

Strategic Mass Killings

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Abstract

- ▶ We identify the key variables and situations that make mass killings more likely to occur. We predict that mass killings are most likely
 - ▶ in countries with large amounts of natural resource rents,
 - ▶ polarization,
 - ▶ institutional constraints regarding rent sharing,
 - ▶ and low productivity of labor.
- ▶ The role of resources like oil, gas and diamonds and other key determinants of mass killings is confirmed by our empirical results based on country level as well as ethnic group level analysis.

Facts

- ▶ **Mass killings:** intentional massacres of large number of civilians.
- ▶ 50 mass killing episodes above 50,000 from WW II, for a total of around 25 million civilians (the number jumps above 100 if direct targeting is not required)..
- ▶ Adding **forced displacements**, the total impact of direct targeting of civilians in terms of changed relative population sizes is around 80 million.
(around 42 million IDPs and 12 million global refugees due to forced migration in same period).
- ▶ Mass killings occurred in one third of civil wars since 1960, while not in interstate wars after Korean war.
- ▶ almost all **after** civil war.

Power kills – quotations

- ▶ Almost all episodes of mass killings are perpetrated by groups having obtained complete control of power.
- ▶ Krain (2000: 43): "Military victories by definition enable the winner to set the terms of the post-internal war period. This may include the decision to punish the losing side by eradicating them, thereby eliminating the problem of having to live side by side with the enemy in the post-internal war state."
- ▶ Chirot and McCauley (2006: 2), "conflict can become genocidal when powerful groups think that the most efficient means to get what they want is to eliminate those in the way."
- ▶ "Governments have probably murdered nearly 170,000,000 of their own citizens and foreigners in this century-about four times the number killed in all international and domestic wars and revolutions." (Rummel, 1995: 3)

Darfur

- ▶ **Well identified groups:** The primary perpetrators of the killings and expulsions are government-backed “Arab” militias. The main civilian victims are black “Africans”
- ▶ The estimates of the death toll vary between 70,000 and 400,000 fatalities, with an estimated 1.8 million people displaced (Straus, 2005, 2006; De Waal, 2007). Total population before was 6.5 million.
- ▶ **Resources and not much else:** 21st century characterized by natural resource windfalls and discoveries. At the same time productivity and state capacity of Sudan remained very low.
- ▶ “Looming elections” and democratization) (Straus, 2005).
- ▶ International community hesitant to rapidly and forcefully intervene (Straus, 2005; 2006; De Waal, 2007).

Preview of model

- ▶ Country with two identifiable groups, one of which is in power at the beginning;
- ▶ *War or peace*: In every period groups decide whether to go to war with each other or not, and peace obviously prevails if and only if both groups choose to maintain peace.
- ▶ *Exercise of power*: Whoever is in power at the end of a period, decides unilaterally the distribution of the surplus of that period's production as well as whether or not to commit mass killings.
- ▶ We will consider as parameters the constraints to the exercise of the two powers.

Preview of results

- ▶ We characterize the best Subgame Perfect Equilibrium of the infinite horizon game between the two groups for every set of parameters:
 - ▶ Likelihood of mass killings higher with natural resource abundance and polarization; and decreasing in labor productivity and destruction costs of war;
 - ▶ an increase in population size (keeping polarization constant) reduces the probability of such events.
 - ▶ Finally, we find that a tightening of institutional constraints to distributive power increases the probability of mass killings whenever the constraint binds, whereas the effects of a tightening of the constraints on the power to kill are ambiguous.

Preview of empirical findings

- ▶ We are first studying effects of natural resources on mass killings at country level and first to study massacres with an ethnic group panel.
- ▶ All theoretical predictions confirmed, including those on population effect, which was not expected given the opposite sign in civil war onset research.
- ▶ At the ethnic group level, resource rich groups are confirmed to be the targets. More oil in hands of groups in power not relevant.
- ▶ Empirical findings on consequences of mass killings as well, in line with the theory assumptions.

Set up

- ▶ Two groups, i, j , group j in power at the start, group sizes N_i, N_j .
- ▶ Per period divisible surplus: $S = \beta N + R$.
- ▶ We assume that if a period displays conflict, the winner seizes the entire surplus of that period, minus a loss d caused by the conflict. We also assume that the probability of victory in war at time t for group h , $h = i, j$, is equal to the relative population size in that period, $\frac{N_h^t}{N^t}$.
- ▶ Standard notation δ for discount factor;
- ▶ The last piece of notation is the fairness level λ_h^t chosen by h when in power at time t : if h is in power and offers a share x of the surplus to group $k \neq h$, such a share x is decomposed as a fairness parameter λ_h^t times the relative group size of group k at the time of surplus sharing.

