Total aid per capita)	2.4706**		
	(1.1597)		
Ln(Food aid per capita)		0.0879	
		(0.1948)	
Ln(Government aid per capita)		0.2589	
		(0.4149)	
Coastal access[a]			2.0578*
			(1.1311)
Constant	0.5691	5.0587	1.4633
	(3.8416)	(3.7990)	(3.9783)
Observations	50	50	50
Log pseudo likelihood	−13.65	−16.79	−15.61
Wald chi2	17.41	20.36	18.09
Probability > Chi square	0.0261	0.0158	0.0206
Pseudo-*R* square	0.5237	0.4140	0.4551
Correctly classified	86.00%	80.00%	86.00%

Note: The dependent variable is coded 1 if a country experienced a food riot in 2007–2008, 0 otherwise. Robust standard errors are in parenthesis.
[a] Dichotomous.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

to Models 2 and 3 and consistent with expectations, the odds of riots occurring are estimated to be 13 times greater if a country has an urban agglomeration with population over 1 million people; 11 out of 13 countries that experienced riots have such large urban centers (only Mauritania and Tunisia do not[17]). Given that the urban poor are most dependent on the formal provision of basic needs and services such as health, infrastructure, education and shelter, it is not surprising that they are typically the hardest hit by rapid increases in the cost of living and thus are particularly susceptible to rioting (Amis, 1995). Inadequate access to or even complete lack of social services and high unemployment rates in modern cities are common features of many African countries, where high levels of urbanization relative to their economic development have been shown to increase the risk of political violence (Walton and Seddon, 1994; Esty et al., 1998). As expected, changes in domestic food supplies are significantly associated with the incidence of food riots: low domestic food production in 2007 (relative to the base period 1999–2001) is positively associated with the likelihood of riots as shown by the negatively signed coefficient on the Food Production Index variable. In terms of short-term effects, countries having riots witnessed an above-average (−5.5%) decrease in food production (*% Change in FPI*) from 2006 to 2007 compared to countries without riots (−1.8% average decrease) (Table 2). However, given high variability in domestic food production across all countries, the estimated coefficient of the variable *% Change in FPI* is not significant in any of the equation specifications.[18]

Table 3 also shows the relations between the indicators of political governance and civil liberties (measured by *PRI* and *CLI*) and the incidence of rioting. The coefficient on *PRI* is negative and significant at least at the 5% level across all three model specifications. As regimes become less oppressive, political representation increases and governmental functioning improves, the likelihood of riots diminishes. Only 11 countries on the continent received a high *PRI* rating (6 or 7) in 2007, and only one of these – Senegal – experienced riots. Many others can be characterized by the oppressive nature of their regimes (military juntas, one-party dictatorships, and autocracies), often associated with civil wars, the restriction of free association and rights of expression, censorship, and, at the extreme, political terror. At the same time, civil society development and greater civil liberties are associated with a higher likelihood of rioting (e.g., the coefficient of *CLI* is consistently positive and also significant). As Benson et al. (2008) suggest, political activities in response to the 2007–2008 food crises were affected by "the government's tolerance of dissent" and the level of urban political mobilization. For example, food riots in Burkina Faso and Senegal were aided by unions and consumer organizations (both countries' *CLI* ratings are a relatively high 5 out of 7). Simi-

[17] Sources differ substantially on the population of Tunisia's largest city, Tunis. Changing the value of the Urban Agglomeration binary variable from 0 to 1 for Tunisia does not significantly alter our results.

[18] Although short-term agricultural production shocks are important to domestic food availability, the annualized FAO's food production index smoothes out seasonal production variability (which also differs by commodity) and therefore may not accurately measure the effects of such shocks. The discrete form of the dependent variable also does not reflect the seasonality of food riots.

larly, Walton and Seddon (1994) earlier found a strong civil society to be a fertile ground for political protests in response to the austerity measures of the 1980s. The seemingly contradictory result of opposing signs of *PRI* and *CLI* lends support to the argument that the transition to democracy can be volatile and its path unpredictable (Mansfield and Snyder, 1995; Hegre et al., 2001; Savun and Tirone, 2011)[19]: in many countries, steps toward democratic pluralism and greater governmental effectiveness reduce the likelihood of conflict, but other countries may become at least temporarily prone to political conflict even as civil society is allowed to flourish. Democratizing states often lack sufficient capacity to effectively respond to crises, deliver services, and maintain the government's authority. Such countries have been commonly termed "anocracies" – neither autocratic nor democratic, they are often unstable, ineffective and vulnerable to the onset of political instability (Sambanis, 2004). Many of these countries are in Africa. In fact, all but three countries that experienced foot riots in 2007–2008 can be classified as anocracies (Marshall et al., 2011). The 2011 *World Development Report* mapped the same food protests against government effectiveness data to demonstrate that the occurrence of violence was much higher in countries with less effective governance (World Bank, 2011).

