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Autocrats in crisis mode: Strategic favoritism during economic shocks

Jose Morales-Arilla

josemoralesarilla@tec.mx

School of Government and Public Transformation, Tecnológico de Monterrey

School of Government and Public Transformation

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Autocrats in crisis mode: Strategic favoritism during economic shocks*

Jose Morales-Arilla

Research Professor, Tecnológico de Monterrey

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Abstract

This paper introduces a theory of autocratic redistribution and repression during economic downturns. It predicts that negative shocks induce autocrats to favor supporters in order to limit the scope of protests to opposition groups. I provide evidence on economic outcomes and policy responses to shocks from three different settings. Firstly, I focus on the Venezuelan blackouts of 2019. Nicolás Maduro's autocratic regime protected supporter regions affected by power losses through selective rationing, containing economic consequences, protests and repression to affected opposition areas. In contrast, Hugo Chávez's still democratic government responded to the 1999 Vargas floods with reconstruction efforts that did not engage in political discrimination, leading to balanced economic consequences across the state. Finally, I show that national droughts in Sub-Saharan Africa magnify economic differences favoring leaders' home regions, but only under autocracies rule. These findings show how regime type can shapen the response to economic shocks.

Keywords: Autocracy, Economic shocks, Favoritism, Protest, Repression.

JEL Codes: D7, H4, O1.

*Address: Av. Revolución 756, Nonoalco, Benito Juárez, 03730 Ciudad de México, CDMX. Email: josemoralesarilla@tec.mx. Phone: +1-609-258-8157. I am indebted to Alberto Alesina, Melissa Dell, Edward Glaeser, Ricardo Hausmann, Horacio Larreguy and Nathan Nunn for all their advice and attention. Luis Da Silva, Ana Ibarra and Rui Alleyne provided excellent research assistance. The Growth Lab at Harvard University provided key financial support. I thank insightful suggestions from Marcella Alsan, Peter Buisseret, Jeffrey Frieden, Rema Hanna, Alisha Holland, Gabriel Kreindler, Asim Kwaja, Dan Levy, Francisco Monaldi, Mateo Montenegro, Pia Raffler, Leonard Wantchekon, Jaya Wen and David Yang. I am also thankful for participants' comments in Harvard's Economics Department Development Seminar, Development Workshop and Political Economy and Culture Workshop; Harvard's Government Department Political Economy and Political Violence Workshops; Harvard's Growth Lab Seminar; Princeton's Political Economy Research Seminar; the Causal Inference with Spatial Data Workshop at RWI Essen; the 2022 LACEA-LAMES Conference and the 2022 NEUDC Conference. All errors are my own.

1 Introduction

Autocrats tend to favor their supporters.¹ While such behavior is often attributed to leaders' preferences (Hodler and Raschky, 2014b), the strategic value of in-group favoritism for regime stability remains debated. On one hand, favoring supporters may help retain their backing (Padró i Miquel, 2007). On the other hand, directing benefits towards opponents could prevent the spark of a destabilizing wave of protests (DeNardo, 1985). This trade-off becomes particularly acute during economic crises, when downturns both broaden grievances across society and enable the coordination of dissent.² Moreover, negative shocks impose budgetary constraints on the regime just as citizen demands peak, forcing autocrats to make stark choices about the distribution of economic losses.

This paper examines how autocrats navigate these competing pressures as economic conditions worsen. I formalize a theory of autocratic redistribution, repression and dissent during economic shocks. Downturns induce shared economic grievances that increase citizens' protest payoffs. Citizens are politically heterogeneous: Opponents hold political grievances against the autocrat that motivate their dissent, while supporters do not. Given an economic shock, the autocrat can invest in both repression capacity and targeted appeasement transfers. Supporters and opponents can then 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 broad 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. Under partial appeasement, the autocrat will choose to appease its supporters and save on the cost of compensating the opposition for its political grievances. The

¹There 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.

²The 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).

model’s main result is that as shared economic grievances increase, autocrat’s expected payoff of appeasing both groups worsens relative to the payoff of favoring supporters and confronting limited opposition protests through political repression.

The model implies that autocrats’ in-group favors should grow as economic conditions worsen in order to avoid a broad revolution and repress limited protests by the opposition.³ To test this prediction, I examine economic outcomes and specific policy responses to two unexpected shocks that occurred in Venezuela under *Chavista* rule. By the late 2010s, the Chavista regime had turned decisively autocratic. I study the country-wide, week-long blackouts of early March of 2019, which occurred during a constitutional crisis that heightened the chances of regime change. While the initial power failure affected regime-leaning and opposition-leaning areas similarly, I find that subsequent economic decline—measured through monthly nighttime lights—was concentrated in affected opposition areas. The regime’s policy response reveals clear political discrimination: one month after the blackouts, its power rationing schedule systematically protected supporter regions. Specifically, while greater exposure to the initial blackouts led to a higher likelihood of future power rationing, this relationship is absent for regime-supporting areas. The political consequences were equally stark: blackout-induced protests and repression fatalities spiked after the rationing schedule was implemented, but these effects were confined to opposition-leaning areas.⁴ These findings align with the model’s key prediction: the autocratic regime strategically shielded its supporters from further economic loss to prevent them from joining opposition protests during a period of heightened political vulnerability.

As a democratic benchmark within the same country and under the same ruling

³Higashijima and Washida (2024) distinguish between “relational clientelism”—long-term, network-based exchanges—and “single-shot clientelism”—short-term handouts. In discussing the distribution of relief efforts to specific economic shocks, this paper focuses on “one-shot” clientelar responses. Similarly, Andirin et al. (2022) distinguish between “preventive” repression (surveillance, preemptive detention) and “suppressive” repression (reactive violence against protesters). While the evidence discussed below relates to suppressive responses to protests after the 2019 blackouts, the appendix discusses how the regime used concurrent “preventive” strategies (Mehrl et al., 2025; Morales-Arilla and Abbott, 2024).

⁴Conclusions are robust to alternative sample definitions including the capital city, alternative measures of regime support, various specifications for spatial correlation in standard errors, controls for political competition in divided areas, and adjustments for prior infrastructure investments and state-level heterogeneity. Additional tests rule out alternative mechanisms related to telecommunications access, military infrastructure, oil production, and the potential endogeneity between protests and repression.

political movement, I analyze the “Vargas Tragedy” of December 1999, when the coastal State of Vargas experienced unprecedented torrential rains.⁵ The resulting flash floods and debris flows near river mouths killed approximately 20,000 people—about 10% of the State’s population. The timing is particularly relevant, as the tragedy occurred just as a new constitution was being enacted, triggering general elections within the year. Using grid-level monthly nighttime lights data, I confirm that areas near river mouths experienced significant economic decline after the tragedy. However, this decline shows no political bias—areas that supported Hugo Chávez’s 1998 election were equally affected. Furthermore, maps of Chávez’s reconstruction plans for the Vargas state show no political favoritism in the distribution of recovery efforts. These findings suggest that despite facing electoral pressures, Chávez’s government—still operating under democratic constraints—maintained an impartial response to the shock.

To assess whether the model’s predictions hold outside of the Venezuelan context, I finally examine rainfall shocks in Sub-Saharan Africa, where national droughts have been shown to induce both conflict ([Miguel et al., 2004](#)) and democratization ([Brückner and Ciccone, 2011](#)). This setting offers broad variation in both economic shocks and regime types, hence allowing the contrast of patterns of favoritism during crises between autocracies and democracies. Using nighttime lights as a measure of local economic development, I compare outcomes between leaders’ birth regions and other regions within the same countries. Differences in local development grow in favor of leader-affiliated regions after negative rainfall shocks. However, consistent with the theory, this pattern is contingent to autocratic settings.

To my knowledge, this is the first study showing that regime type can fundamentally

⁵While the model focuses on autocratic regimes, its parameters can be interpreted as capturing the degree of executive control over redistribution and repression, suggesting natural extensions to increased institutional or democratic constraints limiting leaders’ discretion over resource allocation. The model implies that for equivalent shocks, discrimination should be less likely or less severe under stronger constraints. Indeed, [Burgess et al. \(2015\)](#) and [Curto-Grau et al. \(2018\)](#) document how democratic constraints limit partisan favoritism. However, [Schneider and Kunze \(2025\)](#) document a puzzling non-monotonic relationship between favoritism and disaster intensity in democracies. Using quasi-experimental variation from US hurricane strikes, They show no partisan bias in disaster relief declarations for very strong or very weak hurricanes, but areas governed by co-partisans receive up to twice as many declarations after medium-intensity hurricanes. The authors attribute this hump-shaped favoritism dynamic to “ambiguous decision situations” where relief necessity is unclear.

shape the orientation of policy responses to economic shocks. The evidence presented in this paper is largely consistent with the model’s prediction that autocratic regimes engage in strategic in-group favoritism in response to negative economic shocks to contain the threat of broad-based protests. The paper contributes to the scholarship on the political economy of development and autocratic governance. First, considering the interaction of material shocks and regime type, the paper adds to the literature on in-group favoritism (Franck and Rainer, 2012; Kramon and Posner, 2013; Hodler and Raschky, 2014b; De Luca et al., 2018; Dickens, 2018) and expands the still limited but increasingly relevant literature on the political economy of disaster relief and prevention (Cohen and Werker, 2008; Cooperman, 2021; Garrett and Sobel, 2003; Reeves, 2011; Strömberg, 2007; Kahn, 2005).

On the theoretical front, I build on Acemoglu and Robinson (2001)’s framework showing how economic shocks can trigger revolutionary threats and regime change.⁶ However, by incorporating citizen political heterogeneities and allowing autocrats to blend repression with targeted redistribution, the model generates new equilibrium outcomes where autocrats selectively shield supporters from further economic losses while confronting opposition protests.⁷ The model also extends the literature on autocratic favoritism beyond existing accounts. While Padró i Miquel (2007) argues that autocrats favor supporters to make them "fear" an outsider status under a new regime, I show how simpler grievance-based motives can explain increased favoritism during crises.⁸ To the extent of my knowledge, this is the first theoretical formalization of autocratic behavior during destabilizing crises that considers both political differences within the population and the regime’s capacity to respond jointly through selective redistribution and repression.

⁶Contrary to this perspective, Boix (2003) argues that higher threats of expropriation during economic shocks should heighten the costs for elites to relinquish political control, hence reducing the chances of democratization.

⁷While such instances are anecdotally prevalent, they are not on the equilibrium path in Acemoglu and Robinson (2001) and Acemoglu et al. (2004).

⁸The 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.

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 favor 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 undesirable, and autocrats move towards a strategy of in-group favoritism. An important feature of the model is that autocrats facing smaller shocks may choose to favor the opposition to avert dissent.⁹ More generally, Larreguy et al. (2025) provide a cogent model and empirical evidence of autocratic distribution of favors and repression in response to increased dissent at earlier stages of contestation, when regime change is not yet at stake.

This paper's theoretical framework and empirical focus on Venezuela under Maduro map most directly onto the "personalist" kind of autocracies, where power concentrates in the hands of leaders who personally weigh redistribution costs against survival risks.¹⁰ Moreover, this paper focuses on material redistribution and repression as key autocratic tools for managing dissent during economic shocks. Modern dictatorships employ a broader crisis management toolkit, increasingly relying on propaganda, media control, and censorship to shape narratives around crises—strategies that can complement material favoritism and repression.¹¹ However, information manipulation may backfire when

⁹This scenario would be consistent with Wen (2020), who finds that the Chinese government responds to ethnic tensions in the Xinjiang region by targeting public job opportunities to male minorities in other regions of the country.

¹⁰The model features a unitary autocrat who maximizes personal rents while facing existential removal threats, mapping most precisely to "personalist" autocracies where leaders personally optimize for survival, as opposed to "institutionalized" autocracies optimizing for party longevity or technocratic performance. Blattman et al. (2025) show that the documented economic underperformance of autocracies relative to democracies is primarily a "personalist penalty". Other studies emphasize substantial heterogeneity within non-democratic regimes, with important implications for crisis management (Shih, 2020; Matovski, 2021; Djuve and Knutsen, 2024; Neundorff et al., 2025).

¹¹Guriev and Treisman (2019) argue that modern dictatorships have shifted toward "informational autocracy," relying on propaganda and censorship while concealing coercion. Recent studies document autocratic propaganda in official GDP estimates (Martinez, 2022), and discuss how repression and propaganda can work as strategic complements (Gitmez and Sonin, 2023; Gehlbach et al., 2025). As discussed in the appendix, the Maduro regime's response to the 2019 blackouts combined selective electricity provision and repression with aggressive propaganda attributing the crisis to foreign sabotage.

material deprivation has obvious proximate causes and alternative regime narratives lack credibility (Goldring et al., 2025; Aytac, 2021). Still, increased needs for assistance and the potential for blame-shifting can be such that economic shocks may actually provide opportunities for autocratic consolidation (Rahman et al., 2023).¹² This suggests that for shocks to be destabilizing to autocratic regimes—as the literature largely suggests—certain preconditions about the nature of the shock, opposition coordination capacity and general attitudes about the regime must be met (Manacorda and Tesei, 2020; Enikolopov et al., 2020; Leuschner and Hellmeier, 2024). As discussed in the Appendix, the Venezuelan blackouts of March 2019 exemplified such conditions: the opposition maintained substantial organizational capacity following months of mass protests, the concurrent constitutional crisis had already eroded regime legitimacy, and the blackouts created clear, widespread material deprivation with infrastructure failure as an evident cause.

The paper continues as follows: Section 2 summarizes the theoretical model. Section 3 presents evidence from the 2019 Venezuelan Blackouts. Section 4 presents from the 1999 Vargas Tragedy. Section 5 presents evidence from national droughts in Sub-Saharan Africa. Section 6 concludes.

2 Model summary

In this section, I briefly describe the structure and predictions from the theoretical model of autocratic redistribution, protest and repression during economic shocks, which I develop in full in Appendix Section A.1. The model has three agents, the autocrat, the supporters and the opposition. Economic shocks (Z) are the difference between actual and expected incomes, and are known to all agents at the beginning of the game. While supporters only experience economic grievances from the economic shock, the opposition also holds a political grievance against the regime.

Citizens will decide whether to protest or not based on how their political and economic grievances measure in comparison to the costs of experiencing repression during protests. Protest choices are strategic complements, as the costs of repression are lower

¹²Indeed, Cantoni et al. (2024) show that economic performance only weakly predicts protests.

if protests are larger. Before supporters and opponents decide whether to protest or not, the regime will decide how much to invest in repression and in targeted transfers to ameliorate grievances. The costs of investing in repression for the regime are convex.

The regime's objective is to maximize expected rents from remaining in office, net of repression costs and targeted transfers. Rents from office are affected by the economic shock. In the absence of protests, the regime remains in office with certainty. If both groups protest, the regime is deposed with certainty. If only one group protests, there is a known probability that the regime is deposed. Once a negative economic shock is realized, it is never optimal for the regime to allow both groups to protest, so it will engage in some repression investments and targeted transfers in order to appease society.

The regime needs to choose whether to appease both groups and remain in office with certainty at a higher cost, or to allow for partial protests by one of the groups at a lower cost but risking the probability of being deposed. A key point is that, if opting for partial protests, it will always be cost-effective for the regime to appease supporters, as they do not require compensation for past political grievances.

At very low negative economic shocks, investing strictly in repression is strategic for the regime, as marginal costs are low and it affects both groups' payoffs. However, given the convexity in repression costs, the regime will start using targeted transfers at some point during stronger economic shocks. At mild shocks, the rent of remaining in office with certainty is high and the costs of fully appeasing society are low. However, as economic shocks grow, rents of certain office dwindle and the costs of full appeasement grow. As shown in Figure 1, the difference between the regime's expected payoffs under no protests and under partial protests will shrink for stronger economic shocks, and will actually become negative after a threshold shock level (Z^*).

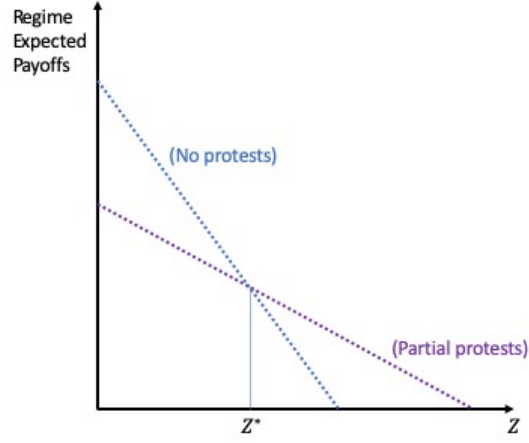


Figure 1: Regime returns for full and partial appeasement strategies

For economic shocks under Z^* , the regime will achieve full appeasement through repression and potentially through a transfer vector that benefits the opposition. But as shown in Figure 2, for shocks beyond Z^* , the regime will opt for partial appeasement by investing in repression and targeted transfers for its supporters. These “in-group” transfers will continue to grow for even greater economic shocks. In this scenario, the regime will engage in confront opposition protests, as it was not appeased.

