Conflict and disaster

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Abstract: In principle, disasters could prolong or shorten conflicts, and conflicts could improve or undermine disaster recovery efforts. Sympathy for victims might extend to combatants and the experience of working together to provide post-disaster relief could inspire greater confidence in peace agreements. However, both systematic and qualitative evidence indicates that this is not the case: droughts precipitate conflicts and earthquakes prolong them. The relationship between drought and conflict in sub-Saharan Africa, first documented by Miguel, et al. (2004) is revisited here, showing that the overarching institutional and political environment determines both whether countries experience large growth effects from drought and whether drought leads to conflict. Conflict also disrupts disaster relief. Case studies of disaster relief in several conflict countries, including Sri Lanka and Aceh, demonstrate that the strategic interests of political actors and of combatants in civil wars seem to explain these outcomes.

1 This paper was commissioned by the Joint World Bank - UN Project on the Economics of Disaster Risk Reduction. We are grateful to Apurva Sanghi, S. Ramachandran, Saroj Jha and seminar participants at the World Bank for valuable comments, suggestions, and advice. Funding of this work by the Global Facility for Disaster Reduction and Recovery is gratefully acknowledged. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s).
Conflict and disaster

Whether natural hazards have disastrous consequences depends not only on how societies respond to these hazards, but also on the presence of other, “unnatural” hazards. Chief among these is conflict. Conflict and natural disaster coincide surprisingly often. Not only are drought and war closely intertwined, especially in Africa, but earthquakes and conflict are closely related: 53 percent of earthquakes occur in countries experiencing civil war, though these account for only 18 percent of all country-years in the data. This note uses existing and new research to reach two conclusions about the coincidence of conflict and disaster. First, disaster is associated with more or longer conflicts; second, underlying political factors that increase countries’ vulnerability both to conflict and disaster are an important determinant of this association.

Neither conclusion is self-evident. In principle, disasters could prevent or precipitate conflicts, or shorten or prolong them. Combatants could join hands to address the tragedy of disaster, or exploit disaster for strategic advantage. Case studies of the tsunami in Sri Lanka and Aceh and of drought in the Sudan, and cross-country analysis of earthquakes and conflict, offer few grounds to believe that disaster triggers an altruistic response by combatants. On the contrary, it seems to extend or precipitate conflict, giving rise to societal tensions that some governments are hard-pressed to resolve and by favoring weaker insurgents relative to stronger governments. Cases where disaster is associated with the end of conflict appear to be exceptional. Disaster may have accelerated the end of the conflicts in Aceh and Sri Lanka, for example, but in both cases the effects of disaster fell disproportionately on areas controlled by insurgents.

One reason that disaster appears to cause or exacerbate conflict is that the underlying political conditions that weaken government response to natural hazards also make governments more vulnerable to insurgency. Governments with weak incentives to provide the public goods that mitigate disaster risk and promote disaster recovery tend to provide fewer public goods generally (reducing their popularity) and to have less counter-insurgency capacity. Governments that cannot protect property rights or distribute emergency assistance are also unlikely to be able to mount a meaningful counter-insurgency. Evidence from drought in Africa drives home this point. The accepted wisdom is that drought precipitates a struggle for scarce resources; however, this struggle is more likely to turn into open conflict in countries where government protection of rights to resources and government safety nets are weak.

The political and strategic factors that promote an association between conflict and disaster also lead to distortions in the allocation of disaster relief. The paper closes with an outline of the strategic considerations that guide combatants in the aid allocation decisions and shows that these considerations lead to allocation outcomes very similar to those observed in Sri Lanka, Aceh, Guatemala, Kashmir and the Sudan.

Conflict, natural disasters and disaster recovery

The association of conflict and natural disaster raises two important questions. First, the focus of this section, do natural disasters trigger or prolong conflict? And second, the focus of the remainder of this paper, does conflict have a large effect on disaster response? Although, in principle, the answer to both questions is ambiguous, in practice it is “yes”: disasters exacerbate conflict and conflicts distort post-disaster assistance.
Conflicts start when governments are unable to defuse opposition or prevent opposition from turning into outright insurgency. Disasters make conflict more likely if the government response to disaster increases citizen dissatisfaction or undermines the government’s ability to mount a counter-insurgency. Conflicts persist when neither side can gain a decisive strategic advantage over the other. Disasters may have no effect on conflict persistence if they do not disturb the strategic balance. They may extend conflict if they increase parity (by strengthening a party that was otherwise losing ground in the conflict); or they may shorten conflict if they significantly shift the strategic balance in favor of the party that was in any case gaining ground, or if they trigger cooperative behavior by combatants to relieve the suffering of disaster victims.

**Rapid-onset disasters**

In contrast to the ambiguous theoretical relationship between disaster and conflict, empirically the two are significantly, positively correlated. Rapid-onset disasters seem to prolong conflict and, as the discussion below reveals, chronic disasters (droughts) seem both to trigger and to prolong conflict. Brancati (2007) looks at earthquakes and conflict. Her data indicate that conflict countries experienced approximately one earthquake every four years (in jurisdictions with at least 50 inhabitants per square kilometer). Countries not suffering from civil war experienced approximately one earthquake every 25 years.2 Put differently, an earthquake was six times more likely to strike during a period of civil war than during a period of peace.

Civil wars obviously do not cause earthquakes. However, the data also do not support the contention that earthquakes cause conflict, since there are only four civil wars, out of 63, in which an earthquake occurred either the year before or in the first year of a conflict. Instead, the best interpretation of these data is that earthquakes prolong conflicts. Average conflict length in the 44 conflicts that experienced no earthquakes was 8.8 years, compared to 15.4 years in the 19 conflicts that experienced at least one earthquake.3 For every earthquake that occurs during a civil war, the civil war appears to persist for an additional five months.4

The most plausible explanation for this result is that, in general, earthquakes reduce the relative strategic advantage of the stronger power (probably the government) relative to the weaker. The 1999 earthquake in Colombia killed 1,000, injured thousands more, left 35,000 homeless, and crippled coffee production. The disaster-affected themselves engaged in violent actions (clashes with police, looting) in response to the government’s slow disaster response.

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2 In her data, civil wars occurred in 661 country-year observations during the 1975-99 period, with peace prevailing in 2970 country-years.

3 The difference is highly significant, equal to one standard deviation of civil war length.

4 If one regresses the length of civil war on the number of earthquakes during the civil war, controlling for land area and elevation differences (how mountainous a country is), the result for 61 conflicts in 51 countries, with clustered standard errors, is

\[
\text{length of war} = 9.94 + .42 \text{total earthquakes} - .4 \text{million square kilometers} + .0001 \text{elevation differences}.
\]

\[t\text{-statistics:} \quad (3.91)\quad (-2.22)\quad (.80)\]

This relationship is not simply the spurious result of longer wars increasing the temporal window during which earthquakes could occur. The probability that an earthquake occurs in a conflict year (.25) is far greater than the probability that it occurs either during those years in which conflict countries happen to be at peace, .044, or in countries that never experience conflict during the period, .042.
Brancati (2007, 724-5) reports that disaster response diverted the attention of government security forces away from the ongoing rebellion. As a consequence, the rebels reneged on an agreement to withdraw from the demilitarized zone and increased their attacks.

In contrast to the systematic evidence that comes from the examination of earthquakes, the devastating tsunami that swept through the Indian Ocean in December 2004 seems to have been associated with a more rapid end to the conflicts in both Sri Lanka and Aceh, Indonesia. Both cases are informative, however, for understanding the dynamics of conflict and rapid-onset disaster. In particular, did the tsunami, or other, coincidental forces, force an end to the conflict? And if the tsunami had this effect, was it because it inspired cooperative behavior by combatants, laying the groundwork for peace, or because it changed the balance of power, allowing one side to defeat the other?

The insurgency of the Tamil Tigers (LTTE) in Sri Lanka began in 1983. The conflict killed approximately 70,000 people and displaced one million, five percent of the population. The tsunami evidently did nothing to facilitate the implementation of a cease-fire agreement signed in 2003 nor to trigger an outpouring of sympathetic cooperation between the combatants. Brancati (2007, 725) reports that conflict activity actually increased in the immediate aftermath of the tsunami. In the first ten months of 2005, the LTTE killed 200, three times as many as in the previous year. The government then renewed its offensive; in 2007, Kuhn (2009) writes that 4,369 died in the war, of whom 3,345 were LTTE fighters. In 2008, the government prevailed in major land and sea battles. By early 2009, government forces had pushed the LTTE into a small area of the country and the civil war looked to be almost at an end.

