Autocrats in crisis mode:
Strategic favoritism during economic shocks

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Abstract

Do autocrats favor their supporters during economic shocks? I introduce a model of redistribution and regime stability that shows how in-group favors can be a strategic response to economic downturns. The model predicts that, as economic shocks worsen, autocrats may favor their supporters and confront opposition protests to save on appeasement costs. I test the model's main results in two empirical settings. First, I focus on the Venezuelan blackouts of 2019. Consistent with the model, the Maduro regime was more likely to exempt regime-supporting regions affected by the blackout from later power rationing. Moreover, blackout-induced protests were limited to opposition-leaning regions. I then focus on negative rainfall shocks in Sub-Saharan Africa. Droughts magnify differences in development, protests and state-coercion outcomes in favor of leaders' home regions.

Keywords: Favoritism, Economic shocks, Development, Protests, Repression, Venezuela, Sub-Saharan Africa, Political economy, Geography.

JEL Codes: D7, H3, H4, I0, N5, N9, O1, O2, O5, Q1, Q4, R1, R5.

1 Introduction

Autocrats tend to favor their supporters.[1] While such behavior is often attributed to leaders' preferences (Hodler and Raschky, 2014b), it is unclear whether in-group favors are strategic for regime stability. Favoring supporters may help retain their backing (Padró i Miquel, 2007), but directing benefits towards opponents could prevent the spark of a destabilizing wave of protests (DeNardo, 1985). This latter logic seems especially relevant during economic downturns, as shocks broaden grievances across society and enable the coordination of dissent.[2] However, economic shocks also impose budgetary constraints on the regime - just as citizen demands peak. Do autocrats respond to shocks hoping to prevent the spark of dissent, or do they aim at just retaining supporters' loyalty? Who do autocrats favor during economic crises?

In this paper, I argue that strategic autocrats balancing these trade-offs may choose to favor regime supporters as economic conditions worsen. Intuitively, the argument goes as follows: In good times, economic grievances are low, and autocrats are able to deter protests with moderate investments. During an economic contraction, autocrats' worst possible outcome is a revolution with broad popular support. One way to avoid such outcome is to appease the opposition by spending on repressive deterrence and targeted favors. Autocrats could also avert a broad revolution by moderating supporters' exposure to the shock. This latter approach saves on appeasement costs, but allows for the opposition to confront the regime in street protest. As the economy tanks and autocrats' resources dwindle, favoring supporters to save on appeasement costs becomes relatively attractive.

To formalize this argument, I first introduce a simple model of redistribution, repression and dissent during economic shocks. Downturns induce shared economic grievances

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[1]There is broad empirical evidence that autocratic leaders favor regions, groups or citizens affiliated with the regime. Franck and Rainer (2012); Kramon and Posner (2013); De Luca et al. (2018); Dickens (2018) provide extensive evidence on ethnic favoritism based on relative health, education, wealth and local development outcomes. Furthermore, Hodler and Raschky (2014b) show evidence of regional favoritism towards autocrats' home regions.

[2]The idea that downturns are destabilizing because they enable the coordination of dissent has been established in the academic literature both theoretically (Lipset, 1959; Kuran, 1989, 1991; Huntington, 1993; Acemoglu and Robinson, 2001) and empirically (Burke and Leigh, 2010; Brückner and Ciccone, 2011; Aidt and Leon, 2016).

that increase citizens' protest payoffs. Citizens are politically heterogenous: Opponents hold political grievances against the autocrat that motivate their dissent, while supporters do not. Given an economic shock, the autocrat needs to invest in both repression capacity and targeted appeasement transfers. Taking these investments as given, supporters and opponents choose between protesting or abstaining. Protest choices between both groups operate as strategic complements, as repression losses imposed on demonstrators are spread out for larger protests. In order to avoid a revolution (a situation in which both opponents and supporters choose to protest), the autocrat will choose investments to either appease both groups and retain power with certainty, or appease only one group and risk the possibility of regime change. If appeasing only one group, the autocrat will choose to appease its supporters and save on the cost of compensating the opposition for its political grievances. The model's main result is that as shared economic grievances increase with the economic shock, the autocrat's expected payoff of appeasing both groups worsens relative to the payoff of favoring supporters and confronting limited opposition protests.

This result implies that in-group favors should grow as economic conditions worsen, and as a consequence, the resulting dissent should limit to the opposition. I provide evidence consistent with these predictions from two separate empirical settings. First, I present a case study on the Venezuelan week-long blackouts of early March of 2019, which occurred during a constitutional crisis that heightened the perceived chances of regime change. The regime responded one month after the blackouts with a rationing schedule that fully exempted some areas of the country from official power cuts. I start by studying the determinants of the local assignment to power rationing. Local exposure to the blackouts in early March is associated with a higher chance of rationing in early April, but this association is absent for regime supporting areas. I then perform difference-in-differences analyses to assess the effect of the blackout on local protests. I find that blackouts induced a spike in political protests, but the effect was limited to opposition-leaning areas. From the perspective of the model, these results suggest that the regime prevented further power cuts on its supporter base in order to limit the effect of the

blackouts on protests during a period of heightened vulnerability to political dissent.

I then show that the implications of the model generalize beyond the Venezuelan context, and help explain local development, dissent and repression outcomes in a cross-country setting. I focus on rainfall shocks in Sub-Saharan Africa, where dependence on rain-fed agriculture is relatively high, and where national droughts have been shown to induce both conflict (Miguel et al., 2004) and democratization (Brückner and Ciccone, 2011). I first evaluate the differences in local nightlights, protests and repression outcomes between the regions of leaders' birth and other regions. I confirm that nightlights, as a measure of local economic development, improve for leaders' birth regions. Moreover, I find that protests and repression of dissent are also lower in these regions. Chiefly, as predicted by the model, national droughts magnify all these differences in favor of leaders' birth regions. Furthermore, I build on data from Dickens (2018) and Franck and Rainer (2012) to assess the effect of ethnolinguistic similarity and co-ethnicity to regime leaders on different development outcomes during national droughts. Once again, I find that the benefits associated with units ethnically affiliated to country leaders magnify during rainfall shocks. In a final set of results, I leverage data from Girardin et al. (2015) and Francois et al. (2015) to test for the accumulation of political power by leaders' co-ethnics during national droughts, but find no such patterns. From the perspective of the model, this result suggests that autocrats do not consider the further accumulation of political power in the hands of co-ethnics as an effective tool to prevent supporters' dissent during economic crises.

This paper contributes to the theoretical and empirical literatures on economic shocks, favoritism, protests and regime change. On a theoretical front, the model introduces a simple mechanism to formalize how regimes invest in repression and targeted transfers to overcome economic crises. Consistent with Acemoglu and Robinson (2001), the model argues that economic shocks lead to threats of revolution that may induce regime change.[3] However, the model incorporates citizen political heterogeneities along with the possibility for autocrats to blend repression and redistribution in their strategic responses

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[3]Contrary to this perspective, Boix (2003) argues that reduced threats of expropriation should lower the costs for elites to relinquish political control.

to economic downturns. As a result, the model highlights how autocrats may choose to selectively moderate sudden economic grievances and confront the dissent of excluded groups despite the possibility of being deposed.[4] Moreover, the model expands the formal literature on the political economy of favoritism. Padró i Miquel (2007) argues that autocrats favor affiliated groups to make them "fear" the prospect of being treated as outsiders if the regime falls. The model presented in this paper relies on simpler grievance-based motives for dissent to expands the strategic logic of in-group favoritism to periods of economic crisis.[5]

Furthermore, the model adds to the literature considering complementarities in citizens' protest choices (Passarelli and Tabellini, 2017; Cantoni et al., 2019; Bursztyn et al., 2021), and the role of focal points as opportunities to overcome protest coordination problems (Granovetter, 1978; Oliver et al., 1985; DeNardo, 1985; Kuran, 1989, 1991; Lohmann, 1994). Interestingly, several contributions in this literature highlight how regimes may decide to appease outsiders to prevent them from inducing other groups to join protests. By adding broad grievances from economic shocks, this model identifies the economic conditions after which the appeasement of outsiders becomes unaffordable, and autocrats move towards a strategy of in-group favoritism. An important aspect of the model is that autocrats facing smaller shocks may choose to favor the opposition to avert dissent altogether.[6]

The evidence presented in this paper, which leverages methods from the field of economic geography, is consistent with the model's prediction of strategic in-group favoritism in response to negative economic shocks. Such findings contribute to the literature on the political economy of development, redistribution and dissent. To my knowledge, this

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[4]While such instances are anecdotally prevalent, they are not on the equilibrium path in Acemoglu and Robinson (2001).

[5]The model's consideration of economic shocks as drivers of citizen protests is grounded in the "relative deprivation theory" proposed by Gurr (1970). This "grievance-based" perspective argues that citizen discontent is driven by the intensity and scope of the mismatch between individuals' material expectations and actual conditions, and that attributing the responsibility for such gaps on the political establishment legitimizes violent rebellions. A recent formalization building on this perspective is Passarelli and Tabellini (2017), who combine "endogenous aggrievement" motives along with strategic considerations in modelling citizen protest choices.

[6]This scenario would be consistent with Wen (2020), who finds that the Chinese government responds to ethnic tensions the Xinjiang region by targeting public job opportunities to male minorities in other regions of the country.

is the first study to assess how economic shocks affect autocrats' strategic choices on redistribution.[7]

Moreover, the paper expands the literature on regional and ethnic favoritism (Franck and Rainer, 2012; Kramon and Posner, 2013; Hodler and Raschky, 2014b; De Luca et al., 2018; Dickens, 2018). First, I consider differences in protest and repression outcomes between leaders' regions of origin and other regions. To my knowledge, this is the first study to document lower dissent and coercion in leader-affiliated regions. While not necessarily surprising, this finding highlights the possibility of endogeneity in the favoritism literature focusing on development outcomes, as heightened conflict in non-affiliated areas may yield local economic costs. Most importantly, I find that national droughts magnify all these differences in development, protest and repression outcomes in favor of regime-affiliated regions. While these results are fully consistent with the model's proposition, it remains possible that rainfall shocks magnify differences on development outcomes by exacerbating costly dissent and coercion in rival regions. The Venezuelan case-study overcomes this concern by focusing on a specific policy response to a broad economic shock during a period of heightened political instability.

The paper continues as follows: Section 2 presents the theoretical model. Section 3 presents the 2019 Venezuelan Blackouts case-study. Section 4 presents evidence from Sub-Saharan Africa. Section 5 concludes.

2   Model

I now present a simple model of redistribution, dissent and autocratic stability during economic shocks. The model is an extensive form stage game solved by backward induction. In the model, the autocrat observes an economic shock and has limited agency to deter or appease dissent from regime supporters and opponents by targeting benefits and investing in repression. A strategy of defusing citizen coordination with targeted transfers in favor of regime supporters will allow autocrats to limit the scope of dissent to

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[7]A related but limited literature addresses the political economy of prevention and relief spending during natural disasters. See Cohen and Werker (2008); Cooperman (2021); Garrett and Sobel (2003); Reeves (2011); Strömberg (2007); Kahn (2005).

the opposition, moderating appeasement costs but allowing for the possibility of regime change. The model predicts that as economic shocks grow, autocrats' relative payoffs under this "partial appeasement" strategy improve, so they become more likely to favor their supporters to prevent them from joining opposition protests.

2.1 Model Setup

Players, payoffs and sequence of play

There are three groups in society: The autocratic regime (R), the opposition citizens (O) and the supporter citizens (S). There are no within-group coordination or free-riding problems, so that each group can be considered an individual agent.

R's utility boils down to the level of income it can retain. In the autocratic status quo, A captures a fraction of θ of actual income y. In a revolution, which will be determined by citizen protest choices, R's payoff would be 0. In order to avoid the revolution, R can invest in group-specific transfers A^O and A^S and in repression level κ to disincentivize protests. R faces convex costs of repression $\frac{\kappa^2}{c}$, where c measures R's baseline repressive capacity.

All agents expect incomes to take a value of y^e. The economic shock Z is measured as the gap between expectations and reality ($Z = y^e - y$). The shock generates economic grievances that motivate citizens to protest. S and O citizens differ from each other in their political grievances against R: While S citizens have no political grievance against R, O citizens do. T^j measures the political grievance for citizen group j, and I assume that $T^O = T > T^S = 0$. Finally, citizens protest choices are complementary, since the repression costs experienced by a dissenting group are slashed in half if the other group is also joining the protests.

Consider $\rho^j \in \{0, 1\}$ to be citizen group j's decision to abstain from protesting or to protest. Incorporating economic and political grievances, repression costs, appeasement transfers and strategic motives, the payoff for group j to protest ($\rho^j = 1$) if group $-j$ also protests ($\rho^{-j} = 1$) is:

$$V_{1,1}^j = Z - A^j + T^j - \frac{\kappa}{2}$$

This expression captures that the economic grievance is driven by the combination of the economic shock (which is shared by both groups) and the appeasement transfer received by group j (which the regime can target across groups). The political grievance T^j equals 0 for S and is positive for O. Because both groups are protesting, the repression losses of each group are divided by two. In the case that group $-j$ abstains from protesting ($\rho^{-j} = 0$), the payoff for group j to protest is:

$$V_{1,0}^j = Z - A^j + T^j - \kappa$$

Regardless of group $-j$'s decision, the payoff of abstention for group j is always 0:

$$V_{0,1}^j = V_{0,0}^j = 0$$

Timing of play and possible outcomes for R

In the first stage of the game, the actual level of income y is revealed. Upon observing the value of y, R determines group-specific appeasement transfers and repression levels. Taking appeasement transfers and repression levels as given, both citizen groups will decide in parallel whether to protest ($\rho^j = 1$) or abstain ($\rho^j = 0$). $\rho = \{\rho^O, \rho^S\}$ is the joint vector of citizen protest choices. If both groups protest ($\rho = \{1, 1\}$), then there is a successful revolution (X) and R is deposed, receiving a payoff of 0. If both groups abstain ($\rho = \{0, 0\}$), then there is a revolt failure (F). R receives its status quo payoff $\theta * y$ with certainty minus appeasement and repression costs. Finally, if only one group protests ($\rho = \{1, 0\}$ or $\rho = \{0, 1\}$), then the game ends in a confrontation (C). Protests will succeed in deposing the regime with probability p and fail with probability $(1 - p)$. The group that protests suffers all repression costs, and R will keep its privileges only if protests are unsuccessful.

2.2 Citizen protest game

Citizens will decide whether to protest or not taking transfers and repression levels as given. Under the payoff functions shown above, citizen decisions will be contingent on other group choices. Here I provide a mathematical characterization of this citizen protest game.

Lemma 1 *For all κ, A^O, A^S, T and x such that $\kappa \geq 0$; $A^S = A^O \geq 0$; $T > 0$ and $x \in \{0, 1\}$, we know that:*

$$V_{1,x}^O > V_{1,x}^S \tag{1}$$

This is because if $A^S = A^O$, then $V_{1,x}^O - V_{1,x}^S = T > 0$.

Lemma 2 *For all κ, A^O, A^S, T and j such that $\kappa \geq 0$; $A^S \geq 0$, $A^O \geq 0$; $T > 0$ and $j \in \{O, S\}$, we know that:*

$$V_{1,1}^j > V_{1,0}^j \tag{2}$$

This is because, for the possible range of parameter values, $V_{1,1}^j - V_{1,0}^j = \frac{\kappa}{2}$.

Lemma 1 highlights that under no discriminatory transfers, the value that the opposition gets from protesting will be higher than that of regime supporters. Lemma 2 shows that the payoffs of protesting improve when the other group also protests (that is, protests are complementary).

2.3 R's cost minimization problems

The worst possible outcome for R is a certain revolution (X), which would come about whenever both citizen groups protest at the same time. R has two possible strategies to try and prevent a revolution during economic shocks. The first one is to invest in appeasement transfers and repression to the point that both O and S decide to abstain from protesting, which would result in a failed revolt (F). The second one is to set transfers and repression levels that appease only one of the groups, which would induce

a confrontation (C) where the probability for R to retain power becomes $1 - p$. R will consider the cost-minimizing transfers and repression levels to induce each of these outcomes in order to compare their relative payoffs and make a decision. Importantly, let's define $K = \frac{\kappa^2}{c} + A^O + A^S$ to be R's investments in appeasement transfers and repression efforts.