Time line in each period

1. Production takes place, the surplus is collected and the group in power announces a distribution of this surplus between the two groups.
2. *Peace or Conflict*: The two groups decide simultaneously whether to have conflict or peace, where peace prevails only if both choose peace. In case of conflict an amount d of the surplus is destroyed. Group h remains in power in case of peace and in case it wins the war, whereas group $k \neq h$ obtains power only by winning the civil war.
3. *Exercise of power*. This has two dimensions.
 - 3.1 the group in power keeps all the surplus in case of victory or carries out the announced distribution in case of peace.
 - 3.2 The ruler may decide to eliminate members of the other group, without surpassing a total over time upper bound \bar{M} .
4. *Consumption*: Consumption takes place.

Constraints on exercise of power

- ▶ The exercise of power stage of each period is where *institutions, regimes, and perhaps third parties* can enter the picture:
 - ▶ in the *unlimited power* benchmark, the group in power has full discretion to choose the division of the surplus of that period and the number of killings to perpetrate;
 - ▶ However, power is usually limited or constrained, by institutions or social norms, and we will capture these limits to the exercise of power by means of two parameters:
 $\underline{\lambda}$ and \bar{M} .
 - ▶ The first of these two constraints can be interpreted as a constraint to the *exploitation* of the powerless group;
 - ▶ Constraints to mass killings are binding when $\bar{M} < \min\{N_i, N_j\}$.

Equilibrium in unlimited power case

- ▶ **Claim 1:** there always exist equilibria with war at the very start of the game. The punishment phase of a grim trigger profile always starts with a war.
- ▶ However, **Claim 2:** In the unlimited power case, war forever can never be sustained as SPE.
- ▶ **Claim 3:** there exists a SPE strategy profile Σ^* in which (1) both groups always choose war in any period where they both exist, and (2) there is full extermination of the opponent by whoever is in power at the first occasion.
- ▶ Given these three facts, we can show that:
Lemma 1: In the unlimited power benchmark, Σ^* is the worst SPE of the game, consisting of strategies by the two players with immediate war followed by full mass killings by the winner.

Minimum λ that avoids i 's rebellion

- Conditional on having had peace before, the value for group i from continuing on path is

$$\frac{1}{1-\delta} \lambda_j \frac{N_i}{N} S,$$

while when rebelling (hence switching to the worst path) it obtains

$$\frac{N_i}{N} \left(S - d + \frac{\delta}{1-\delta} (S - \beta N_j) \right).$$

- Thus, i prefers the stationary peaceful path as long as

$$\frac{1}{1-\delta} \lambda_j S > S - d + \frac{\delta}{1-\delta} (S - \beta N_j),$$

that is

$$\lambda_j \geq \lambda_j^* \equiv \frac{S - d(1-\delta) - \delta\beta N_j}{S}. \quad (1)$$

- Note that λ_j^* is increasing in R , meaning that the more natural resource rents there are, the more difficult it is to keep the minority group peaceful.

When is j willing to give λ_j^* ?

Group j 's payoff of buying peace in all periods is

$$\begin{aligned} & \left(1 - \frac{N_j}{N} \lambda_j^*\right) \frac{S}{1 - \delta} \\ = & \left(1 - \frac{N_j}{N} \frac{S - d(1 - \delta) - \delta \beta N_j}{S}\right) \frac{S}{1 - \delta} \\ = & \frac{\frac{N_j}{N} S + \frac{N_j}{N} (d(1 - \delta) + \delta \beta N_j)}{1 - \delta}. \end{aligned}$$

- ▶ Two types of deviations are possible: *mass killings* or *exploitation*, where by the latter we mean the decision by group j to give $\lambda_j = 0$ in the deviation period.

- ▶ With the mass killings deviation, group j obtains

$$S + \frac{\delta}{1 - \delta} (S - \beta N_j). \quad (2)$$

- ▶ With the exploitation deviation, on the other hand, group j obtains

$$S + \delta \frac{N_j}{N} \left[S - d + \frac{\delta}{1 - \delta} (S - \beta N_j) \right]. \quad (3)$$

When is peace with λ_j^* better than mass killing deviation?

