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Topher McDougal* and Raul Caruso

Wartime Violence and Post-Conflict Political Mobilization in Mozambique

Abstract: Mozambique's post-conflict development has recently focused on the promise of biofuels production, and the Government of Mozambique has accordingly made hundreds of agricultural concessions to foreign and domestic corporations since 2006. In response, local groups have sought community land grants to protect livelihoods. We seek to understand whether the magnitude and recentness of violent events during Mozambique's 16-year civil war determined the success of communities' efforts to secure lands. We hypothesize that violence weakens the ability of communities to protect their traditional land uses from concessions by lobbying for community land grants. This hypothesis – dubbed the "weak institutions hypothesis" – is contrasted with the idea that violence galvanizes political participation. We test the hypothesis using GIS-generated data at the district level on recognized community landholdings and civil war events. Controlling for factors such as market access, road distance to grain warehouses, and spatial auto-correlation, we find that more intense violence is possibly (but not significantly) associated with *more* land grants, and that districts experiencing more recent violence are actually more likely to lobby successfully for land grants – lending support to the idea that violence boosts community use of risk-pooling institutions.

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Corresponding author: Topher McDougal: Joan B. Kroc School of Peace Studies, University of San Diego, USA, Center on Conflict, Development, and Peacebuilding, Graduate Institute of International and Development Studies, Geneva, Switzerland, Tel.: +1 617 642 5842; fax +1 617 849 8109. E-mail address: tlm@sandiego.edu.
Raul Caruso: Institute for Economic Policy, Catholic University of the Sacred Heart, Milan

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1 Introduction

Does the violence of war depress the ability of communities to influence post-conflict development policy effectively, thereby dooming the most conflict-affected areas to bear the brunt of the costs of future development? Or, on the other hand, do the communities who suffered most in the war, whether because it generates greater internal social cohesion or heightened general political participation rates, enjoy an enhanced ability to shape the implementation of future development policy? The answers will bear on the important issue rebuilding post-war political institutions (Sambanis, 2002): if the former scenario is the case, we might expect the dynamics of the war may be reproduced without some purposeful intervention. If the latter scenario is the case, we might tentatively conclude that war sews the seeds of its own autonomous recovery in some way (see, e.g., Weinstein, 2005).

This paper analyzes a cross-sectional, GIS-generated dataset designed to capture the spatial effects of violence on the distribution of agricultural land concessions to corporations at the district level in Mozambique. Mozambique has made tremendous development strides since the termination of its 16-year civil war in the early 1990s. Since 2006, the Government of Mozambique (GoM) has controversially begun according land concessions to biofuels corporations foreign and domestic (Schut, Slingerland, & Locke, 2010) – a land use that competes with local agriculture, which tends to focus on food production (Deininger, et al., 2011, Estabrook, 2011). The resulting concern over food security has prompted some international NGOs to cry foul (Oxfam International, 2007), and motivated many local communities to oppose the concessions and press the government to recognize their claims to the land with community land grants (see Deininger, et al., 2011, p. 189). Assuming that all communities wish to secure lands in their districts, we exploit the spatial variation in the distribution of community land grants to assess the effects of wartime violence on the effectiveness of local political mobilization.

2 Background: The Debate

We hypothesize that violence weakens the ability of communities to oppose the redistribution of land from traditional to industrial uses via concessions. This hypothesis – dubbed the "weak institutions hypothesis" – is contrasted with the idea that violence galvanizes political participation. Many scholars contend that civil wars in developing nations can precipitate (and result from) the degeneration and/or perversion of national-level governance institutions needed for long-term development and accountability (Collier, et al., 2003, Humphreys, 2005, p. 512, Reno, 1997, 1999, 2003) – particularly when weak governments receive outside support and are therefore unaccountable to the tax-paying public (Humphreys, 2003, p. 13). At the micro level, Brück (2003) argues that certain household characteristics – for instance, being headed by a woman – effectively limit land access in Mozambique, and that war heightens the magnitude of those effects. At the individual level, exposure to civil war is a significant predictor of future violent behavior (Miguel, Saiegh, & Satyanath, 2011), which may erode social cohesion and thereby the effectiveness of community institutions.