2.3.1 Strategy profile 1: "Full appeasement"

Lemma 3 *The cost-minimizing strategy to induce a F outcome ($\rho = \{0, 0\}$) is for R to set the following investment vector as a function of the level of shock Z:*

- *If $Z \leq \frac{c}{2} - T$:*

$$\kappa_{F1} = Z + T \ ; \ A^O_{F1} = 0 \ ; \ A^S_{F1} = 0 \ ; \ V(R)_{F1} = \theta(y^e - Z) - \frac{(Z+T)^2}{c}$$

- *If $\frac{c}{2} - T < Z \leq \frac{c}{2}$:*

$$\kappa_{F2} = \frac{c}{2} \ ; \ A^O_{F2} = Z + T - \frac{c}{2} \ ; \ A^S_{F2} = 0 \ ; \ V(R)_{F2} = \theta(y^e - Z) + \frac{c}{4}Z - T$$

- *If $\frac{c}{2} < Z \leq c$:*

$$\kappa_{F3} = Z \ ; \ A^O_{F3} = T \ ; \ A^S_{F3} = 0 \ ; \ V(R)_{F3} = \theta(y^e - Z) - \frac{Z^2}{c} - T$$

- *If $c < Z$:*

$$\kappa_{F4} = c \ ; \ A^O_{F4} = Z + T - c \ ; \ A^S_{F4} = Z - c \ ; \ V(R)_{F4} = \theta(y^e - Z) + c - 2 * Z - T$$

Intuitively, the costs of inducing a full appeasement equilibrium grow with the level of the economic shock. In the absence of a shock, only the opposition holds (political) grievances against the regime, so that inducing full appeasement depends on setting the level of repression at a level such that deters the opposition from protesting conditional on the supporters abstaining. As the shock grows beyond $\frac{c}{2} - T$, the convexity in repression

costs now make it an expensive mean to appease the opposition, so the regime starts transferring appeasement transfers to them.[8] The shock, importantly, is also shared by regime supporters, who will start to consider whether to protest or not when the shock reaches $\frac{c}{2}$. At this point, the regime increases the level of repression back up, as the alternative is now to provide appeasement to both O and S for their exposure to stronger shocks. Finally, once the shock reaches c, the convex costs of repression become such that it's preferable for the regime to send additional appeasement transfers to both the opposition and the regime supporters for their exposure to additional economic grievances.

Lemma 4 *A situation of "full appeasement" induced by the regime will not be a unique equilibrium if the level of the shock $Z \geq min\{T; \frac{c}{4}\}$.*

Intuitively, the regime induces full appeasement by making the opposition indifferent between protesting and not protesting. Once the shock reaches $\frac{c}{2}$, the regime also needs to make the supporters just indifferent between protesting or not protesting. From lemma 2 we know that both payoffs would improve if the other group protested, so that with the same regime investment vector, both $\rho = \{0, 0\}$ and $\rho = \{1, 1\}$ would be Nash equilibria of the protest game. For shock levels below $\frac{c}{2}$, supporters value of protesting is negative conditional on the appeasement of the opposition, but may be positive if the opposition protests. The value of the shock after which $V_{1,1}^{S}$ turns positive given the investment vector strategy described above is the minimum value between T and $\frac{c}{4}$. This point highlights the importance of protest complementarities in the model and the potential value of outsider favoritism: The regime often needs to appease the opposition not to avoid a confrontation with them, but to avoid a broad revolution.

2.3.2 Strategy profile 2: "Partial appeasement"

Alternatively, R could consider the option of appeasing just one group and confronting the other. The reason to do this would be to save on appeasement costs at the expense of some probability of regime change. From lemma 1, it is easy to see that, whatever the

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[8]One possibility is that the value of $T > \frac{c}{2}$. This would mean that the political grievances of the opposition are so large that they would need to receive positive appeasement transfers even in the absence of a economic shock for them to acquiesce to the regime.

level of Z, the costs of appeasing supporters conditional on opposition protests should be cheaper than the costs of appeasing the opposition conditional on supporters' protests.

Corollary 1 *Define $K_{\{0,1\}}^{j}$ as the regime's cost of appeasing group j conditional on group $-j$ protesting. Because $V_{1,1}^{S} < V_{1,1}^{O}$ for any value of κ and $A^{O} = A^{S} \geq 0$ (lemma 1), then $K_{\{0,1\}}^{S} < K_{\{0,1\}}^{O}$. Similarly, define $V(R)_{C}^{j}$ as the regime's expected payoff of a confrontation strategy focusing on the appeasement of group j. Given lemma 1, $V(R)_{C}^{S} > V(R)_{C}^{O}$.*

This means that given a strategy of partial appeasement, it will always be preferable to appease supporters and confront the opposition than the opposite. Hence, I focus on deriving the optimal investment vector to appease S in measuring the value for the regime to pursue a partial appeasement strategy.

Lemma 5 *The cost-minimizing strategy to induce a C outcome (either $\rho = \{1,0\}$ or $\rho = \{0,1\}$ is for R to set the following investment vector as a function of the shock Z:*

- *If $Z \leq \frac{c}{8}$:*

$$\kappa_{C1} = 2 * Z \ ; \ A_{C1}^{O} = 0 \ ; \ A_{C1}^{S} = 0 \ ; \ V(R)_{C1} = \theta(1-p)(y^{e} - Z) - \frac{(2*Z)^{2}}{c}$$

- *If $Z > \frac{c}{8}$:*

$$\kappa_{C2} = \frac{c}{4} \ ; \ A_{C2}^{O} = 0 \ ; \ A_{C2}^{S} = Z - \frac{c}{8} \ ; \ V(R)_{C2} = \theta(1-p)(y^{e} - Z) + \frac{c}{16} - Z$$

Intuitively, S citizens hold no grievances in the absence of an economic shock, but because the opposition is protesting, repression investments need to grow with the shock twice as fast so as to induce the supporters to abstain than would be needed if the opposition was also abstaining. For this reason, the level of the economic shock after which the marginal cost of repression equals that of appeasement transfers to supporters is $\frac{c}{8}$. Larger shocks under the partial appeasement strategy will be addressed with supporter favors.

Lemma 6 *If $T \leq \frac{c}{8}$, a "partial appeasement" strategy will yield a multiple equilibrium between a failed revolt and a broad revolution for shock levels $Z \in [T, \frac{c}{4} - T]$.*

What lemma 6 highlights is that it may be possible to appease the opposition by also supporters under the condition that the opposition protests. This could happen if the level of repression needed to induce S to abstain conditional on O protesting is also enough to induce O to abstain conditional on S abstaining. While O's political grievances would lead to protests under the partial appeasement strategy when $Z = 0$, both a positive shock and the fast growing levels of repression to induce S to abstain would also influence O's protest choice. As shown in lemma 5, the level of repression under the partial appeasement strategy will be capped at $\frac{c}{4}$ when $Z \geq \frac{c}{8}$. This means that if $T > \frac{c}{8}$, the opposition will always protest under the partial appeasement strategy. If $T < \frac{c}{8}$, the level of repression under this strategy will be enough to make O abstain in a range of the economic shock between $Z = T$ and $Z = \frac{c}{4} - T$. In this range, the strategy of partial appeasement will lead to multiple equilibria between protest failure ($\rho = \{0, 0\}$) and a broad revolution ($\rho = \{1, 1\}$). This is because while making supporters indifferent is enough to also appease the opposition in this shock range, lemma 2 shows that the opposition would protest if indifferent supporters took to the streets.

Lemma 7 *Suppose that $T < \frac{c}{8}$ and $Z \in [T, \frac{c}{4} - T]$. Then, $K^S_{\{0,1\}} \geq K^O_{\{0,0\}}$.*

The results from lemmas 3 and 6 show that if $T < \frac{c}{8}$, both strategies could lead to full appeasement when $Z \in [T, \frac{c}{4} - T]$. Lemma 7 shows that the cost of doing so will be lower under the full appeasement strategy profile, which confirms that R would never pursue a partial strategy profile in the hopes of achieving a full appeasement outcome.

2.4 Comparing R's payoffs under both strategy profiles

Lemmas 3 and 5 provide optimal strategies and expected payoffs for R conditional on different shock levels. Will R choose full or partial appeasement? Let's define $\Delta = V(R)_F - V(R)_C$ to be the difference in expected payoffs for R between the full appeasement and partial appeasement strategies.

An important question is how the shock threshold after which positive transfers are needed for the opposition to abstain under the a full appeasement strategy $(Z = \frac{c}{2} - T)$ relates to the shock threshold after which positive transfers are needed for supporters to abstain under the a partial appeasement strategy $(Z = \frac{c}{8})$. I will assume that the latter is greater, so that $T \geq \frac{3}{8}$.[9]

Assumption 1 *The value of T relative to c is such that $T \geq \frac{3}{8}c$.*

I now characterize the values of Δ at different levels of Z, and most importantly, how the value of Δ changes with increases to the economic shock.

Theorem 1 Δ *as a function of Z is such that $\frac{\partial \Delta}{\partial Z} \leq 0$*

Proof. Δ as a function of Z is described below:

- If $Z \leq \frac{c}{2} - T$:
$$\Delta = \theta p[y^e - Z] + \frac{(2Z)^2 - (Z+T)^2}{c}$$

- If $\frac{c}{2} - T < Z \leq \frac{c}{8}$:
$$\Delta = \theta p[y^e - Z] + \frac{c}{4} - Z - T + \frac{(2Z)^2}{c}$$

- If $\frac{c}{8} < Z \leq \frac{c}{2}$:
$$\Delta = \theta p[y^e - Z] + \frac{3}{16}c - T$$

- If $\frac{c}{2} < Z \leq c$:
$$\Delta = \theta p[y^e - Z] + Z - \frac{Z^2}{c} - T - \frac{c}{16}$$

- If $c < Z$:
$$\Delta = \theta p[y^e - Z] + \frac{15}{16}c - Z - T$$

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[9]This assumption also rules out the possibility of multiple equilibria in the partial appeasement strategy discussed in lemma 6.

The theorem is proven by differentiating each of these expressions by Z and showing that the derivatives are negative under their respective range of Z values. ∎

Theorem 1 is the key result of the model: As the economy deteriorates, the costs of staying in office with certainty through a full appeasement strategy become unaffordable for a regime whose resources are also dwindling as a consequence of the shock.

Corollary 2 *Define Z^* as the value of Z such that $\Delta = 0$. Z^* is such that:*

$$\frac{\partial Z^*}{\partial T} < 0 \; ; \; \frac{\partial Z^*}{\partial y^e} > 0 \; ; \; \frac{\partial Z^*}{\partial \theta} \geq 0 \; ; \; \frac{\partial Z^*}{\partial p} \geq 0 \; ; \; \frac{\partial Z^*}{\partial c} \geq 0$$

This corollary can be proven directly by differentiating the expressions of Δ by each parameter and observing the offsetting change to Z needed to keep $\Delta = 0$. Z^* marks the level of the shock after which R switches from a full appeasement strategy to a partial appeasement strategy. Importantly, because the value of T raises the cost of full appeasement but does not affect the expected regime payoff under partial appeasement, Z^* can take a value of 0 for very high values of T.[10]

2.5 Strategy changes at Z^* and the characterization of equilibria

As discussed, Z^* characterizes the level of the shock after which the regime changes it's strategy from full appeasement to partial appeasement. This means that the equilibrium levels of repression and appeasement transfers as a function of the observed economic shock will be determined by the strategy profile presented in lemma 3 if shock $Z \leq Z^*$, and will be determined by the strategy profile presented in lemma 5 when $Z^* < Z$. The proposition below shows equilibrium appeasement transfers and repression levels according to the level of the shock and the value of Z^*.

Proposition 1 *Under assumption 1, the equilibrium of the game is characterized as follows:*

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[10]The maximum possible value of Z^* would occur in parameter values when $D > 0$ at $Z = c$, and $T = \frac{3}{8}c$. This means that $Z^* \in [0, \frac{\theta p y^e + \frac{9}{16}c}{1 + \theta p}]$. The important point is that even for a low value of T, there is still a threshold level of the shock after which partial appeasement becomes the preferred strategy profile.

If $Z^* = 0$:

In this instance, the partial appeasement strategy is optimal for R even in the absence of a negative economic shock.

- If $Z \leq \frac{c}{8}$: The repression level will be K_{C1} and there are no appeasement transfers. There is limited confrontation against the opposition.

- If $\frac{c}{8} < Z$: The repression and supporter appeasement transfers will be K_{C2} and A_{C2}^S. There is limited confrontation against the opposition.

If $0 < Z^* \leq \frac{c}{2} - T$:

In this case, the strategy switch occurs from a point where there is no opposition transfers under the full appeasement strategy to a point where there is no appeasement transfer to supporters under the partial appeasement strategy.

- If $Z \leq Z^*$: The repression level will be K_{F1} and there are no appeasement transfers. There are no protests.

- If $Z^* < Z \leq \frac{c}{8}$: The repression and supporter appeasement transfers will be K_{C1}.

- If $\frac{c}{8} < Z$: The repression and supporter appeasement transfers will be K_{C2} and A_{C2}^S. There is limited confrontation against the opposition.

If $\frac{c}{2} - T < Z^* \leq \frac{c}{8}$:

In this case, the strategy switch goes from full appeasement with positive transfers to the opposition to partial appeasement with no transfers for supporters.

- If $Z \leq \frac{c}{2} - T$: The repression level will be K_{F1} and there are no appeasement transfers. There are no protests.

- If $\frac{c}{2} - T < Z \leq Z^*$: The repression and opposition appeasement transfers will be K_{F2} and A_{F2}^O. There are no protests.

- If $Z^* < Z \leq \frac{c}{8}$: The repression will be K_{C1} and there are no appeasement transfers. There is limited confrontation against the opposition.

- If $\frac{c}{8} < Z$: The repression and supporter appeasement transfers will be K_{C2} and A_{C2}^S. There is limited confrontation against the opposition.

If $\frac{c}{8} < Z^* \leq \frac{c}{2}$:

The strategy switch now goes from full appeasement with positive transfers to the opposition to partial appeasement with positive transfers for supporters.

- If $Z \leq \frac{c}{2} - T$: The repression level will be K_{F1} and there are no appeasement transfers. There are no protests.

- If $\frac{c}{2} - T < Z \leq Z^*$: The repression and opposition appeasement transfers will be K_{F2} and A_{F2}^O. There are no protests.

- If $Z^* < Z$: The repression and supporter appeasement transfers will be K_{C2} and A_{C2}^S. There is limited confrontation against the opposition.

If $\frac{c}{2} < Z^* \leq c$:

The strategy switch now goes from full appeasement with positive transfers to the opposition and increased repression to partial appeasement with positive transfers for supporters.

- If $Z \leq \frac{c}{2} - T$: The repression level will be K_{F1} and there are no appeasement transfers. There are no protests.

- If $\frac{c}{2} - T < Z \leq \frac{c}{2}$: The repression and opposition appeasement transfers will be K_{F2} and A_{F2}^O. There are no protests.

- If $\frac{c}{2} < Z \leq Z^*$: The repression and opposition appeasement transfers will be K_{F3} and A_{F3}^O. There are no protests.

- If $Z^* < Z$: The repression and supporter appeasement transfers will be K_{C2} and A_{C2}^S. There is limited confrontation against the opposition.

If $c < Z^*$**:**

The strategy switch now goes from full appeasement with positive transfers to the opposition and to supporters to partial appeasement with positive transfers only for supporters.

- *If $Z \leq \frac{c}{2} - T$: The repression level will be K_{F1} and there are no appeasement transfers. There are no protests.*

- *If $\frac{c}{2} - T < Z \leq \frac{c}{2}$: The repression and opposition appeasement transfers will be K_{F2} and A_{F2}^O. There are no protests.*

- *If $\frac{c}{2} < Z \leq c$: The repression and opposition appeasement transfers will be K_{F3} and A_{F3}^O. There are no protests.*

- *If $c < Z \leq Z^*$: The repression, opposition appeasement transfers and supporter appeasement transfers will be K_{F4} and A_{F4}^O and A_{F4}^S. There are no protests.*

- *If $Z^* < Z$: The repression and supporter appeasement transfers will be K_{C2} and A_{C2}^S. There is limited confrontation against the opposition.*

2.6 Implications for empirical tests: In-group favoritism and limited dissent.

As proposition 1 shows, whenever an economic shock $Z \geq max\{Z^*, \frac{c}{8}\}$, R will engage in growing in-group favoritism to avoid regime supporters from joining opposition protests. Whether smaller shocks can induce opposition-oriented favors in order to induce full appeasement will depend on the value of Z^*. More specifically, out-group favors are only possible for milder shocks if $Z^* > \frac{c}{2} - T$. Hence, the model allows the strategic logic for out-group favors under complementarities in citizen protest choices (DeNardo, 1985). But even when parameter values allow for it, this logic is outweighed by the increasing costs of appeasing the opposition after a sufficiently strong shock.

For this reason, the key implications of the model that I take to the data for empirical test is that stronger economic shocks induce regimes to transfer favors to their supporters ("in-group favoritism") so that they don't join the opposition in the ensuing protests

("limited dissent"). Testing this hypothesis empirically requires observable variation in exposure to economic shocks, in economic policies and outcomes, in expressions of dissent, and in the degree of affiliation with the current regime. Below, I argue for measurement and substantive reasons in favor of geospatial analysis methods prevalent in the economic geography literature as the ideal approach to tackle this question.