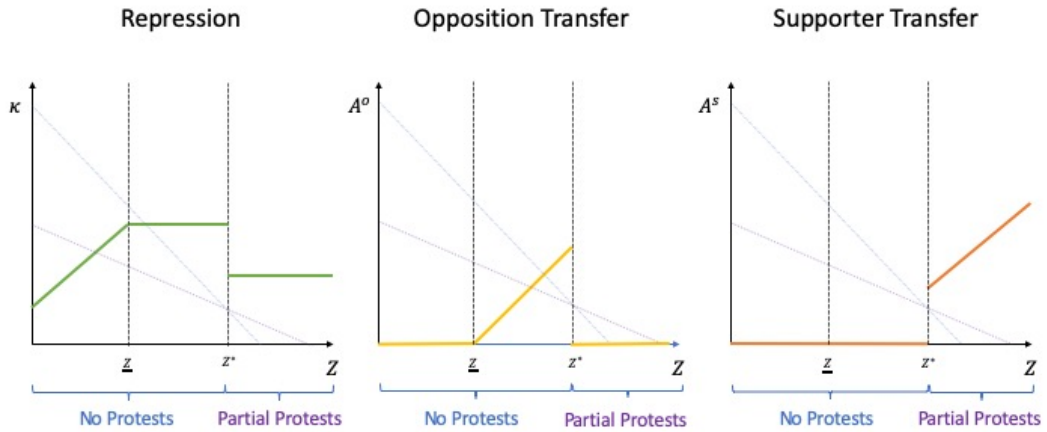


Figure 2: Regime choices as a function of the economic shock

The key implications of the model that I take to the data is that stronger economic shocks induce regimes to transfer favors to their supporters (“in-group favoritism”) so that they do not 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, in measures of political repression, and in the degree of affiliation with the current regime.

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 stronger political heterogeneity in shock-related relief policies and in the levels of protests and repression in areas more strongly affected by an economic 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. A thorough description of the empirical setting is provided in the Appendix Section [A.2](#). 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, along with weekly panel variation in local protests, along with monthly panel variation in repression fatalities. 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 choices, on citizens’ political protests, and on the number of repression fatalities. I find that all results are consistent with the model’s predictions.

3.1 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 area¹³ 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 2019.¹⁴ But perhaps most importantly, events during this initial shock were not endogenous to the regime policy responses that I study as outcomes.

Daily nighttime lights data comes from NASA’s Black Marble Project¹⁵, 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 $500\text{m} \times 500\text{m}$ 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 several regions across the country.¹⁶ I then calculate the total radiance of the administrative unit as the zonal sum for the grids within each administrative unit’s polygon.¹⁷ I finally add the relevant days for the pre-blackout reference and the original blackout period, and calculate the drop rate of total radiance between the two periods. Figure 3 shows that blackouts lasted longer in the north-western region, where power supply became much more unreliable even after the initial blackout was

¹³Venezuela 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.

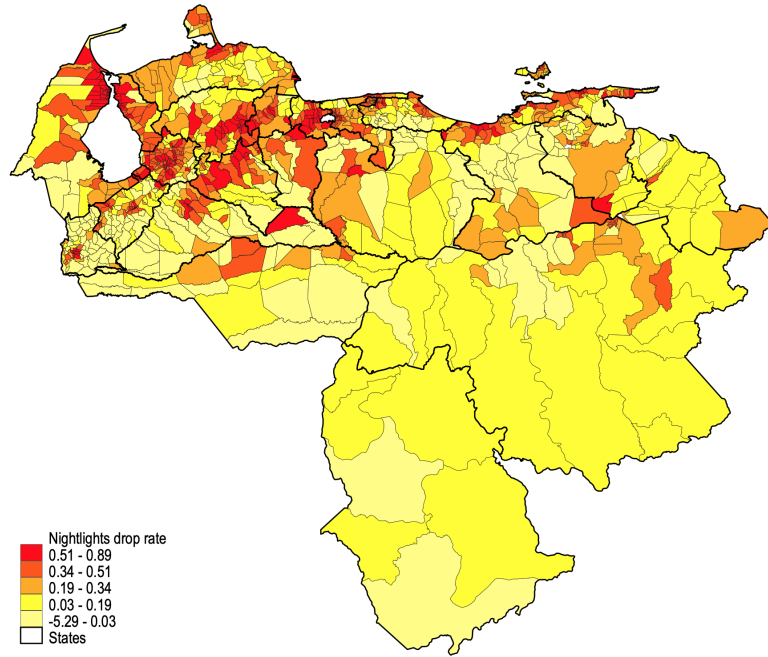
¹⁴Monash University’s IP Observatory provides interesting insights on IP connections to the internet from a set of Venezuelan cities during the crisis. Consistent with the discussion above, the gap between latent and actual internet connectivity was greatest for Maracaibo -the largest city in North-Western Venezuela- both during the March blackouts and all through April and May. See [Monash University IP Observatory \(2019\)](#).

¹⁵See [Román et al. \(2018\)](#).

¹⁶Flare data from [NOAA National Centers for Environmental Information \(2024b\)](#).

¹⁷Shapefiles for Venezuela’s administrative units can be found at UN’s Humanitarian Data Exchange. See [UN Office for the Coordination of Humanitarian Affairs \(2024\)](#).

Figure 3: Local exposure to the blackouts of early March 2019



Notes: Daily nighttime lights 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 ($-\left[\text{Radiance}_{\text{post}}/\text{Radiance}_{\text{pre}} - 1\right]$).

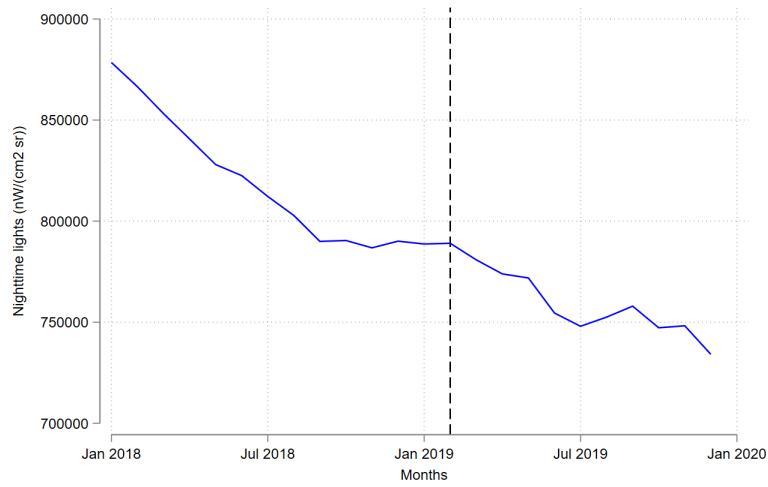
contained.¹⁸

I measure the degree of economic deterioration in different areas with data from NASA’s Visible Infrared Imaging Radiometer Suite (VIIRS). Specifically, I use grid-month Cloud-free day night band composite scores from the Earth Observation Group at Colorado School of Mines’ Payne Institute for Public Policy (Elvidge et al., 2013). I aggregate the granular measure of total nightlight radiance ($\text{nW}/(\text{cm}^2 \text{ sr})$) at the parish-month level using the same shapefiles as above. Figure 4 shows the monthly erosion of total nighttime lights across all parishes in the country between January 2018 and December 2019.

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

¹⁸16% 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 nighttime lights 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.

Figure 4: Monthly nighttime lights in Venezuela

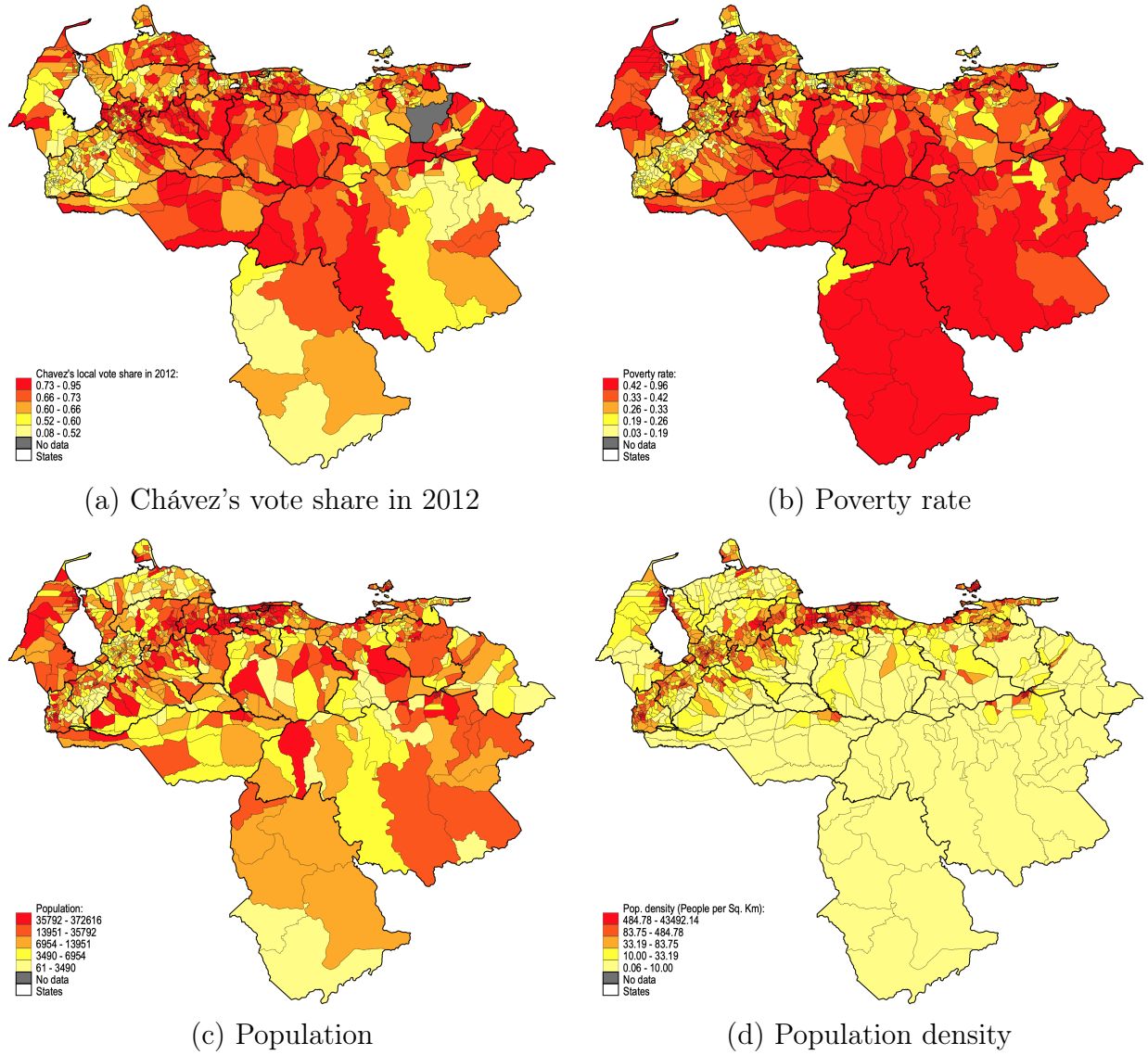


Notes: Monthly nighttime lights measure from VIIRS aggregated across all Venezuelan parishes, removing municipalities with gas flaring presence.

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 5 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. Furthermore, I take data from the Armed Conflict Location Event Data Project (ACLED) to identify events of political

Figure 5: Regime Support, Poverty, Population and 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.

repression that led to fatalities, aggregating the number of repression-related fatalities at the municipality-month level.¹⁹ Figure 6 shows the spatial distribution of total utility protests, political protests and fatalities in repression events across Venezuelan municipalities during the first semester of 2019. Figure 7 shows the evolution of weekly protests during the first semester of 2019, and Figure 8 shows the number of fatalities in repression events each month between July 2018 and July 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.²⁰ Figure 9 identifies parishes that were rationed from those that were spared from rationing.

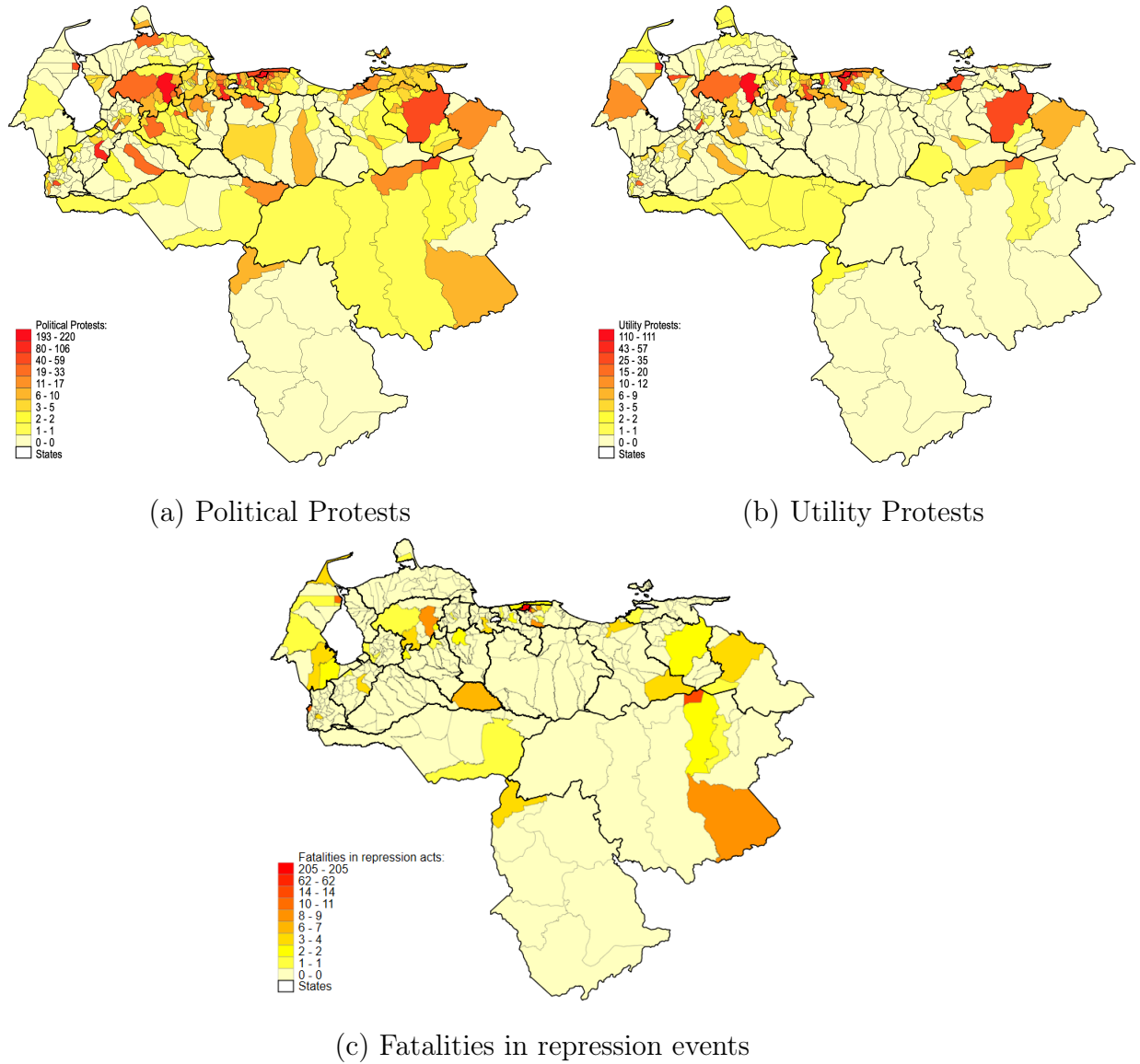
Finally, I produce a broad set of variables capturing how each administrative unit relates to the structure of the Venezuelan power supply grid. First, I identify and geolocate all power generation plants and transmission substations in the country from official sources, and then map the network structure 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. Figure 10 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.

Table A.1 provides summary statistics for the main variables used in the analyses that follow.

¹⁹ACLED classifies events of conflict according to the relationship between the actors engaged in that event. I consider events classified as “Violence against civilians”, “Arrests” and “Excessive force against protesters” as events of political repression.