In terms of the results for development aid, the coefficient on total aid per capita in 2007 in Model 1 has a positive sign and is significant at the 5% level. However, Model 2's more refined identification of the specific mechanisms by which foreign aid may influence the incidence of riots – via an increase in food availability and/or support for democratic institutions – shows inconclusive results: the coefficients on food aid and government aid have positive signs, but are insignificant. This suggests that it could be other components of aid, or the combination of many, that are responsible for the strong association between food riots and total aid in Model 1, particularly since food aid and aid to government and civil society contribute, on average, only 2% and 8%, respectively, to total foreign aid in the sample countries.[20] Additionally, food aid often comes as a short-term measure and may not be the only, or even the most efficient, means of addressing food insecurity (del Ninno et al., 2007). Previous research also shows that the empirical evidence linking foreign aid, democratization and civil conflict is ambiguous, largely due to the fact that so many African nations are anocratic "semi-democracies," currently in transitional phases toward democratization where the linkages between the abovementioned variables are often tenuous (Hegre et al., 2001; Wright, 2009; Savun and Tirone, 2011). Savun and Tirone (2011) conclude that "There is still no scholarly consensus on the subject" of the linkages among aid, democracy and conflict; we concur. Finally, the significance and positive sign of the coefficient on the Coastal access variable in Model 3 point to the likely greater exposure of coastal populations to global economic conditions, such as international high prices and their consequences, as they are passed through to individual countries and regions, sometimes culminating in the occurrence of riots.

To determine the magnitude of the effects of our independent variables on the likelihood of food riots in Africa, we compute their respective marginal effects. Given the wide heterogeneity of our sample, and recognizing that the magnitude of the effects will vary with the values of the explanatory variables, we report these results by computing the marginal effects at the levels of the variables for three illustrative "case study" countries, representing three different sets of circumstances and responses to the food crisis of 2008[21]: Egypt, a North African coastal country with a large mega-city; Niger, a small and poor land-locked Sub-Saharan country; and Mozambique, a coastal, resource-rich SSA country.

Egypt

Four countries in our sample fit the criteria of a North African coastal country with a large urban population – Algeria, Egypt, Libya and Morocco (Egypt and Libya experienced riots, while Algeria and Morocco did not). Egypt serves as an interesting case study here due to its history of food riots as well as recent political developments. In 1977, Egypt was rocked by spontaneous urban uprisings of poor people protesting the IMF-mandated termination of state subsidies on basic foodstuffs (Seddon, 1986; Walton and Seddon, 1994). Once again in 2007, Cairo and the northern town of Mahalla al-Kobra experienced violent scuffles in bread queues, sporadic demonstrations in response to acute shortages of the subsidized bread *baladi*, and calls for a general strike. Although Egypt is one of the world's largest per capita consumers of bread, the country grows only about 60% of its 14 million tons of wheat consumed annually (IRIN, 2010c). To make up the difference, Egypt imports wheat from the US, Russia, France, Kazakhstan and other countries, giving rise to the country's extreme dependence on wheat imports and to its sensitivity to wheat price changes. The marginal effects of the variables included in this study, evaluated at the values for Egypt, are presented for all three models in Table 4. They suggest that a potential contributing factor to the Egyptian riots of 2007 could be its large urban population (if Egypt did not have an urban center of more than 1 million people, its predicted probability of riots would fall from 99% to 38%, according to Model 1). Cairo and other Egyptian cities – 43% of the total population lives in urban areas – were the hotbeds of the "Bread Riots" of 1977 as well as the riots thirty years later in 2007. Again, at the beginning of 2011, protesters filled the squares of Egyptian cities to air a wide range of grievances, including a lack of political freedoms, high food prices, chronic government corruption, and high levels of poverty and unemployment (IRIN, 2011a). These civil protests led ultimately to the end of the 30-year rule of President Hosni Mubarak.