First, modern satellite imagery and information from other ecological detection devices allow access to scientific-quality data on environmental and human characteristics and behaviors. This data helps proxy for economic shocks and development outcomes in a timely and comparable manner, which is particularly relevant for the field of economic development, where data are often limited. For example, Henderson et al. (2012) develop a statistical framework to use nightlights data as measures of economic growth at national, subnational and supranational levels. Moreover, data on exogenous environmental shocks that can disrupt human economic activity can help address endogeneity concerns. Consistently, a large portion of the literature on how economic shocks affect political outcomes has leveraged on granular data from rainfall shocks in Sub-Saharan Africa, which heavily relies on rain-fed agriculture activities (Brückner and Ciccone, 2011; Miguel et al., 2004).

Second, citizens may choose to hide their political affiliations whenever they are not highly correlated with observable ascriptive features. In these instances, regimes may only observe how such affiliations cluster at some level of spatial aggregation. In these cases, spatial targeting may be the regime's best option to minimize leakage in the distribution of favors. Moreover, there may be spatial economies of scale in the particular goods that regimes want to distribute in favor of some groups over others, so that some leakage may be acceptable in return for spatial concentration in areas dominated by target groups. In a recent contribution on ethnic favoritism in Sub-Saharan Africa, Dickens (2018) studies how the ethnic linguistic similarity to the language of the leader's ethnic group affects household-level measures of wealth. Consistent with these perspectives, Dickens finds that while the linguistic similarity of the dominant ethnic group in a household's region associates with higher wealth, the linguistic similarity of the household's ethnic group

does not.

Perhaps most importantly, spatial factors are determinant for collective action, and regimes hoping to defuse coordinated expressions of dissent may choose to target benefits according to such factors. This has been clearly established in the literature on the political economy of urbanization and urban concentration. There is vast anecdotal and empirical evidence on the connection between population density, collective action, and the effectiveness of uprisings (Glaeser and Steinberg, 2017). Ades and Glaeser (1995) discuss how political factors can determine urban primacy. They argue how distance from the seat of power undermines political influence by lessening the threat of violence, access to information and communication with the government. These factors suggest that the citizens in capital cities should enjoy disproportionate political influence over the distribution of benefits, motivating a rural exodus to the capital city, whenever governments face lower institutional controls. The authors document evidence consistent with the implication that dictatorial regimes should induce urban concentration.[11]

In the following sections, I will build from spatial analysis tools prevalent in the field of economic geography to test for strategic in-group favoritism during negative economic shocks. First, I will present a case study on the Venezuelan blackouts of 2019, leveraging spatial variation on the local exposure to the blackout and on the prevalence of regime-supporters in past elections to assess effects on the regime's spatial power rationing choices and on the change in the concentration of citizen political protests. I will then focus on administrative and ethnic regions within countries in Sub-Saharan Africa. I will assess how changes in the regional affiliation with the current leader of the country affect spatial

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[11]This paper triggered a large literature on the connection between the spatial distribution of the population, the likelihood of conflict, and the propensity for urban favoritism. Fay and Opal (2000) find that democratization slows the speed of urbanization, while ethnic conflict stimulates it. Davis and Henderson (2003) make the distinction between urbanization (what share of the population live in cities) and urban concentration (the clustering of a country's population in just one or two cities), and find that democratization erodes urban concentration. More recently, Anthony (2014) finds that longer democratic experiences associate with lower urban primacy. Kelekar and Turner (2020) suggests that low repressive capacity induces regimes to favor cities with public goods. Finally, Campante et al. (2019) study the connection between capital cities, conflict and the quality of government, building the above arguments that threats of violence drive political influence, but such influence is lowered by distance from the seat of power. They find that conflict closer to the capital is both more prevalent and effective in inducing regime change, and that countries where capital cities that are relatively isolated from their population tend to suffer from misgovernance. Campante and Do (2014) find similar patterns of misgovernance in US States with relatively isolated capital cities.

differences in development, dissent and repression outcomes. Most importantly, I will study how such differences connect to country-specific changes in rainfall so as to study whether patterns of spatial favoritism and dissent are driven by exogenous weather shocks.

3   The Venezuelan Blackouts of March 2019

The purpose of this section is to test the model's prediction that regimes confronting a threat of revolution should limit the effect of shocks on their supporters in order to limit the scope of dissent. The implication of this proposition is that we should expect partisan heterogeneity in the distribution of shock-related relief policies and in the protests induced by the shock. I look at the case of the Venezuelan blackouts of early March of 2019, which occurred in the midst of a constitutional crisis that threatened to induce a democratic transition in the country. The case is useful because the distribution of power-rationing decisions aimed to ameliorate the economic effects of the blackouts are observable. Moreover, we observe cross-sectional variation in the local exposure to the blackouts in early March, along with weekly panel variation in local protests. I explore the main effect of the blackout and its heterogeneity along the regime's baseline electoral support on both the regime's power rationing choice and on citizens' political protests, finding results that are mutually consistent with the model's predictions.

3.1   Empirical Setting

Chavismo's tenure at the start of the economic crisis

Hugo Chávez, a former Lt. Colonel in the Venezuelan Army, was sworn in as President of Venezuela in January of 1999. He rose to national political recognition after leading a failed coup attempt in 1992. As his case got dismissed by President Rafael Caldera in 1994, Chávez became the leading anti-establishment figure in a country that had grown disappointed with its 40-year old bipartisan electoral democracy.

Upon his inauguration, Chávez progressively centralized political and economic power in the presidency, leading to increasing polarization against a "democratic opposition"

shaped by traditional and new parties and civic organizations. Chávez benefited from greatly increasing oil prices, which allowed him to fund popular social programs and subsidize an import-based consumption boom while eroding legal and informal limits on his power - including term limits - and imposing restrictive measures against private enterprise in all sectors of the economy.

By the time the 2012 presidential elections were due, Chávez had been diagnosed with cancer. He decided to run nonetheless, building his campaign on massive new public spending programs running in parallel to the electoral cycle. Chávez defeated the opposition in October that year, but passed away in March 2013. His appointed successor, Nicolás Maduro, was much less charismatic, had much less money to campaign with, and could not play Chávez's role as arbiter of last resort for conflict resolution within Chavismo. Maduro was narrowly elected in April 2013, only a few months before the start of the economic crisis.

3.1.1 Venezuela's economic collapse and democratic backsliding.

While strong signs of economic deterioration -such as the growing scarcity of key staple goods- were already visible by mid-2013,[12] Venezuela officially entered in a recession in the first quarter of 2014, as the government became unable to sustain the spending and import levels experienced in 2011 and 2012. International oil prices collapsed in late 2014, making matters much worse for a country that relied on oil and oil derivatives for about 95% of its exports. Given his frail control over Chavismo, Maduro failed to pass the economic reforms necessary to deal with the ensuing crisis effectively: devaluing the official exchange rate, restructuring sovereign debt and that of PDVSA,[13] and consolidating the country's fiscal accounts to prevent the monetization of the deficit.

Such inaction sent the country into a tailspin. By almost any conceivable measure, Venezuela started experiencing the largest collapse in human welfare in recent history. The country's GDP dropped by over 70% between 2013 and 2019.[14] The country went

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[12] https://www.usatoday.com/story/money/business/2013/05/16/venezuela-toilet-paper-chavez/2165405/

[13] *Petróleos de Venezuela*, the country's National Oil Company.

[14] https://publications.iadb.org/publications/english/document/A-Look-to-the-Future-for-

into hyperinflation in 2017, and experienced an inflation level of over 1,600,000% in 2018.[15] Income poverty grew from 40% to 90%, and university-led substitutes for official household surveys found that 70% of the population lost weight involuntarily in 2017.[16] By 2017, infant mortality had grown by 70%, and the purchasing power of the minimum wage had dropped by 92%.[17] By 2019, the crisis had forced over 16% of the Venezuelan population to leave the country, yielding a regional refugee crisis without precedent in Latin America.[18] Such an economic collapse is virtually unprecedented outside the context of civil war or natural disasters.

Maduro's popular support eroded as the economic crisis unravelled. In the National Parliamentary Elections of December 2015, the opposition obtained a 2/3 super-majority that allowed it to enact organic laws, pass constitutional amendments, and generally impose important oversight and institutional restrictions on Maduro's executive power.[19] Maduro leveraged the Chavista control over the Judicial branch to defang the legislature, ruling all new legislative actions as unconstitutional, and preventing a Recall Referendum on Maduro in 2016.[20] These judicial actions triggered a set of mass protests in 2017 which were met with violent repression by official security forces.[21] Moreover, Maduro circumvented the legal procedure to call for a National Constitutional Assembly, effectively assuming legislative powers for Chavismo.[22]

By this point, most observers agreed that Venezuela had effectively transitioned into autocratic rule. On August 2017, following the creation of the National Constitutional Assembly and with accelerating migration rates, neighboring countries created the *Grupo de Lima*, a regional coordination space to advocate for a return to constitutional rule in

Venezuela.pdf

[15]https://www.piie.com/sites/default/files/documents/pb19-13.pdf

[16]https://www.proyectoencovi.com/

[17]https://www.brookings.edu/wp-content/uploads/2019/05/impact-of-the-2017-sanctions-on-venezuela_final.pdf

[18]https://www.thecipherbrief.com/column_article/the-staggering-scale-of-the-venezuelan-refugee-crisis

[19]https://www.efe.com/efe/english/world/venezuelan-opposition-obtains-supermajority-in-legislature/50000262-2784920

[20]https://www.bbc.com/news/world-latin-america-37724322

[21]https://www.theatlantic.com/photo/2017/06/months-of-anti-government-protests-continue-in-venezuela/530031/

[22]https://www.bbc.com/news/world-latin-america-41094889

Venezuela.[23] At the same time, the U.S. administration enacted the first set of financial sanctions on PDVSA.[24]

3.1.2 Constitutional Crisis of January 2019.

As presidential elections were scheduled for 2018, Chavismo and the Opposition met in the Dominican Republic to negotiate credible electoral conditions. Negotiations failed to deliver an agreement, and Julio Borges -the chief negotiator for the opposition- was not able to return to the country and remains in exile.[25] The opposition opted to boycott the 2018 election, as the *Grupo de Lima*, the US, the EU, the OAS and most international electoral observers stated that there were no conditions for a free and fair election that year.[26] Maduro went ahead with the election regardless, despite unprecedentedly low turnout numbers.[27] Later that year, Fernando Albán -a Caracas councilman and one of Borges' closest aides- was detained in the airport and died while under police custody, setting the tone for the constitutional clash to come in 2019.[28]

Maduro's term officially ended on January 10th, 2019. The opposition-led legislature argued that whenever there is no legally elected president at the start of a new presidential period, the constitution mandates for the Speaker of the National Assembly to take on the Interim Presidency until new free elections are held.[29] Under this reading of the constitution, Juán Guaidó, took oath of office as interim president on January 23rd, and was recognized as such by countries in the *Grupo de Lima*, the U.S., most countries of the E.U. and a number of democracies around the world.[30]

The start of this crisis led to a new wave of domestic protests and international diplomatic and economic efforts to push for a democratic transition.[31] The regime decided

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[23]https://www.international.gc.ca/world-monde/international_relations-relations_internationales/latin_america-amerique_latine/2017-08-08-lima_group-groupe_lima.aspx?lang=eng

[24]https://www.nytimes.com/2017/08/25/world/americas/venezuela-sanctions-maduro-trump.html

[25]https://www.voanews.com/americas/venezuela-talks-break-down-presidential-vote-looms

[26]https://www.reuters.com/article/us-venezuela-election-limagroup-idUSKCN1IM19G

[27]https://www.nytimes.com/2018/05/20/world/americas/venezuela-election.html

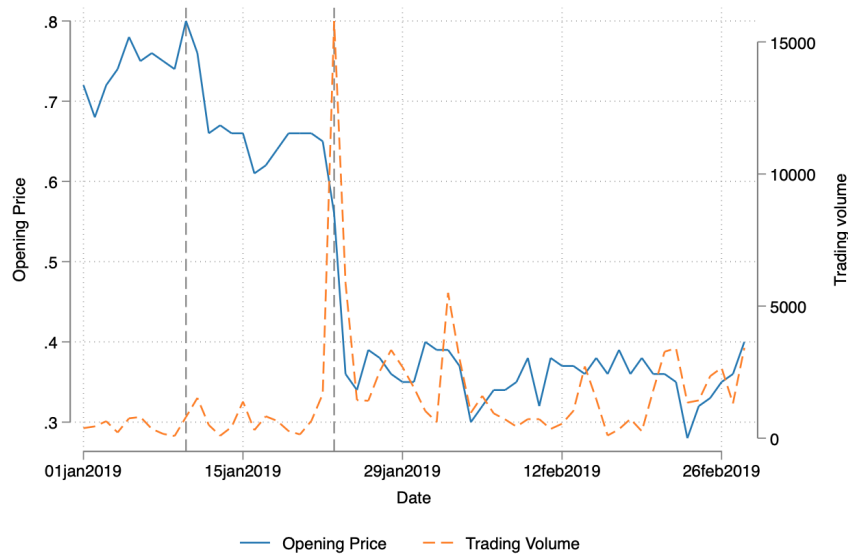[28]https://www.nytimes.com/2018/10/09/world/americas/venezuela-opposition-death-alban.html

[29]https://law.stanford.edu/2019/02/01/guaido-not-maduro-is-the-de-jure-president-of-venezuela/

[30]https://www.bloomberg.com/news/articles/2019-01-23/brazil-canada-join-trump-backing-guaido-as-venezuela-president

[31]https://www.theguardian.com/world/2019/jan/23/venezuela-protests-thousands-march-against-

Figure 1: PredictIt's betting market data on the Maduro Regime, IQ 2019

Notes: PredictIt data on market opening price and trading volume for the question "Will Nicolás Maduro be president of Venezuela on Dec. 31, 2019?". Vertical dashed lines mark the end of Maduro's constitutional term (January 10th) and Guaidó's oath of office (January 23rd).

to repress protests[32] and forcefully prevent the entry of international aid to support the ailing population.[33] These events drastically affected beliefs over the possibility of regime change during 2019. Figure 1 shows betting market data from PredictIt[34] on the market opening price and trading volume for the question "Will Nicolás Maduro be president of Venezuela on Dec. 31, 2019?". The market's predicted probability that Maduro would make it as Venezuela's president through 2019 went from 80% at the end of Maduro's term on January 10th to 35% at the end of the month, hovering between 30% and 40% during all of February as the conflict unfolded.

3.1.3   Blackouts of March 2019.

On March 07, a 5-day long nation-wide blackout hit the country. The regime and the opposition presented conflicting narratives about the causes of the blackout. The regime

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maduro-as-opposition-sees-chance-for-change

[32]https://www.hrw.org/news/2019/01/25/venezuela-arrests-killings-anti-government-protests

[33]https://theconversation.com/why-maduro-is-blocking-venezuela-bound-humanitarian-aid-when-so-many-people-in-his-country-need-it-111585

[34]PredictIt is a New Zealand-based online prediction market that offers exchanges on political and financial events. I'm thankful to Parker Howell, Senior Data Analyst at PredictIt, for sharing this data.

argued that the blackout was caused by foreign sabotage, while the opposition blamed it on poor maintenance of the power infrastructure network. Local experts reported that the blackout was triggered by a fire that reached the 765 kV transmission lines near the San Gerónimo Power Transmission Substation in the state of Guárico. These lines have the highest transmission capacity, and connect the Guri Hydropower Plant in south-eastern Venezuela -the main generation station in the Venezuelan power grid- to the north-western urban corridor.[35] Consistent with expert reports, Figure 2 shows that blackouts lasted longer in the north-western region, where power supply became much more unreliable even after the initial blackout was contained. Figure 3 shows the structure of the Venezuelan power grid, highlighting the Guri hydropower station and the 765 kv line connecting the Malena and San Gerónimo transmission substations.[36]

Moreover, a large portion of the country lost access to power again between March 25 and 29.[37] On March 30th, the regime published a rationing schedule laying out the structure of official power cuts for the month of April.[38] Importantly, some areas of the country were spared from any type of formal rationing. As has been the case in past instances of energy rationing, the Caracas' metropolitan area was fully exempted from any power rationing. Given the pivotal importance of Caracas as the country's seat of power, the special treatment of the capital uncovers political motives in the regime's power rationing choices.[39] However, Figure 4 shows that north-western parishes were also more likely to be assigned to rationing, which suggests that technical factors may have also informed the rationing schedule.

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[35] https://www.univision.com/noticias/america-latina/por-que-ocurrio-el-apagon-nacional-que-provoco-el-caos-en-venezuela-los-expertos-explican

[36] 16% of parishes receive a negative measure of the drop rate - that is, they capture a higher total nightlight radiance for the period of the blackout than during the reference period. This may be due to the occurrence of fires in sparsely populated areas during the blackouts or to other factors contributing to the inherently noisy nature of daily nightlights data. However, these parishes account for 7.4% of the population, suggesting that they will receive relatively little weight in later analyses that account for the relative population size of each administrative unit.