If the tsunami affected the outcome of the Sri Lankan civil war, and these effects did not emerge because of enhanced cooperation among combatants, its influence must have been felt in the balance of power between government and LTTE forces. In fact, although the tsunami had significant effects in all of Sri Lanka’s 14 coastal districts, it struck with greatest force in the eastern districts, areas with much higher proportions of Tamils and Muslims. Kuhn (2009) estimates that Muslim and Tamil populations incurred approximately 70 percent of total losses, with Tamils suffering 38 percent of total deaths and 46 percent of total housing damage. The Tamils, however, comprised only 18 percent of the population, Muslims seven percent, and the Sinhalese 74 percent. By itself, the eastern Ampara District, approximately two-thirds Muslim and one-quarter Tamil, suffered 10,346 deaths and lost over 10,500 homes. The disproportionate impact of the tsunami on the LTTE support base is sure to have weakened the LTTE’s capacity to sustain the insurgency, although the fact that the insurgency lasted for 4 more years suggests that it did not cripple the LTTE entirely.

The independence movement in Aceh and, particularly, the violent insurgency conducted by the Free Aceh Movement (GAM), had three separate periods. A guerrilla began in 1976 but were put down by Indonesian government forces by 1977. The GAM renewed its guerrilla activities in 1989 before once again being suppressed in 1996. The fall of Suharto in 1998 triggered a renewed drive for independence, both peaceful (including a demonstration of a million Acehnese in 1999) and violent, with the resumption of attacks by the GAM. After decades of unrest, a peace agreement was signed in 2005, months after the tsunami, granting the

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5 However, Kuhn (2009) argues that the seeds of organized violence were sown in 1971 with an uprising by a nationalist Buddhist social movement that targeted Sinhalese and Tamil elites, killing thousands.
Acehnese significant autonomy but much less than full independence. Government troops were withdrawn by December 2005.

As in the Sri Lankan case, the role that the tsunami played in persuading the combatants to conclude the war is not straightforward to discern. In the period leading up to the tsunami, figures on both sides of the conflict, including both the president and vice president of Indonesia, were actively seeking to resolve the conflict; and the GAM had already agreed to give up claims for full independence. The civilian, elected leadership of Indonesia had begun to exercise unprecedented control over the military, rendering potential peace agreements more credible than they had been before. Moreover, the Free Aceh Movement had never enjoyed military success, nor had it administered territory in the manner of the LTTE in Sri Lanka. Even absent the tsunami, its prospects of success were not as high as that of the LTTE.

Nevertheless, there are several reasons to believe that the tsunami made a difference. First, it generated a wave of sympathy among other Indonesians generally for the plight of the Acehnese, offsetting their antipathy towards Acehnese demands for greater autonomy. Second, as in Sri Lanka, but even more markedly, the tsunami struck the heartland of support for the insurgency, where the damage was far worse than in Sri Lanka. More than 165,000 died in Aceh, out of a population of approximately four million, compared to approximately 35,000 in Sri Lanka, out of a population of approximately 20 million (of whom approximately five million are Tamils or Muslims). This meant that the capacity of the Acehnese to support the GAM was severely weakened relative to the capacity of the Tamils to support the LTTE.

Third, the Acehnese became far more reliant on the government of Indonesia for support, both in absolute terms and relative to their reliance on the GAM, than was the case in Sri Lanka. The discussion below on disaster relief indicates that the Indonesian government controlled the relief effort almost entirely, in contrast to the important role played by the LTTE in Sri Lanka. Continued vigorous support for the insurgency therefore exposed the Acehnese to higher economic losses than had been the case previously. Finally, fourth, the presence of many international aid workers in Aceh after the tsunami helped to cement the credibility of commitments made by the government to the Acehnese, such as those related to the comportment of the military.

Both Sri Lanka and Aceh illustrate the degree to which disaster’s effect on conflict is likely to depend crucially on how disaster damage is distributed. In these cases, the disaster struck the small part of the country where insurgents were strongest. In most cases, though, since governments tend to control most of the land and population of countries, we should expect government-controlled areas to bear the brunt of most disasters. The fact that, in general, earthquakes are associated with longer conflicts, is evidence that this is, indeed, the case.

*Slow-onset disasters*

The relationship between conflict and a slow-onset disaster, drought, has long preoccupied policy makers and scholars. The argument of Homer-Dixon (1999), that environmental scarcity drives conflict (inter-state and intra-country), is the broadest manifestation of this concern, linking climate change to human conflict. Most analysis, though, focuses on the somewhat narrower concern of the relationship between drought (whether

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6 Personal communication, Adam Burke.
episodic or climate-change related) and conflict. Miguel, et al. (2004) investigate the relationship of conflict and rainfall disasters in Africa. They find that a one percent increase in rainfall from the previous year to the current year reduces the probability of serious conflict by approximately six percent; a one percent increase in rainfall in the previous year relative to two years before the current year reduces the probability of conflict by approximately seven percent.\(^7\) They further show that the income losses associated with exceptionally low rainfall have a significant impact on conflict probability. Hendrix and Glaser (2007) obtain similar results using different rainfall data and controlling for climactic conditions and land degradation. Like Miguel, et al., they attribute the drought-conflict association in Africa to the dependence of African agriculturalists on rainfall.\(^8\)

Unlike earthquakes, rainfall disasters seem to trigger rather than extend conflicts. In non-conflict years, the countries Miguel, et al. (2004) analyze experience increasing rainfall: average rainfall grows by as much as two percentage points per year. In the first year of conflict, though, rainfall is seven percentage points less than in the prior year. In the remaining years of conflict, rainfall is close to the normal pattern: growth in rainfall from one year to the next, after the first year of conflict, is approximately two percentage points per year. If anything, higher rainfall during the conflict period seems to be associated with longer conflicts.\(^9\) One explanation for this is that once conflict has started, high crop yields from heavier rainfall may help insurgents sustain their activities.\(^10\)

Qualitative studies of drought in Afghanistan and volcanic eruptions in eastern Congo (both in 2002) also conclude that these disasters exacerbated conflict (Wisner, et al. 2004). Extensive, within-country evidence on drought in Africa reinforces the conclusion of Miguel, et al. (2004), that drought on that continent triggers a scramble for resources. However, in contrast to the discussion in Miguel, et al. (2004) and Hendrix and Glaser (2007), which focuses on reliance on rainfed agriculture, within-country investigations of conflict emphasize the conflict between agriculturalists (whether or not they benefit from irrigation) and drought-afflicted pastoralists seeking water for their herds. The scope of pastoral activities is large. Meier, et al. (2007, p. 718) report Food and Agriculture Organization (FAO) estimates that pastoral systems use a quarter of the world’s land area and provide 10 percent of global meat production.

Bassett (1988) describes peasant-herder conflicts in the Northern Ivory coast following the Sahelian drought of the early 1970s, when Fulani pastoralists emigrated to the Ivory Coast to an area populated by Senufo peasants, with the support of the Ivorian government. In his study

\(^7\) Technically, Miguel, et al. (2004) employ rainfall/drought as an instrumental variable to measure the effect of exogenous changes in income per capita on the probability of conflict.

\(^8\) Their main conclusion is that rainfall volatility is the main weather-related source of conflict in Africa and that climate change is unlikely to affect this volatility. That is, climate change is unlikely to exacerbate the vulnerability of African countries to conflict.

\(^9\) If one regresses the length of 23 civil wars in 18 African countries on rainfall growth and lagged rainfall growth, controlling for land area and elevation differences (as in the earthquake case discussed earlier) rainfall growth and lagged rainfall growth have a small (not quite statistically significant) positive association with conflict.

\(^10\) For example, Meier, Bond and Bond (2007) argue that rainfall-fed vegetation provides cover for organized cattle raids by pastoralists on other pastoralists, partially explaining why they, in contrast to Miguel, et al. (2005), find no conclusive evidence at the very local level that a decline in rainfall increases one particular type of resource conflict.
area, Bassett (1988) estimated that on average, among households that suffered crop damage from Fulani cattle, losses amounted to roughly 20 percent of household income. At the same time, however, cropping patterns of the Senufos encroached on manure-rich lands that the Fulanis relied upon for cultivation of their own crops.