Conversely, some evidence suggests that the adverse effects of wartime violence on local economic growth tend not to persist, due to "rebound effects" (Davis & Weinstein, 2002). Bellows and Miguel (2008) argue that measures of local political mobilization, like community meeting attendance, memberships in local political groups, and voting, are higher in Sierra Leonean households that directly experienced more intense violence than those that experienced less or none. On the other hand, political mobilization at the individual level does not necessarily proxy well for the effectiveness, transparency, or inclusiveness of local institutions, and there is some evidence that violent conflict may provoke negative coping mechanisms in local institutions, resulting in the exclusion or even persecution of certain sub-populations (Krause, 2010).

Stated succinctly then, in our context, the "weak institutions" hypothesis (H_{WI}) we test is: *The greater the intensity of violence that occurred within a district, the smaller the total area of community land grants will be*.

3 Empirical Strategy

We employed a cross-sectional, district-level dataset with 142 observations, which include all rural and major metropolitan districts. The sources of the data vary and are noted below, but special mention is made of the Domingues (2011) dataset on Mozambican war events, which exclusively informs the war-related

predictor variables. The latter include the indices for battle intensity, and rebel and government troop presences, which were created by assigning a value of 2 to battles or the establishment of rebel/ government headquarters, 1 to the occurrence of "one-sided" violence or reports of troop movements and encampments, and then summing the scores for all events in that district. The outcome variable – community land grant area awarded in kilometers – is derived from the World Bank report by Deininger et al. (2011) and a geographic information system (GIS) shapefile that informed that report. The mean area of community land grants awarded is about 500 km^2 per district, but the distribution is heavily left skewed (skewness = 3.7), with the median at zero, and even the 75th percentile about half the mean, at 225 km^2. Figure 1 illustrates the distribution of community land grants. All data were generated in a GIS using ArcGIS software.[1]

In order to test the "weak institutions" hypothesis, we distinguish between districts in which violence took place on the one hand, and districts that hosted or otherwise supported rebel and government forces on the other (which we control for separately). Many control variables are also included in the dataset, most of which – such as distance by road to the nearest city, distance to the nearest grain warehouse, and spatial autocorrelation corrections – were generated in a GIS.

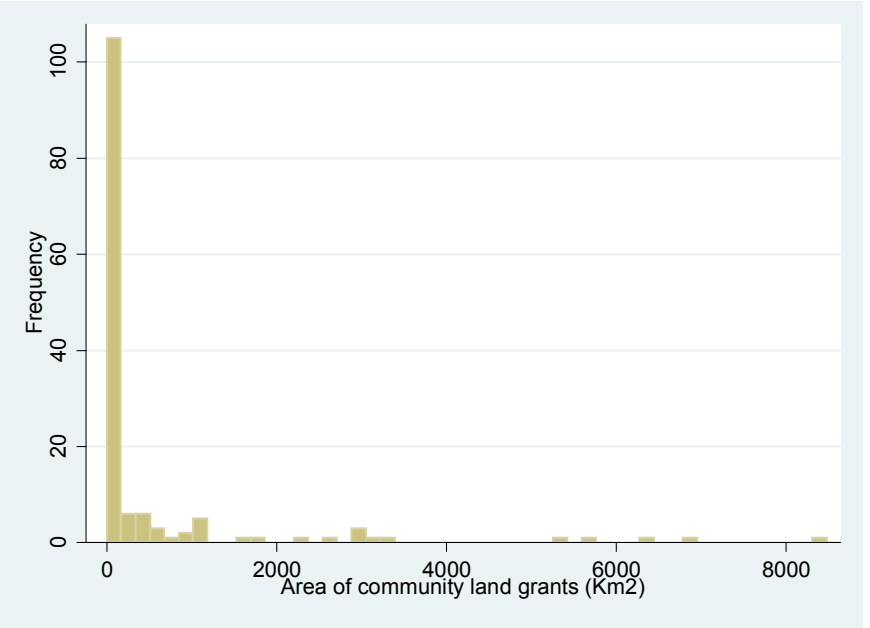

Figure 1: Histogram illustrating the distribution of community land grants.

1 A codebook is available from the corresponding author upon request.

Table 1 gives some descriptive statistics of the outcome and primary predictor variables. The outcome variable's distribution is heavily skewed, it includes an abundance of zeros, and its variance is greater than the mean, suggesting our use of a negative binomial GLM with a log link.

