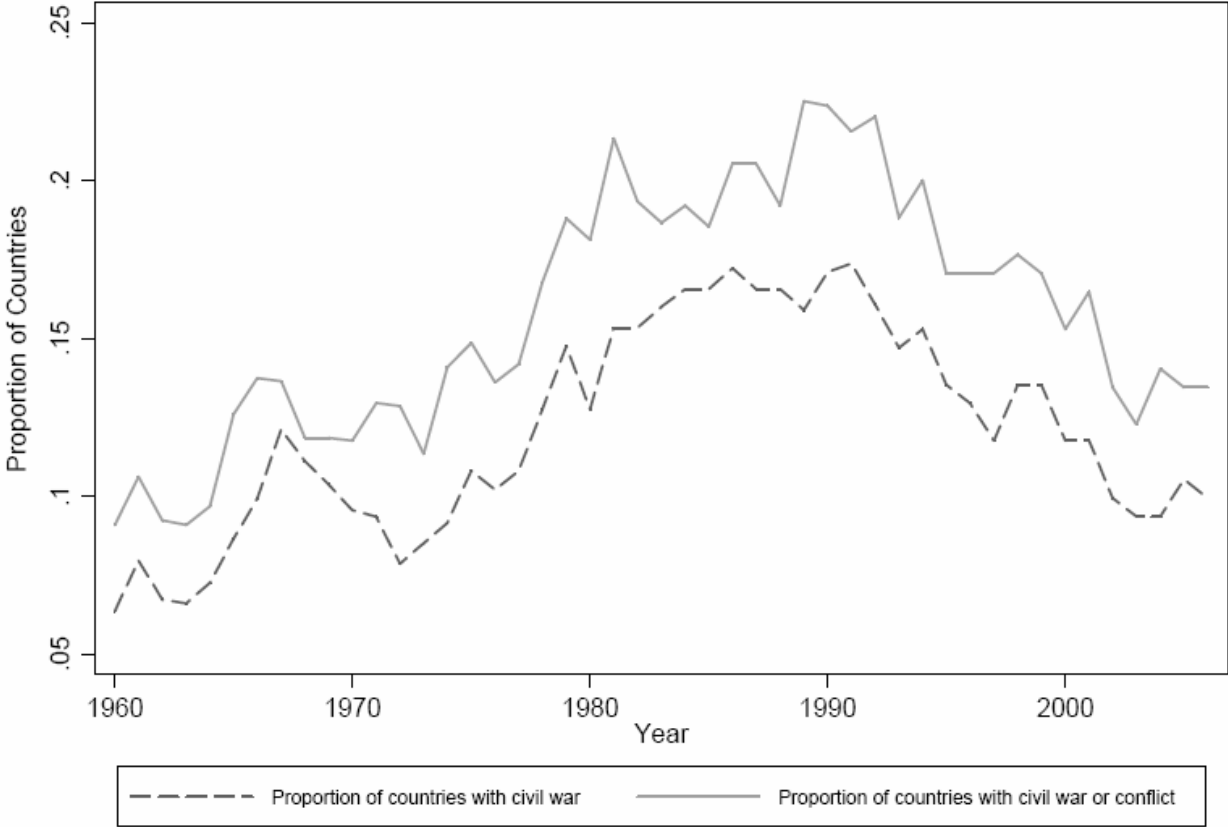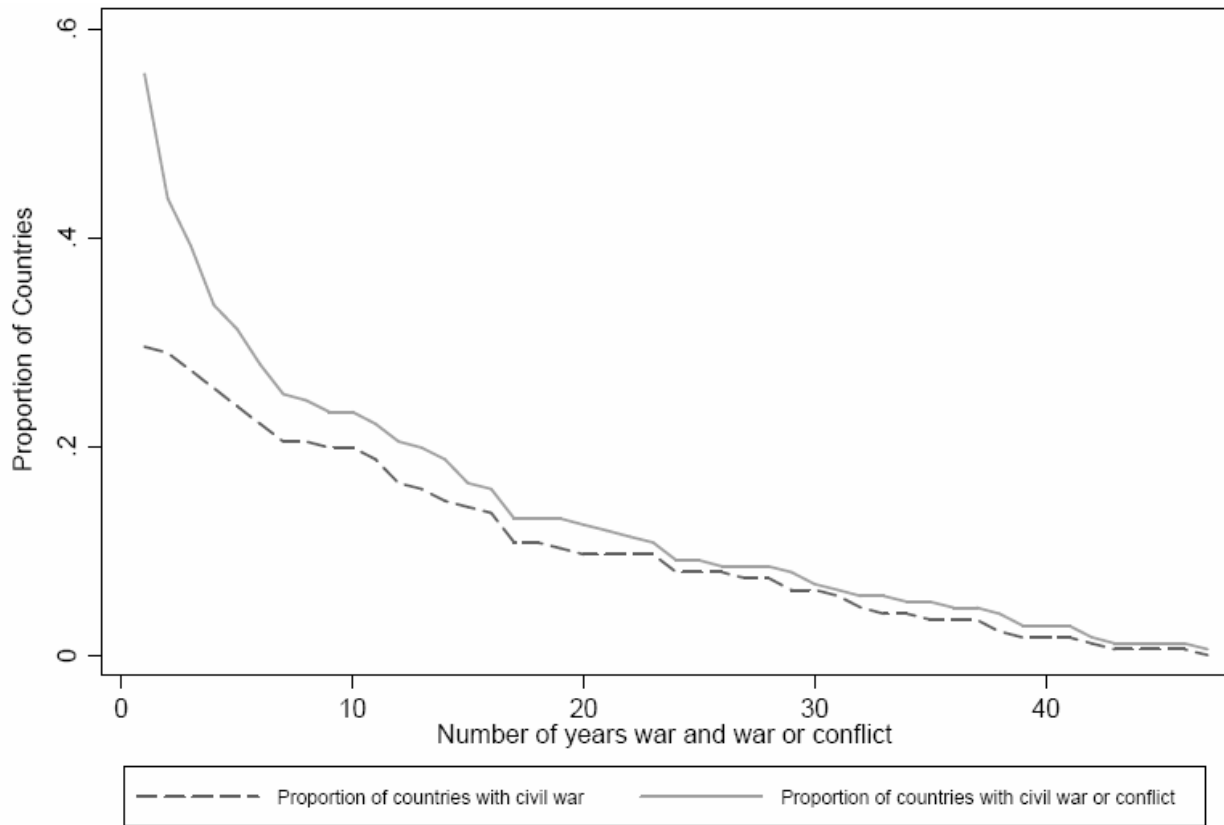**Figure 2: Proportion of countries with an active civil war or civil conflict, 1960-2006**