[37] https://www.theguardian.com/world/2019/mar/25/venezuela-new-blackout-half-country-no-power-maduro

[38] https://news.yahoo.com/maduro-announces-30-days-electricity-rationing-venezuela-015233386.html

[39] This result is consistent with theories connecting patterns of urban concentration with the political nature of different regimes (Ades and Glaeser, 1995).

Figure 2: Local exposure to the blackouts of early March 2019
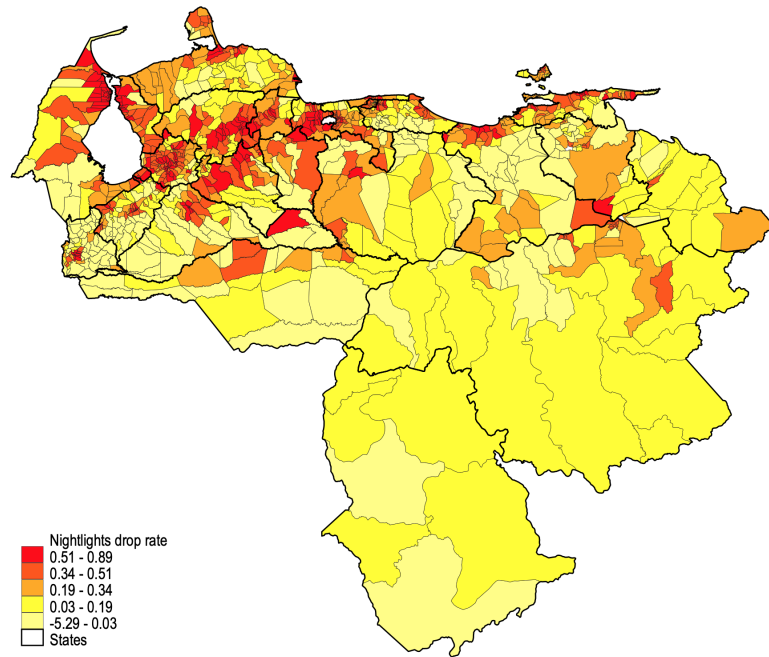
Notes: Daily nightlights data from VIIRS collected at the parish level. The drop rate is calculated as the inverse rate of change in the sum of local nightlight radiance between the week prior to the blackouts and the week of the blackout.

Figure 3: Structure of Venezuela's power grid
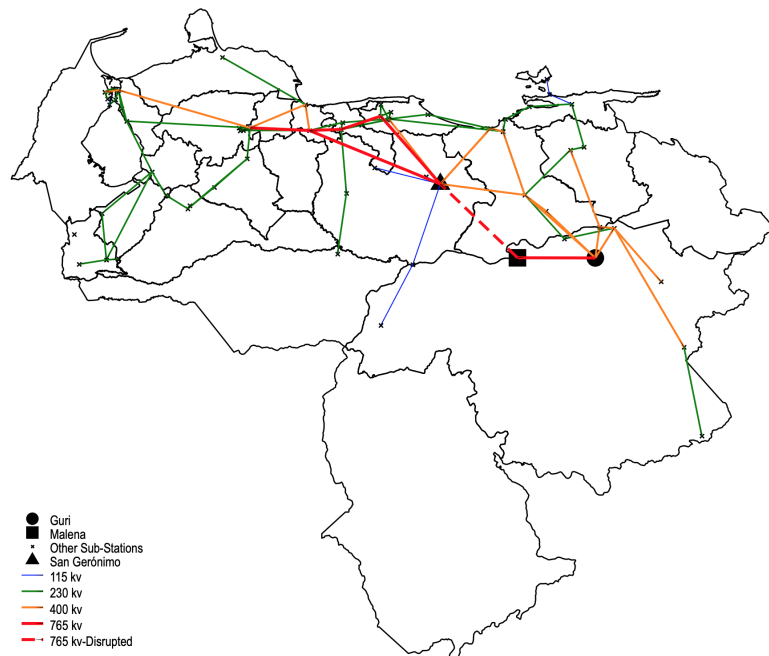
Notes: The map shows the location of all network transmission substations in the country and the transmission lines connecting them. The Guri Hidropower plant and the Malena and San Gerónimo substations and connecting line are highlighted as the main power generation source and the point of disruption in the transmission grid that induced the blackouts of early March 2019.

Figure 4: Rationing schedule
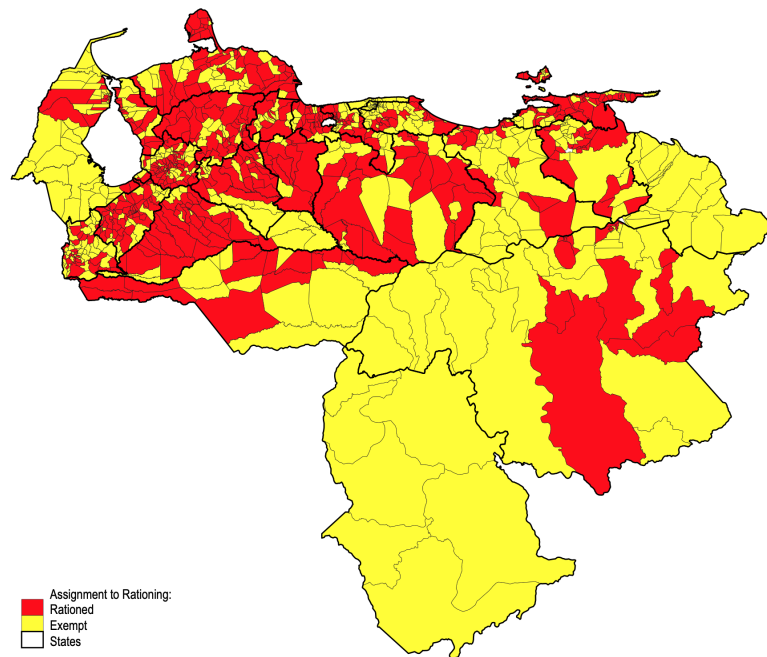
Notes: The map shows parishes in the country that the regime assigned to official rationing at the start of April 2019, and those that were exempt from any rationing.

3.1.4 Failed Putsch and Stabilization after May 2019.

While political protests spiked at the start of the constitutional crisis in January and February, dissent shifted towards demands for improvements in public utilities in March, as the country dealt with the blackouts and their immediate aftermath. Political protests throughout the country resumed in April, as the power rationing schedule was being rolled out. On April 30th, in the midst of this new wave of political dissent, police and military officers aligned with the opposition attempted to overthrow the Maduro regime. The uprising was unsuccessful in eliciting broad military support, but it further stimulated pro-democracy protests - now often oriented towards military detachments as means to pressure for an uprising against the regime.[40] This period turned out to be the apex of the conflict. As it became apparent that the military was not going to break with the Maduro regime, protests started to subside. Figure 5 shows the evolution of protests during the first semester of 2019.

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[40]https://apnews.com/article/nicolas-maduro-caribbean-ap-top-news-venezuela-latin-america-7143cc60448a4647805ff784ce6df95f

Figure 5: Weekly Protests in Venezuela, first semester of 2019
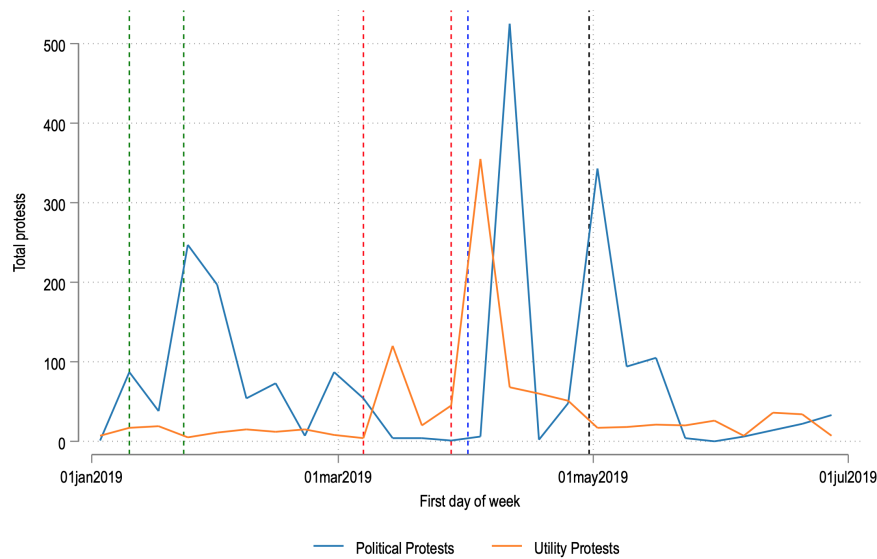
Notes: Data comes from the Venezuelan Observatory of Social Conflict (OVCS). Protests are classified as "political" when they focus on expressing rejection against the Maduro regime, and they are classified as "utility" when they focus on demands for improved access to water and power services. Weekly protests counts are shown. Vertical dashed lines highlight events in the constitutional and power supply crises of early 2019. The first two lines (green) mark the end of Maduro's constitutional (Jan. 10) and Guaidó's oath of office (Jan. 23). The next two lines (red) mark the original blackout (Mar. 07) and it's aftershock (Mar. 25). The next line (blue) marks the roll-out of the rationing schedule (Apr. 01). Finally, the last line (black) marks the failed military uprising against the Maduro regime (Apr. 30).

As these events unfolded, the Maduro regime decided to stop enforcing exchange and price controls in the country. This led to a *de-facto* dollarization of the Venezuelan economy, which motivated the private sector to import previously unavailable goods and sell them at international market prices.[41] Moreover, the regime started to rely on the newly created *Fuerzas de Acción Especial* (FAES)[42] -a SWAT-like branch within the National Police Force previously focused on anti-gang efforts- to punish opposition organizers.[43] All in all, moderate economic improvements, increases in political repression, and the growing belief that the military would not break from the regime demobilized the opposition. While grievances against the Maduro regime remained strong, Guaidó and the opposition became increasingly unable to mobilize such grievances towards collective

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[41]https://www.ft.com/content/1d899e2e-0d20-11ea-bb52-34c8d9dc6d84

[42]FAES was created by President Nicolás Maduro to "combat crime and terrorism" in 2017. FAES has been accused by human rights organizations of multiple political killings around the constitutional crisis of 2019. The UN High Commissioner for Human Rights reported the murdering of at least 6,800 Venezuelans from January 2018 to May 2019 by various security forces, including the FAES. These murders are usually registered as events of "resistance to authorities".

[43]https://www.caracaschronicles.com/2019/01/27/meet-faes-the-bolivarian-police-death-squads-leading-repression-against-protesters/

demands for democratization.[44]

3.2 Data

I measure local exposure to the blackouts in early March of 2019 in the cross-section as the drop rate in total daily nightlight radiance emanated from an administrative area[45] during the 5 days of the original blackout (between March 07 and March 12) in comparison to the 5 days prior. The reasons for focusing on this initial shock are two-fold. First, anecdotal evidence suggests that areas disproportionately affected by the original blackout in the north-west of the country were more likely to experience aftershocks and power supply irregularities later in 2019.[46] But perhaps more importantly, events during this brief initial period are least endogenous to regime policy responses to the crisis that I hope to study as outcomes.

Daily nightlights data comes from NASA's Black Marble Project[47], which provides information from the Visible Infrared Imaging Radiometer Suite (VIIRS) in the NASA-NOAA Suomi National Polar-orbiting Partnership (Suomi NPP) satellite. In particular, I use the VNP46A1 data product, which provides 500m × 500m grid data on science-quality sensor radiance measures. Each grid takes values from 0 to 65,534 nW/(cm2 sr). In order to aggregate measures at the administrative unit level, I first collect grids around the Venezuelan shapefile and remove grids affected by oil and gas flares, which are present in the eastern region of Furrial and in the Paraguaná Peninsula.[48]. I then calculate the total radiance of the administrative unit as the zonal sum for the grids within each administrative unit's polygon.[49]. I finally add the relevant days for the pre-

[44]https://www.nytimes.com/2020/03/10/world/americas/venezula-protests-maduro-guaido.html

[45]Venezuela has three administrative area levels: States, Municipalities and Parishes. The data sources allow me to focus protest analyses at the municipality level and power rationing analyses at the parish level.

[46]Monash University's IP Observatory provides interesting insights on IP connections to the internet from a set of Venezuelan cities during the crisis. Consistent with the discussion above, the gap between latent and actual internet connectivity was greatest for Maracaibo -the largest city in North-Western Venezuela- both during the March blackouts and all through April and May. See https://ip-observatory.org/observatory/venezuela-crisis-2019

[47]https://blackmarble.gsfc.nasa.gov/

[48]Gas flare shapefile taken from https://www.ngdc.noaa.gov/eog/interest/gas_flares_countries_shapefiles.html

[49]Shapefiles for Venezuela's administrative units can be found at UN's Humanitarian Data Exchange. See https://data.humdata.org/dataset/venezuela-administrative-level-0-1-and-2-boundaries

blackout reference and the original blackout period, and calculate the drop rate of total radiance between the two periods.

I measure an administrative area's level of support for the Chavista regime as the local vote share for Hugo Chávez in the 2012 National Presidential Election. While the opposition participated in two later national elections (presidential election of 2013 and legislative elections of 2015), this was the last national election in which President Chávez was on the ballot, best capturing the local ideological alignment with the Chavista movement. This data is collected from the Venezuelan National Electoral Council. I measure an administrative unit's poverty rate and population levels from the Venezuelan National Census of 2011. Population density is calculated as the fraction of the population of an administrative unit in 2011 by its total area. Figure 6 shows the spatial distribution in Chávez's 2012 vote share, poverty rate, population and population density across Venezuelan parishes.

Regarding protests, I collect data from the Venezuelan Observatory of Social Conflict (OVCS), a Venezuelan NGO tracking traditional and social media outlets in order to document events of protests throughout the country. I use data from 2018 and 2019, and produce weekly protest totals at the state and municipality levels. Importantly, I also segment protests according to the grievance expressed in each event, separating protests demanding improvements to utility service provision (chiefly, power and water services) from protests demanding political change. Figure 7 shows the spatial distribution of protests across Venezuelan municipalities during the first semester of 2019.

Regarding power rationing after the blackouts, I take data from Prodavinci, a Venezuelan investigative journalism outlet which scraped and coded the rationing schedule at the Parish level. I process this data further to produce a cross-section binary marker for whether a given parish was assigned any power rationing at all or was fully exempted from it.[50]

Finally, I produce a broad set of variables capturing how each administrative unit relates to the structure of the Venezuelan power supply grid. First, I identify and geolo-

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[50]I thank Helena Carpio for sharing this information with me. See http://factor.prodavinci.com/lashorasoscuras/index.html

Figure 6: Regime Support, Poverty, Population and Population Density

Chavez's local vote share in 2012:
- 0.73 - 0.95
- 0.66 - 0.73
- 0.60 - 0.66
- 0.52 - 0.60
- 0.08 - 0.52
- No data
- States

(a) Chávez's vote share in 2012

Poverty rate:
- 0.42 - 0.96
- 0.33 - 0.42
- 0.26 - 0.33
- 0.19 - 0.26
- 0.03 - 0.19
- No data
- States

(b) Poverty rate

Population:
- 35792 - 372616
- 13951 - 35792
- 6954 - 13951
- 3490 - 6954
- 61 - 3490
- No data
- States

(c) Population

Pop. density (People per Sq. Km):
- 484.78 - 43492.14
- 83.75 - 484.78
- 33.19 - 83.75
- 10.00 - 33.19
- 0.06 - 10.00
- No data
- States