Following Ver Hoeff and Boveng (2007), the outcome variable is denoted as exhibiting a negative binomial (NB) distribution as $Y \sim NB(\mu,\kappa)$, parameterized such that

$$E(Y)=\mu$$
$$var(Y)=v_{NB}(\mu)=\mu+\kappa\mu^2, \quad (1)$$

where μ is the mean of the distribution, κ is a dispersion parameter, and $\mu>0$ and $\kappa>0$. The relationship between $E(Y_i)$, the expected number square kilometers of community land grants in district , and , the intensity of violence in district i, in a NB model can be expressed

$$E(Y_i) = \mu_i = exp(\beta_0 + \alpha HWISCORE_i + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_q X_{iq} + \varepsilon_i), \quad (2)$$

where and are regression coefficients, and are control variables.

Control variables, listed in Table 2, included in the dataset were mostly generated in a GIS, and include demographic (i.e., rural population density), geographic (e.g., total length of major rivers within a district), and market access (e.g., distance to the nearest grain warehouse) attributes. Distances were

Statistic	Community Land Grants	Logged Battle Intensity	Average Time Since War's Start
p5	0	0	0
p25	0	0	0
p50	0	1.098612	7.235
p75	224.9	2.079442	10.21
p95	3027.1	2.995732	12
mean	500.7507	1.236719	5.766549
variance	1837787	1.25554	23.23976
min	0	0	-1.17
max	8479.6	4.077538	13.39
skewness	3.710675	0.3497726	-0.16741

Table 1: Descriptive statistics for area of community land grants (Km^2), logged battle intensity, and average time (in years) elapsed from war's beginning to violence in that district.

Name	Description	Source
LnDistKm2	Natural log of district surface area in Km^2	MIT GIS File: 1314153131_mz_f7districts_2002.shp
PopUrb	Urban population	http://www.citypopulation.de/
PopRur	Total rural population	MIT GIS File: 1314154139_mz_a1villages_2007.shp
PopDensR	Rural population density (people/ Km^2)	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp
TotPop	Total population of the district	MIT GIS File: 1314154139_mz_a1villages_2007.shp; http://www.citypopulation.de/
PopDens	Total population density (people/ Km^2)	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/
FloodKm2	Area (Km^2) of the district in the flood plain	MIT GIS Files: 1314153329_mz_c32flood_1999.shp[1], 1314153131_mz_f7districts_2002.shp
FloodPerc	Percentage of district in the flood plain	MIT GIS Files: 1314153329_mz_c32flood_1999.shp, 1314153131_mz_f7districts_2002.shp
RivLen	Cumulative length (Km) of rivers passing through the district	MIT GIS Files: 1316561501_mz_p53rivers_1999.shp[2], 1314153131_mz_f7districts_2002.shp
Twns5k	Number of towns and cities over 5k inhabitants	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/
CityFID	FID of the nearest city over 50k inhabitants	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp[3]; http://www.citypopulation.de/
CityDist	Distance (Km) from centroid to nearest city	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/
CityRoute	"[Origin] – [Destination]" of route to nearest city by road	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/;
TimeByRd	Time (hours) it takes by road to reach the nearest city >50k from district centroid[4]	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314154033_mz_p2roads_2002.shp[5], 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/

Table 2: continued

DistByRd	Distance (Km) by road to the nearest city >50k from district centroid	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314154033_mz_p2roads_2002.shp, 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/
WHFID	FID number of nearest food warehouse	MIT GIS Files: 1314153131_mz_f7districts_2002.shp, 1314153361_mz_g17warehouses_1999.shp
WHDist	Distance (Km) from district centroid to nearest food warehouse	MIT GIS Files: 1314153131_mz_f7districts_2002.shp, 1314153361_mz_g17warehouses_1999.shp
CapDist	Distance (Km) from district centroid to capital city (Maputo)	MIT GIS Files: 1314154139_mz_a1villages_2007.shp, 1314153131_mz_f7districts_2002.shp; http://www.citypopulation.de/
NGOFID	FID number of nearest NGO field office	MIT GIS Files: 1314153131_mz_f7districts_2002.shp, 1314153540_mz_e624ngos_2004.shp
NGODist	Distance (Km) from district centroid to nearest NGO field office	MIT GIS Files: 1314153131_mz_f7districts_2002.shp, 1314153540_mz_e624ngos_2004.shp[6]
WFPFID	FID number of nearest World Food Programme (WFP) office	MIT GIS Files: 1314153131_mz_f7districts_2002.shp, 1314154113_mz_e624unwfp_1999.shp[7]
WFPDist	Distance (Km) from district centroid to nearest WFP office	MIT GIS Files: 1314153131_mz_f7districts_2002.shp, 1314154113_mz_e624unwfp_1999.shp

Table 2: Control variables by name, description, and source.