Sources: Data based on UCDP/PRIO armed conflict database (N. P. Gleditsch et al., 2002; Harbom & Wallensteen, 2007).

Figure 1: The distribution of civil war or conflict years across countries, 1960-2006

Sources: Data based on UCDP/PRIO armed conflict database database (N. P. Gleditsch et al., 2002; Harbom & Wallensteen, 2007).

Figure 3: Incidence of civil war by country income per capita, 1960-2006
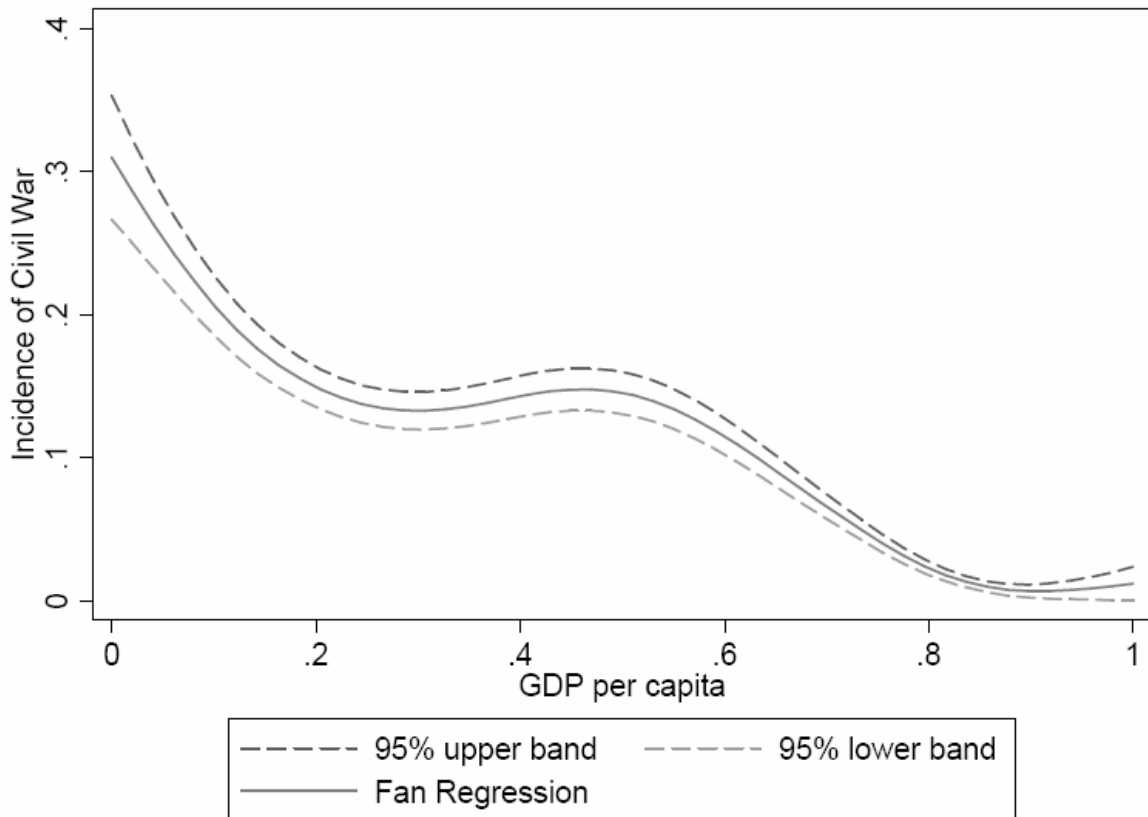
Sources: Figure displays the results of a Fan regression of the incidence of civil war on GDP per capita (bandwidth=0.3, bootstrapped standard errors). Population and GDP data are drawn from the World Development Indicators (World Bank, 2008). Civil war incidence is drawn from the UCDP/PRIO armed conflict database (N. P. Gleditsch et al., 2002; Harbom & Wallensteen, 2007).

