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FORCED DISPLACEMENT, THE PERPETUATION OF AUTOCRATIC LEADERS, AND DEVELOPMENT IN ORIGIN COUNTRIES

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ABSTRACT

When millions flee an autocratic regime, what happens to economic development in the country they leave behind? In Venezuela, nearly eight million people (38.8% of the population in 1990) have left since 2013. Using a difference-in-differences design exploiting historical foreign settlement shares (as migration networks) and post-2013 oil shocks, we find affected municipalities experienced a 29.4 percent GDP contraction (mirrored in lower income per capita and employment) and higher inequality at origin. Paradoxically, this exodus sustains autocracy by silencing political opposition and strengthening organized crime that channels illicit rents and armed enforcement to the regime. These linked economic and political shifts reveal how large-scale migration from weak institutional contexts can entrench autocracy and deepen long-run underdevelopment.

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"Exit has [been] shown to drive out voice."

Albert O. Hirschman, 1970

1 Introduction

Over the past 50 years, the number of forced migration crises has skyrocketed. By 2023, these involuntary relocations of people due to extreme socioeconomic crises, conflict, violence, persecution, disasters, and climate change had displaced more than 123 million people (UNHCR, 2024a). This trend is likely to intensify, making the issue a pressing global development challenge. While recent research has studied how these flows affect *destination* countries (e.g., Dustmann et al., 2019; Steinmayr, 2021) and *migrants* themselves (e.g., Abramitzky et al., 2014; Clemens et al., 2019; Becker et al., 2020; Pritchett and Hani, 2020; Chiovelli et al., 2021), less is known about how they shape the development paths of *origin* countries, specifically those with weak institutional backgrounds.

While in strong institutional contexts, migration flows can generate positive externalities, including knowledge diffusion, increased trade, higher foreign direct investment, and rising income levels (Javorcik et al., 2011; Parsons and Vézina, 2018; Khanna et al., 2022; Godlonton and Theoharides, 2025; Dinkelman and Mariotti, 2016; Dinkelman et al., 2024), in weak institutional environments with autocratic regimes and non-state actors, these channels are often muted, and negative spillovers may dominate. For instance, forced migration in these settings can open opportunities for criminal organizations to expand and for illicit economies to become more entrenched (Kapur, 2014; Bada and Feldmann, 2018; Yates and Leutert, 2018; Bandiera et al., 2025; Guerrero and Sviatschi, 2025; Sviatschi et al., 2025).[1] Politically,

[1]Across a wide range of contexts, substantial qualitative evidence indicates that forced displacement in settings with weak institutions creates governance vacuums and new sources of revenue, which criminal and armed groups exploit through activities such as trafficking, taxation, and smuggling. Sviatschi et al. (2025) reviews several such dynamics in Latin America. In Venezuela, mass outflows of migrants combined with restrictive policies in neighboring states increased the profitability of cross-border human trafficking, thereby enhancing the rents of existing Venezuelan criminal groups and strengthening their connections with foreign drug-trafficking groups. In Haiti, escalating gang violence in Port-au-Prince displaced more than 20,000 people in just four days, as armed organizations consolidated territorial control and paralyzed transport

forced migration can shift the balance of power if those leaving are more likely to oppose the ruling party (e.g., Anelli and Peri, 2017; Grossmann et al., 2024), while economically it further drains labor and investment from home, creating space for non-state actors to collaborate with authoritarian regimes in consolidating power as formal institutions erode.

We investigate these hypotheses by assessing the role of forced migration in shaping Venezuela's development between 1992 and 2021. In response to economic and social turmoil during the regimes of Hugo Chávez and Nicolás Maduro, at least 38.8 percent of Venezuela's population of 1990—7.7 million individuals—has fled the country. Although the Venezuelan migration crisis did not originate principally from a conflict or a climate disaster, it is recognized by the United Nations as a forced displacement crisis considering the desperate conditions of Venezuelans, including the inaccessibility of food and health services and the massive and sudden nature of the migration flows.

Although Chávez became president in 1998 and his government introduced constitutional reforms that concentrated power in the executive branch and strongly weakened political accountability, forced displacement only surged after 2013, when his successor, Maduro, faced plummeting international oil prices in the world's twelfth-largest oil-producing nation. This shock, amplified by distortionary policies, hyperinflation, reliance on criminal actors and illicit resources, and international sanctions, escalated the crisis and triggered the unprecedented outflow.