1. *"Mozambique (Flood Region, 1999)", created 11 February 1999.*
2. *"Mozambique (Major Rivers, 1999)", created 30 January 1999.*
3. *Centroids were created for each district, which serve as the basis for all distance measurements to follow.*
4. *Using a network analysis, assuming that highways allow for speeds of 90 Km/hr, primary roads 65 Km/hr, and dirt paths 35 Km/hr.*
5. *"Mozambique (Roads, 2002)", created 12 March 2002.*
6. *"Mozambique (NGO Offices, 2004)", created 14 September 2004.*
7. *"Mozambique (UN World Food Program (WFP) Offices, 1999)", created 1 January 1999.*

calculated by way of a road network analysis, taking the centroid of the district as the point of departure to any given destination. Spatial autocorrelation was also controlled for by way of an inverse distance-weighted matrix of community land grant magnitudes.

4 Results

Table 2 reports the results. Uncontrolled models include only those variables that are visible in the table. Controlled models also include those described above and in Table 2. In models 1-4, the extent that a district suffered wartime violence is an extremely significant, positive predictor of community land grant awards. Moreover, when a time dimension is tested for in models 2 and 4, the recentness of violence also is an extremely significant, positive predictor of community land grant awards. Both of these findings possibly suggest that violence does indeed galvanize, rather than undermine, community political mobilization. In controlled regressions, however, only in the model that includes the time variable but excludes all alternative hypothesis variables (column 6) does wartime violence continue to be a significant, positive predictor of community land grants, though the coefficient never dips into negative territory. Overall, wartime violence seems to have a neutral, or possibly positive, effect on the formation of community land grants, suggesting that our initial hypothesis should be rejected.

The recentness of violence seems to be more unequivocal in its effects, improving a district's efforts at mobilization for community lands across the board. Figure 1 illustrates this phenomenon: heavily and recently conflict-affected

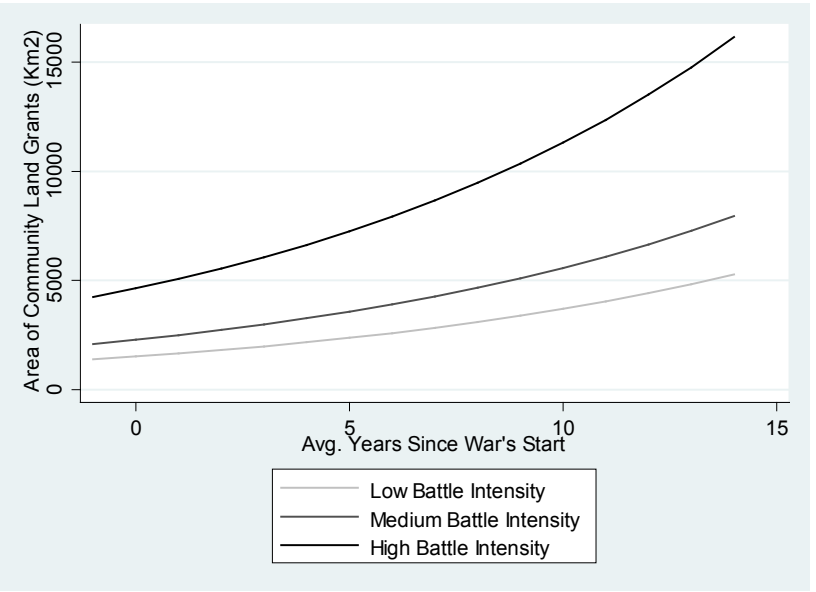

Figure 2: Adjusted predictions of community land grants in Km2 by average years since violence, by low (5th %ile), medium (50th %ile) and high (95th %ile) battle intensity. Based on Model 8. Source: The authors, based on Model 2(8).