Table 3: Greed Model

	1	2	3	4	5	6	7
Male secondary schooling	-0.0312 (0.010)***	-0.029 (0.010)***	-0.025 (0.010)**	-0.024 (0.010)***			
Ln GDP per capita					-0.837 (0.253)***	-1.237 (0.283)***	-1.243 (0.284)***
GDP growth	-0.119 (0.044)***	-0.116 (0.043)***	-0.117 (0.044)***	-0.118 (0.044)***	-0.105 (0.042)***		
Primary commodity exports/GDP	19.990 (5.882)***	17.634 (5.959)***	18.149 (6.006)***	18.900 (5.948)***	16.476 (5.207)***	17.567 (6.744)***	17.404 (6.750)***
(Primary commodity exports/GDP) ^{2}	-31.562 (12.003)***	-26.171 (11.889)**	-27.445 (11.996)***	-29.123 (11.905)***	-23.017 (9.972)**	-28.815 (15.351)*	-28.456 (15.366)*
Social fractionalization	-0.0001 (0.0001)	-0.0002 (0.0001)*	-0.0002 (0.0001)	-0.0002 (0.0001)	-0.0002 (0.0001)**		
Previous war		1.057 (0.374)***	0.464 (0.547)				
Peace duration			-0.003 (0.002) p=0.128	-0.004 (0.001) ***	-0.004 (0.001)***	-0.002 (0.001)	-0.002 (0.001)
Post-coldwar	-0.518 (0.427)	-0.588 (0.434)	-0.326 (0.469)	-0.207 (0.450)	-0.454 (0.416)		
Diaspora/peace						700.931 (363.29)**	
Diaspora corrected/peace							741.168 (387.635)*
(Diaspora-diaspora corrected)/peace							82.798 (287.192)
Ln population	0.849 (0.155)***	0.710 (0.161)***	0.669 (0.163)***	0.686 (0.162)***	0.493 (0.129)***	0.295 (0.141)**	0.296 (0.141)**
Geographic dispersion	-2.281 (1.014)**	-2.394 (1.024)**	-2.211 (1.038)**	-2.129 (1.032)**	-0.865 (0.948)		
Mountainous terrain	0.016 (0.008)**	0.012 (0.009)	0.013 (0.009)	0.014 (0.009)	0.008 (0.008)		
N	688	688	688	688	750	595	595
No of wars	46	46	46	46	52	29	29
Pseudo R^2	0.21	0.23	0.24	0.24	0.22	0.25	0.25
Log likelihood	-133.79	-129.69	-128.49	-128.85	-146.86	-93.27	-93.23

Notes: All regressions include a constant. Standard errors in parentheses. ***, **, * indicate significance at the 1, 5 and 10 percent level, respectively.

Table 4: Grievance Model

	1	2	3
Ethnic fractionalization	0.010 (0.006)*	0.011 (0.007)*	0.012 (0.008)
Religious fractionalization	-0.003 (0.007)	-0.006 (0.008)	-0.004 (0.009)
Polarization α =1.6	-3.067 (7.021)	-4.682 (8.267)	-6.536 (8.579)
Ethnic dominance (45-90%)	0.414 (0.496)	0.575 (0.586)	1.084 (0.629)*
Democracy	-0.109 (0.044)***	-0.083 (0.051)*	-0.121 (0.053)**
Peace duration	-0.004 (0.001)***	-0.003 (0.001)***	-0.004 (0.001)***
Income inequality		0.015 (0.018)	
Land inequality			0.461 (1.305)
Ln population	0.221 (0.096)**	0.246 (0.119)**	0.300 (1.133)**
Geographic dispersion	-0.509 (0.856)	-0.763 (1.053)	-1.293 (0.102)
Mountainous Terrain	0.011 (0.007)	0.007 (0.009)	-0.0001 (0.009)
N	850	604	603
No of wars	59	41	38
Pseudo R^2	0.13	0.11	0.17
Log likelihood	-185.57	-133.46	-117.12

Notes: All regressions include a constant. Standard errors in parentheses. ***, **, * indicate significance at the 1, 5 and 10 percent level, respectively.

Column 1: the two measures of fractionalization and ethnic dominance are not jointly significant.