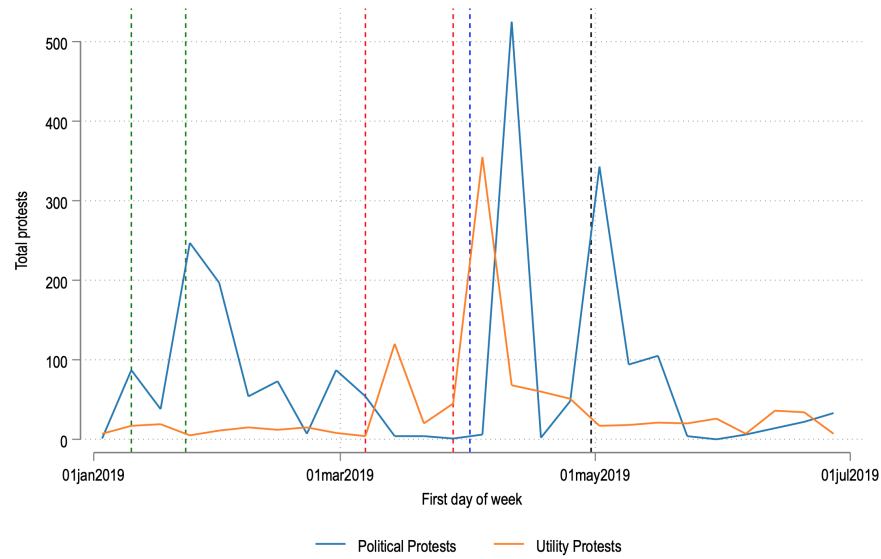
²⁰I thank Helena Carpio for sharing this information with me. See Carpio and Prodavinci (2019).

Figure 6: Protests and repression fatalities during the first semester of 2019



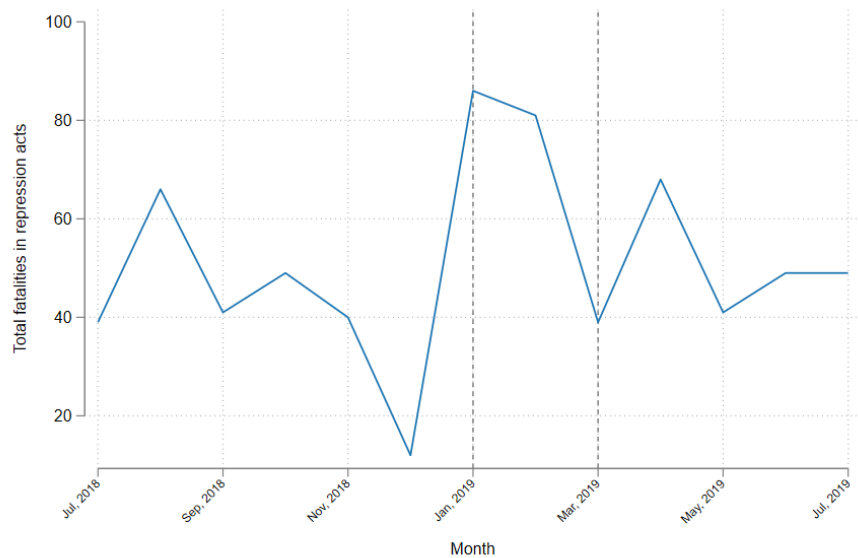
Notes: Panels A and B show the spatial distribution of political and utility protests across Venezuelan municipalities during the first semester of 2019. Data is from the Venezuelan Observatory of Social Conflict (OVCS). Protest events are classified as either expressing “political” or “utility” demands according to the grievance expressions associated to each event as coded by OVCS. Panel C shows the spatial distribution of fatalities in repression events during the first semester of 2019. Data comes from the Armed Conflict Location Event Data Project (ACLED). Events classified as “Violence against civilians”, “Arrest” or “Excessive force against protesters” are considered acts of “repression”. Map shows total fatalities in acts of repression in each municipality in the country.

Figure 7: Weekly Protests in Venezuela, first semester of 2019



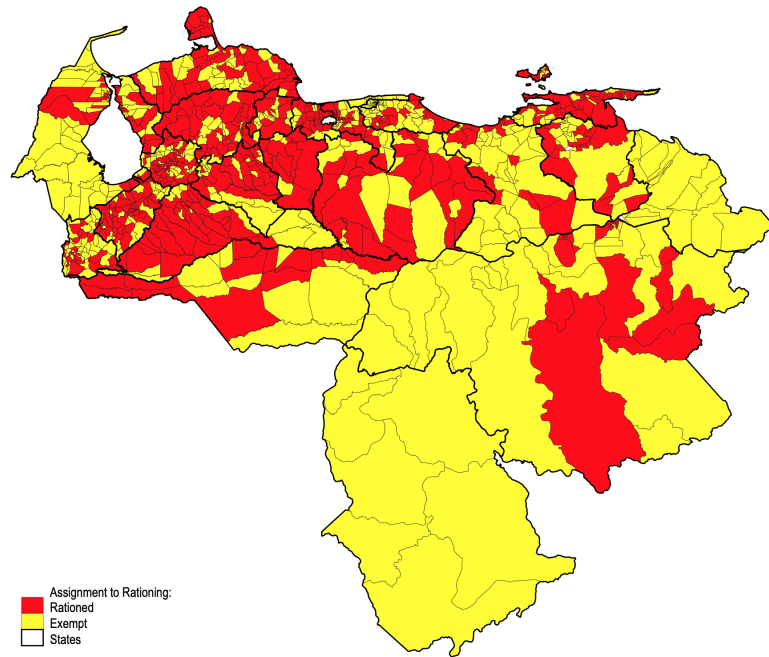
Notes: Data comes from the Venezuelan Observatory of Social Conflict (OVCS). Protests are classified as “political” when they focus on expressing rejection against the Maduro regime, and they are classified as “utility” when they focus on demands for improved access to water and power services. Weekly 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).

Figure 8: Monthly repression fatalities in Venezuela



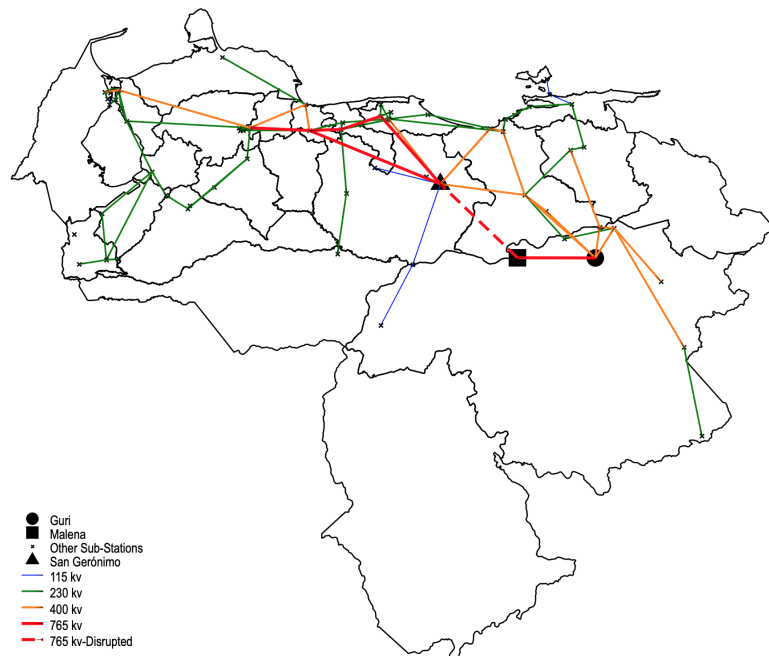
Notes: Data comes from the Armed Conflict Location & Event Data Project (ACLED). Events classified as “Violence against civilians”, “Arrest” or “Excessive force against protesters” are considered acts of “repression”. Monthly fatalities during acts of repression are shown. Vertical dashed lines highlight the start of the constitutional crisis (January, 2019) and the start of the blackouts (March 2019).

Figure 9: 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.

Figure 10: 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.

3.2 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 power grid. Specifically, I estimate the following regression specification:

$$S_p = \alpha Shock_p + \sum_{k \in \{Ch, P, D\}} \beta^k C_p^k + \sum_{k \in \{Ch, P, D\}} \gamma^k Shock_p * C_p^k + f(G_p) + \epsilon_p \quad (1)$$

where S_p is a dummy variable for whether parish p was spared from power rationing or not, $Shock_p$ is the local nighttime lights 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 substation 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 level of regime support, and their interaction with the probability of being spared from the regime’s power rationing schedule.

Table 1 provides estimates for Equation 1. 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 between both terms, Column 2 suggests that the effect of a 1 s.d. increase in regime support on the probability of being spared from rationing grows by 3.4pp in parishes with a 1 s.d. higher exposure to the blackouts. Comparing parishes that connect similarly to the power grid reveals technical and political motives behind the regimes’ rationing choices. Column 3 adds the “grid controls” described above and shows that parishes suffering a 1 s.d. higher exposure to the blackout experience a 5 pp lower probability of being spared from power rationing, while a 1 s.d. increase in baseline regime support associates with a 8.2 pp higher probability of being spared. Column 4 assesses the political heterogeneity in the technical effect of blackouts on power rationing, and confirms the results described in Column 2. Column 4 provides the “baseline” reference for later regression tables. Figure 11 builds on the results from Column 4 to provide estimated marginal effects of the local exposure to the blackout on the regime’s rationing choices at different levels of baseline support. The figure confirms that the technical connection between local blackout exposure and power rationing is only present in opposition-leaning areas.

Table 1: Blackouts, Regime Support and Power Rationing

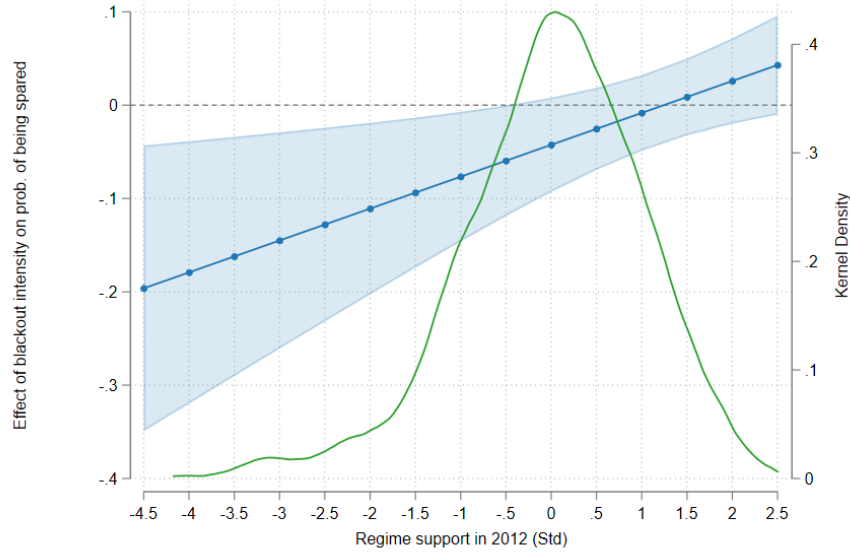
VARIABLES	(1)	(2)	(3)	(4)
	Parish spared from rationing			
Shock	-0.0356 (0.0222)	0.0126 (0.0210)	-0.0499** (0.0236)	-0.0425** (0.0195)
Regime Support	-0.0205 (0.0264)	-0.0263 (0.0232)	0.0824*** (0.0292)	0.0723*** (0.0275)
Shock $\times$ Support		0.0344* (0.0191)		0.0341*** (0.0123)
Observations	1,076	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

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 \(2010\)](#). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

I provide further evidence that these results are not driven by politically “split” parishes. A seminal insight in political economy is that politicians should target “swing voters” who are not uncompromising in their political behavior ([Downs et al., 1957](#); [Lindbeck and Weibull, 1987](#); [Feddersen and Pesendorfer, 1996](#); [Robinson and Torvik, 2009](#)) and who may reside in politically split regions. Moreover, there may be information advantages of protecting regime support in split areas of the country ([Balcells, 2010](#)). Table [A.2](#) considers whether a split level of regime support affects informs the regime’s rationing choices.²¹ Column 1 provides the baseline specification as reference. Column 2 shows no statistically significant effect of split support on rationing choices. Column 3 confirms both the results of the baseline specification and the absence of independent

²¹The degree to which the support for the regime is considered “split” is measured by the negative of the absolute difference between a given parish and the average level of regime support across all parishes.

Figure 11: Marginal effect of the blackout at different levels of regime support.



Notes: Figure provides estimates of the effect of 1 s.d. increase in the local exposure to the blackout on the probability of being spared from power rationing at different levels of Chávez’s vote share in 2012.

effects for the split support.²²

Furthermore, I evaluate whether these results can be explained by the deployment of prior power infrastructure favors towards regime-supporting regions. While the lion share of the Venezuelan power grid was built before Chávez first took office, later investments could explain these results if any supplementary infrastructure allows blackout-affected, regime-supporting regions to regain access to power supply and avoid the need to be rationed. To address this possibility, I leverage information about the location of “*Generación Distribuida*” local power plants procured and installed by the Government between 2009 and 2011.²³ While small in comparison to the inherited installed power generation capacity in the country, these investments constituted the largest addition to the power generation system in Venezuela during the Chávez and Maduro administrations.²⁴ Most importantly, the small scale of each investment allowed for the pursuit of

²²Controlling for split support does make the estimates for the effects of regime support more imprecise. This problem of collinearity is explained by the fact that the measure of split support is a linear transformation of the level of regime support at each side of its average level. Still, we observe that the estimated effects of regime support on power rationing are largely unaffected.

²³Information about the location and power generation capacity of each of these power plants comes from Corpoelec, the national electricity company. See [Corpoelec \(2011\)](#).

²⁴These 117 localized plants added 1,295 MW to the Venezuelan power generation system. As reference, the Guri hydropower plant has an installed generation capacity of 10,325 MW.

local political priorities in their deployment. Table A.3 tests whether controlling for State fixed-effects or/and for the local presence of one of these “local plants” affects the main results. The main conclusions of the analysis remain unaffected.

Finally, Table A.4 tests for the possibility that the main results are driven by alternative political or economic mechanisms. In particular, I study whether the results are robust to controlling for, or are specific to, areas with a high reach of the 4G cellular network, areas with Military barracks, and oil producing regions. The regime might have decided to ration electricity in blackout-affected, opposition-leaning areas of the country in order to limit the opposition’s access to social networks and other protest coordination-enabling technologies. If this was the case, we would expect the results to concentrate in areas with high baseline access to these technologies. I measure this baseline access with data from the OpenCellID.²⁵ I measure the share of the area in each parish that is covered by the 4G Network. Column 1 shows that the main results are robust to controlling for the reach of the 4G network, and Column 2 shows that the main results are not largest for areas with high network coverage. Similarly, the regime may have tried to spare the military infrastructure from further rationing in order to avoid loss of morale and coup coordination, and this infrastructure may be strongest in regime supporting areas. If this was the case, the main effects of the study would be expected for areas with presence of military infrastructure. I analyze whether the presence of military barracks explain rationing choices.²⁶ Column 3 shows that the main results are robust to controlling for the presence of military barracks, while Column 4 shows that the results are not contingent to parishes with military barracks. Finally, rationing decisions may have been geared towards improving power access in regime-supporting oil producing regions only supporters work in the oil sector, and their protests would disrupt oil operations. If this was the case, results would concentrate in oil producing regions in the country. Column 5 shows that the main results are robust to controlling for an indicator of local presence of oil production. Column 6 shows that effects the main results do not seem exclusive to

²⁵See [OpenCellID \(2024\)](#).

²⁶I thank José Gustavo Arocha, Ronna Risquez and Luis Da Silva for their help in building this dataset.

oil producing areas.

3.3 Economic effects of Blackout

I now study parish-month panel data on nighttime lights to assess whether the economic effects of the blackout were disproportionately high in opposition-leaning parishes, as would be expected by the evidence on the regime’s power rationing choices.²⁷ I perform the following regression specification:

$$NL_{pt} = \alpha * Shock_p * Post_t + \sum_{k \in \{Ch, P, D\}} \beta^k * C_p^k * Post_t + \sum_{k \in \{Ch, P, D\}} \gamma^k * Shock_p * C_p^k * Post_t + \psi_p + \psi_{gt} + \epsilon_{pt} \quad (2)$$

Where NL_{pt} is the inverse hyperbolic sine of the per capita nighttime lights of parish p in month t .²⁸ $Shock_p$ is the cross-section variation in parish p ’s exposure to the blackout, and $Post_t$ is a binary marker for whether month t is in the post-blackout period. C_p^k is the value of the k cross-section covariates (Chávez’s 2012 vote share, and the population density and poverty rate in 2011) in parish p . ϕ_p and ϕ_{gt} are fixed effects by parish p and by the interaction of month t and the nearest transmission station in the power grid to parish p . ϵ_{pt} is the error term. All explanatory variables are standardized to interpret estimates as the effect of 1 s.d. treatment changes. The key estimates of interest are α , β^{Ch} and γ^{Ch} , as they evaluate the effects of a 1 s.d. higher blackout intensity, higher

²⁷Before doing this, it is important to show that the shock was not disproportionately concentrated in regime opposing areas of the country. Table A.5 shows the correlation between the local intensity of the blackout and its level of baseline regime support. Column 1 shows that the intensity of the shock and regime support are negatively correlated, and Column 2 shows that this result holds after controlling for sociodemographic covariates. However, the correlation disappears after adding fixed-effects for the nearest transmission substation, which accounts for the way in which each parish connects to the country’s power grid. This last result is robust to including Caracas in the specification and to accounting for the possibility of spatial correlation of errors across parishes within the same State. This confirms that, conditional on socioeconomic controls and the structure of the Venezuelan power grid, the intensity of the blackout was not systematically associated with baseline regime support levels.