Nyong and Fiki (2005) interviewed 800 households in the Sahel region of northern Nigeria. About 200 of these had experienced conflicts, more than half of which were related to access to resources. 60 percent of all conflicts occurred in the dry season and the most violent conflicts occurred within the most resource-rich areas (e.g., fertile flood plains). Resource-related conflicts appear largely to have been between pastoralists and agriculturalists. Pastoral respondents claimed that in times of drought, farmers cultivate along cattle paths, while farmers claimed that the pastoralists water their cattle at wells that they constructed and allow them to feed on crops.

Conflicts between pastoralists and farmers, while common and locally destructive, usually do not grow to become civil wars. However, they provide fertile ground for war to emerge. Meier, et al. (2007) quote Hendrickson, et al. (1996: 186) that raids by pastoralists on each others’ herds moved from being a “quasi-cultural practice” to a large scale, predatory, very violent activity that is promoted by actors from outside the sector.11

Politics and governance, disaster and conflict

Natural disasters cause and prolong conflicts. Whether earthquakes or droughts, the evidence is surprisingly clear that conflict risk rises when countries are shaken by natural disaster. Rapid onset disasters seem especially to prolong conflicts: the need to respond to the earthquake disrupts the balance of power between government and insurgent groups in a way that generally favors the weaker (insurgent) group, allowing them to fight longer. Droughts seem to trigger conflict. This section reviews the now conventional explanation for the drought-conflict relationship, that droughts reduce incomes, leading to a struggle over limited resources. The argument and evidence presented here suggest that these associations are highly dependent on political incentives. When political actors have weak incentives to provide public goods, such as the protection of contract and property rights and disaster risk reduction, conflict is more likely and drought has a larger effect on incomes.

As is evident in the foregoing discussion, most research examining disaster and conflict concludes that the first causes the second. One argument is that disaster reduces incomes, triggering a struggle for resources that leads to conflict. This is the explicit argument in research as different in its approach as that of Homer-Dixon (1998) and Miguel, et al. (2004). Anthropological studies of low-level conflict in Africa emphasize the effect of drought on conflicts between pastoralists and herders who abandon traditional allocations of grazing and water rights when the available resources shrink. Alternatively, disaster causes conflict by reducing the costs of insurgency relative to the costs of fighting insurgency. Disasters place a strain on governments as they are forced to divert resources and attention from the insurgency in order to respond to the disaster. This weakens governments relative to insurgents. In addition, analyses of the political economy of disaster, particularly rainfall-related, have found substantial

evidence that disasters trigger strong anti-incumbent effects, regardless of incumbent responses to disasters (Keefer 2009 summarizes these).

However, each of these arguments abstracts from the broader political and institutional context that affects both disaster and conflict. For example, the effect of disaster on citizen welfare depends on the political decision of governments to undertake risk mitigation measures. In addition, the probability that disaster-inspired disputes turn into conflict depend on government decisions to protect property rights, finance and administer a safety net, and maintain an effective counter-insurgency capacity. A potentially more accurate description of the relationship between disaster and conflict is therefore that governments that have weak political incentives to respond effectively to disaster also have weak political incentives to build up a competent counter-insurgency capacity or relatively strong incentives to mount armed attacks against their own people.

Political circumstances that reduce government incentives to mitigate disaster risk also reduce their incentives to protect property rights and to develop an effective counter-insurgency capability. Keefer (2009), for example, examines the effect of political market imperfections on the mortality consequences of disaster and concludes that when political incentives to serve narrow interests predominate, at the expense of incentives to serve the broad public interest, governments under-provide secure property rights and disaster safety nets. Keefer (2008) argues that these same incentives undermine the capacity of governments to combat insurgency. A wealth of evidence points, finally, to the determinants of the rule of law, ranging from the introduction of elections to the credibility of political promises and the institutionalization of political parties.

Detailed case study evidence supports the view that the relationship between conflict and disaster is heightened in settings where institutional arrangements are weak and political actors have fewer incentives to satisfy broad public interests. Scholars looking at the relationship between drought and conflict in particular African settings argue that policy distortions, and especially the failure of governments to protect property rights, underlie the relationship between conflict and drought. Nyong and Fiki (2005) note, first, that the literature traces the failure of traditional institutions in the management of conflicts in Africa to the imposition of “modern” on “traditional” land tenure regimes. This, in itself, suggests a policy failure, though not an easy one to sort out for even the best-motivated governments. Nyong and Fiki (2005) insist, though, on the importance of a second, deeper and unambiguous problem with “modern” tenure regimes in Africa: the weakness of the formal institutions of justice administration that are charged with enforcing them.

Morton (1996) argues that violence in Darfur (prior to 1993) was not the result of increasing competition over resources — that is, drought did not cause conflict — but instead a failure of dispute-resolution mechanisms at the political level (see also Morton 1994). Bassett’s (1988, 468) account of violence in the Ivory Coast emphasizes the reluctance or inability of the government to protect property rights: “Despite contracts drawn up by SODEPRA [Société pour le Développement de la Production Animale] which state otherwise, customary land holders fear that they will lose control of the land once the Fulani establish their camps. . . The above fear is well-founded due to the ambiguities of Ivorian land tenure laws which officially give the state the power to distribute ‘unused’ lands.” While these conflicts did not rise to the level of civil war during this period, in part because the Fulani began to return to Mali and Burkina Faso, a small rebellion in 1986 left 80 Fulani dead. Bassett writes, “What were originally localized
tensions between farmers and herders had now become an explosive inter-ethnic conflict (p. 469).”

This qualitative evidence suggests that it may not be the fall in income, per se, that explains why drought triggers conflict, as Miguel, et al. (2004) and others have argued. Instead, drought may cause higher losses to income when governments have weak incentives to pursue policies that mitigate the risk of drought. In countries where governments provide safety nets, encourage private investments in drought-resistant production technologies, and make public investments that mitigate the risks of drought, income losses are smaller. Drought may also precipitate civil conflict, even when income losses are small, when governments do not prevent the violent or uncompensated rearrangement of property rights in the face of economic shocks.

The quality of governance may therefore mediate the influence of rainfall shocks on conflict in two ways. First, the growth effects from rainfall shocks could be large or small depending on whether the governance environment discourages or encourages investments that mitigate the effects of shocks. Second, the likelihood that income declines lead economic actors to engage in a violent scramble for resources, which spirals into civil war, could be low or high depending on whether governments provide institutions that contain the struggle for resources and protect property rights.

Tables 1 and 2 attempt to shed light on each proposition. First, is it the case that the growth effects of rainfall shocks depend on the governance environment? Fialo (2009) concludes that it does not. He looks at all countries, but uses an elaborate lag structure that may obscure the effects of governance. The approach taken here is to take the data, specifications and results from Miguel, et al. (2004) as a starting point and examine the impact of governance. Their data are from sub-Saharan Africa for the years 1981-1999.

An appropriate governance indicator is one that captures the degree to which governments provide a safe environment for private investment and institutions to resolve conflicts peacefully. The rule of law variable from International Country Risk Guide is precisely such an indicator. However, though the country and year coverage of International Country Risk Guide is larger than any other governance indicator, it begins coverage in 1982 and 1983 with a small number of countries, rising to more than 90 countries by 1984. The data are therefore only available for 483 of the 743 observations in the Miguel, et al (2004) analysis.

This creates difficulties for examining whether the effects of drought on income are conditioned on the rule of law, for two reasons. First, the early 1980s were periods of frequent conflict and unusual large declines in rainfall; 1981-1984 are covered either not at all or thinly with rule of law data. Second, income per capita is one third higher in the observations with rule of law data than in the observations without. Because of the significant association between the rule of law and income, it is likely that the omitted countries would have exhibited even lower rule of law, on average. For example, of the 30 civil war observations in the sample years prior to 1985, 26 were from Uganda, Ethiopia, Mozambique, Sudan, Angola, Chad and the Zaire, all of which would have been regarded as low rule of law countries in the period before conflict started. Consistent with these two factors, the relationship between rainfall and conflict is much stronger in the countries without rule of law data than among those with it.