We employ a difference-in-difference methodology and exploit two sources of variation. The first is annual variation from the oil price shocks that occurred after 2013. The second is

and supply chains (International Organization for Migration (IOM), 2024). Beyond Latin America, similar patterns are evident. In Sudan, both the Sudan Armed Forces (SAF) and the paramilitary Rapid Support Forces (RSF)—successors of the Janjaweed militias—have long depended on informal economies and criminal networks, which now expand amid massive internal displacement and refugee flows (UNHCR, 2024b). In Syria, years of civil war eroded the distinction between state and nonstate authority, as regime-linked elites and armed groups jointly managed illicit trade and cross-border smuggling to finance the conflict (Brookings Institution, 2023). Likewise, in Myanmar, decades of military rule and the entrenched presence of ethnic armed organizations (EAOs) fostered parallel governance systems and illicit economies, which deepened following the violent campaigns against the Rohingya population in 2016–2017 (Baron-Mendoza, 2017).

municipal variation in the share of foreigners living in each municipality in 1990, the last population census before Chávez's presidency. Foreigners in Venezuela in 1990—predominantly Colombians—likely lowered migration costs by providing network support and information to prospective migrants. Consistent with this, most Venezuelans who later migrated to Colombia came from municipalities with a larger Colombian presence in 1990. Data from Venezuela's unique National Surveys on Living Conditions (ENCOVI in Spanish) collected between 2017 and 2021 further corroborate this link: municipalities with a higher 1990 foreign share were more likely to have households reporting relatives in Colombia.[2] Moreover, there is a positive and high correlation between the 1990 foreign share and the municipal origins of Venezuelans living in Colombia in 2018.

Our empirical strategy compares economic outcomes in Venezuelan municipalities with varying foreign settlement shares in 1990, before and after the shocks that induced mass forced displacement from 2013 to 2018. In particular, we exploited the fact that while the decline in oil prices and subsequent economic policies induced a national shock, Venezuelans from municipalities with more foreigners—predominantly Colombians—were more likely to be able to leave.[3] Importantly, we show that municipalities with a large foreign share do not have different economic structures that could therefore be disproportionately affected by the oil shock. Particularly, all our estimates are robust to the inclusion of interactions between municipal oil-production concentration and time trends. In addition, we show that national economic measures during the period of analysis did not differentially target or affected municipalities with a high foreign share.

To explore these sources of variation, we use data on night-light density, household living conditions, elections, and organized crime for the period 1992–2021. We use night-light data as a proxy for economic growth and inequality (Chiovelli et al., 2023).[4] We measure in-

[2]These data are available for 2014 to 2021, but the migration module is only available for 2017 to 2021.

[3]Additionally, examining previous trends, we can also test the identifying assumption—that is, municipalities with a large foreign settlement share and those with a low share would have experienced similar economic development trends if migration had not increased after 2013.

[4]We validate these measures for correlation with household-level income measures, using the ENCOVI.

equality using a novel spatial measure that estimates the dispersion of night-light density at the *parroquia* (county) level within each municipality. We find that this measure positively correlates with traditional income-based inequality metrics, validated using census data from Venezuela and Colombia. Second, to examine effects on the perpetuation of political leadership, we use unique web-scraped data on the results from the last four presidential and six mayoral elections, the ENCOVI, a representative survey of Venezuelan migrants in Colombia, and data on the presence of several organized criminal groups from the Armed Conflict Location and Event Data (ACLED) and the Global Terrorism Database (GTD).

Our first key result is that municipalities affected by forced displacement experienced sharper declines in development and greater inequality than other areas. A one percent higher share of foreign settlements in 1990 is associated with a 12.6 percent lower night-light density after 2013.[5] Using a two-stage least squares specification—instrumenting the 2018 municipal origins of Venezuelans living in Colombia with the 1990 foreigners settlement shares—we estimate that night-light density declined by 7.5 percent for every additional percentage point of the municipal population that migrated from Venezuela to Colombia. This corresponds to an estimated 2.1 percent decline in GDP (Henderson et al., 2012). Since about 14 percent of Venezuela's 1990 population is registered as living in Colombia, for a municipality with such migration outflows, our estimates imply that total out-migration from Venezuela to Colombia would translate into a GDP contraction of 29.4 percent ($= 2.1 \times 0.14$). Importantly, these patterns are not mechanically driven by population loss: data from ENCOVI show consistent declines in income per capita and employment, and increments in poverty. Additionally, inequality also rose markedly in high-exposure municipalities.

How does an autocratic regime remain in power during such a profound economic and social crisis? Our second key finding is that forced migration contributed to the medium-

Moreover, we control for the presence of oil fields in our estimates to rule out concerns that luminosity driven by gas flares could affect our main results.