Niger

Seven Sub-Saharan countries in our sample are land-locked and poor, with HPI values greater than 30.[22] Niger is an interesting case study in this category for several reasons: its response to the food crisis in 2007, its changed political situation since then, and its high vulnerability to climatic conditions. After mass protests in response to a food crisis in 2005, the government of Niger set up a cabinet-level ministry to coordinate action on prices, which helped avert riots in 2007–2008 (Harsch, 2008). Given the values of explanatory variables at the levels of Niger in 2007, Table 4 suggests that, in contrast to Egypt, Niger's low level of urbanization (16% according to WDI) is one of the factors that likely contributed to its avoiding riots in 2007. Our estimates suggest that were Niger to have a large urban center, the likelihood of riots would increase by 53–56%. Furthermore, a February 2010 *coup d'état* sharply changed the political and civil situation (the Political Rights index declined from 5 to 3 in 2010

[19] An additional reason for these results may be purely econometric ones, in particular, the relatively small sample size and the high level of correlation of the *PRI* and *CLI* variables, which affects the values and inflates the variances of the estimated coefficients, reducing their explanatory power.

[20] Higher aid per capita, as one of the reviewers suggested, could also be associated with aid dependency and/or aid conditionality that could have constrained governments' response to the escalating food prices.

[21] It is common to compute marginal effects at the variable means or average marginal effects, computed as means of marginal effects evaluated at each observation. We employ the strategy described here to reflect the high heterogeneity of the African countries.

[22] These are Burundi, Central African Republic, Chad, Lesotho, Niger, Rwanda, and Swaziland.

Table 4
Marginal effects of logit results for Egypt, Niger and Mozambique.

	Model 1			Model 2			Model 3		
	Egypt	Niger	Mozambique	Egypt	Niger	Mozambique	Egypt	Niger	Mozambique
Human Poverty Index	0.004	0.002	0.061***	0.011	0.016	0.042***	0.012	0.021	0.058***
	(0.006)	(0.005)	(0.022)	(0.013)	(0.019)	(0.015)	(0.016)	(0.026)	(0.019)
Sub-Saharan Africa[a]	−0.983***	−0.986***	−0.327	−0.892***	−0.867***	−0.458**	−0.892***	−0.875***	−0.381*
	(0.029)	(0.023)	(0.215)	(0.121)	(0.094)	(0.227)	(0.113)	(0.085)	(0.205)
Urban agglomeration[a]	0.602	0.489	0.656***	0.425	0.510**	0.459**	0.368	0.481*	0.506**
	(0.366)	(0.387)	(0.213)	(0.427)	(0.230)	(0.211)	(0.447)	(0.262)	(0.203)
Food Production Index per capita	−0.002	−0.001	−0.031**	−0.006	−0.009	−0.023***	−0.005	−0.009	−0.024**
	(0.003)	(0.003)	(0.014)	(0.007)	(0.009)	(0.008)	(0.006)	(0.009)	(0.010)
% Change in Food Production Index	0.073	0.045	1.237	0.248	0.379	0.978	0.368	0.625	1.722
	(0.174)	(0.162)	(2.544)	(0.412)	(0.838)	(1.623)	(0.470)	(1.183)	(2.146)
Political Rights Index	−0.038	−0.024	−0.643**	−0.094	−0.144	−0.372**	−0.093	−0.158	−0.434**
	(0.061)	(0.052)	(0.272)	(0.108)	(0.145)	(0.155)	(0.124)	(0.179)	(0.218)
Civil Liberties Index	0.027	0.017	0.462*	0.087	0.133	0.344*	0.090	0.153	0.422*
	(0.042)	(0.038)	(0.243)	(0.095)	(0.148)	(0.192)	(0.119)	(0.184)	(0.251)
Ln (Total aid per capita)	0.032	0.020	0.544**						
	(0.051)	(0.042)	(0.242)						
Ln(Food aid per capita)				0.006	0.008	0.022			
				(0.015)	(0.019)	(0.048)			
Ln(Government aid per capita)				0.016	0.025	0.064			
				(0.029)	(0.044)	(0.104)			
Coastal access[a]							0.253	0.356	0.446**
							(0.318)	(0.323)	(0.190)
Observations	50	50	50	50	50	50	50	50	50
y = Pr(Riot) (predicted)	0.99	0.01	0.67	0.93	0.11	0.54	0.95	0.09	0.62

Note: The dependent variable is coded 1 if a country experienced a food riot in 2007–2008, 0 otherwise. Robust standard errors are in parenthesis.
[a] dy/dx is for discrete change of dummy variable from 0 to 1.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

and the Civil Liberties index declined from 5 to 4). A military junta was established in response to President Mamadou Tanja's attempted extension of his political term through constitutional manipulation (BBC, 2010b). If we were to estimate the marginal effects at a value of *PRI* equal to 3 and *CLI* equal to 4 (and hold other variables at their 2007 levels), the predicted probability of riots in Niger would increase from 1% to 26% (according to Model 1). These political elements remain a concern in light of recent nutritional crisis caused by the concurrence of drought and massive flooding in 2010 and continuing drought and poor harvests in 2011.[23] Although a massive aid operation saved many lives, addressing long-term structural economic and political problems that contribute to chronic poverty is needed (IRIN, 2010d).