²⁸I use nighttime light measures to proxy for local economic outcomes in my three sets of empirical evidence (Venezuelan Blackouts of 2019, the Vargas Tragedy of 1999 and National droughts in Sub-Saharan Africa). Because these measures tend to be highly right-skewed and to have a high proportion of observations taking values of 0, I use the inverse hyperbolic sine (IHS) transformation of total nighttime light values across all my baseline analyses. See Bellemare and Wichman (2020).

degree of regime support and their interaction on local nighttime lights. All regressions exclude parishes in Caracas from the sample, weight observations by population size and cluster standard errors considering potential error correlation within a 200 km. bandwidth following [Conley \(2010\)](#).

Table 2 provides estimates for α , β^{Ch} and γ^{Ch} as described in Equation 2. Column 1 shows that a 1 s.d. increase in the intensity of the blackout associates with a 2% drop in nighttime light intensity, while a 1 s.d. increase in regime support associates with a 0.07% decrease in luminosity. Column 2 considers the interaction between the intensity of the blackout and baseline regime support, finding that the negative effect of the blackout on later nighttime lights is attenuated in regime supporting areas: a 1 s.d. increase in Chavista support in the 2012 elections reduces the effect of the blackout by 1.5 percentage points. The result suggests that blackout exposure had disproportionate economic effects in opposition-leaning areas of the country, as would be expected by the discrimination in power rationing choices documented in the previous sub-section.

Panel A in Figure 12 shows month-specific estimates for α on nighttime lights, while Panel B provides month-specific estimates for γ^{Ch} , both taking February of 2019 as reference period. The figure confirms parallel pre-blackout trends along the local exposure to the shock and its interaction with baseline regime support. While Panel A shows negative and significant estimates in March of 2019, the first statistically significant coefficient in Panel B occurs in April, pointing to the implementation of the rationing schedule in early April as a key determinant for the political heterogeneity in the effect of the blackout. Panel C shows the estimated marginal effect of the local exposure to the blackout on nighttime lights at different points of the Chávez’s 2012 vote share distribution, showing that the negative effects of the blackout concentrated in opposition leaning areas, and were essentially null in locations with levels of regime support 1 s.d. higher than the mean.²⁹

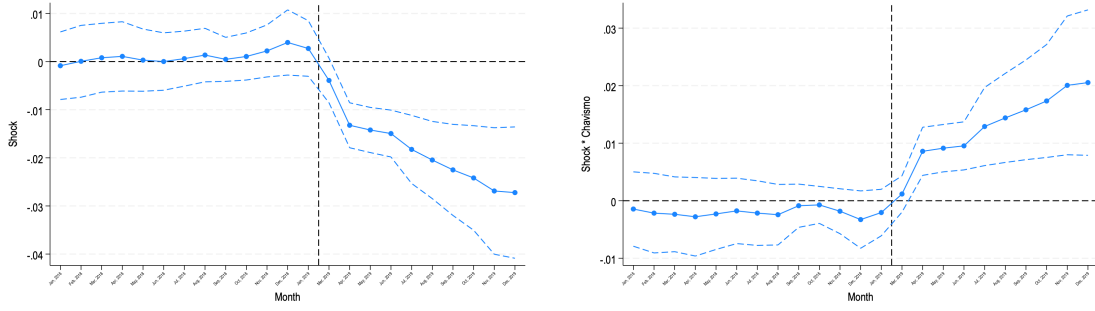
²⁹I use the `acreg` package and function in Stata ([Colella et al., 2023](#)) to estimate [Conley \(2010\)](#) robust standard errors. Unfortunately, because `acreg` cannot currently take interaction terms as inputs, it cannot be used to estimate the marginal effects of blackout exposure at different levels of regime support. For this reason, the 95% confidence intervals shown in Panel C were estimated clustering standard errors across parishes within the same state.

Table 2: Blackouts, regime support and economic outcomes

VARIABLES	(1) Nighttime lights (Inverse hyperbolic sine)	(2)
Shock $\times$ Post	-0.0207*** (0.00298)	-0.0196*** (0.00224)
Regime support $\times$ Post	-0.000663** (0.000333)	-0.00574*** (0.000913)
Shock $\times$ Support $\times$ Post		0.0148*** (0.00213)
Parish FE	Yes	Yes
Month $\times$ Nearest Station FE	Yes	Yes
Socioeconomic Controls	Yes	Yes
Observations	25,824	25,824
R-squared	0.146	0.209

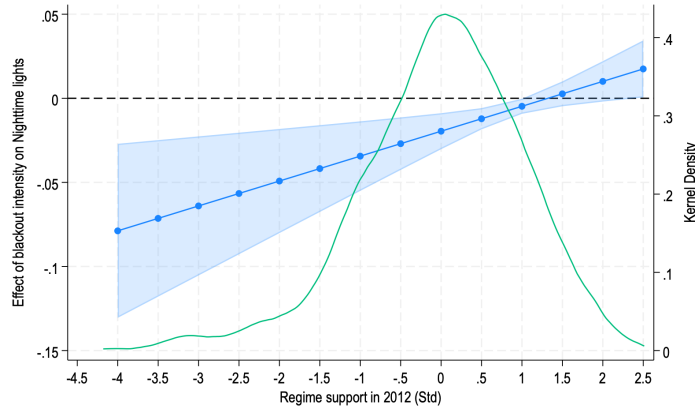
Notes: The table summarizes key results of a difference-in-differences specification assessing the effect of the local exposure to the blackout on nighttime lights at different levels of regime support. Column 1 controls for the interactions between the local poverty rate and the local population density with the identifier of the post-treatment period, while Column 2 also controls 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 \(2010\)](#). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure 12: Blackouts, regime support and nighttime lights



(a) Month-specific: Shock

(b) Month-specific: Shock $\times$ Support



(c) Marginal effect of Shock

Notes: Figures show effect on nighttime lights. Panel A provides month-specific coefficient estimates for the local exposure to the blackout. Panel B provides month-specific coefficients for the interaction between the local exposure to the blackouts and the baseline regime support. Panel C shows the marginal estimated effect of a 1 s.d. increase in the local exposure to the blackouts at different levels of baseline regime support. 95% confidence intervals for Panels A and B were calculated by clustering standard errors within a 200 km. bandwidths following [Conley \(2010\)](#), while the 95% confidence interval of Panel C was calculated clustering standard errors at the state level.

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:

$$\begin{aligned}
P_{mw} = & \alpha * Shock_m * Post_w + \sum_{k \in \{Ch, P, D\}} \beta^k * C_m^k * Post_w + \\
& \sum_{k \in \{Ch, P, D\}} \gamma^k * Shock_m * C_m^k * Post_w + \psi_m + \psi_w + \epsilon_{mw}
\end{aligned} \tag{3}$$

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 explanatory variables 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 described in Equation 3, 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.

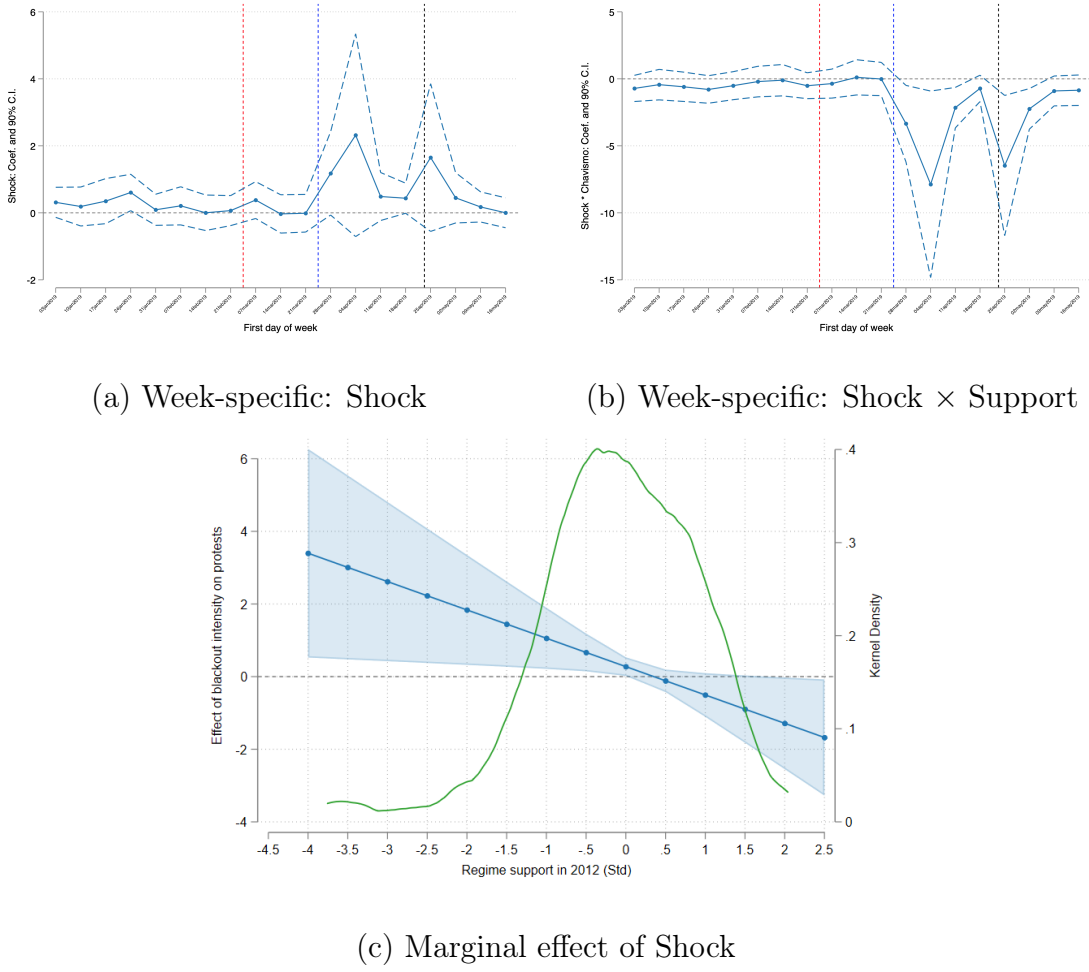
Panel A in Figure 13 shows week-specific estimates for α on total protests, while Panel B provides week-specific estimates for γ^{Ch} on total protests, both taking the week before the blackouts as reference. The figure confirms parallel pre-blackout trends along the local exposure to the shock. Importantly, the figure also confirms that the political heterogeneity in the effect of blackouts did not occur immediately after the blackouts. The key spike in these effects 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 C 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.

Table 3: Blackouts, regime support and protests

VARIABLES	(1) All Protests	(2) All Protests	(3) Utility Protests	(4) Utility Protests	(5) Political Protests	(6) Political Protests
Shock $\times$ Post	0.304* (0.171)	0.154 (0.104)	0.220** (0.100)	0.164*** (0.0584)	0.301* (0.157)	0.177* (0.0911)
Regime Support $\times$ Post	-0.824* (0.425)	-0.612* (0.322)	-0.442* (0.243)	-0.313* (0.183)	-0.785** (0.390)	-0.585** (0.293)
Shock $\times$ Support $\times$ Post		-0.850* (0.449)		-0.451* (0.260)		-0.761* (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

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 focus on total weekly protests in a municipality, while 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). *** p<0.01, ** p<0.05, * p<0.1

Figure 13: Blackouts, regime support and protests



Notes: Figures show effect on total weekly protests. Panel A provides week-specific coefficient estimates for the local exposure to the blackout. Panel B provides week-specific coefficients for the interaction between the local exposure to the blackouts and the baseline regime support. 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 C shows the marginal estimated effect of a 1 s.d. increase in the local exposure to the blackouts at different levels of baseline regime support. 95% confidence intervals for Panels A and B were calculated by clustering standard errors within a 200 km. bandwidths following [Conley \(2010\)](#), while the 95% confidence interval of Panel C was calculated clustering standard errors at the state level.

3.5 Effects of the Blackout on Repression

Similar to the case of protests, I leverage panel data to study the effect of the blackout on repression fatalities during the political crisis. I again perform a difference-in-difference specification considering total monthly repression fatalities at the municipality level between July 2018 and July 2019 as outcome variable. I estimate the following regression specification:

$$\begin{aligned}
K_{mp} = & \alpha * Shock_m * Post_p + \sum_{k \in \{Ch, P, D\}} \beta^k * C_m^k * Post_p + \\
& \sum_{k \in \{Ch, P, D\}} \gamma^k * Shock_m * C_m^k * Post_p + \psi_m + \psi_p + \epsilon_{mp}
\end{aligned} \tag{4}$$

where K_{mp} is the total number of repression fatalities in municipality m in the month period p . $Shock_m$ is the cross-section variation in municipality m 's exposure to the blackout. $Post_p$ is a binary variable identifying whether month p is in the post-blackouts period. C_m^k is the value of each of the k cross-section co-variates in municipality m . ψ_m and ψ_p stand for municipality and month fixed effects, and ϵ_{mp} is the error term. All explanatory variables are standardized to interpret estimates as the effect of 1 s.d. differences on the total number of repression fatalities. 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 repression fatalities. 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 4 provides estimates for the regression specification described in Equation 4, evaluating effects on total repression fatalities. Column 1 shows that a 1 s.d. increase in the blackout associates with 0.03 additional fatalities, while a 1 s.d. increase in baseline regime support associates with a drop in 0.1 fatalities. These coefficients, however, are imprecisely estimated and are not statistically significant. Column 2 explores the interaction between the blackouts shock and baseline regime support shares, and finds political heterogeneities in how the blackout affected repression: a 1 s.d. increase in Chávez's 2012 vote reduces the effect of the shock on repression by 0.19 fatalities. Panel A in Figure 14 shows month-specific estimates for α , while Panel B provides month-specific estimates for γ^{Ch} , both taking the month before the blackouts as reference. The figure confirms the patterns detected for protest activity: While pre-blackout trends along the local exposure to the shock are parallel, the effect of blackouts on repression did not occur immediately

after the blackouts but in April, after the roll-out of the rationing schedule. Panel C shows the estimated marginal effect of local exposure to the blackout on repression fatalities at different points of the Chávez’s 2012 vote share distribution, confirming that the blackout induced a spike in repression fatalities in opposition areas of the country.

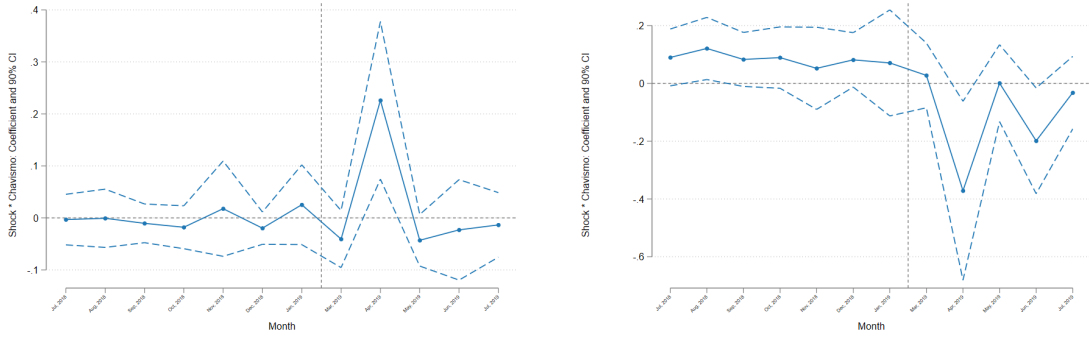
As some repression fatalities are recorded during events of “excessive violence against protesters”, there is a question of whether the effects on repression constitute an independent test of the model. The model suggests that economic downturns should induce autocratic regimes to repress the opposition as it takes to protest. For this reason, the fact that the two processes are connected is a feature of tests described above. Still, Table A.6 shows that these results are robust to controlling for the concurrent and lagged levels of protests, and that results are robust to excluding fatalities during protest repression.