In Table 4 we turn to the examination of a rebellion which is motivated only by grievance. In the first column we examine the relationship between ethnic dominance, ethnic and religious fractionalization, ethnic polarization, democracy and the duration of peace. At this stage we define ethnic dominance as occurring when the largest ethnic group constitutes 45-90 percent of the population and measure polarization with α = 1.6. These specifications are justified in Section 4 where we investigate robustness to alternative definitions. As in the greed model, we control for geographic military advantage by including population, the dispersion of the population, and mountainous terrain. Since we are not including any lagged variables we can use 850 observations of which 59 observations experienced an outbreak of civil war. The results suggest that a higher degree of ethnic fractionalization increases the risk of war and that a greater openness of political institutions reduces the risk of conflict. Religious fractionalization, ethnic polarization and ethnic dominance are neither

Table 5: Combined Greed and Grievance Model

	1	2	3	4	5
Male secondary schooling	-0.021 (0.011)**		-0.029 (0.013)**	-0.022 (0.011)**	-0.023 (0.011)**
Ln GDP per capita					
(GDP growth)t-1	-0.108 (0.044)***		-0.045 (0.062)	-0.108 (0.045)**	-0.103 (0.044)**
Primary commodity exports/GDP	19.096 (5.993)***		37.072 (10.293)***	23.385 (6.692)***	23.204 (6.660)***
(Primary commodity exports/GDP)^2	-30.423 (12.008)***		-69.267 (21.697)***	-36.335 (12.998)***	-36.206 (12.946)***
Social fractionalization	-0.0002 (0.0001)***		-0.0008 (0.0003)**	-0.0005 (0.0003)	-0.0005 (0.0003)
Ethnic fractionalization		0.008 (0.007)	0.041 (0.019)**	0.023 (0.015)	0.022 (0.015)
Religious fractionalization		-0.005 (0.008)	0.015 (0.020)	0.014 (0.019)	0.014 (0.019)
Polarization α =1.6		-9.358 (8.735)	-25.276 (13.390)*	-15.992 (10.518)	-15.556 (10.476)
Ethnic dominance (45-90%)		1.212 (0.648)**	2.020 (0.915)**	1.592 (0.746)**	1.556 (0.740)**
Democracy		-0.036 (0.054)	-0.018 (0.062)	-0.042 (0.054)	-0.044 (0.054)
Peace duration	-0.0003 (0.002)	0.0005 (0.0014)	-0.0003 (0.0015)	-0.003 (0.001)***	-0.003 (0.001)***
Post-coldwar	-0.209 (0.457)		-0.873 (0.644)	-0.281 (0.459)	
Income inequality			0.025 (0.024)		
Ln population		-0.014 (0.136)	0.927 (0.250)***	0.697 (0.181)***	0.685 (0.179)***
Geographic dispersion	-1.978 (1.049)*	0.135 (1.106)	-4.032 (1.490)***	-1.962 (1.149)*	-1.957 (1.153)*
Mountainous Terrain	0.005 (0.010)	0.001 (0.008)	0.005 (0.012)	0.015 (0.009)	0.014 (0.009)
Grievance predicted value	0.767 (0.413)**				
Greed predicted value		1.052 (0.212)***			
N	665	665	479	665	665
No of wars	46	46	32	46	46
Pseudo R^2	0.24	0.25	0.24	0.26	0.25
Log likelihood	-126.69	-125.29	-89.55	-124.60	-124.79

Notes: All regressions include a constant. Standard errors in parentheses. ***, **, * indicate significance at the 1, 5 and 10 percent level, respectively

Although the combined model is superior to the greed and grievance models, several variables are completely insignificant and we drop them sequentially. First we exclude the post-Cold War dummy, then religious fractionalization, then democracy[9], then polarization, then ethnic fractionalization (column 9). Social fractionalization and mountains are both marginally significant in this model (p-value around 0.13) and are jointly significant. When either is dropped, the other becomes significant and in the present model there is little to choose between them. However, when we switch to the larger sample permitted by replacing male secondary school enrolment with per capita income, there is a clear ranking. When both variables are included, social

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[9] We tried different specifications to test for the effect of political repression by investigating non-linear effects, by including the autocracy score instead of the democracy score, and by using the difference between the two variables as suggested by Londregan and Poole (1996). We also tried the Freedom House measure of political freedom, but neither of these alternative political repression measures were found to be significant.

Miguel, Satyanath and Sergenti (2004)

TABLE 1
DESCRIPTIVE STATISTICS

	Mean	Standard Deviation	Observations
	A. Civil Conflict Measures (1981–99)		
Civil conflict with ≥25 deaths: (PRIO/ Uppsala)	.27	.44	743
Onset	.07	.25	555
Offset	.15	.36	188
Civil conflict with ≥1,000 deaths:			
PRIO/Uppsala	.17	.37	743
Onset	.04	.19	625
Offset	.15	.36	118
Collier and Hoeffler (2002)	.17	.38	743
Doyle and Sambanis (2000)	.22	.41	724
Fearon and Laitin (2003)	.24	.43	743
	B. Rainfall Measures (1981–99)		
Annual rainfall (mm), GPCP measure	1,001.6	501.7	743
Annual growth in rainfall, time t	.018	.209	743
Annual growth in rainfall, time $t-1$	.011	.207	743
	C. Economic Growth		
Annual economic growth rate, time t	−.005	.071	743
Annual economic growth rate, time $t-1$	−.006	.072	743
	D. Country Characteristics		
Log(GDP per capita), 1979	1.16	.90	743
Democracy level (Polity IV score, −10 to 10), time $t-1$	−3.6	5.6	743
Democracy indicator (Polity IV score >5), time $t-1$	.15	.36	743
Ethnolinguistic fractionalization (source: *Atlas Marodov Mira*)	.65	.24	743
Religious fractionalization (source: *CIA Factbook*)	.49	.19	743
Oil-exporting country (source: WDI)	.12	.32	743
Log(mountainous) (source: Fearon and Laitin 2003)	1.6	1.4	743
Log(national population), time $t-1$ (source: WDI)	8.7	1.2	743
Growth in terms of trade, time t (source: WDI)	−.01	.16	661

NOTE.—The source of most characteristics in panel D is the World Bank's World Development Indicators (WDI). Initial log per capita income for Namibia pertains to 1990, its first year in the sample (after independence).