(d) Population density
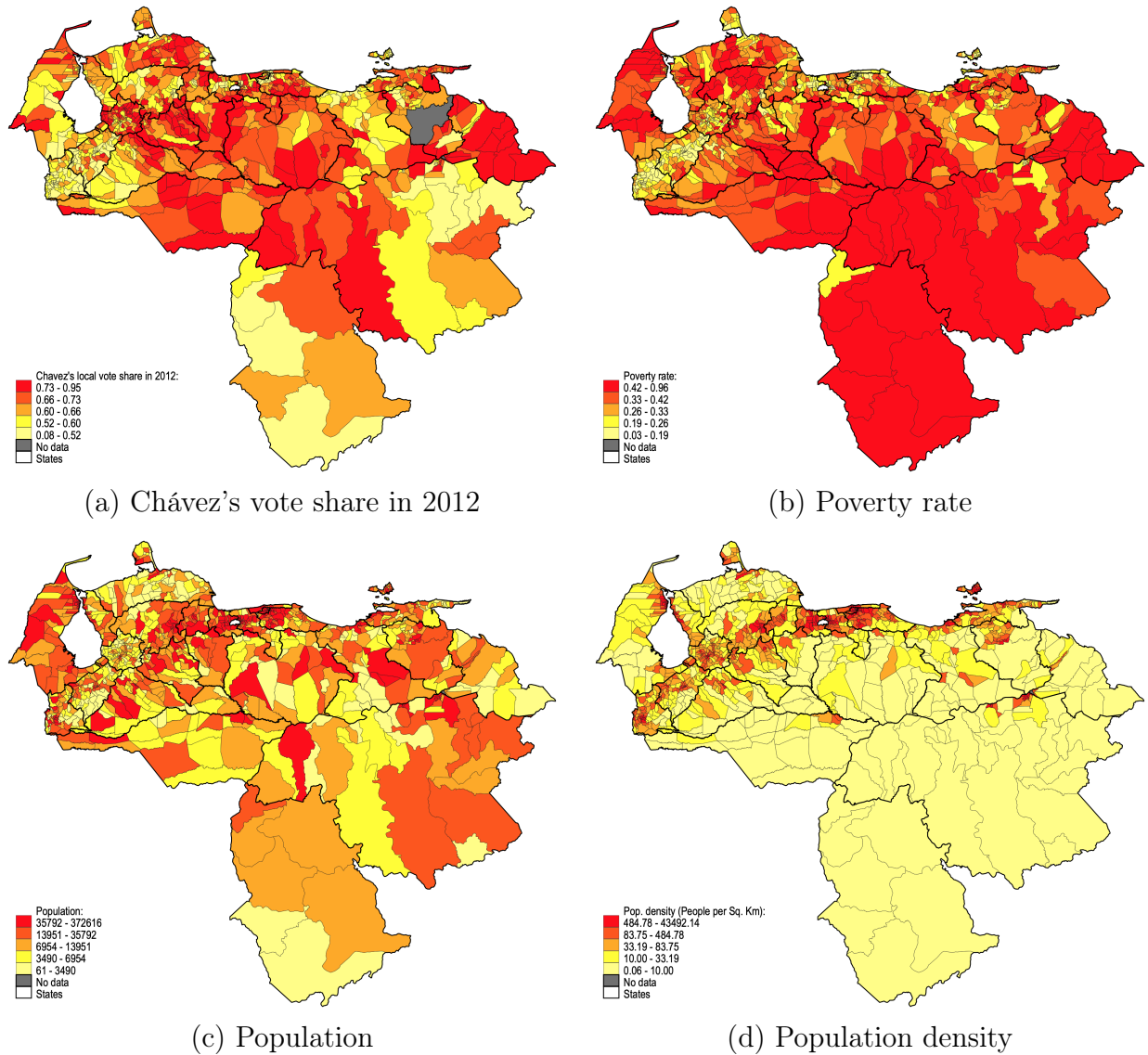
Notes: The figure shows the spatial distribution of political, socioeconomic and demographic baseline co-variates across Venezuelan parishes. Electoral data on the Chavista vote share in the 2012 presidential election comes from the Venezuelan Electoral Council, while population and poverty data come from the 2011 Venezuelan Population Census. Population density is calculated by dividing parishes' population by their area as captured in shapefiles from the UN's Humanitarian Data Exchange.

Figure 7: Political and utility protests in the first semester of 2019

(a) Political Protests
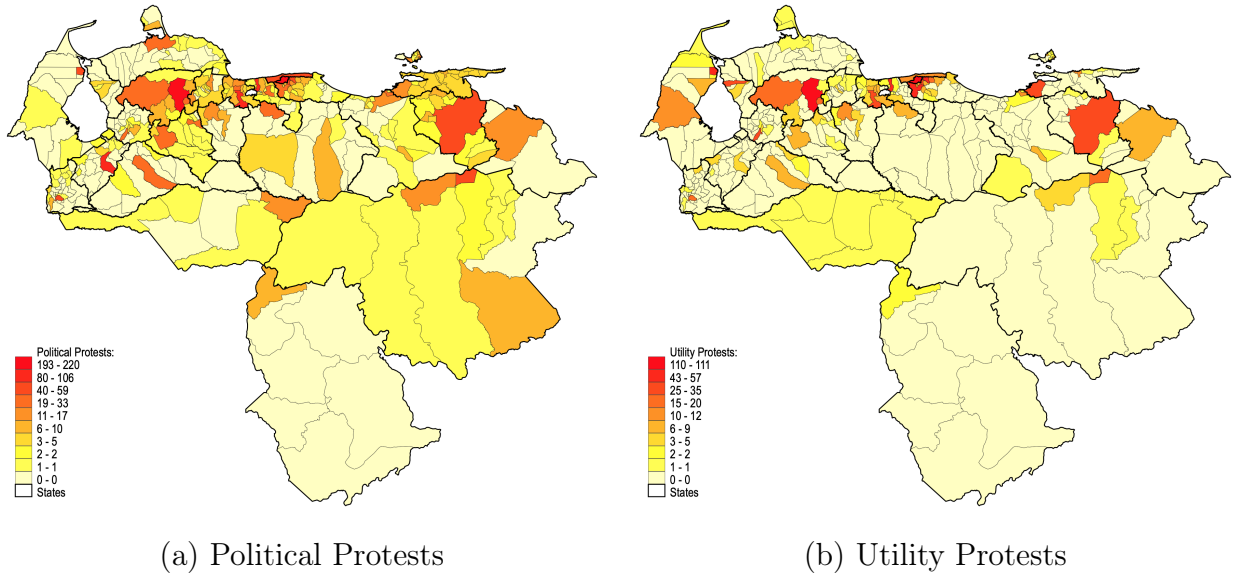
(b) Utility Protests

Notes: The figure shows the spatial distribution of political and utility protests across Venezuelan municipalities during the first semester of 2019. Data is from the Venezuelan Observatory of Social Conflict (OVCS). Protest events are classified as either expressing "political" or "utility" demands according to the grievance expressions associated to each event as coded by OVCS.

cate all power generation plants and transmission substations in the country from official sources, and then map the network structure of the power lines between substations. I then calculate the distance between the centroids of all administrative units and all elements of the Venezuelan power grid, and importantly, I identify the closest transmission station to each administrative unit, its distance to that transmission station, and its distance to the Guri hydro power plant in South-Eastern Venezuela. Table A.1 provides summary statistics for the main variables used in the analyses that follow.

3.3   Local Power Rationing after the National Blackouts

I now study the political heterogeneity in the connection between the local exposure to the blackout and the assignment of different parishes to the power rationing schedule implemented in April of 2019. The rationing schedule provides an explicit measure of the regime's spatial priorities in responding to the blackouts. However, this cross-section outcome incorporates both the regime's political priorities and the technical realities determining the local exposure to the blackouts and the possibility of reconnecting different

areas to the country's main power grid. For this reason, I study the association between parishes' exposure to the blackouts and political profile with the chance of rationing considering a set of "grid controls" approximating how different parishes relate spatially to the Venezuelan main power grid. Specifically, I estimate the following regressions specification:

$$R_p = \alpha Shock_p + \sum_{k \in \{Ch,P,D\}} \beta^k C_p^k + \sum_{k \in \{Ch,P,D\}} \gamma^k Shock_p * C_p^k + f(G_p) + \epsilon_p \qquad (3)$$

where R_p is a dummy variable for whether parish p was assigned to power rationing or not, $Shock_p$ is the local nightlights drop rate, and C_p^k is the value of each of the k cross-section co-variates in parish p. These covariates are the Chavista vote share in the 2012 presidential election, and the poverty rate and population density as reflected in the 2011 population census. Importantly, $f(G_p)$ is a flexible vector of controls capturing the spatial connection between each parish and the network structure of the Venezuelan power grid. This function is shaped by a set of fixed-effects for the closest power transmission sub-station to a parish, the distance between the parish's centroid to that closest sub-station, the distance of the centroid to the Guri hydropower plant, and interaction terms between all these variables. All regressors are standardized so that coefficients can be interpreted as the effect of a 1 s.d. increase in the regressor. Regressions weight all parishes by their respective population in 2011, and standard errors are clustered considering spatial correlation within a 200 km. bandwidth (Conley, 2010). All regressions exclude parishes in the Caracas metropolitan area from the sample in order to guarantee that conclusions are not driven by the special political treatment given to the capital city. The coefficients of interests are α, β^{Ch} and γ^{Ch}, which capture the average association between a 1 s.d. increase in the local exposure to the shock, in the baseline Chavista vote and in their interaction with the probability of assignment to the regime's power rationing schedule.

Table 1 provides estimates for Equation 3. Column 1 shows no statistically significant association between the blackouts or regime support with the rationing schedule before

controlling for the structure of the power grid. However, after considering the interaction term between both, Column 2 suggests that 1 s.d. increase in the exposure to the blackout reduces the chance of power rationing by 3.4pp in parishes 1 s.d. above the average level of regime support. Column 3 adds the "grid controls" described above. Parishes suffering a 1 s.d. higher exposure to the blackout experience a 5 pp higher probability of being assigned to the power rationing schedule, while a 1 s.d. increase in baseline regime support associates with a 8.2 pp lower probability of being assigned to power rationing. This suggests that in comparing parishes that connect similarly to the power grid, unobserved technical factors induce higher rationing to areas most affected by the blackout, and political factors induce rationing exceptions in favor of regime supporting regions. Column 4 incorporates interaction terms to assess political heterogeneities in the technical effect of blackouts on the rationing schedule, and finds that the negative effect of regime support on the association between exposure to the blackout and power rationing is unaffected but much more precise than in Column 2. Figure 8 provides estimated marginal effects of the local exposure to the blackout on assignment to the power rationing schedule at different levels of baseline regime support, confirming that the technical connection between the local blackouts exposure and the assignment to the rationing schedule is only present for opposition supporting areas.

I provide two additional contributions regarding the regime's rationing choice. First, a key idea in political economy is that regime efforts should target regions with split support, where "swing voters" who are not uncompromising in their political behavior are more likely to reside (Downs et al., 1957; Lindbeck and Weibull, 1987; Feddersen and Pesendorfer, 1996; Robinson and Torvik, 2009) or where there may be information gains of retaining regime support (Balcells, 2010). I further analyze whether the inverse of the absolute distance from the average level of regime support associate with the assignment to the rationing schedule. Moreover, I analyze whether the presence of military barracks or criminal gangs explain rationing choices.[51] As discussed above, the opposition was hoping to induce the military establishment to break with the Chavista regime, and

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[51]I thank José Gustavo Arocha, Ronna Risquez and Luis Da Silva for their help in building this dataset.

Table 1: Blackouts, Regime Support and Power Rationing

VARIABLES	(1)	(2)	(3)	(4)
	Parish assigned to rationing schedule			
Shock	0.0356	-0.0126	0.0499**	0.0425**
	(0.0222)	(0.0210)	(0.0236)	(0.0195)
Regime Support	0.0205	0.0263	-0.0824***	-0.0723***
	(0.0264)	(0.0232)	(0.0292)	(0.0275)
Shock × Support		-0.0344*		-0.0341***
		(0.0191)		(0.0123)
Observations	1,076	1,076	1,076	1,076
R-squared	0.037	0.067	0.533	0.536
Socioeconomic Controls	Yes	Yes	Yes	Yes
Grid Controls	No	No	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table summarizes key results of linear probability models assessing the determinants of the regime power rationing choices for April 2019 as expressed in the published schedule. All regressions control for local poverty rates and population density, and Columns (2) and (4) add additional interaction terms between these socioeconomic controls and the local exposure to the blackout. Grid controls considered in Columns (3) and (4) include fixed effects for the closest transmission sub-station to each parish's centroid, the distance to that sub-station, the distance to the Guri dam and interaction terms between the three. All observations are weighted by the local population and standard errors are calculated considering potential spatial correlation within a bandwidth of 200km following Conley (2010).

Figure 8: Marginal effect of the blackout on rationing across the regime support distribution.
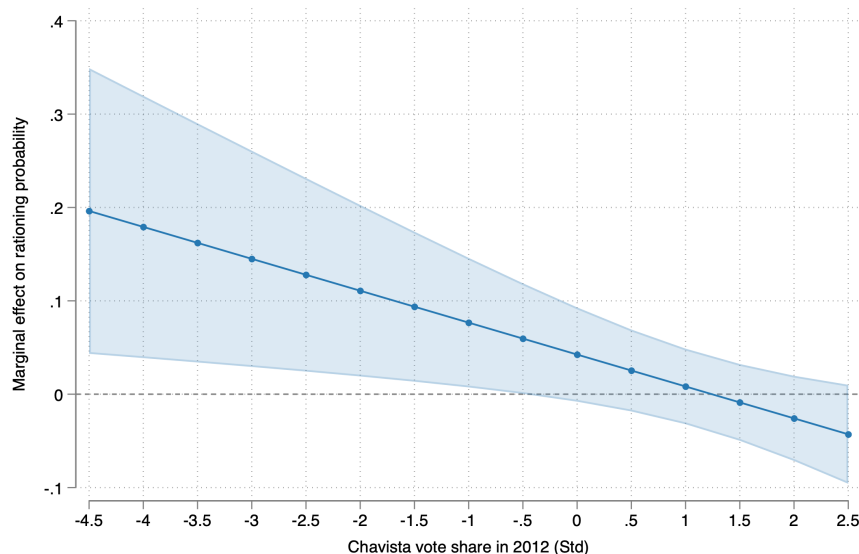
Notes: Figure provides estimates of the effect of 1 s.d. increase in the local exposure to the blackout on the probability of being assigned to power rationing at different levels of Chávez's vote share in 2012.

anecdotal evidence suggests that Maduro attempted to avoid power rationing in military establishments.[52] Moreover, criminal gangs have grown to become powerful local agents in recent years, to the point of actually challenging State security forces.[53] Given the importance of military acquiescence for regime survival and how gangs could threaten to further destabilize an already tense situation, it would be sensible for the regime to limit both their exposure to power rationing.

Table 2 presents results to address these issues. Column 1 provides the baseline reference result. Columns 2 and 3 consider a measure of parishes' inverse distance to average regime support levels, finding that it does not associate with the regime's rationing choice, and that it does not affect the association between regime support and power rationing. Columns 4-6 consider the presence of military barracks and criminal gangs. The results suggest that areas affected by the blackout were more likely to be assigned to rationing only if military or gang units were absent. Moreover, considering military and gang presence uncovers an even stronger decrease in the probability of rationing for

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[52]https://www.miamiherald.com/news/nation-world/world/americas/venezuela/article235687727.html

[53]https://efectococuyo.com/sucesos/no-teniamos-las-armas-para-combatirlos-que-paso-en-la-cota-905/

Table 2: Swing voters, military/gang presence and power rationing

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Parish assigned to rationing schedule					
Shock	0.0425**	0.0313	0.0430**	0.0909***	0.0675***	0.143***
	(0.0195)	(0.0239)	(0.0195)	(0.0352)	(0.0196)	(0.0404)
Regime Support	-0.0723***		-0.0715**	-0.0487*	-0.0717**	-0.0417
	(0.0275)		(0.0281)	(0.0288)	(0.0286)	(0.0291)
Shock × Support	-0.0341***		-0.0342***	-0.0660***	-0.0371**	-0.0813***
	(0.0123)		(0.0124)	(0.0216)	(0.0146)	(0.0211)
Split Vote		7.65e-05	0.000111			
		(0.000940)	(0.000889)			
Shock × Split		-0.000700	-0.000382			
		(0.00219)	(0.00213)			
Military presence				0.141***		0.158***
				(0.0346)		(0.0341)
Shock × Military				-0.0850*		-0.124**
				(0.0514)		(0.0529)
Gang presence					-0.144	-0.154
					(0.0995)	(0.0962)
Shock × Gangs					-0.107**	-0.148***
					(0.0444)	(0.0442)
Observations	1,076	1,076	1,076	1,076	1,076	1,076
R-squared	0.536	0.528	0.537	0.545	0.542	0.553
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Grid controls	Yes	Yes	Yes	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Notes: This table summarizes key results of linear probability models assessing the determinants of the regime power rationing choices for April 2019 as expressed in the published schedule. All regressions control for local poverty rates and population density, their interaction terms with the local exposure to the blackout, and a set of Grid controls that include fixed effects for the closest transmission sub-station to each parish's centroid, the distance to that sub-station, the distance to the Guri dam and interaction terms between these three variables. All observations are weighted by the local population and standard errors are calculated considering potential spatial correlation within a bandwidth of 200km following Conley (2010).

regime-supporting regions relatively affected by the blackout.

3.4 Effects of the Blackout on Protests

Given the availability of panel variation in protest activity, I now study the effect of the blackout on protests building on a difference-in-difference specification considering total weekly protests at the municipality level between September 2018 and July 2019 as outcome variable. Protests are typified by citizen demands, and separated into protests demanding improvements to public utilities and protests anti-regime political protests. I estimate the following regression specification:

$$
\begin{aligned}
P_{mw} = {} & \alpha * Shock_m * Post_w + \sum_{k \in \{Ch, P, D\}} \beta^k * C_m^k * Post_w + \\
& \sum_{k \in \{Ch, P, D\}} \gamma^k * Shock_m * C_m^k * Post_w + \psi_m + \psi_w + \epsilon_{mw}
\end{aligned}
\tag{4}
$$

where P_{mw} is the total number of protests in municipality m in week w. $Shock_m$ is the cross-section variation in municipality m's exposure to the blackout. $Post_w$ is a binary variable identifying whether week w is in the post-blackouts period. C_m^k is the value of each of the k cross-section co-variates (Chávez's vote share in 2012, Poverty rate and Population density in 2011) in municipality m. ϕ_m and ϕ_w stand for municipality and week fixed effects, and ϵ_{mw} is the error term. All predictors are standardized to interpret estimates as the effect of 1 s.d. differences on the total number of protests. Our main coefficients of interest are both α, β^{Ch} and γ^{Ch}, which assess the effect of a 1 s.d. increase in the local exposure to the blackouts, in the baseline local vote share for the regime, and in their interaction on the total number of protests. All regressions exclude municipalities in Caracas from the sample, weight observations by population size and cluster standard errors considering possible spatial correlation within a 200 km. bandwidth.