Mozambique

Nine countries in Sub-Saharan Africa fit the criteria of a coastal resource-rich, yet poor, country.[24] In Table 4, we compute the marginal effects at the explanatory variable values for Mozambique, where, at the beginning of February 2008, protests over a 14% increase in the price of fuel and consequent hikes in bus fares and food prices set off a series of violent clashes, leaving several people dead and more than 100 injured (BBC, 2008). Another wave of rioting in Maputo in September 2010 once again resulted in civilian casualties (IRIN, 2010a). Our results suggest that the most important factors in avoiding future rioting in Mozambique would include addressing poverty, increasing domestic food production, and improving governance and political accountability (strengthening the political regime). According to Model 1, a one-point decrease in the *HPI* (from 46.8 to 45.8) corresponds to a 6% decrease in the likelihood of the occurrence of riots, while a 10-point increase in the Food Production Index would decrease the likelihood of riots by 31%.[25] Helping small- and medium-scale farmers to increase their agricultural production would boost food supplies, help create jobs and reduce the country's vulnerability to world price and domestic currency fluctuations (IRIN, 2010b). Such pro-poor development strategies are needed to address the rioters' underlying frustrations with joblessness and poverty. The February 2011 floods and heavy rains during the food production season in central Mozambique again emphasized the urgency of such measures to prevent future social unrest and tackle poverty in a country where about half of the population of 20 million lives below the poverty line (IRIN, 2010a, 2011b).

Discussion and conclusions

By exploring the different socio-economic and political circumstances facing African countries, we have investigated why some countries experienced food riots in late 2007 and early 2008, while others did not. Our analysis – both the empirical results and three country case studies – points to strong associations between food riots and a range of economic, demographic and political characteristics. Controlling for the geographic location of food riots, our empirical analysis demonstrates that higher rates of poverty, urbanization, the more oppressive nature of political regimes,

[23] The failure of rains in 2009 led to widespread crop failure and pushed millions of Nigeriens into starvation (Thomson, 2010a, 2010b; Hirsch, 2010). Anticipated crops of 2010 were washed away by heavy rainfall producing a catastrophic harvest. Moreover, the abrupt changes in the weather led to tens of thousands of livestock killed.

[24] They are: Angola, Cameroon, Democratic Republic of Congo, Cote d'Ivoire, Madagascar, Mozambique, Nigeria, Senegal, and Sudan (here South Africa, Ghana and Kenya are excluded due to their lower rankings on the Human Poverty Index – below 30).

[25] Gaining one point on the political rights and governance scale (of 1–7) – which is equivalent to a shift to the level of political freedom of Senegal (from 5 to 6) – would also decrease Mozambique's probability of a riot by 64 percent.

and higher levels of civil liberties are associated with a higher likelihood of riots in Africa. Moreover, our results show that limited food availability, restricted access to food (as proxied by the Human Poverty index), and coastal location also contributed to riots over food price spikes.

The food riots of 2007 and 2008, as other conflicts about food, past and present, may be understood in their relation to food entitlements, as proposed by Tilly (1983). Sen (1981) suggests that the occurrence of riots can be viewed as a consequence of shifting or collapsing entitlements: just as famine is caused by declines in "exchange entitlements" or "direct entitlements," so too do food riots follow adverse shifts in the exchange values of endowments of food (e.g., rising food prices) or climatic changes (e.g., loss of food crops to drought). Thus, countries with lower levels of human poverty – that is, with populations which are less vulnerable to the prospects of early mortality, which are better educated, and which enjoy better access to adequate incomes – can withstand longer periods of high prices without experiencing major social tensions. Higher wages and/or accumulated savings provide a buffer during periodic price spikes. Additionally, lower poverty generally means an improved ability to purchase food and enhanced food access, thus lessening the likelihood of civil protests. The crucial insight of Sen's work – that food insecurity affects people who cannot access food regardless of simple food availability – suggests that African governments need to effectively deal with food access and distribution problems to avoid future food riots. By helping poor urban and rural households maintain access to food, energy and essential services, social protection programs – including cash and food transfers, pension systems, and employment programs – can reduce the impact of price shocks on health and education, as well as prevent social unrest. Liberia's public works program and Togo's school lunch vouchers are examples of such policies targeted at vulnerable populations that helped prevent social unrest (World Bank, 2008). Niger's Cabinet-level ministry set up to coordinate action on prices after the 2005 food crisis was also instrumental in averting street protests in 2007–2008 (Harsch, 2008).