B. Rainfall Data

We use the Global Precipitation Climatology Project (GPCP) database of monthly rainfall estimates, which stretches back to 1979, as a source of exogenous weather variation.[12] The GPCP data rely on a combination

[12] The GPCP data are publicly available on the Web at http://precip.gsfc.nasa.gov/.

TABLE 2
RAINFALL AND ECONOMIC GROWTH (First-Stage)
Dependent Variable: Economic Growth Rate, t

EXPLANATORY VARIABLE	ORDINARY LEAST SQUARES				
	(1)	(2)	(3)	(4)	(5)
Growth in rainfall, t	.055***	.053***	.049***	.049***	.053***
	(.016)	(.017)	(.017)	(.018)	(.018)
Growth in rainfall, $t-1$	.034**	.032**	.028**	.028*	.037**
	(.013)	(.014)	(.014)	(.014)	(.015)
Growth in rainfall, $t+1$				.001	
				(.019)	
Growth in terms of trade, t					−.002
					(.023)
Log(GDP per capita), 1979		−.011			
		(.007)			
Democracy (Polity IV), $t-1$		.0000			
		(.0007)			
Ethnolinguistic fractionalization		.006			
		(.044)			
Religious fractionalization		.045			
		(.044)			
Oil-exporting country		.007			
		(.019)			
Log(mountainous)		.001			
		(.005)			
Log(national population), $t-1$		−.009			
		(.009)			
Country fixed effects	no	no	yes	yes	yes
Country-specific time trends	no	yes	yes	yes	yes
R^2	.02	.08	.13	.13	.16
Root mean square error	.07	.07	.07	.07	.06
Observations	743	743	743	743	661

NOTE.—Huber robust standard errors are in parentheses. Regression disturbance terms are clustered at the country level. A country-specific year time trend is included in all specifications (coefficient estimates not reported).
  * Significantly different from zero at 90 percent confidence.
  ** Significantly different from zero at 95 percent confidence.
  *** Significantly different from zero at 99 percent confidence.

The first-stage relationship between rainfall and income growth is strongly positive: current and lagged rainfall growth are both significantly related to income growth at over 95 percent confidence (regression 1 in table 2), and this relationship is robust to the inclusion of country controls (regression 2) and fixed effects (regression 3). Positive rainfall growth typically leads to better agricultural production since most of sub-Saharan Africa lies within the semiarid tropics and is prone to drought. The rainfall instruments are somewhat weak (the F-statistic is 4.5 in regression 3), suggesting that the instrumental variable two-stage least squares (IV-2SLS) estimates may be somewhat biased toward ordinary least squares (OLS) estimates (Bound, Jaeger, and Baker 1995;

TABLE 4
ECONOMIC GROWTH AND CIVIL CONFLICT

EXPLANATORY VARIABLE	DEPENDENT VARIABLE: Civil Conflict ≥25 Deaths						DEPENDENT VARIABLE: Civil Conflict ≥1,000 Deaths
	Probit (1)	OLS (2)	OLS (3)	OLS (4)	IV-2SLS (5)	IV-2SLS (6)	IV-2SLS (7)
Economic growth rate, t	−.37 (.26)	−.33 (.26)	−.21 (.20)	−.21 (.16)	−.41 (1.48)	−1.13 (1.40)	−1.48* (.82)
Economic growth rate, $t-1$	−.14 (.23)	−.08 (.24)	.01 (.20)	.07 (.16)	−2.25** (1.07)	−2.55** (1.10)	−.77 (.70)
Log(GDP per capita), 1979	−.067 (.061)	−.041 (.050)	.085 (.084)		.053 (.098)		
Democracy (Polity IV), $t-1$	.001 (.005)	.001 (.005)	.003 (.006)		.004 (.006)		
Ethnolinguistic fractionalization	.24 (.26)	.23 (.27)	.51 (.40)		.51 (.39)		
Religious fractionalization	−.29 (.26)	−.24 (.24)	.10 (.42)		.22 (.44)		
Oil-exporting country	.02 (.21)	.05 (.21)	−.16 (.20)		−.10 (.22)		
Log(mountainous)	.077** (.041)	.076* (.039)	.057 (.060)		.060 (.058)		
Log(national population), $t-1$	.080 (.051)	.068 (.051)	.182* (.086)		.159* (.093)		
Country fixed effects	no	no	no	yes	no	yes	yes
Country-specific time trends	no	no	yes	yes	yes	yes	yes
R^2	...	.13	.53	.71	...	...	...
Root mean square error	...	.42	.31	.25	.36	.32	.24
Observations	743	743	743	743	743	743	743