Fiallo (2009) finds that the effects of rainfall on growth are strongest in Africa; Miguel, et al (2004) use a sample of sub-Saharan African countries to conclude that rainfall triggers conflict. Consistent with the idea that both results are related to the rule of law and that drought
is more likely to trigger conflict in countries where property rights protection is weakest, African countries during this period exhibited significantly weaker governance than the rest of the world. For example, the International Country Risk Guide’s measure of the rule of law averaged 2.8 over the period for African countries with competitive elections, almost one standard deviation worse than other countries with competitive elections, which averaged 4.3. Among countries lacking competitive elections, those in Africa scored 2.6, approximately 1/3 of a standard deviation less than those outside of Africa (3.1). These differences are only slightly smaller if one excludes African countries experiencing internal conflict.

Miguel, et al. (2004) use several specifications to examine the proposition that rainfall and growth are related and of these, one is significant even for the subsample of countries for which no rule of law data are available. The analysis below relies on this specification to examine the hypothesis that rainfall affects growth conditional on the rule of law. It has a number of controls (see table notes), but no country and year fixed effects.

The first specification in Table 1 replicates Miguel, et al (2004), using the controls indicated in the note to the table, but examining only the sample of observations for which lagged rule of law data are available. The effects of change in rainfall on growth are statistically significant: a 21 percent increase in rainfall this period compared to last period (a one standard deviation increase) is associated with a 0.6 percentage point increase in growth (.03 times .21), approximately one-tenth of the standard deviation of growth in the sample. The second column reports the same specification on those observations for which lagged rule of law data are missing. In this sample, a 19 percent increase in rainfall (one standard deviation for this sample) increases growth by 1.9 percentage points, slightly less than one-fourth of a standard deviation. These results indicate that, in fact, rainfall is significantly more likely to affect growth in countries lacking rule of law data.

The third and fourth specifications indicate that the effects of rainfall on growth, found in the first specification, are entirely conditional on the rule of law. The two interaction terms in Specification 3, lagged rule of law with rainfall growth and with lagged rainfall growth, are both significant or nearly significant. The lowest and highest values of rule of law (both potentially and in this sample) are zero and six. A ten percent increase in current rainfall growth is associated with nearly one percentage point faster growth if rule of law in the last period were zero, but with one percentage point slower growth if rule of law in the last period were six.

The fourth and final specification recognizes that rule of law in the last period might be affected by lagged rainfall growth. It therefore interacts last period’s rule of law (t-1) with this year’s rainfall growth and last year’s rainfall growth the rule of law from the year before (t-2). The results are unchanged: the effects of rainfall on growth are entirely conditional on the rule of law. Though somewhat tentative, because the effects of rainfall on growth are, in the rule of law sample, not as robust as they are in the whole sample used by Miguel, et al. (2004), these results indicate that the effect of rainfall on growth is likely to be conditional on the rule of law.

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12 Using the subsample for which rule of law data are available, rainfall is never significant controlling either for country-fixed effects or country-year trends, in contrast to their results using the whole sample of observations.

13 The calculation for the first is .09*.10 -.03*.10*0=.009, or an increase in growth of 0.9 percentage points. The calculation for the second is .09*.10 -.03*.10*6=.009-.018=-.009, or a decrease in growth of -0.9 percentage points.
### Table 1: Rainfall, growth and the rule of law in Sub-Saharan Africa, 1982-1999

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<tr>
<td>Current year vs. last year’s rainfall?</td>
<td>.03 ($p=.09$)</td>
<td>.10 ($p=.001$)</td>
<td>.09 ($p=.09$)</td>
<td>.11 ($p=.05$)</td>
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<td>Last year’s rainfall vs. year before?</td>
<td>.03 ($p=.12$)</td>
<td>.04 ($p=.05$)</td>
<td>.13 ($p=.03$)</td>
<td>.16 ($p=.002$)</td>
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<td>Rule of law, previous year (t-1)</td>
<td></td>
<td>.02 ($p=.14$)</td>
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<td>.02 ($p=.001$)</td>
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<td>Rule of law, (t-2)</td>
<td></td>
<td>.-01 ($p=.07$)</td>
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<tr>
<td>Rulelaw (t-1)*current year rainfall growth</td>
<td>.-03 ($p=.03$)</td>
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<td>Rulelaw (t-1)*last year’s rainfall growth</td>
<td>.-01 ($p=.00$)</td>
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<td>Rulelaw (t-12)*last year’s rainfall growth</td>
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<td>.-04 ($p=.001$)</td>
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<td>Number of country years</td>
<td>483</td>
<td>260</td>
<td>483</td>
<td>451</td>
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<td>Number of conflict years</td>
<td>89</td>
<td>35</td>
<td>89</td>
<td>82</td>
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Note: Median rule of law in the sample is three on a scale of 1 to 6. All specifications taken from Miguel, Satyanath and Sergenti (2004). All specifications control for initial 1979 income per capita, ethnic fractionalization, religious fractionalization, whether a country is an oil exporter, log of population, and log of an index of how mountainous a country is. The $p$-values are based on robust, clustered standard errors.

One additional piece of evidence that, if rainfall matters, it is through rule of law and not through growth, emerges from a comparison of the effects of the rule of law and growth on conflict. If rule of law is a significant determinant of conflict and growth is insignificant, it is less likely that an exogenous shock, such as low rainfall, operates through growth. In fact, using control variables as in Specification 1 in Table 1, the rule of law has a large and significant effect on conflict; growth does not. This comparison is only suggestive, however. Both the rule of law and growth in income per capita are potential determinants of conflict, both are strongly affected by past rainfall, both influence each other, and both are likely to be endogenous to conflict – that
is, potentially driven by unobserved factors that influence both conflict and growth or rule of law.\textsuperscript{14}

Table 2: Rainfall, civil war and the rule of law in Sub-Saharan Africa, 1982-1999

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<tbody>
<tr>
<td>Current year vs. last year’s rainfall?</td>
<td>-.09</td>
<td>-.06</td>
<td>-.14</td>
<td>-.28</td>
</tr>
<tr>
<td>((p=.05))</td>
<td>((p=.47))</td>
<td>((p=.47))</td>
<td>((p=.20))</td>
<td></td>
</tr>
<tr>
<td>Last year’s rainfall vs. year before?</td>
<td>-.08</td>
<td>-.02</td>
<td>.01</td>
<td>-.18</td>
</tr>
<tr>
<td>((p=.08))</td>
<td>((p=.78))</td>
<td>((p=.96))</td>
<td>((p=.28))</td>
<td></td>
</tr>
<tr>
<td>Rule of law, previous year ((t-1))</td>
<td></td>
<td>.02</td>
<td></td>
<td>-.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>((p=.14))</td>
<td></td>
<td>((p=.001))</td>
</tr>
<tr>
<td>Rule of law, ((t-2))</td>
<td></td>
<td>-.08</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.02)</td>
<td>(.03)</td>
<td></td>
</tr>
<tr>
<td>Rulelaw ((t-1))*current year rainfall growth</td>
<td></td>
<td>.03</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.48)</td>
<td>(.23)</td>
<td></td>
</tr>
<tr>
<td>Rulelaw ((t-1))*last year’s rainfall growth</td>
<td></td>
<td></td>
<td>-.02</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.72)</td>
<td>(.31)</td>
</tr>
<tr>
<td>Rulelaw ((t-12) )*last year’s rainfall growth</td>
<td></td>
<td></td>
<td></td>
<td>-.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.001)</td>
</tr>
<tr>
<td>Number of country years</td>
<td>483</td>
<td>260</td>
<td>483</td>
<td>451</td>
</tr>
<tr>
<td>Number of conflict years</td>
<td>89</td>
<td>35</td>
<td>89</td>
<td>82</td>
</tr>
</tbody>
</table>

Note: Median rule of law in the sample is three on a scale of 1 to 6. All specifications taken from Miguel, Satyanath and Sergenti (2004). All specifications control for initial 1979 income per capita, ethnic fractionalization, religious fractionalization, whether a country is an oil exporter, log of population, and log of an index of how mountainous a country is. The \(p\)-values are based on robust, clustered standard errors.