Table 4: Blackouts, regime support and repression fatalities

VARIABLES	(1) Fatalities in repression events	(2)
Shock $\times$ Post	0.0309 (0.0305)	0.0223 (0.0303)
Support $\times$ Post	-0.0972 (0.0704)	-0.0355 (0.0587)
Shock $\times$ Support $\times$ Post		-0.188*** (0.0665)
Observations	4,316	4,316
R-squared	0.063	0.086
Municipality FE	Yes	Yes
Month FE	Yes	Yes
Socioeconomic Controls	Yes	Yes

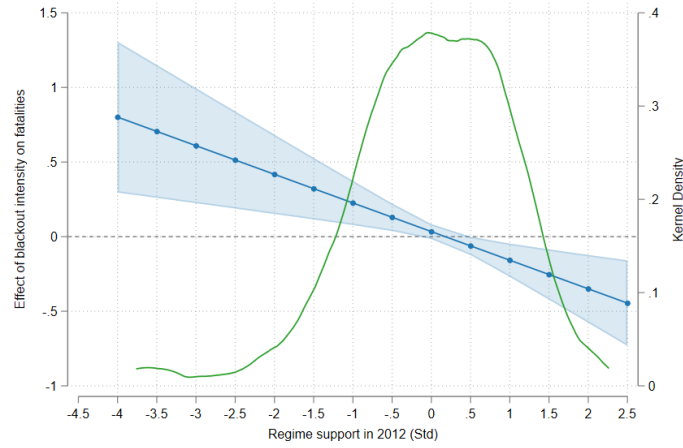
Notes: The table summarizes key results of a difference-in-differences specification assessing the effect of the local exposure to the blackout on repression fatalities at different levels of regime support. All regressions control for the interactions between the local poverty rate and the local population density with the identifier of the post-treatment period, while Column 2 also controls 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 \(2010\)](#). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 14: Blackouts, regime support and repression fatalities



(a) Month-specific: Shock

(b) Month-specific: Shock $\times$ Support



(c) Marginal effect of Shock

Notes: Figures show effect on total monthly repression fatalities. Panel A provides month-specific coefficient estimates for the local exposure to the blackout. Panel B provides month-specific coefficients for the interaction between the local exposure to the blackouts and the baseline level of regime support. Panel C shows the marginal estimated effect of a 1 s.d. increase in the local exposure to the blackouts at different levels of baseline regime support. 95% confidence intervals for Panels A and B were calculated by clustering standard errors within a 200 km. bandwidths following [Conley \(2010\)](#), while the 95% confidence interval of Panel C was calculated clustering standard errors at the state level.

3.6 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.2](#) provides estimates and confidence intervals for γ^{Ch} in Equations 1, 2, 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

and 2015 national elections. Third, I cluster standard errors at different bandwidths around the original 200 km. level. Panel A provides results for the probability of being spared from rationing, Panel B provides estimates for nighttime lights, Panel C provides estimates for political protests, and Panel D provides estimates for repression fatalities. The four panels confirm the robustness of the original results.

4 The Vargas Tragedy of 1999

This section examines whether economic outcomes and policy responses following the 1999 Vargas Tragedy exhibit similar patterns of widening favoritism in affected areas. This second case study tests whether the model’s predictions for autocratic settings break down under comparable democratic environments. The Vargas Tragedy provides an ideal reference point for Chavista distributive responses to large exogenous shocks prior to Venezuela’s democratic erosion. Chávez had been inaugurated less than a year before the disaster and still governed under democratic constraints. Moreover, he faced several consequential 2000 elections mandated by the new constitution, including his own reelection. Section [A.2](#) provides additional details about the nature and political context surrounding the Vargas Tragedy.

While both the 2019 blackouts and the 1999 Vargas tragedy occurred under Chavista rule and during periods of heightened political urgency, key differences exist. Venezuela was substantially poorer in 2019 than 1999.³⁰ The shocks also differed in nature and scope: the 2019 blackouts stemmed from nationwide power infrastructure failures, while the 1999 Vargas Tragedy was a localized natural disaster caused by excessive rainfall and dam overflow. Despite these differences, the Vargas Tragedy enables analysis of political heterogeneity in economic effects and policy responses to a significant shock under democratic Chavista governance.

³⁰IMF data show GDP per capita declined from \$4,130 in 1999 to \$2,620 in 2019 (current prices).

4.1 Data

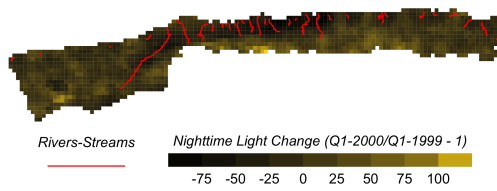
The analyses in this section are performed on a panel of 1,564 grids ($1 \text{ km} \times 1 \text{ km}$) capturing the geography of the Vargas state over 15 quarters between January of 1998 to October of 2001. As the tragedy occurred in December of 1999, the post-treatment period starts on the 4th quarter of 1999, and the reference period for event studies is the 3rd quarter of 1999. I aggregate monthly average daily nighttime light radiance data from the US's National Oceanic and Atmospheric Administration (NOAA) for each quarter-grid.³¹ To identify locations vulnerable areas of the state, I georeferenced the map presented in Figure 2 of [Andressen and Pulwarty \(2001\)](#). I then identify the grids overlapping with the polygons of each of the 12 vulnerable areas, as well as the nearest vulnerable area for all the grids in the state. To identify areas prioritized for policy support, I georeferenced the different maps showing the Special Action Areas (*Areas de Actuación Especial*, or AAEs) available in [Grauer et al. \(2001\)](#), to then identify the grids overlapping with each of the relevant polygons. Finally, I take the address of each of the 88 voting centers in the state along with Hugo Chávez's 1998 vote share in each of them from Venezuela's National Electoral Council. For each grid in the state, I identify its closest voting center and the respective level of support for Hugo Chávez. Figure 15 shows the key variables in my analysis, and Table A.7 provides summary statistics.

4.2 Economic effects of the Vargas Tragedy

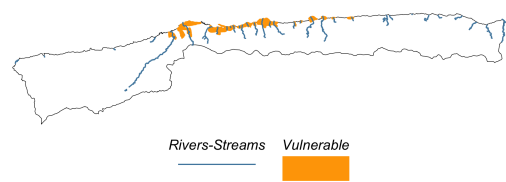
I now study the evolution of nighttime lights in vulnerable and non-vulnerable areas of the state, and the political heterogeneity in the potential effects of vulnerability. I do so pursuing a difference-in-differences strategy on my quarterly panel of grids in the Vargas state. If the Chavista response to the tragedy was akin to that observed in the context of the 2019 blackouts, we would expect a drop in luminosity in vulnerable zones that is less pronounced in Chavista-supporting areas. My hypothesis, however, is that this is unlikely to be the case, given the still democratic nature of the Venezuelan government at the time. I estimate the following regression specification:

³¹See [NOAA National Centers for Environmental Information \(2024a\)](#).

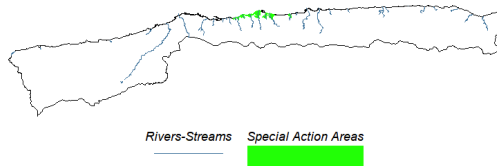
Figure 15: Vargas Tragedy Analysis - Key Variables



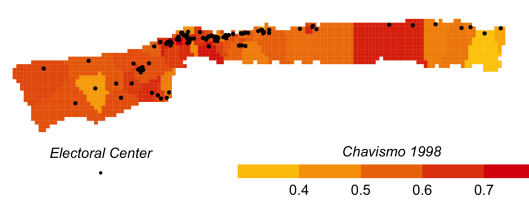
(a) Nighttime lights



(b) Vulnerable Areas



(c) Special Action Areas



(d) Chavista Vote

Notes: Figures show key variables for the analysis of the Vargas Tragedy. Panel A shows the percent change in nighttime lights by grid between Q1 of 1999 and Q1 of 2000. Panel B shows the georeferenced polygon shapes of the areas affected by the tragedy shown in [Andressen and Pulwarty \(2001\)](#). Panel C shows the georeferenced polygon shapes of the Special Action Areas shown in [Grauer et al. \(2001\)](#). Panel D shows the geolocation of voting centers within the State of Vargas along with the 1998 vote share for Hugo Chávez in the nearest voting center of each grid.

$$Y_{g,q} = \beta_0 + \beta_1 V_g \times Post_q + \beta_2 Ch_g \times Post_q + \beta_3 V_g \times Ch_g \times Post_q + \phi_g + \phi_q + \epsilon_{g,q} \quad (5)$$

Where $Y_{g,q}$ is the inverse hyperbolic sine of the nighttime luminosity of grid g in quarter q , V_g is a binary marker for whether grid g is in a vulnerable area, Ch_g is the standardized 1998 vote share for Hugo Chávez in the voting center closest to grid g , $Post_q$ is a binary marker for whether quarter q includes or occurs after the Vargas Tragedy, ϕ_g and ϕ_q are grid and quarter fixed effects, and $\epsilon_{g,q}$ is the error term. If vulnerable areas were most affected by the tragedy but relief efforts prioritized Chavista areas, we would expect a negative estimate of β_1 and a positive estimate for β_3 . However, we would expect a null estimate of β_3 in the absence of political discrimination of disaster relief efforts. To account for the possibility of spatial correlation in the error term, I cluster standard errors within grids sharing the same nearest voting center.

Table 5 provides difference-in-differences estimates. Column 1 estimates the relative effects of the tragedy in vulnerable areas without considering local Chavista support, suggesting an 8% drop in nighttime lights in vulnerable areas. Column 2 controls for the standardized level of Chavista support, showing no changes in the effect of vulnerability and no political effects. Column 3 now considers the possibility of politically heterogeneous effects of vulnerability following Equation 5. The estimate for β_1 suggests that effect of vulnerability at the average level of Chavista support is the effects estimated in Columns 1 and 2. Moreover, the null estimate of β_2 suggests no political heterogeneity in the evolution of nighttime lights outside of vulnerable areas. Most importantly, the null estimate of β_3 suggests that the relative effects of the tragedy on vulnerable areas was not politically heterogeneous, which is consistent with the expectation that in-group discrimination in response to shocks is a feature of autocratic rule. Column 4 aggregates fixed effects of the interaction of quarters and the nearest affected area for each grid. The estimate of β_1 attenuates by half, and the negative and estimate of β_2 suggests that Chavista areas fared somewhat worse outside of vulnerable areas, the null estimate for β_3 confirms no political heterogeneity in the effect of the tragedy in vulnerable areas. Finally,

Column 5 confirms these conclusions after controlling for fixed effects of the interaction of quarters and nearest voting center.

Table 5: Difference-in-differences estimates

VARIABLES	(1)	(2)	(3)	(4)	(5)
		Nightlights (Inverse hyperbolic sine)			
Vulnerable $\times$ Post	-0.0812*** (0.0282)	-0.0812*** (0.0282)	-0.0814*** (0.0282)	-0.0362* (0.0194)	-0.0341 (0.0241)
Chavista support (Std) $\times$ Post		0.00299 (0.0119)	0.00277 (0.0122)	-0.0128** (0.00524)	
Vulnerable $\times$ Chavista Support $\times$ Post			0.00975 (0.0219)	0.000484 (0.0145)	0.00364 (0.0151)
Observations	23,460	23,460	23,460	23,460	23,055
R-squared	0.939	0.939	0.939	0.951	0.960
Grid Cell FE	YES	YES	YES	YES	YES
Quarter FE	YES	YES	YES	NO	NO
Quarter $\times$ Nearest Vulnerable Area FE	NO	NO	NO	YES	NO
Quarter $\times$ Nearest Voting Center FE	NO	NO	NO	NO	YES

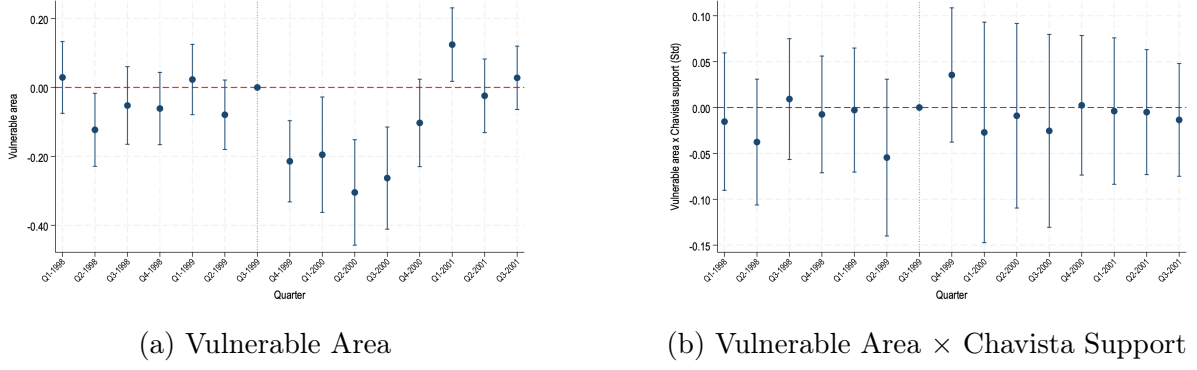
Notes: This table summarizes key results of difference-in-differences specifications assessing the effect of the Vargas Tragedy on vulnerable areas of the state and its potential political heterogeneity. Standard errors are calculated considering potential spatial correlation of errors within grids sharing the same nearest voting center. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Both to evaluate the plausibility of the parallel trend assumption of the difference-in-difference specification and to consider the timing of the effects of the tragedy on vulnerable areas, I calculate quarter-specific estimates of β_1 , β_2 and β_3 in reference to the third quarter of 1999. Panel A of Figure 16 shows that at the average level of Chavista support, vulnerable and non-vulnerable areas of the state moved in parallel before the tragedy, that the effects on vulnerable areas materialized immediately, and that these relative effects lasted for about one year. Most importantly, Panel B confirms that there was no political heterogeneity in the differences between vulnerable and non-vulnerable areas either before or after the tragedy.

4.3 Special Action Areas (AAE)

Results above suggest that the economic effects of the Vargas Tragedy on vulnerable areas of the state were not disproportionately concentrated in opposition zones. We now consider whether observable policy responses to the tragedy showed patterns of political

Figure 16: Quarter-specific estimates



Notes: Figure shows quarter-specific estimates of the effect of the Vargas Tragedy on vulnerable areas with average levels of regime support (Panel A) and the difference of these effects in areas with a 1 s.d. higher level of Chavista support (Panel B). Dots indicate period-specific estimates and cap spikes indicate 95% confidence intervals.

favoritism. For this, we consider zones prioritized for urban redevelopment referred to as Special Action Areas (AAEs). We perform the following cross-sectional linear probability regression specification:

$$A_g = \alpha_0 + \alpha_1 V_g + \alpha_2 Ch_g + \alpha_3 V_g \times Ch_g + \phi_n + \epsilon_g \quad (6)$$

Where A_g is a binary marker of whether grid g is in a Special Action Area, V_g is a binary marker for whether grid g is in a vulnerable area, Ch_g is the standardized 1998 vote share for Hugo Chávez in the voting center closest to grid g , ϕ_n is a fixed effect either for the nearest vulnerable area or nearest voting center, and ϵ_g is an error term. While α_1 captures the difference in the probability of being assigned to a Special Action Area between vulnerable and non-vulnerable areas at average levels of regime support, α_3 captures whether that difference changes for areas with higher Chavista support. The presence of political favoritism would be captured by a positive and significant estimate of α_3 . As before, I allow for within nearest voting center error correlation in estimating standard errors.

Table 6 provides estimates for the linear probability models. Column 1 suggests that vulnerable areas had a 17pp higher probability of being assigned to a Special Action Area than non-vulnerable areas. Column 2 shows that this association is unaffected

after controlling for grids' Chavista support. Column 3 presents results for Equation 6 considering fixed effects for nearest vulnerable area. The estimate for α_1 suggests that vulnerable grids were 17pp more likely to being assigned as Special Action Areas than non-vulnerable grids at average levels of Chavista support. While there is no association between Chavista support and Special Action Areas outside of Vulnerable grids, the estimate of α_3 indicates that the effect of vulnerability on Special Action Areas is reduced by 11pp in zones at 1 s.d. higher levels of Chavista support - a result that contradicts the idea of in-group favors in response to the tragedy. Moreover, this result attenuates and becomes statistically insignificant after controlling for nearest voting center fixed effects (Column 4).

Table 6: Linear probability estimates

VARIABLES	(1)	(2) Special Action Areas	(3)	(4)
Vulnerable	0.169** (0.0644)	0.169** (0.0644)	0.172*** (0.0606)	0.217** (0.0886)
Chavista Support (Std)		-0.000712 (0.00171)	0.00179 (0.00114)	
Vulnerable $\times$ Chavista Support			-0.112** (0.0543)	-0.0642 (0.0785)
Constant	-0.000174 (0.00156)	-0.000170 (0.00157)	-0.000187 (0.00137)	-0.000439 (0.00123)
Observations	1,564	1,564	1,564	1,537
R-squared	0.202	0.202	0.274	0.348
Nearest Vulnerable FE	YES	YES	YES	NO
Nearest Voting Center FE	NO	NO	NO	YES

Notes: This table summarizes key results of linear probability regression specifications assessing the concentration of Special Action Areas in vulnerable of the state and its potential political heterogeneity. Standard errors are calculated considering potential spatial correlation of errors within grids sharing the same nearest voting center. *** p<0.01, ** p<0.05, * p<0.1.