Peace is preferred by j to mass killings iff

$$\frac{\frac{N_j}{N}S + \frac{N_j}{N}(d(1-\delta) + \delta\beta N_j)}{1-\delta} > S + \frac{\delta}{1-\delta}(S - \beta N_j).$$

Rewriting:

$$R < R_j^* \equiv (d - \beta N)(1 - \delta) + \delta\beta N_j. \quad (4)$$

- **Lemma 2:** (I) If $R < R_j^* \equiv (d - \beta N)(1 - \delta) + \delta\beta N_j$, the best SPE in the unlimited power case is a peaceful steady state with fairness level λ_j^* , which is increasing in R .
- (II) If $R > R_j^* \equiv (d - \beta N)(1 - \delta) + \delta\beta N_j$, the best SPE in the unlimited power case involves war, and extermination at the first occasion, perpetrated by whoever is in power at the end of the war.

Prediction Result for unlimited power case:

Proposition 1: *Assuming the groups always select the best SPE behavior, peace is more likely (and hence mass killings less likely) when:*

- R is lower;
- d is larger;
- N_i/N is smaller;
- the size of the group in power is larger (smaller) if $\delta > (<) 1/2$;
- the higher is β or N , for δ sufficiently high;
- the higher is δ , unless d is very large.

- In summary, for sufficiently high δ , the probability of war and mass killings is increasing in R and polarization, and decreasing in d , β and N .

Limited power general case

- ▶ Meaning of $\underline{\lambda}$:
 - ▶ minimum level of income needed for respecting the international human rights conventions, i.e. right for shelter, right for education, covering the basic needs and not letting people die in the street, or
 - ▶ minimum levels of income and/or welfare services prescribed by the local institutions and laws;
 - ▶ common knowledge minimum level of fairness below which the powerless group is expected to rebel and trigger the punishment phase, even if $\underline{\lambda} > \lambda_j^*(R)$.
- ▶ \bar{M} is total upperbound of killings over time that a ruler can eliminate before triggering intervention.

Binding $\underline{\lambda}$ only :

- ▶ Obviously, offering $\underline{\lambda}$ is minimum to appease i by definition;
- ▶ group j will remain peaceful and refrain from mass killings iff

$$\underline{\lambda} < L(R) \equiv \delta \frac{\beta N}{\beta N + R}. \quad (5)$$

Note that $L(R)$ is decreasing in R and equals $\lambda_j^*(R)$ exactly at $R = R_j^* = (d - \beta N)(1 - \delta) + \delta \beta N_j$.

- ▶ **Remark:** If \bar{M} is not binding, the comparative statics of Proposition 1 continue to hold even in the presence of a binding $\underline{\lambda}$. The additional result is that the probability of peace is (weakly) decreasing in $\underline{\lambda}$.

Worst equilibrium when both constraints bind

- ▶ **Lemma 3:** For any $\bar{M} < \min\{N_i, N_j\}$, and for any $\underline{\lambda}$, the worst SPE is as follows:
 1. If $R \geq d$, then the worst SPE for the punishment phase involves war every period, with both groups killing \bar{M} opponents at the first occasion of power;
 2. on the other hand, if $R < d$, the worst SPE involves war forever but without mass killings.

Best SPE when both constraints bind and $d \geq R$

- **Lemma 4:** Let $d \geq R$. The best SPE involves peace if and only if

$$d \geq \frac{1 - \delta}{1 + \delta \frac{N_j}{N_i}} S \quad \text{and} \quad \underline{\lambda} \leq \delta \left[1 + \frac{d}{S} \frac{N_j}{N_i} \right].$$

Otherwise, the best SPE involves conflict.

- The threat in this case is exploitation, while mass killings never appear in equilibrium. Hence the exact value of \bar{M} does not matter for these parameters.

Best equilibrium when both constraints can bind and $R > d$

Lemma 5: Let $\bar{M} < \min\{N_i, N_j\}$ and $d < R$. There exist thresholds R_h^* , λ_h^* and L_h^* , $h = i, j$, such that

- ▶ (i) the best SPE involves peace if and only if $R \leq R_j^*$ and $\underline{\lambda} \leq \max\{\lambda_j^*, L_j^*\}$.
- ▶ (ii) When $R > R_j^*$ and/or $\underline{\lambda} > \max\{\lambda_j^*, L_j^*\}$, the best SPE involves war in the first period, and if group j wins it commits mass killings \bar{M} . If group i wins it commits mass killings \bar{M} iff $R > R_i^*$ and/or $\underline{\lambda} > \max\{\lambda_i^*, L_i^*\}$, while for $R \leq R_i^*$ and $\underline{\lambda} \leq \max\{\lambda_i^*, L_i^*\}$ the best SPE involves peace ever after.
- ▶ When mass killings occurred at the end of the first period, there exist thresholds R_h^{**} , R_j^{**} , L_i^{**} and L_j^{**} , such that
 - ▶ (A) if the winner of the first war is $h = i, j$, and $R \leq R_h^{**}$ (and $\underline{\lambda} \leq L_h^{**}$, in case $\underline{\lambda}$ is binding), then peace follows ever after;
 - ▶ (B) if $R > R_h^{**}$ (and/or $\underline{\lambda} > L_h^{**}$, in case $\underline{\lambda}$ is binding), then war continues until power shifts, at which point the second mass killing \bar{M} takes place, and peace follows after that.