NOTE.—Huber robust standard errors are in parentheses. Regression disturbance terms are clustered at the country level. Regression 1 presents marginal probit effects, evaluated at explanatory variable mean values. The instrumental variables for economic growth in regressions 5–7 are growth in rainfall, t and growth in rainfall, $t-1$. A country-specific year time trend is included in all specifications (coefficient estimates not reported), except for regressions 1 and 2, where a single linear time trend is included.
* Significantly different from zero at 90 percent confidence.
** Significantly different from zero at 95 percent confidence.
*** Significantly different from zero at 99 percent confidence.

these specifications, and national population is also marginally positively associated with conflict in one specification. These results confirm Fearon and Laitin's (2003) finding that ethnic diversity is not significantly associated with civil conflict in sub-Saharan Africa.

An instrumental variable estimate including country controls yields point estimates of −2.25 (standard error 1.07) on lagged growth, which is significant at 95 percent confidence, and −0.41 (standard error 1.48) on current growth (regression 5 of table 4). The two growth terms are jointly significant at nearly 90 percent confidence (*p*-value .12). The IV-2SLS fixed-effects estimate on lagged growth is similarly large, negative, and significant at −2.55 (standard error 1.10 in regression 6). Note that

TABLE 5
INTERACTIONS BETWEEN ECONOMIC GROWTH AND COUNTRY CHARACTERISTICS
Dependent Variable: Civil Conflict ≥25 Deaths

EXPLANATORY VARIABLE	IV-2SLS				
	(1)	(2)	(3)	(4)	(5)
Economic growth rate, t	−1.20	.92	−9.9	−.99	−1.85
	(1.43)	(2.62)	(22.9)	(1.26)	(1.81)
Economic growth rate, $t-1$	−2.86*	−3.01*	−6.4	−2.37**	−2.97**
	(1.46)	(1.70)	(6.1)	(1.04)	(1.39)
Economic growth rate, $t\times$ democracy (Polity IV), $t-1$	.01 (.21)				
Economic growth rate, $t-1\times$ democracy (Polity IV), $t-1$	−.10 (.16)				
Economic growth rate, $t\times\log$(per capita income, 1979)		−1.98 (2.70)			
Economic growth rate, $t-1\times\log$(per capita income, 1979)		.58 (1.09)			
Economic growth rate, $t\times$ ethnolinguistic fractionalization			12.1 (30.1)		
Economic growth rate, $t-1\times$ ethnolinguistic fractionalization			5.1 (8.1)		
Economic growth rate, $t\times$ oil-exporting country				−2.8 (6.9)	
Economic growth rate, $t-1\times$ oil-exporting country				3.2 (3.1)	
Economic growth rate, $t\times\log$(mountainous)					.39 (.83)
Economic growth rate, $t-1\times\log$(mountainous)					.23 (.62)
Country fixed effects	yes	yes	yes	yes	yes
Country-specific time trends	yes	yes	yes	yes	yes
Root mean square error	.33	.34	.41	.32	.32
Observations	743	743	743	743	743

NOTE.—Huber robust standard errors are in parentheses. Regression disturbance terms are clustered at the country level. The instrumental variables are growth in rainfall, t and growth in rainfall, $t-1$ and these two terms interacted with the appropriate explanatory variable. A country-specific year time trend is included in all specifications (coefficient estimates not reported). Similar interaction patterns hold when civil conflict ≥1,000 deaths is the dependent variable and in most OLS specifications (results not shown).
* Significantly different from zero at 90 percent confidence.
** Significantly different from zero at 95 percent confidence.
*** Significantly different from zero at 99 percent confidence.

Africa); for countries with socialist political regimes at the start of the sample period (from Barro [1991]); by religious fractionalization, or any of the social fractionalization measures from Alesina et al. (2003); by population density; across a range of measures of democracy, political competition, regulation of political participation, and constitutional constraints on executive power (from the Polity IV data set); for other political institutional measures, including the degree of federalism, and government checks and balances (from the World Bank Database of Political Institutions); and for political and civil freedom (from Freedom House; results not shown).