Overall, results on economic outcomes and policy responses to the Vargas Tragedy suggest that while vulnerable areas were disproportionately affected, these effects did not favor Chavista-leaning areas of the state. Contrary to the autocratic environment of the 2019 Blackouts, Chavismo did not engage in in-group oriented responses to this large

shock when it was still limited by democratic constraints.

5 Favoritism during droughts in Sub-Saharan Africa

This empirical section evaluates the theoretical predictions of model 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 patterns of favoritism should magnify during bad times. 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 national government. I focus on rainfall shocks in Sub-Saharan Africa. National droughts in this region have been shown to induce conflict ([Miguel et al., 2004](#)) and democratization ([Brückner and Ciccone, 2011](#)). Moreover, patterns of regional and ethnic favoritism have been documented in this region of the World ([Franck and Rainer, 2012](#); [Hodler and Raschky, 2014a](#); [De Luca et al., 2018](#); [Dickens, 2018](#)). According to the model, such patterns of favoritism towards co-ethnics or leader-affiliated regions should compound during national droughts in order to moderate supporters' exposure to its economic consequences, and as a result, limit the scope of the resulting wave of dissent and repression to opponents. In what that follows, I study patterns of regional favoritism and conflict towards leaders' regions of birth. In Appendix Section [A.3](#) I study patterns of ethnic favoritism.

5.1 Regional favoritism and conflict during rainfall shocks

I now evaluate the sub-national variation of local nighttime lights, 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).³² I follow [Hodler and Raschky \(2014a\)](#) in using satellite nighttime lights 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),³³ which provides year-grid (1 km $\times$ 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. As in the Venezuelan case studies, I use the inverse hyperbolic sine transformation of nighttime light aggregates as the main outcome variable in my analyses.

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 from 1979 to the present. 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,³⁴ 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 the assigned geolocation, filtering events for which the

³²See [GADM \(2024\)](#).

³³See [NOAA National Centers for Environmental Information \(2024a\)](#).

³⁴See [GDELT Project \(2024\)](#).

geolocation does not capture any subnational precision.³⁵

Country-year rainfall levels are collected from NOAA’s Global Precipitation Climatology Centre (GPCC).³⁶ GPCC’s “Full Data Product” provides monthly rainfall estimates based on quality-controlled data from 67,200 stations world-wide starting on 1891. GPCC provides files with monthly rainfall estimates in $0.5^\circ \times 0.5^\circ$ latitude-longitude raster grids with the average daily mm rainfall levels.³⁷ 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. I finally take the negative of this value to calculate the "Country Dryness" measure that I use in the analysis below.

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 2012.³⁸ I exclude a few country-year combinations for which the country’s leader was born outside of the country. I also identify capital regions in every country.³⁹

Finally, while my key measure of economic shocks will continue to be the country-wide dryness 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.⁴⁰ 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

³⁵About 80% of these events in the GDELT dataset provide geolocations with subnational precision within the country of the event.

³⁶See [NOAA Physical Sciences Laboratory \(2024\)](#).

³⁷See [Schneider et al. \(2016\)](#) for more details.

³⁸I thank Prof. Horacio Larreguy for sharing their data with me

³⁹Dar es Salaam region is marked as Tanzania’s capital for the full period of analysis.

⁴⁰See [Data-in-Space Initiative \(2021\)](#).

there are oil fields or mines present. I collect international oil, food and metal yearly price indices from the IMF, from [Jacks \(2019\)](#) and from the Commodity Exchange Inc. (COMEX). Table [A.8](#) 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:

$$Y_{r,y} = \beta_1 L_{r,y-1} + \beta_2 D_{c,y-1} * L_{r,y-1} + \phi_r + \phi_{c,y} + \epsilon_{r,y} \quad (7)$$

where $Y_{r,y}$ is the outcome variable in region r and year y , $D_{c,y}$ is the Country Dryness measure for country c in year y , 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.⁴¹ Hence, I focus my attention on regression estimates for β_2 .

Columns 1-3 of Panel A in Table [7](#) provide estimates of the effect of regional affiliation to the regime and national dryness on local nighttime radiance between 1992 and 2013. Column 1 shows that local nighttime lights are somewhat higher in leaders' regions of origin, but the estimate is very imprecise. Column 2 adds the interaction of national dryness with the regime's region of origin. We find that the effect of the leaders' origin at the average national rainfall year is similar to that observed in Column 1, but regime affiliated regions experience a 14% relative improvement in nighttime lights during years

⁴¹Focusing on lagged economic shocks and region origins is standard practice in the conflict, democratization and favoritism literatures.

that are 1 s.d. dryer. Column 3 adds a number of region-year controls⁴² and shows that estimates are again largely unaffected. Overall, Columns 1-3 of Panel A suggest that patterns of regional favoritism are contingent to periods of national droughts.

Columns 4-6 in Panel A of Table 7 provide similar specifications on the total number of protests observed in a location. Column 4 shows that leader regions associate with 2.5 fewer protests. Columns 5-6 show that a 1 s.d. drop in rainfall leads to a further relative drop of 4.5 protests in leader-affiliated regions. Columns 1-3 of Panel B study events of repression of dissent, showing around 0.25 fewer acts of repression on average in leader regions (not statistically significant), and that a 1 s.d. drop in national rainfall induces 0.7 fewer events of this kind in leader regions. Finally, Columns 4-6 of Panel B aggregate all events of State coercion.⁴³ 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 fewer 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 17 provides estimates for the marginal effect of leaders' origin region at different national dryness levels, confirming that the results discussed above are driven by negative rainfall shocks.

5.2 Interpreting effects on development and conflict 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 whenever countries experience negative 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 \(2012\)](#)

⁴²Column 3 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.

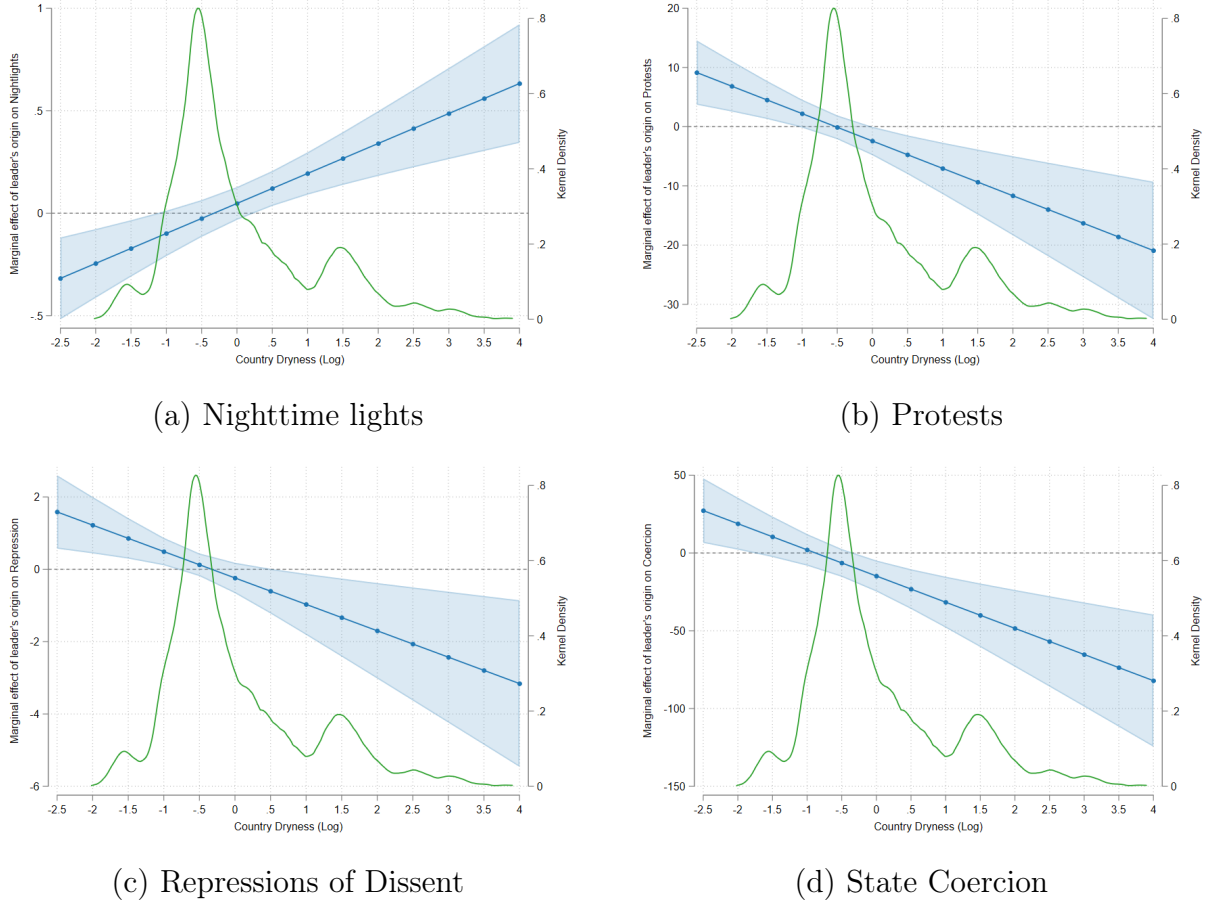
⁴³Including those that occur outside of the context of protests. In unreported results, I find that conclusions are robust to excluding events of protest repression.

Table 7: Regional favoritism and conflict during rainfall shocks

Panel A						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Nighttime lights (Inverse Hyperbolic Sine)			Protests (Total events)		
Leader's (t-1) Region of Birth	0.0395 (0.0495)	0.0477 (0.0487)	0.0426 (0.0491)	-2.463* (1.478)	-2.420* (1.458)	-2.498* (1.476)
Region of Birth $\times$ Country Dryness (Log, Std, t-1)		0.146*** (0.0431)	0.152*** (0.0437)		-4.608*** (1.542)	-4.487*** (1.495)
Observations	13,311	13,311	13,025	19,791	19,791	19,362
R-squared	0.902	0.903	0.902	0.515	0.516	0.517
Controls	None	None	All	None	None	All
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Repression of Dissent (Total events)			State Coercion (Total events)		
Leader's (t-1) Region of Birth	-0.245 (0.260)	-0.238 (0.256)	-0.252 (0.258)	-14.94** (6.137)	-14.79** (6.074)	-14.99** (6.159)
Region of Birth $\times$ Dryness		-0.730** (0.304)	-0.701** (0.294)		-16.82*** (5.640)	-15.93*** (5.482)
Observations	19,791	19,791	19,362	19,791	19,791	19,362
R-squared	0.349	0.349	0.351	0.598	0.598	0.600
Controls	None	None	All	None	None	All
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Regressions evaluate the effect of leaders' region of birth during national dry years on local nighttime lights (Panel A, Columns 1-3), protests (Panel A, Columns 4-6), repression of dissent (Panel B, Columns 1-3) and all events of State coercion (Panel B, Columns 4-6). Columns 1 and 4 evaluate the effect of leaders' origins unconditional on rainfall shocks. Columns 2 and 5 add country dryness and its interaction with leaders' origins. Columns 3 and 6 control for interactions between the national dryness 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. All regressions control for region and country-year fixed effects. Standard errors are clustered at the country-year level to match the exogenous variation of the national rainfall shocks. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 17: Regional favoritism and conflict during rainfall shocks - margin plots



Notes: Figures show estimated marginal effects of regime leaders' regions of origin at different levels of the national rainfall distribution on local nighttime lights (Panel A), protests (Panel B), acts of repression of dissent (Panel C) and acts of State coercion (Panel D). These are calculated on regression outputs shown in Columns 3 and 6 in Table 7 - 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.

highlight three possible distributive channels to explain health and education differences in favor of individuals ethnically affiliated to regime leaders.⁴⁴

However, my analysis also documents a pattern of higher dissent and repression outside of the regions of birth of country leaders, which also magnifies during national 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 nighttime lights or other development outcomes are driven not by favors from the central government towards 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 in the context of autocracies, and that the Venezuelan case-studies discussed above overcome this problem by focusing on policy choices by the central government (the rationing schedule in 2019 and the Special Action Areas in 1999) and not only on economic outcomes.

Finally, while the theoretical arguments discussed in this paper take features characteristic of autocratic regimes -namely full budget agency and the possibility of being deposed in the short run- democratic incumbents may face similar pressures for in-group favors during bad times. I leverage data from the Polity II Democracy scores at the country-year level to evaluate whether patterns of favoritism during droughts are greatest for Sub-Saharan African countries under dictatorial regimes. Countries are characterized as dictatorships if their Polity II score takes the value of 0 or less. Table 8 shows that

⁴⁴They 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.

Table 8: In-group favors in dictatorships and democracies

VARIABLES	(1)	(2)	(3)	(4)
		Nightlights (IHS)		
Leader's (t-1) Region of Birth	0.0426 (0.0491)	0.214** (0.109)	0.0469 (0.0479)	-0.0195 (0.0461)
Region of Birth $\times$ Country Dryness (Log, Std, t-1)	0.152*** (0.0437)	0.318*** (0.0855)	0.00788 (0.0374)	0.0625* (0.0369)
Region of Birth $\times$ Dictatorship				-0.173** (0.0872)
Region of Birth $\times$ Dryness $\times$ Dictatorship				0.202** (0.0817)
Observations	13,025	7,846	5,157	13,025
R-squared	0.902	0.890	0.939	0.902
Controls	All	All	All	All
Region FE	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes
Specification	Main	Dictatorships	Democracies	Interactions

Notes: Regressions evaluate the effect of leaders' region of birth during national dry years on local nighttime lights. Column 1 provides a baseline specification of the average effect of the leader's region of birth and how the effect changes during drier years. Columns 2 and 3 restrict the analysis to samples of dictatorships and democracies respectively. Column 4 assesses the heterogeneity of the effects captured on Column 1 along the democracy-dictatorship dimension. All regressions control for interactions between the national dryness 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. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

in-group favors during national droughts seem to grow only under dictatorial regimes.

6 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 protests 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 heterogeneous citizens with economic and political grievances against an autocratic regime who face 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. Locations more exposed to the blackout were more likely to be assigned to power rationing, but -consistent with the model- this was not the case for regime supporting areas of the country. Unlike opposition-leaning areas affected by the blackout, regime-leaning areas did not observe a spike in protests or repression fatalities at the peak of the constitutional crisis.

I contrast this evidence with the Vargas Tragedy of 1999, which occurred under Chavista rule when Venezuela was still democratic, and find no evidence of policy discrimination or unequal economic consequences. Moreover, the prediction of autocratic strategic favoritism during economic shocks extends beyond the Venezuelan context, amplifying differences in development outcomes for regime-affiliated regions in Sub-Saharan African countries. During national droughts, economic and conflict disparities favoring leader-affiliated regions intensify, and importantly, the growth in economic inequality is contingent on countries being under autocratic regimes.

This paper’s central contribution is showing how regime type can fundamentally shape both the policy responses and distributional consequences of large economic shocks. In autocracies, leaders facing heightened threats may strategically discriminate against and repress opposition areas, exacerbating inequalities during crises. By contrast, democratic accountability may constrain such policy behavior and consequences. This finding is key for the international responses to such large shocks in autocratic contexts: transfers channeled through incumbent regimes may inadvertently worsen discriminatory resource allocation, leaving excluded populations further marginalized precisely when they need support most. As climate change intensifies the frequency and severity of natural disasters, understanding how regime type mediates crisis response becomes an increasingly urgent agenda. Future research should leverage high-frequency satellite data—as demonstrated in the Venezuelan blackout analysis—to monitor the spatial distribution of shock impacts and government responses in real time, enabling donors to identify and potentially circumvent discriminatory allocation patterns. Additionally, examining foreign aid

project locations and tracking public goods provision through satellite imagery in settings where autocrats influence resource distribution could provide internationally comparable evidence of how regime type shapes crisis governance, ultimately informing more equitable and effective humanitarian intervention strategies.

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Appendix

A.1 Model

I now outline 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 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.

A.1.1 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, R 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.

A.1.2 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:*

$$V_{1,x}^O > V_{1,x}^S \quad (8)$$

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:*

$$V_{1,1}^j > V_{1,0}^j \quad (9)$$

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).

A.1.3 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.

A.1.3.1 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 $Z \leq \frac{c}{2} - T$:

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

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

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

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

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

- If $c < Z$:

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

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.⁴⁵ The shock, importantly, is also shared by regime supporters, who will start

⁴⁵One 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.

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.

A.1.3.2 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 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, $K_{\{0,1\}}^S \geq K_{\{0,0\}}^O$.*

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.

A.1.4 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 $T \geq \frac{3}{8}c$.⁴⁶

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.