Table 1 implies that drought might cause conflict only in the presence of weak governance. One can examine this proposition using exactly the same specifications as in Table 1, as in Miguel, et al. (2004), but removing economic growth and substituting whether a country is experiencing a civil war in a particular year. Table 2 reports these results. Although they do

\textsuperscript{14} Miguel, et al (2004) account for the endogeneity of growth and conflict by using rainfall as an instrument for growth. One instrument cannot be used to distinguish the effects of two endogenous variables, growth and the rule of law, however.
not provide evidence that the effect of rainfall is conditional on the rule of law, since the interaction terms in the third and fourth specifications are insignificant, they are supportive of this claim in another respect. In particular, the effects of rainfall are not robust to controls for rule of law, as in Specifications 3 and 4 in Table 2, though rule of law itself is significant in both cases.

The first specification in Table 2 replicates Miguel, et al (2004) with those observations for which rule of law data are available. Positive rainfall shocks significantly dampen the risk of civil war. The second column indicates that rainfall has no effect on conflict in the subsample of observations with no rule of law data, despite the strong association in this subsample between rainfall shocks and income growth in Table 1 and the high frequency of conflict in this group of observations. This is further evidence that growth may not be the main channel through which rainfall shocks affect conflict, and that growth itself may not be key.\(^{15}\)

Specifications 3 and 4 demonstrate that the effects of rainfall on conflict are insignificant when controlling for rule of law. Rainfall shocks are largest in the year before a conflict, so asking whether rainfall shocks are associated with conflict onset, after controlling for rule of law variables, is especially favorable to the argument that rainfall effects are independent of the rule of law. These findings are robust to looking at a different subsample, one that excludes all conflict years after the first. Such a specification estimates only the probability that rainfall precipitates a conflict, not the probability that a conflict persists after having already started.\(^{16}\)

Finally, rainfall shocks are highly correlated with their respective interaction terms (at greater than .90), which may spuriously lead to the rejection of rainfall in these two specifications. However, in both specifications 3 and 4, when the interaction terms are removed, leaving only the linear rule of law variables, rainfall shocks are still not significant. The linear rule of law variables are correlated with rainfall shocks at less than .05.

These results have potentially important policy implications. Conventional wisdom holds that the key to reducing conflict in sub-Saharan Africa is to shift the economies there away from dependence on rain-fed agriculture. If rainfall affects conflict conditional on the rule of law, however, the conventional wisdom requires amendment. Tables 1 and 2 suggest that a greater focus on governance issues may instead be warranted. This is particularly the case because governance failures can undermine strategies that one might use to promote sectoral shifts and drought resistance, such as public investment in irrigation.

**Rainfall and political institutions**

While rainfall shocks affect both the duration and onset of conflict, political variables that mediate the impact of shocks on conflict affect the two differently. To see this, assume that insurgencies that form for the purpose of overthrowing the government will not be smaller than needed to accomplish this task with some reasonable probability. Assume as well that the resilience of an insurgency to losses increases with the size of the insurgency (a small insurgency that loses 10 percent of its members is more likely to disappear than a large insurgency that loses

\(^{15}\) Growth is actually positively associated with conflict in this subsample, controlling or not for rainfall shocks.

\(^{16}\) In contrast to the growth specifications, rainfall is a significant predictor of conflict in the rule of law subsample even when controlling for country fixed effects and country-year time trends. However, as in Specifications 3 and 4, Table 2, the effects of rainfall disappear when controls for rule of law are entered.
10 percent). This could be because there are economies of scale in fighting an insurgency, or because skills are harder to replace in small insurgencies.

Given these two assumptions, strong governments will confront insurgencies more rarely, since it is difficult for insurgencies to form at the necessary scale to defeat the strong government. However, these same governments can also more easily attack elements of the population preemptively, starting a civil war. On the other hand, weak governments confront insurgencies more frequently, since even small insurgencies can succeed. Once an insurgency occurs, however, it is likely to be shorter (in the sense that it will generate high casualties for a shorter period of time) in the second case.

This has two implications for what we should observe in the data. First, the effect of strong governments on the onset of a conflict is ambiguous: weak governments are more likely to be subject to insurgencies, but strong governments are more likely to attack preemptively. Second, conflicts that do happen are likely to last longer in countries with strong governments.

This logic also has implications for the effect of disaster – drought – on conflict. Governments with strong political incentives to field a capable counter-insurgency force can deter more insurgencies in the event of a negative rainfall shock, but are more likely to strike preemptively, attacking insurgents before they become strong. The strength of governments therefore has an ambiguous effect on whether rainfall shocks precipitate conflict. In contrast, once a conflict starts, rainfall shocks its length should be unambiguously related to the strength of government. Weaker governments will find it more difficult to address population needs and handle the conflict than stronger governments, so that rainfall shocks should lengthen conflict when governments are weak, but not when they are strong.

For purposes of examining the issue empirically, a useful operationalization of “strength” is the ability of governments to more easily mobilize large groups of citizens for collective action (e.g., for relief in the event of disasters, counter-insurgencies to fight rebels, or armed actions against opponents). The capacity to mobilize large groups of citizens is more likely in countries where the ruling party is older than the tenure of a country’s leader. In this case, parties are more likely to have an institutional structure that does not depend on the particular leader at the top. Party leaders are more likely to be able to make commitments to party members that do not depend on personal relationships, in part because in such parties members have greater influence over leader selection: they have demonstrated the ability to find new leaders to replace old leaders without disintegrating. When parties are institutionalized in this way, leaders can more easily mobilize all party members to pursue common aims (see, for example, Gehlbach and Keefer 2008).

Table 3 summarizes results of several experiments. The first two, in columns 1 and 2, ask whether rainfall shocks affect the onset of civil war. The last two, in columns 3 and 4, analyze the length of conflicts. The control variables (estimates not reported) are as in Table 2. Columns 1 and 3 examine the effects of the age of the ruling party, holding constant the years in office of the leader and whether the leader is a military office (all lagged one year and all from the Database of Political Institutions, Beck et al. 2001).

Columns 2 and 4 examine whether the effects of rainfall shocks are conditional on the extent of ruling party institutionalization. Since ruling party age and the leader’s years in office are both essential to describing ruling party institutionalization, however, these are combined into a single variable for purposes of forming interaction terms with the rainfall variables.
Specifically, a variable is created that takes a value of zero if the leader’s years in office exceed the age of the ruling party, and otherwise equals the difference between the two. This new variable is then interacted with the rainfall variables in Columns 2 and 4.

Table 3: Ruling party strength, rainfall, and civil war in Sub-Saharan Africa, 1982-1999

<table>
<thead>
<tr>
<th>Dependent variable: Onset or length of civil war</th>
<th>(1) Onset of civil war</th>
<th>(2) Onset of civil war</th>
<th>(3) Length of civil war</th>
<th>(4) Length of civil war</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current year vs. last year’s rainfall?</td>
<td>-.10</td>
<td>-.13</td>
<td>1.00</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>(p=.002)</td>
<td>(p=.06)</td>
<td>(p=.35)</td>
<td>(p=.50)</td>
</tr>
<tr>
<td>Last year’s rainfall vs. year before?</td>
<td>-.06</td>
<td>-.12</td>
<td>1.05</td>
<td>2.71</td>
</tr>
<tr>
<td></td>
<td>(p=.06)</td>
<td>(p=.02)</td>
<td>(p=.23)</td>
<td>(p=.07)</td>
</tr>
<tr>
<td>Age of ruling party, previous year</td>
<td>-.0002</td>
<td>.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(p=.74)</td>
<td>(p=.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leader years in office, previous year</td>
<td>-.0007</td>
<td>-.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(p=.36)</td>
<td>(p=.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruling party age less leader years in office, previous year (= 0 if negative)</td>
<td>-.00001</td>
<td></td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(p=.98)</td>
<td></td>
<td>(p=.07)</td>
<td></td>
</tr>
<tr>
<td>Ruling party-years in office, ((t-1))*current year rainfall growth</td>
<td>.001</td>
<td></td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(p=.54)</td>
<td></td>
<td>(p=.78)</td>
<td></td>
</tr>
<tr>
<td>Ruling party-years in office, ((t-1))*last year's rainfall growth</td>
<td>.003</td>
<td></td>
<td>-.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(p=.09)</td>
<td></td>
<td>(p=.11)</td>
<td></td>
</tr>
<tr>
<td>Was leader a military officer, previous year</td>
<td>.02</td>
<td>.01</td>
<td>-1.10</td>
<td>-1.30</td>
</tr>
<tr>
<td></td>
<td>(p=.35)</td>
<td>(p=.56)</td>
<td>(p=.20)</td>
<td>(p=.06)</td>
</tr>
<tr>
<td>Number of observations (country-years)</td>
<td>586</td>
<td>569</td>
<td>117</td>
<td>101</td>
</tr>
<tr>
<td>Number of conflicts</td>
<td>23</td>
<td>17</td>
<td>21</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: Median rule of law in the sample is three on a scale of 1 to 6. All specifications taken from Miguel, Satyanath and Sergenti (2004). All specifications control for initial 1979 income per capita, ethnic fractionalization, religious fractionalization, whether a country is an oil exporter, log of population, and log of an index of how mountainous a country is. The p-values are based on robust, clustered standard errors.
The results provide support for the earlier discussion. In column 1, ruling party institutionalization has no systematic effect on the onset of civil war, consistent with the idea that strong governments can better suppress conflict, but also can more easily launch attacks on opponents. The results in column 2 indicate that the effect of rainfall growth on conflict may be slightly conditioned on ruling party institutionalization, but the effect is small.