Graphical illustration

Take parameter values ($d = 50$, $N_i = 50$, $N_j = 50$, $\beta = 1$, $\bar{M} = 5$, and $\delta = 0.6$). Hence non-resource production (βN) has a value of 100.

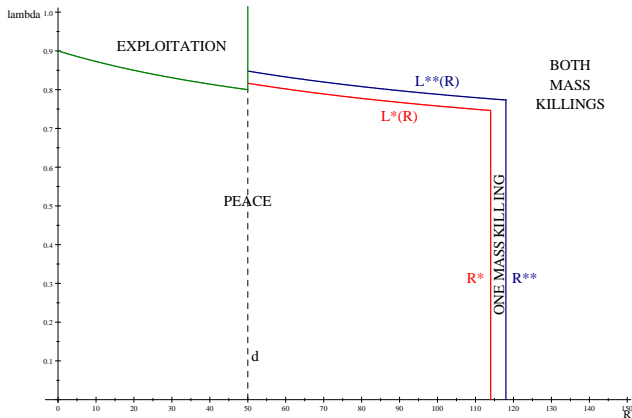


Figure: Zones of Peace, Exploitation and Mass Killings

Main Result:

Proposition 2:

(I) *Like in the unlimited power benchmark, it continues to be true that the probability of mass killings in the best SPE is, for sufficiently high δ : increasing in R and in N_i/N and decreasing in d , β and N .*

(II) *The probability of mass killings in the best SPE is (weakly) increasing in $\underline{\lambda}$.*

(III) *If δ is sufficiently high, then the value of \bar{M} that minimizes the probability of mass killings is always interior (i.e., the probability of peace is a concave function of \bar{M}), and the peace likelihood is maximized by $\bar{M} = \frac{\beta N - d}{4\beta}$.*

Remark:

Note that for many of the parameter constellations where mass killings are the most likely, i.e. for relatively high polarization and relatively low \overline{M} , the thresholds of R_j^* and R_j^{**} are close, \longrightarrow with a uniform distribution of R the probability that the best SPE involves mass killings on both sides (with a sequence of wars between them) may be on average higher than the probability of observing mass killings on one side only.

Discussion

- ▶ **Robust predictions:** as established in proposition 2(1), at least for high δ , the *sign* of the effects of R, β, N, d and polarization on the probability of mass killings remains the same for *every amount of power* that a government controlling group can exercise. Hence no need to assume anything about power in empirical testing of these predictions.
- ▶ Note: a warning coming from the analysis is that historical moments in which a group in power expects some serious reduction in their ability to extract surplus from other groups' production or from natural resources, e.g. moments of expected democratization pressures, may be the most dangerous moments in terms of mass killings incentives. This observation could therefore contribute to explain the particular instability of economies that are transitioning towards democracy.

Intuition for non monotonic effect of \bar{M}

- ▶ Mass killings have multiple effects:
 - ▶ (1) **Distribution effect:** for any $\underline{\lambda}$, the reduction in the number of people in the other group increases the share of the surplus that the group in power will obtain;
 - ▶ (2) **Probability effect:** mass killings increase the probability of winning for the group in power in future wars; but
 - ▶ (3) **Total surplus effect:** mass killings reduce the overall surplus size.
- ▶ How important (3) is, depends on the weight of the non-produced rents. If the non-produced rents are large, the third effect dominates and mass killings are avoided. But if R is sufficiently large, mass killings become more attractive.
- ▶ When δ is sufficiently low, the direct effect dominates and we may have mass killings in the best SPE for all levels of \bar{M} , provided that R is large enough.

Empirical Analysis – country level panel

- ▶ Logit regressions; dependent variable: mass killing dummy, coded by PITF;
- ▶ 268 country-years (3.5 percent of all observations) experiencing mass killings between 1955 and 2007. These killing episodes take place in 28 different countries.
- ▶ Countries with the mass killing episodes have twice as much natural resources on average as rest of sample, but 1/4 of per capita GDP.
- ▶ We run our own regressions because (1) the existing ones on mass killings do not do enough about unobserved heterogeneity; (2) the existing studies of mass killings do not consider the fact that mass killings can be autocorrelated; (3) we wanted to add new controls and **most important** add as independent variables the values of oil production, diamonds, gold, etc.