⁴⁶This assumption also rules out the possibility of multiple equilibria in the partial appeasement strategy discussed in lemma 6.

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 $c < Z$:

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

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:

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

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 .⁴⁷

⁴⁷The maximum possible value of Z^* would occur in parameter values when $D > 0$ at $Z = c$, and

A.1.5 Strategy changes at Z^* and the characterization of equilibria

As discussed, Z^* characterizes the level of the shock after which the regime changes its 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:*

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 κ_{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 κ_{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 κ_{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 κ_{C1} .*

$T = \frac{3}{8}c$. This means that $Z^* \in [0, \frac{\theta py^c + \frac{9}{16}c}{1+\theta p}]$. 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 $\frac{c}{8} < Z$: The repression and supporter appeasement transfers will be κ_{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 κ_{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 κ_{F2} and A_{F2}^O . There are no protests.
- If $Z^* < Z \leq \frac{c}{8}$: The repression will be κ_{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 κ_{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 κ_{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 κ_{F2} and A_{F2}^O . There are no protests.
- If $Z^* < Z$: The repression and supporter appeasement transfers will be κ_{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 κ_{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 κ_{F2} and A_{F2}^O . There are no protests.
- If $\frac{c}{2} < Z \leq Z^*$: The repression and opposition appeasement transfers will be κ_{F3} and A_{F3}^O . There are no protests.
- If $Z^* < Z$: The repression and supporter appeasement transfers will be κ_{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 κ_{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 κ_{F2} and A_{F2}^O . There are no protests.
- If $\frac{c}{2} < Z \leq c$: The repression and opposition appeasement transfers will be κ_{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 κ_{F4} and A_{F4}^O and A_{F4}^S . There are no protests.
- If $Z^* < Z$: The repression and supporter appeasement transfers will be κ_{C2} and A_{C2}^S . There is limited confrontation against the opposition.

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 lead to opposition-oriented favors in order to induce a full appeasement outcome 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.

A.2 Empirical setting: Venezuela between 1998-2019

Chavismo’s early tenure and the constitutional process

Hugo Chávez, a former Lt. Colonel in the Venezuelan Army, was elected president in December 1998 with 56.2% of the vote, riding a wave of anti-establishment sentiment after decades of bipartisan democratic rule that had failed to address growing inequality and poverty. He was inaugurated in February 1999 with an ambitious agenda centered on refounding the Venezuelan state through a new constitution ([Hernández Camargo, 2007](#)). Within his first months in office, Chávez convened a referendum in April 1999 to authorize a National Constituent Assembly, which passed with 87.8% approval. Elections for the 131-member Constituent Assembly were held in July 1999, with Chávez’s supporters winning 125 seats, granting them nearly complete control over the constitutional drafting process. The new constitution, which expanded presidential powers, extended term limits, and restructured state institutions, was approved by popular referendum on December 15, 1999—just before the Vargas Tragedy would strike the country. The constitutional approval triggered a requirement for “megaelections” scheduled for July 2000, in which nearly all elected positions would be contested, including the presidency itself under the new constitutional framework.

The Vargas Tragedy of December 1999

Between December 14 and 16, 1999, the coastal state of Vargas experienced unprecedented torrential rainfall. Precipitation in December 1999 reached extraordinary levels compared to historical patterns, with some areas receiving over 900mm of rain in just three days—nearly the annual average for the region ([Andressen and Pulwarty, 2001](#)). The exceptional rainfall overwhelmed the state’s hydrographic system, which consists of numerous rivers and streams flowing from the Cordillera de la Costa mountain range to the Caribbean Sea, including the Caruao, San Julián, Naiquatá, Uria, and Osorio rivers ([Andressen and Pulwarty, 2001](#)). The steep topography and narrow valley configuration of Vargas created conditions for catastrophic flash floods and debris flows, particularly in areas near river mouths and alluvial fans ([Wieczorek](#)

et al., 2001). Settlements such as Carmen de Uria and Caraballeda were especially vulnerable, as were the parishes of Macuto, Caraballeda, and Naiguatá in the central portion of the state (Andressen and Pulwarty, 2001; López, 2011; Barreto Guédez et al., 2014).

The human toll was staggering: approximately 20,000 people perished—roughly 10% of Vargas state’s population—making it one of the deadliest natural disasters in Venezuelan history and in Latin America during the late 20th century (Wieczorek et al., 2001; Genatios and Lafuente, 2003). Critical infrastructure including the international airport, the main coastal highway, utilities, and thousands of homes were destroyed (Oropeza et al., 2014). Beyond Vargas, neighboring states including Miranda and the Federal District (Caracas) also experienced damage, though on a lesser scale.

The timing of the disaster—occurring just one day after the constitutional referendum and with looming megaelections in 2000—created immediate political pressure on the newly empowered Chávez government to demonstrate effective crisis management. In response, the government established two key institutional bodies to coordinate reconstruction efforts. The *Autoridad Única de Área del Estado Vargas* (AUAEV) was created to oversee planning and coordination across the affected region, while *Corpovargas* was later established to implement reconstruction projects and manage resources (Grauer et al., 2001; Genatios, 2010). These entities worked to develop a comprehensive reconstruction plan for immediate reconstruction and long-term urban redevelopment.

A central component of the reconstruction strategy involved the identification of “Special Action Areas” (*Áreas de Actuación Especial*, or AAEs)—zones designated for priority intervention and urban redevelopment (Grauer et al., 2001). As documented in reconstruction planning documents, these AAEs were concentrated in the areas most severely impacted by flooding and debris flows, particularly those downstream from major river systems that had overflowed during the disaster. The delineation of these zones reflected both the technical assessment of vulnerable areas prone to future disasters and the government’s priorities for rebuilding critical infrastructure and residential areas (Genatios and Lafuente, 2003; Genatios, 2010). Importantly, the reconstruction planning process unfolded during a period of democratic governance, with Chávez facing imminent electoral accountability in the July 2000 megaelections, where he would need to secure reelection under the new constitutional framework while addressing the consequences of the tragedy.

Consolidation of power and the oil boom (2000-2012)

Chávez secured reelection in the July 2000 megaelections with 59.8% of the vote, consolidating his political mandate under the new constitutional framework. The reconstruction efforts in Vargas continued during this period, providing an early test of the Chavista government's capacity for crisis management and disaster response under democratic constraints. However, the political landscape would soon shift dramatically as Chávez moved to concentrate power in the executive branch.

The early 2000s witnessed mounting confrontation between the Chávez government and opposition forces, culminating in a failed coup attempt in April 2002 and a devastating oil industry strike between December 2002 and February 2003. These events provided Chávez with political justification to restructure the state oil company PDVSA, removing thousands of opposition-aligned employees and establishing firmer executive control over Venezuela's primary source of revenue. Rising international oil prices—which would climb from approximately \$20 per barrel in 2000 to over \$100 per barrel by 2008—provided the government with unprecedented fiscal resources to fund expansive social programs (the “Misiones”) and subsidize an import-based consumption boom. These petrodollar windfalls allowed Chávez to build popular support while simultaneously eroding legal and institutional constraints on presidential power.

Throughout the 2000s, Chávez progressively centralized political and economic power, leading to increasing polarization against a “democratic opposition” coalition shaped by traditional and new parties and civic organizations. A 2007 constitutional referendum seeking to eliminate presidential term limits was narrowly defeated, representing one of the few electoral setbacks for Chavismo. However, a subsequent 2009 referendum successfully removed term limits, allowing Chávez to seek indefinite reelection. During this period, the government imposed increasingly restrictive measures on private enterprise across all economic sectors, including expropriations, price controls, and foreign exchange restrictions.

By the time the 2012 presidential elections approached, Chávez had been diagnosed with cancer. Despite his illness, he decided to run for reelection, building his campaign on massive new public spending programs running in parallel to the electoral cycle. Chávez defeated opposition candidate Henrique Capriles in October 2012 with 55.1% of the vote, but his health deteriorated rapidly thereafter. He passed away in March 2013 without completing his inauguration. His appointed successor, Nicolás Maduro, lacked Chávez's charisma, commanded

significantly fewer fiscal resources, and could not serve as the ultimate arbiter of conflicts within the Chavista coalition. Maduro was narrowly elected in a special presidential election in April 2013 with just 50.6% of the vote, only months before Venezuela would enter its devastating economic crisis.

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-2013,⁴⁸ 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,⁴⁹ 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 2019.⁵⁰ The country went into hyperinflation in 2017, and experienced an inflation level of over 1,600,000% in 2018.⁵¹ 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 2017.⁵² By 2017, infant mortality had grown by 70%, and the purchasing power of the minimum wage had dropped by 92%.⁵³ 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.⁵⁴ 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

⁴⁸See [USA Today \(2013\)](#).

⁴⁹*Petróleos de Venezuela*, the country's National Oil Company.

⁵⁰See [Inter-American Development Bank \(2020\)](#).

⁵¹See [Hanke and Krus \(2019\)](#).

⁵²See [Universidad Católica Andrés Bello \(2017\)](#).

⁵³See [Bahar et al. \(2019\)](#).

⁵⁴See [The Cipher Brief \(2019\)](#).

allowed it to enact organic laws, pass constitutional amendments, and generally impose important oversight and institutional restrictions on Maduro's executive power.⁵⁵ 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 2016.⁵⁶ These judicial actions triggered a set of mass protests in 2017 which were met with violent repression by official security forces.⁵⁷ Moreover, Maduro circumvented the legal procedure to call for a National Constitutional Assembly, effectively assuming legislative powers for Chavismo.⁵⁸

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.⁵⁹ At the same time, the U.S. administration enacted the first set of financial sanctions on PDVSA.⁶⁰

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.⁶¹ 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.⁶² Maduro went ahead with the election regardless, despite unprecedentedly low turnout numbers.⁶³ 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 2019.⁶⁴

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,

⁵⁵See [EFE \(2015\)](#).

⁵⁶See [BBC News \(2016\)](#).

⁵⁷See [The Atlantic \(2017\)](#).

⁵⁸See [BBC News \(2017\)](#).

⁵⁹See [Global Affairs Canada \(2017\)](#).

⁶⁰See [The New York Times \(2017\)](#).

⁶¹See [Voice of America \(2018\)](#).

⁶²See [Reuters \(2018\)](#).

⁶³See [The New York Times \(2018b\)](#).

⁶⁴See [The New York Times \(2018a\)](#).

the constitution mandates for the Speaker of the National Assembly to take on the Interim Presidency until new free elections are held.⁶⁵ Under this reading of the constitution, Juan 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.⁶⁶

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.⁶⁷ The regime decided to repress protests⁶⁸ and forcefully prevent the entry of international aid to support the ailing population.⁶⁹ These events drastically affected beliefs over the possibility of regime change during 2019. Figure A.1 shows betting market data from PredictIt⁷⁰ 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.

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 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.⁷¹

Moreover, a large portion of the country lost access to power again between March 25 and 29.⁷² On March 30th, the regime published a rationing schedule laying out the structure of

⁶⁵See [Loxton and Mainwaring \(2019\)](#).

⁶⁶See [Bloomberg \(2019\)](#).

⁶⁷See [The Guardian \(2019b\)](#).

⁶⁸See [Human Rights Watch \(2019\)](#).

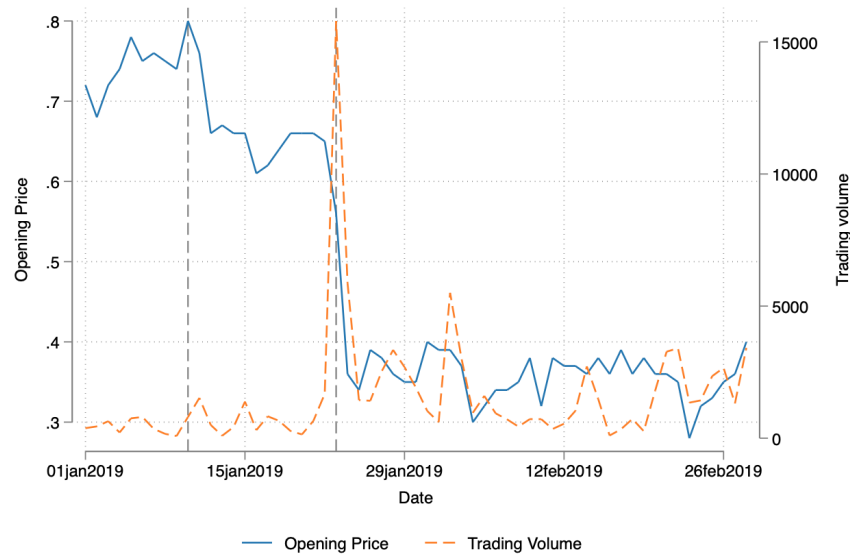
⁶⁹See [Metzler \(2019\)](#).

⁷⁰PredictIt 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.

⁷¹See [Univision \(2019\)](#).

⁷²See [The Guardian \(2019a\)](#).

Figure A.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).

official power cuts for the month of April.⁷³ 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.⁷⁴ However, North-Western parishes were also more likely to be assigned to rationing, which suggests that technical factors may have also informed the rationing schedule.

Failed coup attempt 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 rolled out. Moreover, the regime started to rely on the newly created *Fuerzas de Acción Especial* (FAES)⁷⁵ -an elite

⁷³See [Yahoo News \(2019\)](#).

⁷⁴This result is consistent with theories connecting patterns of urban concentration with the political nature of different regimes ([Ades and Glaeser, 1995](#)).

⁷⁵FAES 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

branch within the National Police Force that was previously focused on fighting organized crime-to punish opposition organizers.⁷⁶ Similar to the patterns observed for political protests, the number of fatalities in events of political repression spiked at the start of the constitutional crisis, temporarily subsiding in the immediate aftermath of the blackouts, and picking back up after the roll-out of the power rationing schedule.

On April 30th, in the midst of this new wave of political dissent and repression, 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.⁷⁷ This failed coup attempt marked the apex of the conflict: Once it became apparent that the military was not going to break with the Maduro regime, protests started to subside.

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.⁷⁸ 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 demands for democratization.⁷⁹

A.3 Ethnic favoritism and rainfall shocks

In Section 5, I 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 leaders' ethnicities, and how these connect with those of the groups that dominate a region of the country, or the ethnicity of an individual. To expand my analysis in this direction, I build on regional

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".

⁷⁶See [Caracas Chronicles \(2019\)](#).

⁷⁷See [Associated Press \(2019\)](#).

⁷⁸See [Financial Times \(2019\)](#).

⁷⁹See [The New York Times \(2020\)](#).

and individual data from [Dickens \(2018\)](#) and from individual data from [Franck and Rainer \(2012\)](#). I assess the effect of similarity to the leader’s ethnic language and co-ethnicity with the leader on local nighttime lights and on individual measures of wealth an infant mortality, and how these patterns vary during national rainfall shocks.

Local nighttime lights 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 in each year.⁸⁰ Nighttime lights from each partitioned ethnic group are calculated using the NOAA yearly rasters and obtaining the log of total nighttime light values plus 0.01.⁸¹ 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 the National Rainfall levels from GPCC to the panel. Table [A.9](#) shows relevant summary statistics.

⁸⁰He 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).”

⁸¹While the main results discussed above focus on the IHS transformation of total nighttime lights, other papers in this literature focus on the logarithm of the total nighttime lights measure after adding 0.01 ([Hodler and Raschky, 2014a; Dickens, 2018](#)). In this section, I use this log transformation to extend the results of [Dickens \(2018\)](#) for comparability.

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 metric 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.11](#) provides summary statistics.

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

I leverage data from [Franck and Rainer \(2012\)](#) on women between 15 and 49 years of age surveyed in different DHS waves in order to assess how patterns of ethnic favoritism on infant mortality are influenced by national rainfall levels. 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 the 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.10](#) shows summary statistics.

Empirical specifications and results

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

$$Y_{gcy} = \beta_1 S_{gcy-1} + \beta_2 S_{gcy-1} * D_{cy-1} + X_{gcy}\omega + \phi_{cy} + \phi_{gy} + \phi_{cg} + \epsilon_{gcy} \quad (10)$$

where Y_{gcy} is the log nighttime lights 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 D_{cy} is the national dryness of 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.⁸² As in the previous subsection, I will focus attention on β_2 , which captures how lagged country dryness affects patterns of ethnic favoritism. Standard errors are again clustered at the country-year level.

Panel A in Table A.12 provides estimates for Equation 10. Column 1 confirms a positive association between linguistic similarity and local nighttime lights. Column 2 shows that this association becomes strongest during dry years. Column 3 confirms that co-ethnic regions experience an improvement in nighttime lights, but Columns 4 shows that this association is contingent to dry years.