[5]To account for the possibility of gas flares affecting night-light measures, Table E.1 shows the estimation controlling by oil fields, using data from Sabbatino (2018).

term survival of autocratic leadership by simultaneously weakening political opposition and expanding organized crime, which provided a steady source of illicit income and coercive capacity.

First, migrants disproportionately backed opposition candidates.[6] Their departure weakened the political opposition, further entrenching the incumbent and reducing momentum for social change. The higher levels of forced displacement in affected municipalities caused a steep drop in electoral turnout and votes for opposition candidates after 2013. In fact, our estimates suggest that the municipality that experience a 14 percent decline in population to Colombia would see a reduction of 18.76 (=14 $\times$ 1.34) in opposition support and 41.3 percentage points (=14$\times$ 2.95) in electoral turnout. This pattern mirrors the 2024 presidential election, where only 60,000 out of seven million Venezuelans abroad were allowed to vote. Our findings hold when using opposition-reported 2024 election data and are consistent with results from the five Venezuelan municipal elections we analyzed. These effects are not a mechanical result of population loss and persist even when the electoral census is updated to reflect the population decline.

Second, we find that organized crime expanded in Venezuelan municipalities more exposed to forced migration, which strengthened network connections to organized criminal groups abroad and inside Venezuela. This expansion in crime provided the regime with an important source of illicit revenue and enforcement capacity, thus, diminish pressure for economic change. Particularly, during the peak of migration, these areas witnessed large gains in activities linked to criminal organizations that exploit migrants and are associated with the regime, including transnational drug-trafficking and human trafficking. The massive exodus enabled criminal groups to more easily enlist, coerce, and exploit migrants. It also facilitated the flow of information about the weak institutional context at migrants' origin locations.

Our quantitative findings align with abundant qualitative evidence from journalists and

[6] This is consistent with the evidence provided by Holland et al. (2024), in which 12.1 percent of all Venezuelan migrants in Colombia supported the left and only 0.1 percent supported Maduro's government.

NGOs in the region, suggesting that forced displacement from Venezuela reduced the transaction costs of drug and human trafficking and allowed these groups to expand while benefiting the regime. In particular, reports suggest that the autocratic Venezuelan government maintains power by leveraging criminal rents, as seen in the *Paraguaná Cartel* and *Cartel of the Sun* cases (Insight Crime, 2022a,b); that politicians, security forces, and drug traffickers form symbiotic networks where officials shield traffickers from prosecution in exchange for financial support, political influence, and public services; that governors and mayors manipulate military and police appointments to ensure loyalty and facilitate drug trafficking; and that, at the same time, traffickers finance campaigns, mobilize votes, and fill gaps left by a collapsing state.[7]

The combined electoral and criminal effects of forced displacement exacerbate already negative impacts on development and enable the regime to be perpetuated. Amid less pressure for reforms and more reliance on illicit activities and coercive enforcement, the incumbent government faces weaker pressure and incentives to improve conditions for private and human capital investment. We leverage a mediation analysis to show that these two channels explain approximately one-third of the effect of forced displacement on development.

Our findings are robust to several validity tests. Notably, municipalities with a higher share of foreigners in 1990 show similar trends in our main outcomes before the crisis began. Moreover, our core estimates remain consistent even after accounting for interactions between linear time trends and a large set of observable baseline measures, providing evidence that displacement effects are not confounded by unrelated dynamics specific to high-foreign share municipalities. In fact, our results remain consistent when controlling for interactions

[7]The Paraguaná Cartel is a criminal organization operating primarily in Venezuela's Falcón state, particularly around the Paraguaná Peninsula. It is involved in large-scale drug trafficking, smuggling, and money laundering, often taking advantage of the area's free-trade zones and proximity to Caribbean maritime routes. On other hand, The Cartel de los Soles ("Cartel of the Suns") refers not to a single cartel but to a network of high-ranking members of the Venezuelan military and security forces allegedly involved in cocaine trafficking and corruption. The name derives from the sun insignias worn by Venezuelan generals (soles), and the term is commonly used to describe the military's role in facilitating and protecting drug shipments, particularly in cooperation with Colombian and Mexican cartels (U.S. Department of Justice, Office of Public Affairs, 2020; Transparencia Venezuela, 2022).

of oil production and time trends, indicating that differential trends in oil-rich areas are not driving the effects. Our results also remain robust when analyzing correcting standard errors for alternative cluster specifications, approximating forced displacement using inverse distance to Colombia's crossing points, and applying alternative difference-in-difference estimators based on recent methodological advances (Abadie, 2005; Sant'Anna and Zhao, 2020). Additionally, our findings are not influenced by contemporaneous government actions. Even when controlling for novel proxies of government intervention—such as data on expropriations of private firms, social program beneficiaries, and irregularities in electricity provision post-2019—our results hold.