More importantly, our analysis demonstrates that, despite geography and past history of riots, effective policy can play an important role by enhancing citizens' political and civil freedoms and improving people's social welfare. Food riots did not necessarily engage the poorest or the hungriest (Messer, 2009). Some protests took part in potentially more advantaged urban areas or relatively more democratic countries (such as Senegal and Madagascar), where people came out to the streets to voice their discontent with decreasing standards of living and government's incapacity to respond to the food crisis effectively. Dissatisfaction with government policies and corruption, as well as desires for increased freedoms, were among the major complaints voiced by the public (Harsch, 2008). In Mauritania, the riots presented a first popular challenge to the policies of President Sidi Mohamed Ould Cheikh Abdallahi's government. In Cameroon, popular anger was voiced against a bid by President Paul Biya to extend his 25-year rule. Such discontent with matters of governance and political rights is not surprising in Africa, where of a total of 53 counties, only 22 were considered to be electoral democracies in 2007 and only 11 were awarded the status of being "free" by Freedom House (2007). In 2011, we were again reminded of these governance concerns as the people in Tunisia, Egypt and Libya tumultuously changed their political regimes. The rulers of Guinea, Cameroon and Burkina Faso – and until very recently, Egypt and Libya – have been in power since the 1980s (or before) and have provided little room for opposition and political participation.

Lack of political accountability and government corruption were widely perceived to have contributed to the economic crisis that accompanied the food price crisis and the widening gap between the political elites and the poor (Harsch, 2008). Walton and Seddon (1994) point out that earlier popular movements for change that started as mass opposition to structural adjustment in some countries led to "a popular wave of dissent which ... toppled some African leaderships" (1994, p. 170). Policies aimed at the development of state capacity – evidenced in outcomes such as service delivery and the protection of individual rights – can reduce both the likelihood of conflict and the incidence of chronic poverty. Less oppressive and more effective governments have a larger taxation capacity and/or other public resources to maintain the necessary social policies (e.g. safety net programs) and invest in long-term economic development. Our analysis confirms previous research (Mansfield and Snyder, 1995; Snyder, 2000; Hegre et al., 2001) that differentiates between the short- and long-run interaction of governance and civil liberties in countries – including the great majority of African countries experiencing food riots – which are in the early stages of democratization; lacking fully developed governance and civil society institutions, short-run conditions may encourage civil conflict, while in the long run, improved governance and domestic institutions that promote civil liberties and democratic freedoms are crucial for securing political and economic stability. In short, as political stability and personal freedoms increase, fewer people desire revolutionary change (MacCulloch and Pezzini, 2004).[26]

Finally, long-term pro-poor programs and policies focused on the rural food economy – such as investments in raising agricultural productivity, improving infrastructure, better risk-management tools, and the dissemination of appropriate technologies – are needed to increase domestic food availability and to forestall increases in poverty. These measures are also likely to have wider developmental, social, and even political benefits (Pinstrup-Andersen and Shimokawa, 2008; World Bank, 2009). Making such investments is a desirable protection mechanism not only to avoid food crises but to increase resilience against all types of shocks. Additionally, as the frequency, variability and unpredictability of natural disasters increase in response to climate change, long-term pro-poor policies can serve to protect the poor from the debilitating consequences of the resulting shocks.

More recently, in the early months of 2011, the FAO Food Price Index averaged above 230 points – higher than at its peak in 2008 – and in February hit its all time high of 238 points (FAO, 2011). Fortunately, good harvests of domestic crops in many African countries limited the transmission of global price hikes and allowed the poor to substitute away from imported staples. Still, these figures should raise alarms among policymakers. Periodic food price spikes are here to stay. Unless governments and donors across the world prioritize investments in agricultural productivity, climate change mitigation and adaption, soil conservation, water efficiency, and other such measures, the world will be confronting both more climatic instability and further food price volatility in the future (Brown, 2011; Lee et al., 2011b). It is long-term investments like these that address poverty, employment and food security, as well as improving policies to strengthen governance, political institutions and civil society that can truly address the underlying circumstances that lead to civil strife and outcomes like food riots.

Acknowledgements

[26] MacCulloch and Pezzini also suggest that in situations with constrained personal freedom, improved economic well-being may "buy off" part of the increase in revolutionary support. Our results support this conclusion. This could be the reason why a country like Gabon, with relatively high GDP per capita (but a low *HPI*) and yet enjoying a low level of political freedoms (Political Rights Index = 2), was able to withstand social unrest.

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