Columns 3 and 4 investigate the length of conflict. Rainfall shocks have no significant unconditional effect on the duration of conflict (column 3). The age of the ruling party significantly extends conflict, however, controlling for the years in office of the leader. The last column reinforces the significance of ruling party institutionalization and offers some evidence that positive rainfall shocks may extend conflict, conditional on ruling parties are not institutionalized. This the positive association between rainfall and conflict length mirrors findings in the qualitative literature that insurgents have greater difficulty concealing themselves in parched landscapes.

Open conflict is not the only possible political consequence of shocks. Another is to change regime type. Among countries with competitive elections in the sample of sub-Saharan African countries used here, average rainfall growth was 4.5 percent, compared to 1.3 percent for those without competitive elections. There is a natural explanation for this: rainfall shocks have a significant effect on regime change.

Table 4 reports estimates of the effect of rainfall shocks, the age of the ruling party, the leader’s years in office and the leader’s military status on transitions from non-competitive to competitive elections and from competitive to non-competitive elections. The control variables are the same as those in Table 3, with the addition of growth in income per capita, which is often argued to influence regime transitions. The first column indicates that positive rainfall shocks make the transition to competitive elections more likely. So also do older ruling parties. These transitions are not explained by changes in control of government: in most cases, the same party controls the government after the transition as before. Instead, less democratic governments that are more confident of popular support (because of high rainfall) and in control of a strong political machine (an institutionalized political party) are more willing to risk elections.

In contrast, column 2 indicates that positive rainfall shocks make transitions to non-competitive elections less likely; political variables (the age of the ruling party) also matter less. Elected leaders who see their political support crumbling, as a result of negative rainfall shocks, are more likely to bar competitive elections.

These regime transitions are not driven by civil war: Only seven of 23 regime changes occurred in the year of civil war onset, the year before it and the year after it. In any case, the results in Table 4 are unchanged after controlling for whether countries are at war.

Tables 3 and 4 yield several important conclusions. First, rainfall shocks have significant effects on both civil war and non-war regime transitions. Negative rainfall shocks make the onset of civil war more likely, either because they give strong governments reason to attack opponents or because they prompt insurgencies against weak governments. Negative rainfall shocks make transitions to competitive elections less likely and transitions away from them more likely. Finally, conflicts are likely to be longer in countries where governments operate through a strong ruling party.
Table 4: Rainfall, ruling party institutionalization and political change in Sub-Saharan Africa, 1982-1999

<table>
<thead>
<tr>
<th>Does growth increase with a significant ($p&lt;.10$) increase in:</th>
<th>(1) Transitions from no competitive elections to competitive elections</th>
<th>(2) Transitions from competitive elections to no competitive elections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current year vs. last year’s rainfall?</td>
<td>$.08 ($p=.01$)</td>
<td>-.26 ($p=.00$)</td>
</tr>
<tr>
<td>Last year’s rainfall vs. year before?</td>
<td>$.01 ($p=.68$)</td>
<td>-.09 ($p=.11$)</td>
</tr>
<tr>
<td>Age of ruling party, previous year</td>
<td>$.001 ($p=.02$)</td>
<td>.0001 ($p=.93$)</td>
</tr>
<tr>
<td>Leader years in office, previous year</td>
<td>$.0003 ($p=.69$)</td>
<td>.002 ($p=.27$)</td>
</tr>
<tr>
<td>Was leader a military officer, previous year</td>
<td>$.004 ($p=.77$)</td>
<td>.04 ($p=.61$)</td>
</tr>
<tr>
<td>Growth, income per capita</td>
<td>-.08 ($p=.43$)</td>
<td>-.24 ($p=.18$)</td>
</tr>
<tr>
<td>Number of country years</td>
<td>591</td>
<td>108</td>
</tr>
<tr>
<td>Number of transitions</td>
<td>21</td>
<td>11</td>
</tr>
</tbody>
</table>

Note: Probit estimations calculate the probability of countries without competitive elections adopting them, of countries with competitive elections of abandoning them. Median rule of law in the sample is three on a scale of 1 to 6. All specifications control for initial 1979 income per capita, ethnic fractionalization, religious fractionalization, whether a country is an oil exporter, log of population, and log of an index of how mountainous a country is. The $p$-values are based on robust, clustered standard errors. Countries are considered to have competitive elections if they have the highest score of seven on both the legislative and executive indices of competitive elections, whereas seven indicates that multiple parties can and do compete and no party gets more than 75 percent of the vote (from the Database of Political Institutions, Beck, et al. 2001).

In other settings, institutionalized ruling parties deliver significant benefits to countries. Gehlbach and Keefer (2008) find that institutionalized ruling parties are associated with significantly higher private investment in non-democracies. In Table 4, institutionalized ruling parties in sub-Saharan Africa are positively associated with the introduction of competitive elections. However, in other respects, institutionalized ruling parties in sub-Saharan Africa have more negative consequences than have been found elsewhere. In particular, Keefer (2007) finds evidence that in a sample of all poor countries, countries with older ruling parties are less likely to engage in conflict. In order to avoid conflict, the resulting policy recommendation was to encourage the formation of institutionalized ruling parties. In Africa, however, institutionalized ruling parties in sub-Saharan Africa are associated with longer conflicts. They have no effect on
shorter conflicts, indicating that the tendency of strong governments to initiate civil wars may be
greater in sub-Saharan Africa than in poor countries as a whole.

A key policy implication also emerges with respect to rainfall shocks. These shocks are
strongly associated with the onset of conflict, but less so with its duration. This suggests that
rapid and significant, but not necessarily sustained, assistance to countries that experience
serious drops in rainfall may be enough to avert conflict. The form of this assistance will not be
homogeneous across countries. Assistance designed to prevent governments from taking
advantage of negative rainfall shocks by attacking opponents is likely to look different than
assistance that is meant to discourage insurgencies from forming.

**Conflict and the response to disaster**

Because of their effects on the strategic calculations of potential or actual combatants,
droughts trigger conflict and rapid-onset disasters such as earthquakes seem to prolong them.
One key element in these calculations is the response to disaster: how can disaster relief best
serve the strategic interests of combatants? Does disaster relief promote cooperative behavior by
combatants? Do altruistic motivations to bring relief to victims offset strategic considerations?
The fact that disasters tend to lengthen conflict (earthquakes) or at least not shorten them
(droughts) suggests that altruistic or cooperative behavior by combatants is not common.
Instead, evidence from disaster relief in Sri Lanka, Kashmir, Aceh, Guatemala and the Sudan
outlined in this section underline the overriding role of strategic and political interests in shaping
disaster relief.

The essential strategic challenge of combatants is easy to summarize: how should they
allocate disaster relief across three groups, victims who are supporters; victims who are
opponents; and those who are neither, and how to adjust the allocation to take into account
whether the members of the group reside in areas controlled by the government or insurgents.

Opponents are more likely to receive assistance to the extent that insurgents are
independently able to finance assistance, have the administrative capacity to distribute it, and
control the area in which the victims live. Unlike the Tamil Tigers, who did have this capacity,
most insurgent groups do not have it. Not surprisingly, conditions are few under which
governments provide disaster relief to victims who are opponents of the government. If the
government’s own supporters are sympathetic to the plight of these victims, if outside agencies
pressure the government to provide assistance, or if the government can leverage the assistance
to undermine support for the insurgency, relief is more likely to be forthcoming. These
conditions held in Aceh, a case reviewed below, but are rare.