We further validate our findings through a strategy based on a measure of imputed outflows by year and municipality, calculated from the interaction of foreign settlement shares in 1990 and forced migration to Colombia. This measure closely tracks actual migration patterns, as shown by its strong correlation with the origins and arrival dates of Venezuelans interviewed in Colombia in 2018.[8] Imputed outflows also positively correlate with the locations of relatives abroad, as seen in the ENCOVI data (2017–2021). Moreover, using road distances from municipalities to major border crossings to define affected areas yields similar results.

One potential concern is the possible manipulation of electoral data. To address this, we conduct data checks for abnormal patterns and find no evidence of manipulation before 2018, in line with reports from the humanitarian and international organizations that validated those elections.[9] However, we do find evidence of manipulation (or the effects of a political boycott by the opposition) in the 2018 presidential election. To validate our findings, we re-estimate the effects of forced migration using opposition-collected data for the 2024 presidential election, which indicate that Maduro lost by a landslide. Additionally, we analyze mayoral elections across 335 municipalities, comprising five election years and 1,675 observations. The scale of these elections makes systematic manipulation unlikely. The estimates

[8] While the geographic scope of Colombian data limits econometric analysis, it still validates our measure.

[9] Reports from the Carter Center (1998–2021) suggest no systematic manipulation before 2018.

remain consistent and support the validity of our findings.

We contribute most directly to recent research on the impacts of cross border migration on migrant-origin socioeconomic conditions (Yang 2008; Dinkelman and Mariotti 2016; Theoharides 2020; Dinkelman et al. 2024; Godlonton and Theoharides 2025). Closest to our work Khanna et al. (2022) and Testa (2021) focus on the effect of emigration on economic growth. Khanna et al. (2022) examines the effects of temporary, voluntary, and government-regulated migration on long-run development in origin areas using the case of the Philippines. The authors document that initial migrant income shocks increase domestic income and education levels. Our paper complements their work examining the effects of forced migration on development in a context with an autocratic regime and further investigates how emigration facilitates the perpetuation of this regime in power. Testa (2021) examines the long-run effects of forced migration on economic development, using Czechoslovakia's expulsion of three million Germans after WWII and find negative effects and a decline in human capital. We complement this line of research by examining a setting where weak state capacity is intertwined with non-state actors, allowing the effects to also endure by weakening economic and political incentives for change and reinforcing the regime's reliance on illicit resources.

This paper also contributes to the literature on the relationship between migration and development. While the vast majority of research has focused on the effects of migration on destination economies (Card, 2001; Borjas, 2014; Abramitzky et al., 2014; Foged and Peri, 2016; Dustmann et al., 2017; Hanson et al., 2018), brain drain (Beine et al., 2008; Gibson and McKenzie, 2011; Docquier and Rapoport, 2012; Batista et al., 2012; Anelli et al., 2023), remittances (Amuedo-Dorantes and Pozo, 2006; Giuliano and Ruiz-Arranz, 2009; Portes, 2009; Ambler et al., 2015), cultural remittances (Melki et al., 2024), and workers' outside options and bargaining power (Karadja and Prawitz, 2019), our study adds a new dimension by examining the impact of forced displacement on development in origin countries with weak institutional background. We offer empirical evidence for Hirschman's hypothesis that in contexts with weak democracies, emigration may reduce pressure for reforms (Hirschman 1970, 1978), in contrast to the well-documented link between emigration, higher democratization, and political change in well-functioning democracies (Spilimbergo 2009; Docquier et al. 2016; Karadja and Prawitz 2019; Grossmann et al. 2024).[10] Furthermore, we show that in weak democracies with non-state actors, the documented positive network effect of brain drain may not materialize (Gibson and McKenzie 2011; Docquier and Rapoport 2012). This may be because individuals are not inclined to invest in such places due to the high risks involved. In fact, "bad investors"—those who might benefit from a weak democracy and rule of law—are often the ones to move there.