The simplest reading of these findings is that economic factors trump

Figures
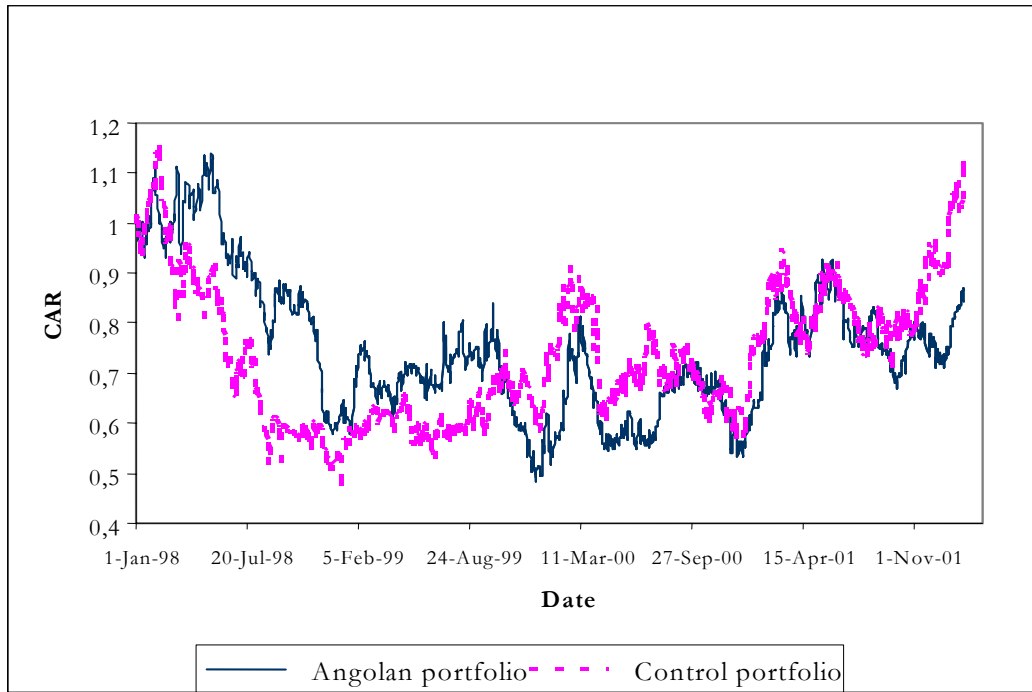
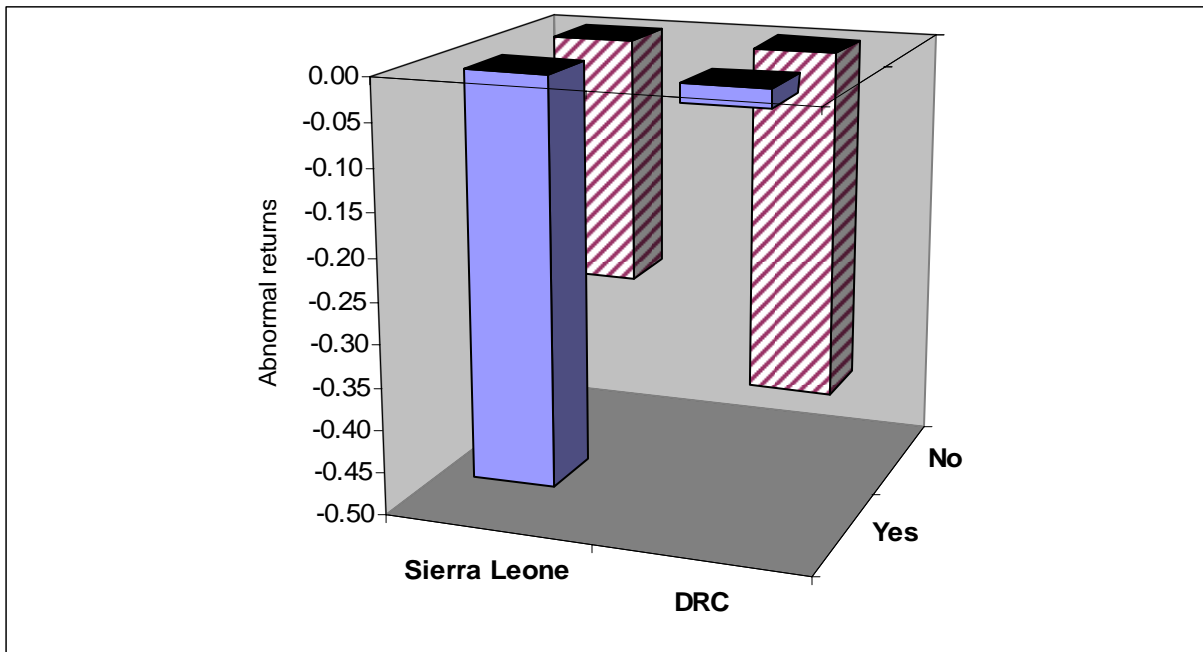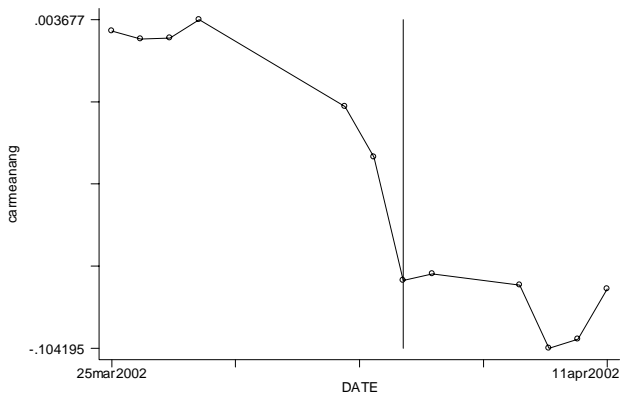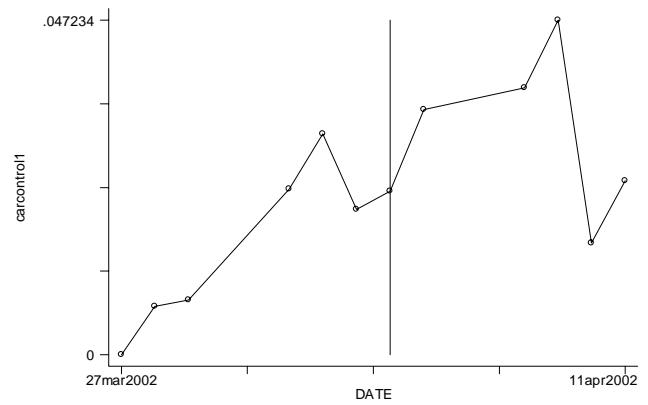**Figure 1: Angolan and Control Portfolio**