Table 3 provides estimates for the regression specification decribed in Equation 4, evaluating effects on total protests and in "utility" and "political" protests separately. Column 1 shows that a 1 s.d. increase in the blackout associates with 0.3 additional

protests, while a 1 s.d. increase in baseline regime support associates with a drop in 0.8 protests. Column 2 explores the interaction between the blackouts shock and baseline regime vote shares, and finding that the positive effect of the blackout on protests very rapidly attenuates for regime supporting municipalities: a 1 s.d. increase in Chávez's 2012 vote reduces the effect of the shock on total protests by 0.85 protest. Columns 3-4 and Columns 5-6 replicate this analysis looking at utility protests and political protests separately, and document similar patterns, confirming strong political heterogeneities in the effect of the blackout on demands for improvements to utility services and demands for political change.

Panel A in Figure 9 shows week-specific estimates for γ^{Ch} on total protests, taking the week before the blackouts as reference. The figure confirms parallel pre-blackout trends along the local exposure to the shock. Importantly, the figure also confirms that the political heterogeneity in the effect of blackouts did not occur immediately after the blackouts. The key spike in this effect occurs between weeks 4 and 9 after the blackout, pointing to the period between the implementation of the rationing schedule in early April and the failed pro-Guaidó military putsch in early May. Panel B in figure 9 shows the estimated marginal effect of local exposure to the blackout on protest activity at different points of the Chávez's 2012 vote share distribution, confirming that the conclusions are driven by a spike protests in opposition areas of the country relatively affected by the blackouts.

3.5   Robustness checks

As discussed, the specifications above exclude municipalities or parishes in the Caracas metropolitan area, measure regime support as Chávez's vote share in the 2012 presidential election (the last election before his passing), and cluster standard errors considering the possibility of spatial correlation with a 200 km. bandwidth. Figure A.1 provides estimates and confidence intervals for γ^{Ch} in equations 3 and 4 considering a number of robustness checks. First, I include locations within the Caracas Metropolitan Area. Second, I measure regime support as the average Chavista vote share in the 2012, 2013

Table 3: Blackouts, regime support and protests

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All Protests		Utility Protests		Political Protests	
Shock × Post	0.304*	0.154	0.220**	0.164***	0.301*	0.177*
	(0.171)	(0.104)	(0.100)	(0.0584)	(0.157)	(0.0911)
Regime Support × Post	-0.824*	-0.612*	-0.442*	-0.313*	-0.785**	-0.585**
	(0.425)	(0.322)	(0.243)	(0.183)	(0.390)	(0.293)
Shock × Support × Post		-0.850*		-0.451*		-0.761*
		(0.449)		(0.260)		(0.421)
Observations	12,144	12,144	12,144	12,144	12,144	12,144
R-squared	0.009	0.015	0.012	0.018	0.013	0.021
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes	Yes	Yes	Yes

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: The table summarizes key results of a difference-in-differences specification assessing the effect of the local exposure to the blackout on protest activity at different levels of regime support. Columns 1-2 show did and triple-did estimates on total weekly protests in a municipality. Columns 3-4 and Columns 5-6 provide similar estimates for Utility protests and Political protests, separately. All regressions control for the interactions between the local poverty rate and the local population density with the identifier of the post-treatment period, while Columns 2, 4 and 6 also control for the triple interaction between these and the local exposure to the blackout. All observations are weighted by the local population and standard errors are calculated considering potential spatial correlation within a bandwidth of 200km following Conley (2010).

Figure 9: Blackouts, regime support and political protests
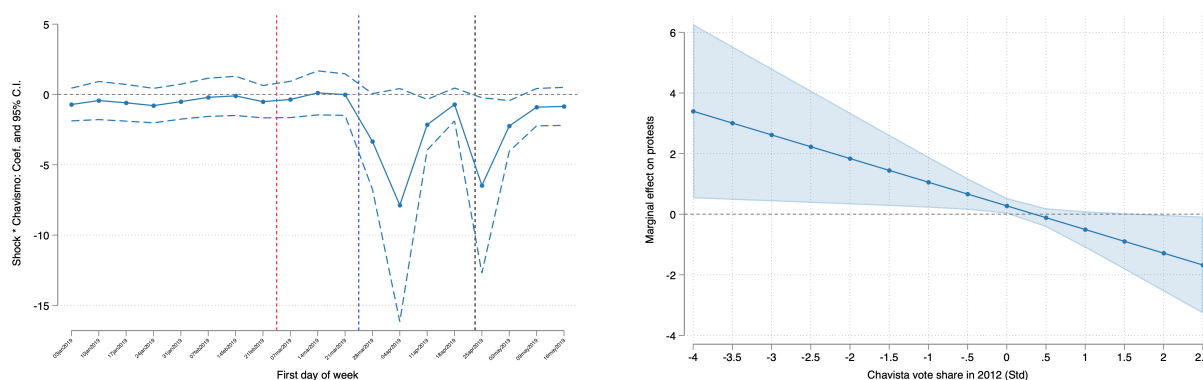
(a) Week-specific coefficients

(b) Marginal effect of Shock

Notes: Figures show effect on total weekly political protests. Panel A provides coefficient estimates for the interaction between the local exposure to the blackouts, the Chávez's vote share in 2012 and a set of week-specific identifiers. While the regression analysis was performed considering all weeks between September 2018 and July 2019, only coefficients for the first semester of 2019 are shown. Panel B shows the marginal estimated effect of a 1 s.d. increase in the local exposure to the blackouts at different levels in the distribution of Chávez's 2012 vote shares.

and 2015 national elections. Third, I cluster standard errors at different bandwidths around the original 200 km. level. Panel A provides results for protests and Panel B provides estimates for the power rationing schedule. Both panels suggest robustness in the original results.

4   Favoritism during droughts in Sub-Saharan Africa

The purpose of this empirical section is to evaluate the implication of the theoretical arguments proposed above in an international setting. The claim that regimes hoping to overcome an economic shock will target benefits in favor of their supporters suggests that general patterns of favoritism should magnify during crises. Assessing this distributive implication requires within-country variation in economic and conflict-related outcomes. Moreover, it also requires within-country variation in the level of support for -or affiliation to- the regime. I focus on rainfall shocks in Sub-Saharan Africa. Droughts in this region have been shown to induce conflict (Miguel et al., 2004) and democratic improvements (Brückner and Ciccone, 2011). Moreover, patterns of regional and ethnic favoritism have been documented for the region (Franck and Rainer, 2012; Hodler and Raschky, 2014a; De Luca et al., 2018; Dickens, 2018). My hypothesis is that such patterns of favoritism towards co-ethnics or leader-affiliated regions will compound during rainfall shocks, further alienating excluded regions or groups.

4.1   Regional favoritism and conflict during rainfall shocks

I now evaluate the sub-national variation of local nightlights, protests and events of repression of dissent and coercion in Sub-Saharan Africa.

Data

I perform the analysis for subnational regions using administrative units at the first level (ADM1) as defined in shapefiles provided by the Database of Global Administrative

Areas (GADM).[54] I follow Hodler and Raschky (2014a) in using satellite nightlights data as key measure of local economic growth to test for the existence of favoritism. This data comes from the US's National Oceanic and Atmospheric Administration (NOAA),[55] which provides year-grid (1 km × 1km) raster observations of the average daily light radiance at night after removing observations affected by clouds and other measure-distorting phenomena. The resulting data, which measures spatial variation in nighttime lights driven by human activities and proxies for local economic activity between 1992 and 2013, takes indexed values from 0 to 63. I then aggregate these values for spatial polygons representing the first administrative unit level in every country. This allows me to produce a panel of subnational economic outcomes of comparable quality across countries in Sub-Saharan Africa. Because the resulting variable is highly right-skewed but also has a high proportion of regions taking values of 0, I use the logarithm of the total nightlights measure after adding 0.01 - a standard transformation in the literature(Hodler and Raschky, 2014a; Dickens, 2018).

I produce region-year totals for events of citizen protests, repression of dissent and state coercion using the Global Database of Events, Language and Tone (GDELT), which tracks media sources to collect a localized dataset of political events starting in 1979. The span of the GDELT data fully covers the 1980-2004 period, which has been the focus of the literature on the effect of economic shocks on democratization (Brückner and Ciccone, 2011; Brückner et al., 2012) and conflict (Miguel et al., 2004; Brückner and Ciccone, 2010). GDELT classifies events according to the Conflict and Mediation Event Observations (CAMEO) classification,[56] and I collect events under the "Protests" classification, which include engagement in political dissent, demonstrations or rallies, hunger strikes, strikes or boycotts, obstruction of passages or blockades, and violent protests or riots. Moreover, GDELT identifies events of State repression of citizen protests from other events of state coercion for this period. To my knowledge, GDELT is the only source to document these events starting in 1980. I assign the country and region of the event according to

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[54]https://gadm.org/
[55]https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html
[56]http://data.gdeltproject.org/documentation/CAMEO.Manual.1.1b3.pdf

the assigned geolocation, filtering events for which the geolocation does not capture any subnational precision.[57]

Country-year rainfall levels are collected from NOAA's Global Precipitation Climatology Centre (GPCC).[58] GPCC's "Full Data Product" provides monthly rainfall estimates based on quality-controlled data from from 67,200 stations world-wide starting on 1891. GPCC provides files with monthly rainfall estimates in $0.5° \times 0.5°$ latitude-longitud raster grids with the average daily mm rainfall levels.[59] The data is then aggregated at the country-year with average mm/year levels according to country-wide shape-files. I finally calculate the logarithm of the country-year rainfall level, and then standardize it.

Regarding regional affiliations to a country's regime, I follow the literature on regional favoritism by focusing on leaders' location of birth. Specifically, I expanded the dataset used in Larreguy and Marx (2014) in order to identify the location of origin of leaders in Sub-Saharan African countries between 1980 and 2012.[60]. Later analyses will exclude the few country-year combinations for which the country's leader was born outside of the country. I also identify capital regions in every country.[61]

Finally, while my key measure of economic shocks will continue to be the country-wide rainfall levels in each year, I complement these measures with local rainfall data, also from GPCC, aggregating yearly rainfall levels at the region level. I collect key economic and industrial markers at the region level from the African Regional Development Indicators from Monash University's Data-in-Space Initiative.[62]. I use data on the local presence of mines and oil fields; ports and roads; and cropland. Importantly, I classify locations as "highly agricultural" if the cropland share is above the country's median. I classify regions as with high infrastructure if its road length is above the median or has a port present. Regions are classified as either oil producing or mineral producing by whether there are oil fields or mines present. I collect international oil, food and metal yearly

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[57]About 80% of protests in GDELT allow for the assignment of a region within the country of the event.

[58]https://psl.noaa.gov/data/gridded/data.gpcc.html#detail

[59]See Schneider et al. (2016) for more details.

[60]I thank Prof. Horacio Larreguy for sharing their data with me

[61]The Dar es Salaam region is marked as Tanzania's capital for the full period of analysis.

[62]https://datainspace.org/index.php/regional-development-indicators-beta/

price indices from the IMF, from Jacks (2019) and from the Commodity Exchange Inc. (COMEX). Table A.2 provides summary statistics for the data variables used in the analysis of patterns of regional favoritism and conflict during national rainfall shocks in Sub-Saharan Africa.

Regression specification and results

I now study the connection between local economic and conflict outcomes, local affiliation with regimes' leaders and national rainfall shocks. I estimate the following regression specification:

$$Y_{r,y} = \beta_1 L_{r,y-1} + \beta_2 R_{c,y-1} * L_{r,y-1} + \phi_r + \phi_{c,y} + \epsilon_{r,y}$$

where $Y_{r,y}$ is the outcome variable (nightlights, protests, repression of dissent or acts of State coercion) in region r and year y, $R_{c,y}$ is the logarithm of the country-level rainfall, and $L_{r,y}$ is a binary variable for whether region r is the region of origin for the country's leader in year y. ϕ_r and $\phi_{c,y}$ are region and country-year fixed effects respectively, and $\epsilon_{r,y}$ is the error term. Standard errors are clustered at the country-year to match the exogenous variation of the rainfall shock. Focusing on the lagged values of the leader's origin and rainfall shocks accounts for the fact that responses to droughts -and their effect on economic and conflict outcomes- are expected to operate with a lag.[63] Hence, I focus my attention on regression estimates for β_2.

Columns 1-4 of Panel A in Table 4 provide estimates of the effect of national rainfall shocks on local nightlight radiance between 1992 and 2013. Column 1 replicates earlier results in the regional favoritism literature, showing that local nightlights are 15% higher in leaders' regions of origin. Column 2 adds the national rainfall shock and its interaction with the regime's region of origin, but substitutes country-year fixed effects for year fixed effects. We find that the effect of the leaders' origin at the average national rainfall is similar to that observed unconditional to national rainfall. While national rainfall shows

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[63]Focusing on lagged economic shocks and region origins is standard practice in the conflict, democratization and favoritism literatures.

no apparent association with local nightlights outside of leaders' origins, there is a 1 s.d. drop in the logarithm of national rainfall associates with an increase in nightlights in leaders' region of origin of 19%. Column 3 adds back the country-year fixed effects, showing that estimates for leader origin and its interaction with the national rainfall are largely unaffected. Finally, Column 4 adds a number of region-year controls[64] and shows that estimates are again largely unaffected. Overall, Panel A confirms the robustness in established patterns of regional favoritism, but -consistent with the theory outlined above- it also shows that this pattern magnifies during national droughts.

Columns 5-8 in Panel B of Table 4 provide similar specifications on the total number of protests observed in a location. Column 5 shows that leader regions associate with 2.5 fewer protests. Columns 6-8 show that considering national rainfall does not affect the average connection between leaders' origins and protests, but that a 1 s.d. drop in the rainfall logarithm associates with 4.5 fewer protests still in leaders' origins. Columns 1-4 of Panel B study events of repression of dissent, showing between 0.25 and 0.52 fewer acts of repression on average in leaders' regions, and that a 1 s.d. drop in the rainfall log associates with 0.7 fewer events of this kind in leader regions. Finally, Columns 5-8 of Panel B aggregate all events of State coercion. Leader regions associate with 15-20 fewer acts of coercion on average, but a 1 s.d. drop in rainfall magnifies this difference by 16-17 additional acts. Overall, these results suggests that there is lower dissent and repression of dissent in regime-affiliated areas, and that this difference compounds during droughts. Figure 10 provides estimates for the marginal effect of leaders' origin region at different national rainfall levels, confirming that the results discussed above are driven by negative rainfall drops.

4.2 Ethnic favoritism and rainfall shocks

So far, I have studied patterns of regional favoritism based on leaders' regions of birth. Another approach to assess local or individual affiliations with the regime is to consider

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[64]Column 4 controls for interactions between the national rainfall and local identifiers for the capital region and for agricultural areas within the country, for interactions between agricultural areas and an index of food prices, for interactions between oil, gas and mining regions and indices for international oil and copper prices, and for local rainfall levels and their interaction with agricultural areas.