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

$$Y_{igcy} = \beta_1 S_{igy} + \beta_2 S_{igy} * D_{cy-1} + X_{igcy}\omega + \phi_{cy} + \phi_{gy} + \phi_{cg} + \epsilon_{igcy} \quad (11)$$

where Y_{igcy} is the individual's household wealth index, S_{igy} is the (local or individual) linguistic similarity to the leader's ethnic group⁸³, and D_{cy} is the national dryness 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 A.12 shows estimates for Equation 11. Columns 1-2 focus on the linguistic

⁸²The main difference with the structure of this specification and that of Equation 7 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.

⁸³The 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.

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 highlights an even stronger association during dry years at the country level. Columns 3-4 show no effects of individuals' linguistic similarity to the leader and their wealth index, and a smaller and imprecise heterogeneity during droughts. This is consistent with the idea that central governments target benefits to ethnically affiliated regions, but they cannot 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:

$$Y_{iesy} = \beta_1 C_{iesy-1} + \beta_2 C_{iesy-1} * D_{sy-1} + X_{iesy} \omega + \phi_{sy} + \phi_{es} + \epsilon_{iesy} \quad (12)$$

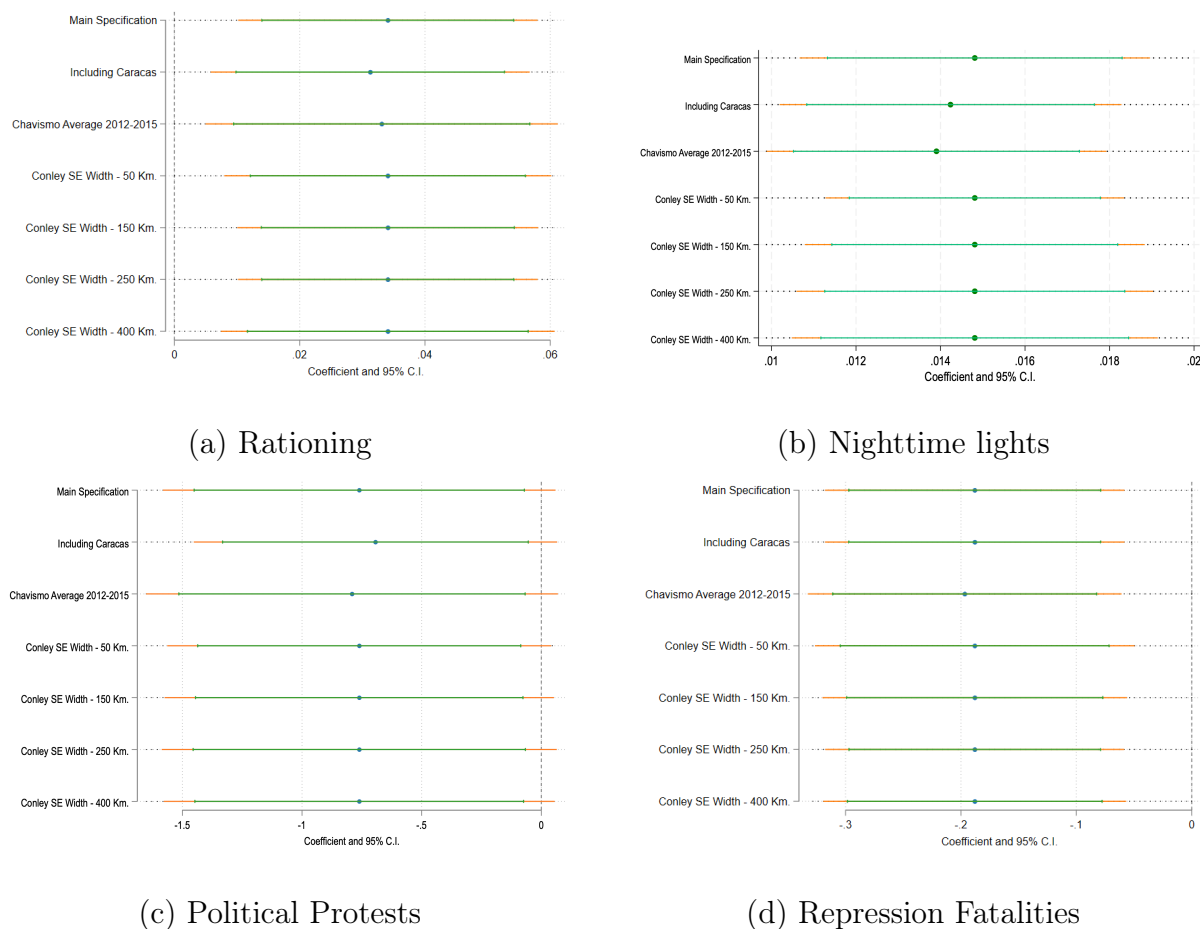
where Y_{iesy} is a binary variable for whether newborn i of a mother from the ethnic cluster e in survey s born in year y died as an infant. C_{iesy} is a marker for whether the mother's ethnic cluster e is the same of the leader of the country of survey s in year y . D_{cy-1} is the national dryness for survey s in year $y - 1$.⁸⁴ 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 A.12 shows estimates for Equation 12. As in previous results, Column 1 shows lower infant mortality for children born to mothers sharing ethnicity with the leader, and Column 2 shows that this association is even stronger during dry years at the national level.

⁸⁴DHS surveys are performed at the country level, so that leaders and rainfall for a given individual are set according to the relevant survey.

A.4 Additional Figures and Tables

Figure A.2: Robustness checks



Notes: Figures provide a number of robustness checks for different specification decisions in estimating γ^{Ch} . Panel A provides robustness estimates for the probability of being spared from rationing. Panel B provides estimates for nighttime lights. Panel C provides estimates for Political Protests. Panel D provides estimates for repression fatalities. 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.

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
Blackout shock intensity	1,108	0.223	0.465	-5.288	0.888
Spared from rationing	1,108	0.479	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, 2011	1,108	24,377	38,673	61	372,616
Population density, 2011	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
Distributed Generation	1,108	0.085	0.279	0	1
Reach of 4G Network	1,108	0.170	0.329	0	1
Oil Production	1,108	0.051	0.219	0	1
Panel B: Municipality Cross-Section Variables					
VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Blackout shock intensity	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: Parish/Month Panel Variables					
VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Nighttime lights per capita (Inverse hyperbolic sine)	26,592	0.085	0.36	0	4.70
Panel D: Municipality/Week 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
Repression Fatalities	4,381	0.151	1.85	0	62

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, local nighttime lights, protests and repression fatalities.

Table A.2: Regime support and “split” parishes

VARIABLES	(1) Parish spared from rationing	(2)	(3)
Shock	-0.0425** (0.0195)	-0.0568 (0.0513)	-0.0511 (0.0485)
Regime Support	0.0723*** (0.0275)		0.0966** (0.0431)
Shock $\times$ Support	0.0341*** (0.0123)		0.0381 (0.0293)
Split Vote		0.0254 (0.0330)	-0.0439 (0.0489)
Shock $\times$ Split		-0.0229 (0.0404)	-0.00892 (0.0510)
Observations	1,076	1,076	1,076
R-squared	0.536	0.528	0.538
Socioeconomic controls	Yes	Yes	Yes
Grid controls	Yes	Yes	Yes

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 \(2010\)](#). *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: Regime support, blackouts and rationing

VARIABLES	(1)	(2)	(3)	(4)
	Parish spared from rationing			
Shock	-0.0425** (0.0195)	-0.0365** (0.0184)	-0.0380 (0.0242)	-0.0354* (0.0207)
Regime Support	0.0723*** (0.0275)	0.100*** (0.0324)	0.0726*** (0.0253)	0.0992*** (0.0284)
Shock $\times$ Support	0.0341*** (0.0123)	0.0317** (0.0136)	0.0320* (0.0186)	0.0322* (0.0187)
Observations	1,076	1,076	1,076	1,076
R-squared	0.536	0.567	0.537	0.568
Socioeconomic controls	Yes	Yes	Yes	Yes
Grid controls	Yes	Yes	Yes	Yes
Additional controls	None	State FEs	Local Plants	Both

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 \(2010\)](#). *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Alternative mechanisms

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Parish was spared from rationing					
Shock	-0.0852*** (0.0280)	-0.0884*** (0.0298)	-0.0909*** (0.0352)	-0.0873** (0.0348)	-0.0486 (0.0323)	-0.0434 (0.0314)
Regime Support	0.0586** (0.0272)	0.0707 (0.0462)	0.0487* (0.0288)	0.0578* (0.0301)	0.0703** (0.0284)	0.0762*** (0.0272)
Shock $\times$ Support	0.0353*** (0.0118)	0.0386*** (0.0145)	0.0660*** (0.0216)	0.0691*** (0.0197)	0.0382* (0.0208)	0.0335 (0.0207)
Mechanism	-0.267** (0.127)	-0.283** (0.142)	-0.141*** (0.0346)	-0.153*** (0.0356)	-0.108 (0.102)	-0.125 (0.0966)
Shock $\times$ Mechanism	0.309* (0.161)	0.314* (0.169)	0.0850* (0.0514)	0.0515 (0.0741)	0.00402 (0.0513)	0.0113 (0.0606)
Support $\times$ Mechanism		-0.0202 (0.0643)		-0.0226 (0.0416)		-0.142** (0.0649)
Shock $\times$ Support $\times$ Mech.		-0.0105 (0.0743)		-0.0578 (0.0753)		0.0327 (0.0602)
Observations	1,076	1,076	1,076	1,076	1,076	1,076
R-squared	0.545	0.551	0.545	0.547	0.538	0.539
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Grid controls	Yes	Yes	Yes	Yes	Yes	Yes
Mechanism	Reach of 4G Network		Military Barracks		Oil production	

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 \(2010\)](#). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.5: Shock intensity and regime support

VARIABLES	(1)	(2)	(3)	(4)	(5)
			Shock Intensity (Std)		
Regime support (2012, Std)	-0.189*** (0.0432)	-0.104* (0.0611)	-0.0109 (0.0438)	-0.00855 (0.0366)	-0.0109 (0.0392)
Population density (2011, Std)		0.372*** (0.0805)	0.110** (0.0469)	-0.0312* (0.0164)	0.110** (0.0438)
Poverty rate (2011, Std)		0.0102 (0.0936)	-0.224*** (0.0576)	-0.251*** (0.0558)	-0.224*** (0.0611)
Constant	0.244* (0.126)	0.218* (0.121)	0 (0.0196)	0 (0.0178)	0.222*** (0.0352)
Sample	Standard	Standard	Standard	Adding Caracas	Standard
St. Errors	Conley (200km)	Conley (200km)	Conley (200km)	Conley (200km)	State level
Observations	1,076	1,076	1,076	1,108	1,076
R-squared	0.033	0.091	0.055	0.048	0.055

Notes: This table summarizes key results of linear regression models assessing the association between the Shock intensity and the degree of regime support. Column 2 controls for local poverty rates and population density. Column 3 controls for a set of Grid controls that include fixed effects for the closest transmission sub-station. Column 4 adds parishes within Caracas to the sample. All observations are weighted by the local population. Standard errors in Columns 1-4 are calculated considering potential spatial error correlation within a bandwidth of 200km following [Conley \(2010\)](#), and standard errors in Column 5 consider potential correlation of errors across parishes within the same State. *** p<0.01, ** p<0.05, * p<0.1.

Table A.6: Repression beyond protests

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
		Repression Fatalities (All events)		Repression Fatalities (Excluding protests)		
Post × Shock	0.0235 (0.0308)	0.0224 (0.0299)	0.0193 (0.0301)	0.00472 (0.0266)	0.00549 (0.0263)	0.00182 (0.0271)
Post × Regime Support	-0.0425 (0.0617)	-0.0399 (0.0604)	-0.0273 (0.0591)	-0.00378 (0.0446)	-0.00564 (0.0447)	0.00330 (0.0464)
Post × Shock × Support	-0.191*** (0.0672)	-0.188*** (0.0640)	-0.181*** (0.0630)	-0.107** (0.0506)	-0.109** (0.0489)	-0.105** (0.0515)
Protests		0.0720 (0.132)	0.0816 (0.132)		-0.0516 (0.110)	-0.0341 (0.112)
Protests (t-1)			0.161 (0.135)			0.0747 (0.119)
Observations	4,290	4,290	3,960	4,290	4,290	3,960
R-squared	0.088	0.090	0.097	0.093	0.094	0.094

Notes: The table summarizes key results of a difference-in-differences specification assessing the effect of the local exposure to the blackout on repression fatalities at different levels of regime support. Columns 1-3 show triple-did estimates on total monthly repression fatalities in a municipality. Column 1 provides a baseline specification, and Columns 2 and 3 control for concurrent and lagged protests respectively. Columns 4-6 provide similar specifications using the total repression fatalities outside of protest events. All regressions control for the interactions between the local poverty rate and the local population density with the identifier of the post-treatment period, and with the local exposure to the blackout in the post-treatment period. All observations are weighted by the local population and standard errors are calculated considering potential spatial correlation within a bandwidth of 200km following [Conley \(2010\)](#). *** p<0.01, ** p<0.05, * p<0.1.

Table A.7: Vargas tragedy - summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Nighttime lights (Inverse hyperbolic sine)	23,460	2.80	0.86	0.76	4.84
Vulnerable Area	23,460	0.0237	0.152	0	1
Special Action Areas	23,460	0.00384	0.0618	0	1
Chávez's 1998 Vote Share	23,460	0.563	0.0850	0.306	0.706
Nearest Affected Area	23,460	5.644	4.909	1	12
Nearest Voting Center	23,460	35.84	24.78	1	88

Notes: Summary statistics for variables used in the analysis of the Vargas Tragedy.

Table A.8: 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
Nighttime lights (Inverse hyperbolic sine)	13,750	7.154	3.088	0	14.075
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
Country rainfall (log)	21,250	4.209	0.717	1.408	5.660
Local rainfall (log)	21,216	7.097	1.952	-4.239	11.97
Dictatorship	21,250	0.67	0.47	0	1
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.9: Ethnic favoritism and regional nighttime lights - summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Nighttime lights ($\log(\text{Total}+0.01)$)	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
Country 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 nighttime lights during national rainfall shocks.

Table A.10: 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
Country rainfall ($\log$)	56,455	7.823	0.757	5.938	9.760

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

Table A.11: Ethnic favoritism and infant mortality - summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Child survived as infant marker	1.180e+06	0.900	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
Country 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.12: Ethnic favoritism during rainfall shocks

Panel A: Nighttime lights				
VARIABLES	(1)	(2)	(3)	(4)
	Nighttime lights: Log(Total Radiance + 0.01)			
Linguistic Similarity to Leader's (t-1) Group	0.305*** (0.0752)	0.195** (0.0866)		
Linguistic Similarity × Country Dryness (Log, Std, t-1)		0.110* (0.0658)		
Leader's (t-1) Ethnic Region			0.168** (0.0670)	0.0798 (0.0809)
Ethnic Region × Dryness				0.109* (0.0621)
Observations	6,610	4,896	6,610	4,896
R-squared	0.971	0.978	0.971	0.978
Controls	All	All	All	All
Country-Year FE	Yes	Yes	Yes	Yes
Language-Year FE	Yes	Yes	Yes	Yes
Language-Country FE	Yes	Yes	Yes	Yes

Panel B: Individual's "Wealth"				
VARIABLES	(1)	(2)	(3)	(4)
		Wealth Index		
Local Linguistic Similarity to Leader's (t) Group	0.540*** (0.117)	1.337*** (0.462)		
Local Similarity × Dryness		1.261* (0.680)		
Individual's Linguistic Similarity to Leader's (t) Group			0.239 (0.180)	0.282 (0.222)
Individual Similarity × Dryness				1.032 (1.131)
Observations	56,455	56,455	56,455	56,455
R-squared	0.606	0.607	0.606	0.606
Controls	All	All	All	All
Country-Year FE	Yes	Yes	Yes	Yes
Loc. Language-Year FE	Yes	Yes	Yes	Yes
Ind. Language-Year FE	Yes	Yes	Yes	Yes

Panel C: Infant Mortality				
VARIABLES	(1)	(2)		
	Indicator of Survival as Infant			
Mother's Co-Ethnicity to Leader (t-1)	0.00228* (0.00122)	0.00253** (0.00118)		
Mother's Co-Ethnicity × Dryness		0.00228** (0.00111)		
Observations	1,172,842	1,172,842		
R-squared	0.013	0.013		
Controls	All	All		
Survey-Birth Year FE	Yes	Yes		
Survey-Ethnic Group FE	Yes	Yes		

Notes: Regressions evaluate the effect of ethnic affiliation to the country's leader on ethnic region nighttime lights (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 4 add the interaction between national dryness and ethnic affiliation measures. 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 A.3. Standard errors are clustered at the country-year or survey-year level to match the exogenous variation of the national rainfall shocks. Panel A considers the Log(radiance + 0.01) transformation of nighttime lights measures for replicability in relation to [Dickens \(2018\)](#). *** p<0.01, ** p<0.05, * p<0.1