(a)   Angolan portfolio

(b)   Control portfolio
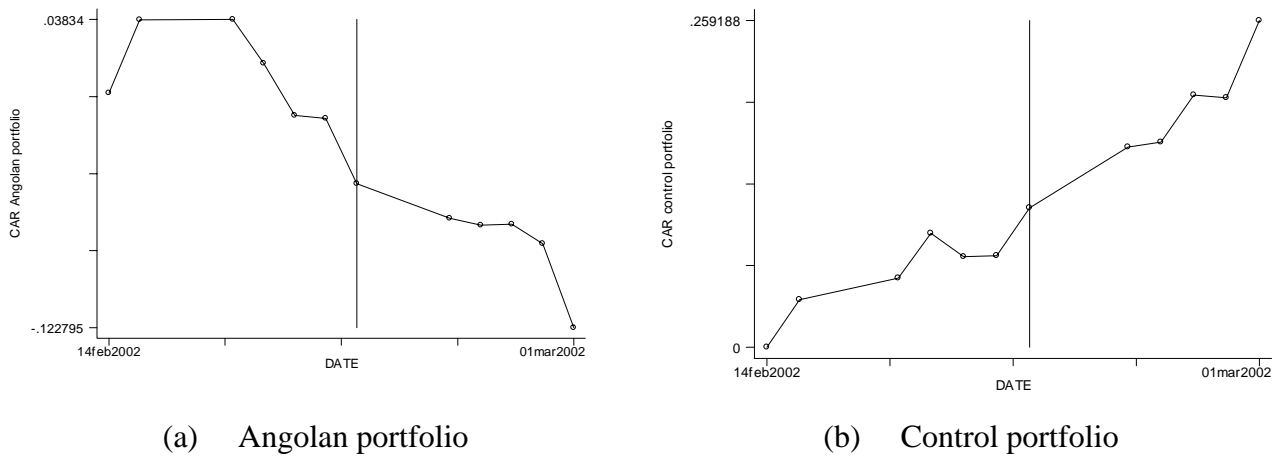
Figure 2: Savimbi's death

Figure 3: Involvement in conflict zones

(a)   Angolan portfolio

(b)   Control portfolio

Figure 4: Cease fire

Besley and Persson (2009)

Table I.A

	(1)	(2)	(3)
Log GDP	0.668***	0.652***	0.660***
	(7.85)	(7.56)	(6.81)
Parliamentary Democracy	0.401***	0.345***	0.316***
	(6.98)	(7.84)	(7.88)
Large Oil Exporter	1.102	1.269	1.081
	(0.63)	(1.43)	(0.41)
Large Primary Exporter	0.644***	0.572***	0.377***
	(3.97)	(4.66)	(6.80)
Weathershock	1.186***	1.420***	1.399***
	(3.88)	(8.32)	(7.66)
Export price index			1.106***
			(3.24)
Import price index			0.206**
			(2.52)
Oil Export Prices			1.008
			(0.46)
Oil Import Prices			1.394***
			(7.68)
Year Dummy Variables	No	Yes	Yes
Observations	1993	1993	1878

Notes to Table: The dependent variable is constructed from the COW and Gibney et al (2007) as described in the text. Sources for other variables as described in Besley and Persson (2008). All columns are estimated using an ordered logit. The reported coefficients are odds ratios with robust z-statistics in parentheses: (* significant at 10%; ** significant at 5%; *** significant at 1%).

Table I.B

	(1)	(2)	(3)
Log GDP	0.631***	0.630***	0.626***
	(8.37)	(8.24)	(7.97)
Parliamentary Democracy	0.578***	0.554***	0.580***
	(3.36)	(3.72)	(3.39)
Large Oil Exporter	1.200	1.314*	1.205
	(1.13)	(1.67)	(1.06)
Large Primary Exporter	0.284***	0.284***	0.195***
	(7.30)	(7.30)	(7.26)
Weathershock	1.124***	1.250***	1.275***
	(2.78)	(4.69)	(4.93)
Export price index			1.172***
			(3.83)
Import price index			1.413
			(0.82)
Oil Export Prices			1.030***
			(3.33)
Oil Import Prices			1.198***
			(2.59)
Year Dummy Variables	No	Yes	Yes
Observations	3549	3549	3394

Notes to Table: The dependent variable is constructed from the COW and from the purges data in Banks (2005) as described in the text. Sources for other variables as described in Besley and Persson (2008). All columns are estimated using an ordered logit. The reported coefficients are odds ratios with robust z-statistics in parentheses: (* significant at 10%; ** significant at 5%; *** significant at 1%).