## Table 4: Regional favoritism and conflict during rainfall shocks

Panel A

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Nightlights				Protests		
		(Log[sum + 0.01])				(Total events)		
Leader's (t-1) Region of Birth	0.151**	0.162**	0.162**	0.128**	-2.463*	-2.420*	-2.420*	-3.706**
	(0.0639)	(0.0635)	(0.0634)	(0.0623)	(1.478)	(1.459)	(1.458)	(1.463)
Log National Rainfall (Std, t-1)		0.0357				0.627		
		(0.0769)				(2.036)		
Region of Birth × Log Rainfall		-0.191***	-0.195***	-0.193***		4.608***	4.624***	4.478***
		(0.0667)	(0.0669)	(0.0678)		(1.542)	(1.542)	(1.525)
Observations	13,311	13,311	13,311	12,827	19,791	19,791	19,791	19,065
R-squared	0.930	0.920	0.930	0.925	0.515	0.343	0.516	0.520
Controls	None	None	None	All	None	None	None	All
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Only year	Yes	Yes	Yes	Only year	Yes	Yes

Panel B

| VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Repression of Dissent				State Coercion		
		(Total events)				(Total events)		
Leader's (t-1) Region of Birth	-0.245	-0.238	-0.238	-0.524**	-14.94**	-14.79**	-14.79**	-20.48***
	(0.260)	(0.256)	(0.256)	(0.247)	(6.137)	(6.079)	(6.074)	(6.100)
Log National Rainfall (Std, t-1)		-0.0415				6.785		
		(0.269)				(9.678)		
Region of Birth × Log Rainfall		0.739**	0.730**	0.710**		16.87***	16.82***	15.69***
		(0.304)	(0.304)	(0.301)		(5.640)	(5.640)	(5.545)
Observations	19,791	19,791	19,791	19,065	19,791	19,791	19,791	19,065
R-squared	0.349	0.224	0.349	0.353	0.598	0.409	0.598	0.601
Controls	None	None	None	All	None	None	None	All
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Only year	Yes	Yes	Yes	Only year	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Notes: Regressions evaluate the effect of leaders' region of birth during national rainfall shocks on local nightlights (Panel A, Columns 1-4), protests (Panel A, Columns 5-8), repression of dissent (Panel B, Columns 1-4) and all events of State coercion (Panel B, Columns 5-8). Columns 1 and 5 evaluate the effect of leaders' origins unconditional on rainfall shocks. Columns 2 and 6 add national rainfall and its interaction with leaders' origins substituting country-year fixed effects for year fixed effects. Columns 3 and 7 add country-year fixed effects. Columns 4 and 8 control for interactions between the national rainfall and local identifiers for the capital region and for agricultural areas within the country, for interactions between agricultural areas and an index of food prices, for interactions between oil, gas and mining regions and indices for international oil and copper prices, and for local rainfall levels and their interaction with agricultural areas. Standard errors are clustered at the country-year level to match the exogenous variation of the national rainfall shocks.

Figure 10: Regional favoritism and conflict during rainfall shocks - margin plots
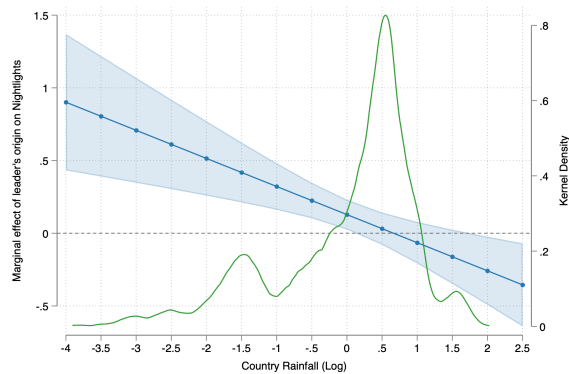
(a) Nightlights
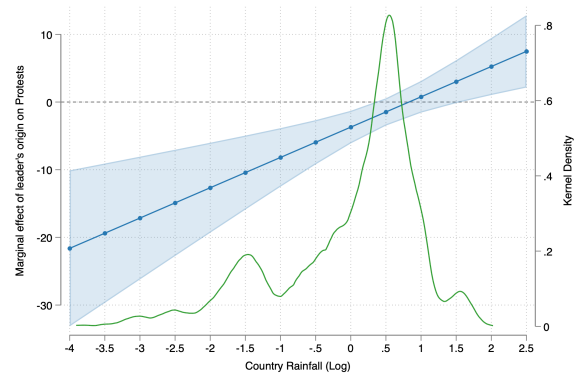
(b) Protests
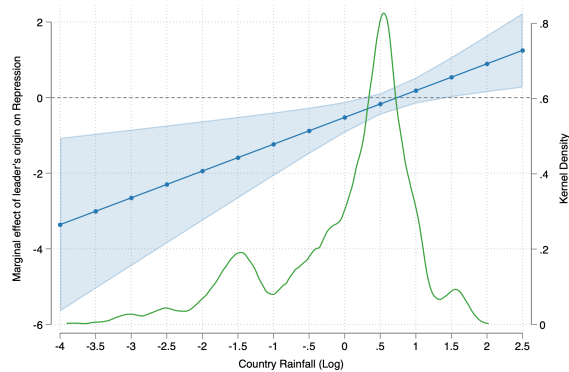
(c) Repressions of Dissent
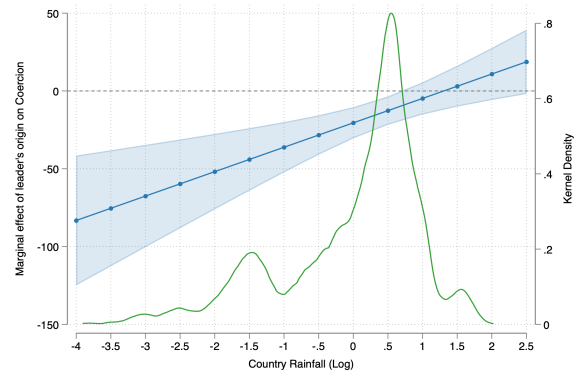
(d) State Coercion

Notes: Figures show estimated marginal effects of regime leaders' regions of origin at different levels of the national rainfall distribution on local nightlights (Panel A), protests (Panel B), acts of repression of dissent (Panel C) and acts of State coercion (Panel D). These are calculated based on regression outputs shows in Columns 4 in Table 4 - that is, controlling for interactions between the national rainfall and local identifiers for the capital region and for agricultural areas within the country, for interactions between agricultural areas and an index of food prices, for interactions between oil, gas and mining regions and indices for international oil and copper prices, and for local rainfall levels and their interaction with agricultural areas.

leaders' ethnicities, and how these connect with those of the groups that dominate a region or the ethnicity of an individual. To expand in this direction, I am going to build on regional and individual data from Dickens (2018) and from individual data from Franck and Rainer (2012), assessing the effect of similarity to the leader's ethnic language and co-ethnicity with the leader on local nightlights and on individual measures of wealth an infant mortality, and how these vary during national rainfall shocks.

Local nightlights by ethnic regions

To study the effect of national droughts on established patterns of favoritism across ethnic regions, I take the ethnic region panel used in Dickens (2018), who partitions Sub-Saharan Africa at the intersection of national borders and ethnolinguistic homelands described in the Ethnologue (Lewis, 2009). This strategy relies on the quasi-random assignment of national borders in the continent (Michalopoulos and Papaioannou, 2016), which split about 200 ethnic groups into different countries. Dickens (2018) identifies the ethnic group of each country's leader in every year between 1992 and 2013, and identifies the region of the leader's ethnic group. Importantly, he calculates a measure of lexicostatistical similarity between the language of each ethnic group and that of the leader's ethnic group, allowing for a continuous measure of affiliation to the leader each year.[65] Nightlights from each partitioned ethnic group are calculated using the NOAA yearly rasters and implementing an analogous procedure to the one discussed in the previous subsection. Additional variables in this panel include average of population density (log) for each ethnic group, the geodesic distance between the homeland of an ethnic group and the homeland of the leader's group, indicators for the presence of oil and diamond reserves in a given region and that of the leader, and the absolute difference in elevation, ruggedness, rainfall, temperature, and in agricultural quality (Galor and Özak, 2015) between each ethnic region and that of the country's leader. Finally, I add

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[65]He describes his preferred measure of lexicostatistical similarity between languages as follows: "As percentage estimate of a language pair's cognate words (i.e., words that share a common linguistic origin), lexicostatistical similarity approximates the phonological similarity between two languages. Because the extent of this similarity is a function of time since two languages split from a common ancestral group, the lexicostatistical similarity of a group to their leader captures that group's ancestral relatedness to their leader (i.e., ethnic similarity)."

the National Rainfall levels from GPCC to the panel. Table A.3 shows relevant summary statistics.

Individuals' wealth and linguistic similarity with the leader

To assess the effect of national rainfall shocks on the wealth of individuals with different ethnic affiliations to regime leaders, I take individual level data from Dickens (2018). He collects data from the Demographic and Health Surveys (DHS) for 13 countries. Individuals are linked to two measures of linguistic similarity to the leader's language, one for the location they are surveyed in, and for the language spoken at home. The resulting data is made of 33 DHS country waves capturing 13 countries and 20 partitioned language groups. Of the 56,455 respondents, only 56% reside in their ethnolinguistic homeland. Importantly, each individual is provided with a wealth index, aggregating different measures about household living conditions, including ownership of assets (e.g., television, refrigerator, telephone, etc.) and access to public resources (e.g., water, electricity, sanitation facility, etc.). Hence, the measure can be considered a joint measure of a household's access to private assets and public infrastructure. Individuals' age, gender, city characteristics, education and religion are considered as controls. Finally, I add the GPCC national rainfall measure. Table A.5 provides summary statistics.

Infant mortality and mother's co-ethnicity with the leader

I now assess how patterns of ethnic favoritism on infant mortality are influenced by national rainfall levels. I leverage data from Franck and Rainer (2012) on women between 15 and 49 years of age surveyed in the different DHS waves. Surveyees were asked to report about all the children they gave birth to in the past, highlighting their children's dates of birth and dates of death whenever a child died before the interview was conducted. Following Kudamatsu (2012), the authors build a dataset with each newborn baby reported, and define an Infant Death marker that captures whether a newborn child died within the first year of life. They then link every child to the ethnic group of the mother, and chiefly, they highlight whether the mother was a co-ethnic of the country's

leader at around the time of the child's birth. Their final sample collects DHS data on 1,173,710 children from 18 countries in sub-Saharan Africa. They also consider the children's gender and whether the mother was surveyed in a rural location or not. I then add information of the national rainfall level. Table A.4 shows summary statistics.

Empirical specifications and results

In order to assess effects on ethnic regions' nightlights, I perform the following regression specification:

$$Y_{gcy} = \beta_1 S_{gcy-1} + \beta_2 S_{gcy-1} * R_{cy-1} + X_{gcy}\omega + \phi_{cy} + \phi_{gy} + \phi_{cg} + \epsilon_{gcy} \tag{5}$$

where Y_{gcy} is the log nightlights emanated from the ethnic region of group g in country c at time c, S_{gcy} is the similarity (lexicostatistical linguistic similarity or co-ethnicity) between group g and the leader of country c in year y, and R_{cy} is the log of the national rainfall in country c in year y. X_{gcy} capture the set of co-variates discussed above, while ϕ_{cy}, ϕ_{gy} and ϕ_{cg} capture country-year, ethnic group-year and country-group fixed effects.[66] As in the previous subsection, we will focus attention on β_2, which captures how lagged rainfall shocks affect patterns of ethnic favoritism. Standard errors are again clustered at the country-year level.

Panel A in Table 5 provides estimates for Equation 5. Column 1 confirms a positive association between linguistic similarity and local nightlights. Columns 2 and 3 show that this association becomes strongest during national droughts. Column 4 confirms that co-ethnic regions experience an improvement in nightlights, but Columns 5-6 show that this association is contingent to national droughts.

To study effects on individuals' wealth index, I perform the following regression:

$$Y_{igcy} = \beta_1 S_{igy} + \beta_2 S_{igy} * R_{cy-1} + X_{igcy}\omega + \phi_{cy} + \phi_{gy} + \phi_{cg} + \epsilon_{igcy} \tag{6}$$

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[66]The main difference with the structure of this specification and that of equation 4.1 is that, since ethnic regions cut across countries, we are able to observe the same group in different countries, so we can control for within-group and within-country events separately.

where Y_{igcy} is the individual's household wealth index, S_{igy} is the (local or individual) linguistic similarity to the leader's ethnic group[67], and R_{cy} is the log of the national rainfall in country c in year y. X_{igcy} capture the set of individual co-variates discussed above, while ϕ_{cy}, ϕ_{gy} and ϕ_{cg} capture country-year, ethnic group-year and country-group fixed effects. Standard errors are clustered at the country-year level.

Panel B of Table 5 shows estimates for Equation 6. Columns 1-3 focus on the linguistic similarity between the ethnic region of the surveyee and the country's leader. Column 1 confirms a positive association between the local linguistic similarity and the household wealth index, and Columns 2 and 3 highlight an even stronger association during droughts. Columns 4-6 show no effects of individuals' linguistic similarity to the leader and their wealth index - even during droughts. This is consistent with the idea that central governments target benefits to ethnically affiliated regions, but they do not reach ethnically affiliated individuals outside of these regions.

Finally, I now study effects of mothers' co-ethnicity with regime leaders during rainfall shocks on infant mortality. For this purpose, I estimate the following equation:

$$Y_{iesy} = \beta_1 C_{iesy-1} + \beta_2 C_{iesy-1} * R_{sy-1} + X_{iesy}\omega + \phi_{sy} + \phi_{es} + \epsilon_{iesy} \tag{7}$$

where Y_{iesy} is a binary variable for whether newborn i of a mother from the ethnic cluster e in survey s born in year y died as an infant. C_{iesy} is a marker for whether the mother's ethnic cluster e is the same of the leader of the country of survey s in year y. R_{cy} is the log of the national rainfall for survey s in year y.[68] X_i capture demographic covariates of the individual, and ϕ_{sy} and ϕ_{es} capture survey-year and survey-ethnic cluster fixed effects. Standard errors are clustered at the survey-year level.

Panel C of Table 5 shows estimates for Equation 7. As in previous results, Columns 1-3 show lower infant mortality for children born of mothers sharing ethnicity with the leader, and that this association is even lower during national droughts.

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[67]The individual-level data in Dickens (2018) only provides similarity measures for the year of the survey and not for the previous year. Hence, this is the only specification where I look at the current level of affiliation to regime leaders.

[68]DHS surveys are performed at the country level, so that leaders and rainfall for a given individual are set according to the relevant survey.

Table 5: Ethnic favoritism during rainfall shocks

Panel A: Nightlights

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Nightlights: Log(Total Radiance + 0.01)					
Linguistic Similarity to Leader's (t-1) Group	0.305*** (0.0752)	0.00307 (0.0802)	0.195** (0.0866)			
Log National Rainfall (Std, t-1)		-0.0207 (0.0446)			-0.0271 (0.0421)	
Linguistic Similarity × Log Rainfall (t-1)		-0.0375 (0.0627)	-0.110* (0.0658)			
Leader's (t-1) Ethnic Region				0.168** (0.0670)	0.0414 (0.0765)	0.0798 (0.0809)
Ethnic Region × Log Rainfall (t-1)					-0.0750 (0.0579)	-0.109* (0.0621)
Observations	6,610	4,896	4,896	6,610	4,896	4,896
R-squared	0.971	0.968	0.978	0.971	0.968	0.978
Controls	All	All	All	All	All	All
Country-Year FE	Yes	No	Yes	Yes	No	Yes
Language-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Language-Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Individual's "Wealth"

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Wealth Index					
Local Linguistic Similarity to Leader's (t) Group	0.540*** (0.117)	0.885*** (0.244)	1.155*** (0.354)			
Log National Rainfall (Std, t-1)		-1.164 (0.869)			-1.441 (1.024)	
Local Similarity × Log Rainfall		-1.044* (0.589)	-1.562** (0.764)			
Individual's Linguistic Similarity to Leader's (t) Group				0.239 (0.180)	0.709 (1.248)	-0.556 (0.724)
Individual Similarity × Log Rainfall					0.438 (1.201)	-0.746 (0.838)
Observations	56,455	56,455	56,455	56,455	56,455	56,455
R-squared	0.606	0.605	0.607	0.606	0.605	0.606
Controls	All	All	All	All	All	All
Country-Year FE	Yes	Only country	Yes	Yes	Only country	Yes
Loc. Language-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Language-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Infant Mortality

VARIABLES	(1)	(2)	(3)
	Indicator of Death as Infant		
Mother's Co-Ethnicity to Leader (t-1)	-0.00228* (0.00122)	-0.00358*** (0.00116)	-0.00253** (0.00118)
Log National Rainfall (Std, t-1)		0.000893 (0.00284)	
Mother's Co-Ethnicity × Log Rainfall (t-1)		0.00322*** (0.00114)	0.00228** (0.00111)
Observations	1,172,842	1,172,865	1,172,842
R-squared	0.013	0.010	0.013
Controls	All	All	All
Survey-Birth Year FE	Yes	Only year	Yes
Survey-Ethnic Group FE	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Notes: Regressions evaluate the effect of ethnic affiliation to the country's leader on ethnic region nightlights (Panel A), individual wealth (Panel B), and events of infant mortality (Panel C). Columns 1 and 3 evaluate the effect of different ethnic affiliation measures on the relevant outcome. Columns 2 and 5 adds national rainfall and its interaction with ethnic affiliation measures, removing country-year or survey-year fixed effects. Columns 3 and 6 adds country-year fixed effects back. All regressions add the set of controls considered in the relevant specifications in Dickens (2018) and Franck and Rainer (2012), which are discussed in subsection 4.2. Standard errors are clustered at the country-year or survey-year level to match the exogenous variation of the national rainfall shocks.

4.3 Ethnic power and the composition of government

One potential channel through which the observed patterns of ethnic favoritism may operate is for regime leaders to further concentrate political power in their ethnic group by either restricting other groups' capacity for effective political participation or by packing government positions with co-ethnics. I now study the evolution of ethnic groups' relative power status and the share that each group represents in the make-up of national government between leaders' ethnic groups and other groups within their countries during rainfall shocks.