Results

- ▶ Running the country level regressions without our corrections, we replicate the results in the literature: high GDP and democracy reduce the likelihood of mass killings, while polarization and the presence of civil war increase the risk.
- ▶ When clustering standard errors at the country level and introducing lagged mass killings plus new controls, democracy loses significance.
- ▶ Lagged oil production value / GDP is significant at the 1% level;
- ▶ also oil reserves (in absolute terms as well as in relative terms to GDP) significant at 1% level;
- ▶ In column 4 we use as natural resource variable the relative size of rents (i.e. total market value minus total production costs) of oil, natural gas, and coal production in percent of the Gross National Income (from World Bank, 2010). Also this measure increases the mass killings risk at a significance level of 1%, and so all other measures.

Observations about consequences of mass killings

One feature of our theory is that natural resource rents R are not affected by mass killings, while the non-resource production decreases in the aftermath of mass killings by $\beta \overline{M}$.

If our assumptions are valid, we should observe that in the aftermath of mass killings the amount and value of oil production is largely unaffected, while the share of oil production in GDP should increase, given that the non-resource sectors are harmed by the killings.

To assess this, we perform a very simple analysis, where we compare the average values of various oil revenue measures in the 10 (resp. 5) years before a mass killings (MK) episode starts and compare them with the averages of the same measures in the 10 (resp. 5) years after the end of a mass killings episode.

- ▶ All measures of natural resource abundance over national income confirm the validity of the assumption.

Ethnic group level evidence

- ▶ What kinds of ethnic groups become victims of military massacres of civilians?
- ▶ We build an ethnic group level measure of natural resource wealth.
Using GIS software (ArcGIS) we have matched the data from GREG (Weidmann, Rod and Cederman, 2010).)on the geographical boundaries of ethnic groups with the geo-referenced petroleum dataset (PETRODATA) from Lujala, Rod and Thieme (2007), which tells us where oil fields lie. Combining this information, we have computed a variable measuring which part of the territory occupied by a given ethnic group contains oil.
- ▶ Group level petrol wealth allows us to identify more precisely whether groups in petrol-rich areas become more attractive targets for strategic elimination.

GREG and MAR

- ▶ The advantage of using group boundaries from the 1960s is that this limits concerns of reversed causality, as the massacres we study take place three decades later.
- ▶ Dependent variable: ethnic group - year dummy. MAR contains a panel of all ethnic minority groups that suffer from threats or discrimination. 23% of all groups from GREG are included in MAR, and 4.3% of the observations in MAR are coded as being subject to military massacres of civilians.
- ▶ We first do the analysis on all groups from GREG (putting a zero for sure as MK dummy for groups in GREG but not in MAR); then we do the analysis within MAR set, with more control variables.

Independent variables

- ▶ Our main independent variable is the ethnic group's petrol abundance, which is captured by the percentage of a group's territory covered with oil and gas;
- ▶ dummy variable on whether a group has diamond production on its territory;
- ▶ Area of the territory occupied by the group; group's population size, population size of the ethnic group in power, share of group's territory covered by mountains, distance from the group territory to its country's capital (all from Cederman, Buhaug and Rod, 2009);
- ▶ variables capturing the group's economic potential: percentage of the group's territory with high-fertility soil; average light intensity during night in the ethnic group's territory, measured with the help of meteorologic satellites; dummy taking value 1 for groups that have been coded as politically relevant by Cederman, Buhaug and Rod (2009).

Results

- ▶ According to our theory we expect groups that live in petrol-rich areas or diamond rich, but are economically relatively unproductive, to be attractive targets for the ruling groups.
Running order logit or normal dummy logit, we confirm the hypothesis.
- ▶ A given ethnic group is significantly more at risk if it is relatively small and the ruling group in its country large. Further, politically relevant groups are significantly more likely to be massacred.
- ▶ Among the additional MAR specific variables, only being of a different language from ruling group is significant.

Policy implications

- ▶ Our positive analysis (theory and empirics) has shown robust significance of natural resources over productivity for the determination of mass killing risk, plus results on distribution constraints, population size, polarization effects. What are the potential implications at the normative level?
 1. Targeted embargos of natural resource related exports better than general sanctions;
 2. Promises of support in institution building and development funding in case of peace agreement: could be thought of as inputs to raise the productivity parameter β , and hence land reforms should be a good example of policy proposals to be made. Cash foreign aid could have negative effect, since any "cake" not produced by labor may have similar incentive consequences as natural resource windfalls.
 3. Pressure to democratize: better to push for elections and accountability before pushing for checks and balances raising λ ?
 4. Optimal intervention threat depends on productivity and population size.