	Uncontrolled Models				Controlled Models			
LABELS	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Log Battle Intensity Score	**0.322*** ** (0.0720)	**0.476*** ** (0.118)	**0.378*** ** (0.0775)	**0.557*** ** (0.131)	0.00401 (0.131)	**0.310*** (0.179)	0.00152 (0.139)	0.265 (0.189)
Log Government Troop Presences Index			**-1.342*** ** (0.451)	-1.407 (1.104)			-0.0257 (0.607)	**-4.266*** ** (1.349)
Log Rebel Presences Index			-0.216 (0.183)	-0.757 (0.515)			0.0444 (0.217)	0.622 (0.633)
Years Since War's Beginning (Battles)		-0.0479* (0.0274)		-0.0536* (0.0290)		-0.103*** (0.0389)		-0.0996*** (0.0384)
Years Since War's Beginning (Gov't Presences)				0.0290 (0.0881)				0.325*** (0.109)
Years Since War's Beginning (Rebel Presences)				0.0930 (0.0854)				-0.0898 (0.102)
Constant	**4.871*** ** (0.123)	**4.945*** ** (0.134)	**4.886*** ** (0.123)	**4.946*** ** (0.136)	**7.415*** (4.137)	6.722 (4.181)	**7.341*** (4.159)	6.693 (4.151)
Observations	142	142	142	142	142	142	142	142
Degrees of freedom	140	139	138	135	122	121	120	117
AIC	12.57	12.56	12.54	12.54	11.72	11.69	11.75	11.67
Log likelihood	-890.5	-889.0	-886.1	-883.3	-812.3	-808.8	-812.3	-803.8
Standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Table 3: Uncontrolled and controlled negative binomial log-link models predicting agricultural concessions

districts fare the best in obtaining land grants, while districts that were lightly affected by conflict long ago fare the worst in terms of securing their communal claims to land. The fact that the adjusted predictions "fan out" as the violence occurred more recently suggests that the effects of violence on the demand for community land grants fades over time.

Finally, note that the presence of government troops in a district negative and significant effect on the level of community land grants awarded.

5 Discussion

As noted above, Bellows and Miguel (2008) argue that exposure to wartime violence actually galvanized collective action in postwar Sierra Leone. If a similar mechanism is at work here, we might speculate that violence bolstered community cohesion in Mozambique (and that these effects fade with time). One might postulate that efforts to secure communal lands represent a manifestation of a demand for risk-pooling mechanisms in the wake of insecurity, and that this demand for risk-pooling declines as the environment becomes less turbulent and the inefficiencies of collective property no longer outweigh the risks of private property (see, e.g., Demsetz, 1967, Ellickson, 1993). The effect of government troop presence might corroborate this reading: districts that supported government troops may be rewarded during and after the war. That support might decrease the need of local communities to depend on risk-pooling mechanisms.

However, it is worth noting one of this study's results presented elsewhere (McDougal & Caruso, 2012): the ability of communities to oppose the local agricultural concessions successfully increases with recentness of violence in accordance with Bellows' and Miguel's political participation mechanism, but it seems to remain flat or even decrease with intensity of violence. That is, districts that experienced elevated levels of violence during the war tend to have similar or larger areas allocated by government as corporate biofuels concessions. These two findings considered jointly, high intensity violence may boost the use of risk-pooling institutions, such as communally-governed lands, but possibly weaken the effectiveness of communities in negotiating with central government.

Our findings may suggest that post-war Mozambican communities are more self-reliant, but also more politically isolated. Why would violence bolster community solidarity on the one hand and impair community effectiveness on the other? This speculative claim may imply that war-affected Mozambican districts have fewer political connections to government. Such an interpretation resonates, for example, with the claims of Woolcock (1998) that while "horizontal"

social capital (bond between and within local communities) increases community self-reliance, "vertical" social capital (local ties to higher levels of governance) are critical for successful community development. Violence might plausibly have bolstered the former, while damaging the latter. This conclusion may represent a middle ground between those who bemoan the effects of violence on local institutions, and those (like Bellows and Miguel) who note its beneficial effects. The primary contribution of this study, then, is the insight that violence may have positive effects on certain forms of community institutions, and negative forms on others.

For policymakers, our findings may suggest that attempts at promoting post-conflict community development might well be anchored in those local community-level institutions that adapted to the wartime violence in the first place. Moreover, building links between government and these possibly new forms of community organization may be an important safeguard against political exclusion and exploitative development scenarios in the post-war period. Finally, engaging these local institutions as early as possible may be particularly important, as war's effects on the political effectiveness of local communities seem to fade over time.

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