In order to measure the effects on relative ethnic power, I build on EPR's GROW dataset (Girardin et al., 2015). This data identifies different relevant ethnic groups within each country, identifying each of them with an ethnic power status rank. This rank takes discrete values between 1 ("Powerless") and 7 ("Monopoly"). I match every country-year with the relevant ethnic group of the country's leader and with the national level of rainfall, retaining data for 38 countries in Sub-Saharan Africa between 1980 and 2013.[69] I build on data from Francois et al. (2015) to assess effects on the share of government captured by each ethnic group. The authors provide a dataset of 15 countries in Sub-Saharan Africa between 1960 and 2004, identifying the relevent ethnic groups within each country, the ethnic group of the country's leader in a given year, and the share that each group captures for top and low government positions. I complement this data with country-year rainfall data. Table A.6 provides relevant summary statistics.

I estimate the following equation:

$$Y_{c,g,y} = \beta_1 L_{c,g,y-1} + \beta_2 R_{c,y-1} * L_{c,g,y-1} + Y_{c,g,y-1} + \phi_{c,g} + \phi_{c,y} + \epsilon_{c,g,y} \qquad (8)$$

where $Y_{c,g,y}$ is the ethnic power rank of group g in country c during year y. $L_{c,g,y}$ is a marker for whether group g is the ethnic group of the leader of country c during year y. $R_{c,y}$ is the log of the national rainfall levels. $\phi_{c,g}$ and $\phi_{c,y}$ stand for country-ethnic group and country-year fixed effects. This regression controls for the lagged values of

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[69]Burkina Faso, Lesotho and Somalia are excluded from the data because the EPR dataset only identifies a single ethnic group in these countries during the relevant period.

the dependent variable due to the problem of mean reversion in categorical or proportion outcome variables. Standard errors are estimated allowing for clustering at the country-year level.

Table 6 provides results for estimates of Equation 8. Columns 1-3 suggest that while leaders' ethnic groups do accumulate relative power, there is no evidence that this association expands during droughts. Columns 4-6 suggest that leaders' ethnic groups do accumulate government positions, but that this association is contingent to periods of abundant rainfall. While this is contrary to the expectation of accumulation of power during droughts, decomposing results between top government and low government positions uncovers an interesting heterogeneity. Column 7 shows that leaders' groups accumulate positions in top government during average rainfall years, and this association is not meaningfully affected by national rainfall levels. Column 8 shows that leaders' groups shed low government positions during average rainfall years as they accumulate top government positions. However, droughts do seem to induce further erosion in their low government share. Overall, while there seems to be an improvement in the ethnic power and government positions of leaders' groups during average rainfall years, there is no evidence that droughts induce further accumulation of relative political power in the hands of leader co-ethics after national droughts.

4.4 Favoritism or consequences of conflict? Interpreting effects on development outcomes

The international evidence on regional and ethnic favoritism has documented robust differences in local or individual development outcomes in favor of units affiliated with the country's leader at a given period. The first result in this subsection and those in the next subsection below confirm this finding, and highlight how differences in favor of leader-affiliated units magnify during rainfall shocks. Since the literature focuses on "favoritism", these patterns are often interpreted as driven by regime choices on the distribution of economic benefits. For instance, Franck and Rainer (2012) highlight three possible distributive channels to explain health and education differences in favor of in-

Table 6: Ethnic discrimination and political power during Rainfall Shocks

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7) Top Gov. Share	(8) Low Gov. Share
	Ethnic Power Status Rank			Total Government Share				
Leader's Ethnic Group (t-1)	0.133**	0.154***	0.138**	0.0120***	0.00277	0.00271	0.0439***	-0.0136**
	(0.0529)	(0.0588)	(0.0548)	(0.00307)	(0.00479)	(0.00481)	(0.0107)	(0.00563)
National Rainfall (std, t-1)		-0.00311			-0.000991			
		(0.0317)			(0.000702)			
Leader's group × Rainfall		0.0145	0.0292		0.0190**	0.0194**	-0.000746	0.0439***
		(0.0565)	(0.0541)		(0.00927)	(0.00936)	(0.0191)	(0.0102)
Observations	6,133	6,136	6,133	11,038	11,038	11,038	11,038	11,038
R-squared	0.951	0.932	0.951	0.877	0.877	0.877	0.743	0.770
Country-Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Only year	Yes	Yes	Only year	Yes	Yes	Yes
Laged Outcome Variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Notes: Regressions evaluate the effect of rainfall shocks on ethnic power status (Columns 1-3) and on the share of government positions captured by an ethnic group (Columns 4-8). All regressions control for the lagged value of the outcome variable, and provide standard errors clustered at the country-year level of aggregation.

dividuals ethnically affiliated to regime leaders.[70]

However, my analysis documents a pattern of higher dissent and repression outside of the regions of birth of country leaders which also magnifies during rainfall droughts. These new findings highlight the possibility of endogeneity in the standing evidence of favoritism. There is ample evidence for the economic costs of conflict. To the degree that dissent and repression may yield local economic costs, it remains possible that differences in nightlights or other development outcomes are driven not by favors from the central government to affiliated regions or individuals, but by their differential exposure to higher levels of confrontation. It may also be true that, if national rainfall shocks induce dissent in excluded areas, then the magnifying of differences in economic outcomes may also be driven by conflict and not by favors. While my cross-country analysis thus far will remain agnostic on this point, it is important to highlight that both these results are consistent with the main theoretical proposition of this paper, and that the Venezuela case-study evidence overcomes this problem by focusing on a policy choice by the central government

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[70]They argue that regimes can directly increase access and quality of health and education services for co-ethnics. At the same time, leaders could support the incomes of co-ethnics, enabling them to take advantage of available health and education services. Finally, policies favoring co-ethnics may improve their future outlooks so that they decide to invest in the education of their children or care more for newborn children. While all these channels are plausible and identifying between them would be of interest, the authors recognize that such assessment is not possible while focusing on development outcomes and not on international comparable development policies.

(the rationing schedule) and not on an economic outcome.

5   Conclusions

This paper argues that autocrats confronting a threatening economic shock will choose to minimize their supporters' economic grievances to prevent them from joining opposition protest and avert a broad revolution. The strategic logic behind this hypothesis is that in the face of sudden and shared impoverishment, it should be cheapest to defuse coordinated dissent by moderating the grievance of citizens that do not hold past grudges against the regime. I formalize a proposition of strategic in-group favoritism and limited dissent during stronger economic shocks with a simple model of redistribution, dissent and autocrat stability during economic shocks, considering politically heterogenous citizens with economic and political grievances against autocrats and with complementarities in their protest choices.

I test this proposition in the context of the Venezuelan blackouts of early March 2019, which occurred during a constitutional crisis that heightened the possibility of regime change. Higher exposure to the blackout induced assignment to the government's power rationing schedule, but -consistent with the model- regime-leaning regions of the country were spared from power rationing. Unlike opposition-leaning areas affected by the blackout, regime supporting areas did not observe a spike in dissent at the peak of the constitutional crisis.

The prediction of strategic in-group favoritism during economic shocks travels outside of the Venezuelan context, explaining differences in development and conflict outcomes in favor of regime affiliated regions in Sub-Saharan Africa. The local nightlights differences in favor of leader-affiliated regions magnify during rainfall shocks. Similarly, differences in infant mortality and in indicators of access to private assets and public services in favor regime-affiliated regions and individuals also grow during droughts. These patterns are not driven by an accumulation of political power in the hands of regime co-ethnics. Moreover, I document differences in protests, repression and state coercion in favor of

leaders' regions of birth, and these differences also seem to magnify during droughts.

This paper highlights a number of open avenues for future research. First, the model could be expanded to account for dynamic considerations during transitory economic shocks, and to include a "democratization" outside option. Second, the Venezuelan case-study highlights how high-periodicity satellite data can be leveraged to assess the spatial distribution of natural or economic shocks and governments' responses along political dimensions in other settings. Such methodologies seem most pertinent to the study of natural disaster relief efforts - an agenda that is likely to become prescient as the effects of climate change ensue. Finally, the question of potential endogeneity between development and dissent outcomes in the Sub-Saharan Africa evidence on regional favoritism needs to be addressed empirically by shifting attention from local development outcomes to internationally comparable but subnationally precise measures of governments' distributive policy choices. This could be advanced by considering foreign aid projects in places where autocrats have influence over their location, and by leveraging satellite imagery that can help reconstruct panels of the evolution of public goods such as road and electricity networks.

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Figure A.1: Robustness checks

(a) Rationing

(b) Political Protests
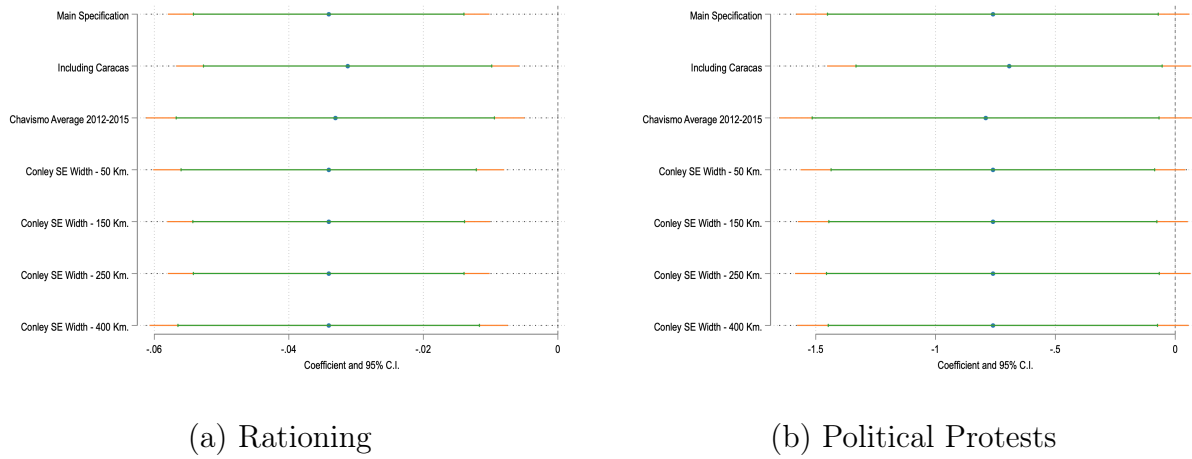
Notes: Figures provide a number of robustness checks for different specification decisions in estimating γ^{Ch}. Panel A provides robustness estimates for Column 4 on Table 1, while Panel B provides robustness estimates for Column 6 on Table 3. Figures compare estimates and statistical significance of the main specification with specifications that include municipalities and parishes in the Caracas Metropolitan Area as part of the sample, specifications that consider an average of the Chavismo vote share in all national elections between 2012 and 2015, and specifications considering different bandwidths in estimating the Conley spatial correlation robust standard errors.

Appendix

Table A.1: Venezuelan blackouts analysis - summary statistics

Panel A: Parish Cross-Section Variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Nightlights drop rate	1,108	0.223	0.465	-5.288	0.888
Power rationing	1,108	0.521	0.500	0	1
Chavista vote share, 2012	1,107	0.622	0.131	0.0760	0.950
Poverty rate, 2011	1,108	0.317	0.160	0.0251	0.965
Population	1,108	24,377	38,673	61	372,616
Population density	1,108	877.1	3,199	0.0586	43,492
Distance to Guri	1,108	659.2	272.0	16.94	1,102
Distance to Transmission Grid	1,108	42.38	41.78	0.363	544.2
Military unit presence	1,108	.1895307	.3921066	0	1
Gang presence	1,108	.482852	.4999315	0	1

Panel B: Municipality Cross-Section Variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Nightlights drop rate	335	0.206	0.365	-2.971	0.784
Power rationing	335	0.755	0.431	0	1
Chavista vote share, 2012	335	0.602	0.113	0.177	0.858
Poverty rate	335	0.299	0.128	0.0331	0.852
Population	335	81,271	168,542	2,029	1.95 MM
Population density	335	278.0	673.5	0.0586	5,405
Distance to Guri	335	641.3	266.7	59.71	1,080
Distance to transmission grid	335	47.49	56.34	1.906	544.2

Panel C: Municipality Panel Variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Total protests	12,384	0.514	2.426	0	118
Political protests	12,384	0.177	1.638	0	113
Utility protests	12,384	0.122	0.985	0	53

Notes: Summary statistics for all variables considered in the analyses of the effects of the Venezuelan blackouts of early March 2019 on later power rationing and protests.

Table A.2: Regional favoritism - summary statistics

Panel variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Leader's region of birth	21,250	0.0615	0.240	0	1
Nightlights (log(total + 0.01))	13,750	5.778	4.313	-4.605	13.74
Protests (Total)	21,250	7.501	50.55	0	3,154
Acts of repression of dissent (Total)	21,250	0.715	6.621	0	393
Acts of State coercion (Total)	21,250	37.55	220.2	0	8,982
National rainfall (log)	21,250	4.209	0.717	1.408	5.660
Local rainfall (log)	20,672	4.25614	.8237	-1.700	6.026

Cross-section variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Capital region	625	0.0672	0.251	0	1
Presence of mines	612	0.395	0.489	0	1
Presence of oil/gas fields	612	0.0833	0.277	0	1
Agricultural regions	612	0.520	0.500	0	1
High infrastructure regions	612	0.601	0.490	0	1

Time-series variables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
WTI oil price (Index)	34	348.6	167.6	131.5	672.7
Food price (Index)	34	34.81	12.32	18.64	69.97
Copper price (Index)	34	150.8	107.5	62.64	408.0

Notes: Summary statistics for variables used in the analysis of regional favoritism and conflict during rainfall shocks in Sub-Saharan Africa.

Table A.3: Ethnic favoritism and regional nightlights - summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Nightlights (log(Total+0.01))	7,800	-3.478	1.415	-4.605	1.515
Population Density (log)	7,800	2.911	1.517	-2.169	6.116
Linguistic Similarity Index	7,107	0.192	0.228	0.000569	1
Distance to leader's region (log)	7,800	5.859	1.440	0	7.419
Elevation (abs. difference to leader's region)	7,800	250.0	297.8	0	2,022
Ruggedness (abs. difference to leader's region)	7,800	99.01	103.2	0	542.4
Local rainfall (abs. difference to leader's region)	7,800	31.41	32.00	0	230.7
Local temperature (abs. difference to leader's region)	7,800	16.48	16.88	0	120.2
Agricultural quality (abs. difference to leader's region)	7,800	286.4	304.3	0	1,711
Oil present in own and leader's region	7,800	0.0154	0.123	0	1
Diamonds present in own and leader's region	7,800	0.0785	0.269	0	1
Co-ethnicity with Leader	7,800	0.00603	0.0774	0	1
National rainfall (log)	6,780	6.853	0.539	5.307	7.881

Notes: Summary statistics for variables used in the analysis on the effect ethnic favoritism on regional nightlights during national rainfall shocks.

Table A.4: Ethnic favoritism and individuals wealth - summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Region's Linguistic Similarity	56,455	0.350	0.380	0.0251	1
Individual's Linguistic Similarity	56,455	0.363	0.387	0.0206	1
Age	56,455	29.36	10.51	15	78
Age^2	56,455	972.4	687.2	225	6,084
Female marker	56,455	0.663	0.473	0	1
Rural locality marker	56,455	0.635	0.482	0	1
Capital city marker	56,455	0.0513	0.221	0	1
Distance to coast	56,455	587.3	395.4	5.226	1,391
Distance to border	56,455	192.8	141.2	2.510	899.2
Education category	56,455	4.721	1.520	1	6
National rainfall (log)	56,455	4.528	0.432	3.089	5.426

Notes: Summary statistics for variables used in the analysis on the effect ethnic favoritism on individuals' wealth index during national rainfall shocks.

Table A.5: Ethnic favoritism and infant mortality - summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Child died as infant marker	1.180e+06	0.100	0.300	0	1
Mother's co-ethnicity with Leader at birth	1.245e+06	0.224	0.417	0	1
Urban marker	1.252e+06	0.268	0.443	0	1
Female marker	1.252e+06	0.490	0.500	0	1
National Rainfall (log)	1.252e+06	4.078	0.690	1.785	5.177

Notes: Summary statistics for variables used in the analysis on the effect ethnic favoritism on individual's infant mortality during national rainfall shocks.

Table A.6: Ethnic discrimination and political power - summary statistics

Ethnic Power Relations Data

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Ethnic Power Status Rank	6,382	3.341	1.482	1	7
Leader's Ethnic Group	6,382	0.188	0.391	0	1
National Rainfall (log)	6,382	4.131	0.814	1.408	5.551

Government Ethnic Composition (FTR) Data

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Government Share	11,749	0.0541	0.0831	0	0.882
Top Government Share	11,749	0.0542	0.110	0	1
Low Government Share	11,749	0.0540	0.0856	0	0.864
Leader's Ethnic Group	11,749	0.0613	0.240	0	1
National Rainfall (log)	11,749	4.725	0.344	3.596	5.660

Notes: Summary statistics of data used to assess the effect of ethnic leadership on discrimination and political power during rainfall shocks.