The second group of potential recipients are supporters of the government. They receive
more assistance to the extent that they reside in government-controlled areas and, crucially, to
the extent that the government faces political repercussions from failing to provide assistance.
The politics of government-controlled areas varies across conflict countries. In some, as in Sri
Lanka, governments confront well-organized political opponents who compete with the
government for votes. Decisions by the Sri Lankan government to provide assistance to the
Sinhalese majority were encouraged not only by the fact that the Sinhalese population supported
the government’s efforts to suppress the LTTE rebellion, but also by the fact that multiple parties
compete for Sinhalese support.
In other countries, such as Myanmar, governments are immune to electoral threats and are willing to take extraordinary measures to prevent the organization of groups that might challenge the government. The first type of government is likely to dedicate more effort to disaster relief in areas that they control, even at the expense of their counter-insurgency effort, as in Sri Lanka; the second type of government is less likely to do so – the Myanmar hurricane did not affect the counter-insurgency efforts against the Karen rebellion.

However, many citizens in conflict settings support neither the government nor the insurgents. How does conflict affect relief to them? A well-known problem in political economy helps to answer this question. Political actors seeking support from voters need to decide whether to target promises to their core supporters or to those who are neutral or indifferent (e.g., swing voters). They lose the support of the neutral if they promise them less than their opponents promise them. However, the more they promise to neutral citizens, the less they can do for their core supporters (see Dixit and Londregan 1996). Core supporters are unlikely to switch sides, but they could respond to neglect by failing to express support (not donating to an insurgency, not voting for a party, etc.). Political actors are therefore more likely to target neutral citizens with benefits when their core supporters are more deeply committed to them.

A second concern of political actors is that core supporters and neutral citizens may not be equally easy to reach with targeted benefits. Political actors can often identify and monitor core supporters more easily. In contrast, they may confuse neutral citizens with opposition supporters, or they may have a difficult time monitoring the political behavior of neutral citizens. As the costs of reaching neutral citizens rises, political competitors are less likely to target them with benefits.

In all of these cases, conflict actors seek to secure victory and avoid defeat. These are important motivations that compete against other possible reactions to conflict. They could for example, be inspired to cooperate in the provision of assistance in order to better serve the needs of victims. However, if the cost of this is a potential loss of strategic advantage and the threat of defeat, they will likely forego such opportunities. Post-disaster conditions are in any case usually unfavorable to cooperation. Disasters usually harm one side’s supporters more than the others, making the gains from cooperation asymmetrical and more difficult to negotiate. The technical or logistical payoffs in terms of better relief delivery to many victims – those residing in areas controlled by each side – are low. When victims from a disaster reside in areas firmly controlled by the government, cooperation between government and opposition may not increase the efficiency with which relief is distributed. The benefits of cooperation are highest precisely in those areas where the risks of cooperation are greatest – areas most exposed to conflict, where neither side has an advantage.

In fact, relief efforts across a range of devastating disasters, where altruistic and cooperative impulses might have been strongest, are consistent with, if not driven by, tradeoffs that reflect the strategic interests of combatants. In Sri Lanka, the LTTE and the government initially agreed to cooperate in the distribution of tsunami relief (Kuhn 2009). Kuhn (2009) also cites reports that hopes for peace surged in the aftermath of the tsunami. However, “as early as January 22, 2009 both sides had expressed concerns that foreign assistance funds would be used for military expenditures than relief. . .”(p. 17). Evidence presented in Kuhn (2009) suggests
that, in the end, aid appeared to obey strategic and political considerations. Kuhn (2009) compares levels of housing reconstruction with housing losses across districts.17

Ampara and Batticaloa were among the hardest hit areas in the country; they were heavily contested areas and not controlled by the LTTE, but they had high concentrations of Tamils and Muslims. He estimates that approximately 5,300 Muslim homes were destroyed in Ampara and 5,260 Tamil homes, of which approximately 2,080 have been rebuilt. In Batticaloa, approximately 8600 Tamil homes were destroyed, of which 2560 had been rebuilt. In contrast, in the Sinhalese districts of Galle, Matara and Hambantota, where approximately 9,350 homes were destroyed, approximately 9,120 were rebuilt. This evidence is consistent with the fact that targeting disaster assistance to potential supporters in contested areas was difficult, so the government focused its assistance efforts on its core supporters (Kuhn 2009, Figure 4).

Moreover, the distribution of new housing across the Sinhalese-majority areas damaged in the tsunami highlights the importance of political considerations even within government-controlled sections. Evidence summarized in Keefer (2009) points to considerable political bias in the distribution of disaster aid in the United States and elsewhere. A high level of bias is also evident in the Sinhalese-dominated area of Sri Lanka: of the 9,120 homes that were rebuilt, as many as 4065 were in the Hambantota district, where only 1,290 homes had been destroyed. This district is the area from which the governing party drew its greatest support, while Galle District, the base of the main Sinhalese opposition party, lost approximately 5,560 homes, or which approximately half (2,760) were reconstructed (Kuhn 2009, Figure 4).

International pressure to bring assistance to all victims was significant and all parts of the country received substantial assistance, as a consequence. However, as Kuhn (2009, Table 6) reports, assistance was heavily tilted towards the south and, in particular, towards the government’s favored Hambantota district. More striking, though, is that the Northern and Southern Province received more assistance relative to housing damage than did the Eastern Province, where fighting was more difficult and where neither the LTTE nor the government exercised the level of control they exercised in the north or south, respectively.

In some cases, though, and in contrast to the Sri Lankan case, both sides are ready to dedicate aid to contested areas, leading to cooperation. The 2005 earthquake in Kashmir provides some evidence of this. On the one hand, both sides feared that disaster aid would be used for strategic advantage. So, for example, restrictions were placed on the use and staffing of relief aircraft. On the other hand, though, it also triggered cooperation across disputed borders. International aid agencies witnessed cooperation between Pakistan and India in the provision of assistance (Renner and Chafe 2007). Nevertheless, this cooperation does not appear to have accelerated the resolution of the dispute between the two countries regarding the status of Kashmir.

The reason almost certainly relates to the fact that cooperation was triggered by strategic interest. While the Kashmir conflict is militarized, it is still the case that winning hearts and minds of the population of Kashmir is part of the overall strategic approach of each side (in

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17 Victims also used their own financial resources to rebuild, making reconstruction an imperfect measure of aid intensity. However, Galle District, in the south, is richer than Hambantota District, but rebuilt far fewer homes. More generally, the magnitude of the differences in reconstruction far exceed differences in income per capita across regions of the country. Finally, figures on aid flows reveal similar biases.
contrast, perhaps, to the contest over the Eastern Province in Sri Lanka). Cooperation in providing earthquake assistance may have been seen as the best way at least to avoid losing hearts and minds. If cooperation was part of the strategy of winning the conflict, however, it is then not surprising that it did not lead to rapid resolution of the conflict subsequently.

In Aceh, in contrast, government-controlled assistance flooded into an area supportive of insurgency. The government was urged on by other Indonesians and, as in Sri Lanka, by the international community. At the same time, in contrast to Sri Lanka, the devastation in Aceh was so great that Indonesian government assistance weighed far more heavily in Aceh than in Sri Lanka in the calculations that citizens made about the level of support they should offer to the insurgency. That is, disaster assistance to the Acehnese was more likely to soften support for the GAM in Indonesia than disaster assistance to the Tamils was to weaken support for the LTTE. The risks that aid would benefit insurgents was lower in Aceh.

Also in contrast to Sri Lanka, the government of Indonesia could exercise firm control over the distribution of assistance, which the Sri Lankan government could not do in the LTTE-controlled north. This allowed post-tsunami assistance to be used as a way to co-opt former insurgents and finance their re-integration into peaceful, civilian life. As Aspinall (2009) documents, post-tsunami assistance has funded a construction boom from which GAM leaders and their followers have derived significant benefits. Re-integration into the social and economic life of Aceh means, however, being able to benefit from the personal connections, particularly political connections, that underlie economic exchange, particularly in dominant sectors such as construction. Aspinall argues that “the new GAM contractors are being transformed by [the neo-patrimonial and corrupt networks that suffuse political and business life in provincial Indonesia.]”

In contrast to other post-conflict settings, the GAM itself has not been dismantled in this process. On the contrary, Aspinall (2009) makes clear that the hierarchical structure of the GAM has remained intact and that GAM leaders remain as patrons of former “client” insurgents. The usual risk that arises when an insurgent group retains its organizational integrity in the post-conflict period is that it can more easily resume the insurgency. In Aceh, though, the scale of post-tsunami contracts and the degree to which GAM leaders have been able to win those contracts suggest that GAM members would incur large economic losses from renewing insurgency.

The devastating 1976 earthquake in Guatemala killed at least 20,000 outright and many more from illness and injury. Though the decades-long civil war claimed thousands more victims than the Aceh conflict, the government response to the earthquake was similar. Hinshaw (2006) indicates that the Guatemalan government allowed international assistance, including religious groups and other NGOs and bilaterals, unfettered access to the damaged area. Again, however, there was a strategic interest. On the one hand, the western highlands, where the quake struck, were not yet embroiled in the civil war; the government’s response was consistent with an effort to prevent the earthquake from becoming a recruiting tool of insurgents. On the other hand, Hinshaw (2006, p. 1) reports that the government used quake relief to gather intelligence on the area in case war did break out.

The relief response to drought in the Sudan is the most ruthless example of the use of disaster assistance to gain strategic advantage in a civil conflict. Burr and Collins (1995) document the history of aid to the conflict-torn southern part of the country during the drought in
the mid-1980s. Initially, outright conflict prevented aid delivery: battles drove people off the land and into Ethiopia or into towns. The government in Khartoum made no effort to assist the three southern provinces in 1984, while efforts to get foreign aid to these provinces were hobbled by logistics at Port Sudan, theft (including by government forces) and risks posed by the war itself. As the drought persisted, the insurgent SPLA itself blocked aid, arguing that the United Nations could not promise that SPLA-controlled villages would receive the aid. At the same time, the government tried to channel aid to army-controlled garrison towns, in order to attract villagers away from villages where they could support the SPLA. Aid distribution was further hindered by food wars between conflicting tribes in villages that neither the SPLA nor the government dominated (p. 52).

Famine-induced population declines in key areas of the south lowered the costs of counter-insurgency efforts against the SPLA (p. 101); it is therefore unsurprising that Khartoum began to provide food aid only in 1987, when disease (visceral leishmaniasis, or kala-azar, and meningitis) broke out in the south and spread to Khartoum. However, this effort lasted a short time: the government loaded food aid onto barges for delivery to the south, but the barges made only one trip (p. 96-97).

In January and February 1989, donors delivered more aid than they had through the whole period 1983-1988 (p. 177). This jump coincided with significantly greater military success by the SPLA: by April 17, 1989, the SPLA had taken 11 government garrisons and three district capitals (p. 188). Assistance to the Sudan government, both economic and military, dropped, the defense and finance ministers resigned, inflation in Sudan approached 80 percent and bread shortages emerged in Khartoum (p. 173). Still, 40 percent of donor relief moved by air at a cost of $700 per ton; the government and SPLA would not cooperate on land transportation.

Even this modest relaxation on restrictions on donors came to an end when the elected government in Khartoum was overthrown by Umar al-Bashir, a brigadier in the paratroops corps. He immediately curtailed the relief effort and renewed the war against the SPLA. Other events also adversely affected the SPLA. In particular, the People’s Revolutionary Democratic Front, opposed to the SPLA, took over in Ethiopia, forcing hundreds of thousands of southern Sudanese, including the SPLA hierarchy, to return to Sudan, where the Sudanese armed forces took advantage of their air power to bomb refugee camps (p. 296).

The argument in this section makes the point strongly that disaster relief in the midst of conflict obeys the same rules as disaster relief in other circumstances: the actors who control relief use it to their advantage. In the absence of conflict, that advantage is usually political. In the presence of conflict, relief is targeted to gain strategic advantage against opposition combatants. Outside actors can go some distance to re-directing priorities towards victims, but in the midst of hostile actions this is difficult: the effort by outsiders to bring aid to starving Sudanese was immense, the costs extraordinary, and ultimately even these efforts were insufficient. In contrast, in Guatemala, Kashmir, Indonesia and Sri Lanka, there was more scope for international assistance to facilitate the provision of relief.

The difference has entirely to do with the nature of the conflict. The government of Sudan had less interest in providing aid even to victims who were not necessarily opponents of the regime, and so were willing to demand large concessions as a condition of allowing relief to flow to opponents. The government of Sri Lanka, on the other hand, had a large interest in
getting relief to the Sinhalese victims of the tsunami and were correspondingly more willing to allow aid to flow to other groups on the island. Even then, however, the politicization of relief assistance was significant. It is in improving their ability to monitor in real time the distribution of aid to different population groups, and focusing even more intently on aid allocation across victim groups, that donors can improve disaster relief in the midst of conflict.

**Conclusion**

Despite theoretical ambiguity about how disaster should affect the onset and length of conflicts, the evidence is persuasive that earthquakes, at least, significantly prolong conflicts and droughts trigger them. Rapid-onset disasters such as earthquakes appear to distract governments from combating insurgency, allowing insurgents to sustain conflict for longer periods. The pathway through which droughts affect conflict is more contentious, however.

Conventional wisdom holds that drought triggers a scramble for resources that lays the groundwork for civil war. The discussion here, however, introduces new evidence that suggests that this effect is highly conditional on the political and institutional environment. Miguel, et al. (2004) use a sample of sub-Saharan African countries to document for the first time that drought drives conflict and to argue that the effect is significantly, if not exclusively, through its effects on growth. Using the same sample of countries, the evidence presented here suggests that both the drought-growth link disappears in settings where the rule of law is better.

The analysis also examines more closely the political dynamics of drought and conflict, looking especially at the role of institutionalized ruling parties and regime change. Consistent with theory, institutionalized ruling parties have no systematic effect on whether rainfall shocks trigger conflict, but they do have a strong independent effect on the duration of conflicts, which is unaffected by drought. Both rainfall shocks and institutionalized ruling parties affect regime change: positive rainfall shocks and institutionalized ruling parties both make it more likely that unelected leaders will allow competitive elections; negative rainfall shocks make it more likely that elected leaders will curtail competitive elections.

The paper does not discuss the effects of conflict on disaster risk mitigation, though these are certain to be large, as well. It is self-evident that risk mitigation is a lower priority for governments enmeshed in a civil war. However, conflict also reduces private and local disaster mitigation investments. In the extreme, where conflict creates high risks of dislocation, households face a high risk of losing immobile investments in mitigation. Many effective disaster mitigation investments that are within reach of households and communities are immobile, however, and would be lost if they had to flee.

The discussion here yields some new recommendations for donor policies towards disaster countries. First, the evidence here does not support the argument that a transition away from rain-fed agriculture is a necessary and sufficient policy response to drought, the conclusion that many policy makers and researchers draw from the findings of Miguel, et al (2004) or Hendrix and Glaser (2007). Instead, conflict over resources triggered by drought seems to occur when governments fail to protect property rights and install social safety nets, or themselves are actively engaged in exploiting drought to undercut their opponents. Conflict risk mitigation strategies in Africa should focus on these aspects of drought and conflict and not only those aspects related to agricultural production technologies.
Second, it appears that rainfall shocks precipitate but do not prolong conflicts. This implies that significant donor assistance at the time of the shocks may prevent conflict, even if the aid is not sustained. This proposition requires further investigation, but in the context of broader discussions of climate change and drought, this would be particularly worthwhile.

Finally, the evidence here makes clear that incentives to divert disaster relief to political and strategic objectives are at least as strong in conflict as in non-conflict settings. This conclusion is taken for granted when dealing with disaster in countries such as the Sudan or Myanmar, where governments have little political incentive even to look after the welfare of citizens unaffiliated with their opponents. However, as housing assistance in Sri Lanka demonstrates, aid is also strategically allocated in countries with governments that are more accountable to their support base. The evidence suggests that housing assistance not only went disproportionately to Sinhalese compared to Muslims and Tamils, obeying the logic of disaster relief in the midst of conflict, but even among distinct Sinhalese populations aid distribution was highly uneven, consistent with the electoral calculations of a government party trying to win the next election. Donors are cognizant of these effects, but could more to monitor in real-time the allocation of disaster relief across victim groups in conflict countries.
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