Our paper is also related to recent work examining how mass migration and deportations intersect with criminal organizations, facilitating the expansion of criminal networks across borders (Murphy and Rossi, 2020; Guerrero and Sviatschi, 2025; Bandiera et al., 2025; Sviatschi et al., 2025). This literature largely highlights how mass migration from and to countries with weak institutions can strengthen criminal groups by enabling network expansion and rent diversification, particularly through human trafficking that exploits vulnerable migrants. We extend this line of research by demonstrating that periods of mass migration in weak institutional settings can reinforce the power and resources of criminal organizations linked to autocratic regimes in origin countries. In this regard, we also complement the work analyzing authoritarian regimes (Besley and Kudamatsu, 2007; Acemoglu and Robinson, 2009; Acemoglu et al., 2019; Hsieh et al., 2011; Egorov and Sonin, 2023; González et al., 2023; Yang, 2024). However, rather than focusing on the effects of the regimes themselves, we investigate the role of forced migration outflows and how they may reinforce the power of autocratic leaders in origin countries by reducing opposition and promoting reliance on illicit activities and coercive illegal enforcement.

We also contribute to the literature by combining unique data sources to assess trends in a

[10] See Kapur (2014) for a detailed survey of the literature on international emigration and political outcomes in origin countries.

country experiencing forced migration in weak institutional settings and by exploring their impact on development outcomes. Such data are rarely available (Martinez 2022; Chiovelli et al. 2023), as origin countries often undergo crises that make data collection extremely challenging. We integrate data from multiple unique sources, including Venezuela's annual ENCOVI (2014–2021). They provide insights into national poverty trends, sectoral recomposition, and public service provision despite being limited to the largest urban centers. Additionally, we use night-light density and other satellite data to approximate changes in economic growth and spatial inequality. We also web-scrape online electoral results from presidential and mayoral elections between 2004 and 2024, and combine them with population censuses, web-scraped data on private-firm expropriations, international economic sanctions, and surveys of Venezuelan migrants in Colombia. This comprehensive approach enables us to assess the complexity of forced migration and its wide-ranging effects.

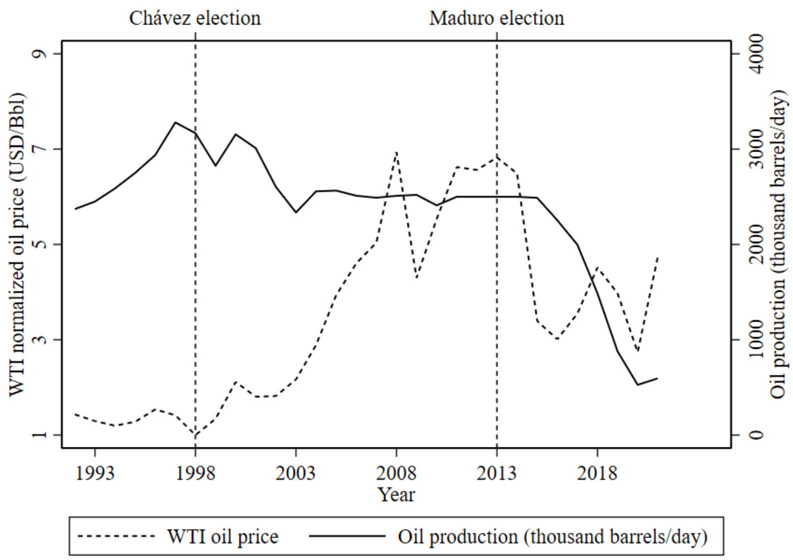
2 Local Context: Venezuela's Unraveling

Venezuela, historically reliant on oil, entered an economic recession in the late 1990s due to falling oil prices and a downturn in its non-oil sector, which fueled widespread discontent and led to the election of Hugo Chávez in 1998 (Hausmann and Rodríguez 2014).[11] Chávez's presidency brought sweeping changes, including constitutional reforms that concentrated power in the executive branch and weakened political accountability. His administration also expropriated private firms, spurring a sharp contraction of the private sector (Panel A, Figure A.1). Despite early political instability marked by a coup attempt and an oil strike, Venezuela eventually recovered and achieved sustained economic growth, thanks to rising oil prices and expansionary government policies during Chávez's tenure (Figure 1).[12] These factors helped Chávez maintain widespread popularity until his death in 2013.

[11] The recession made already rampant inequality more salient and boosted the populist agenda.

[12] For instance, government spending rose to 30 percent of GDP by 2006 (Weisbrot and Sandoval 2008).

Figure 1: Oil Prices and Production in Venezuela, 1992–2021



Notes: Oil price data come from the Global Commodity Prices dataset of the World Bank (2024). Annual oil production data come from Datosmacro (2024).

2.1 Venezuela's Crisis: 2013 to Present

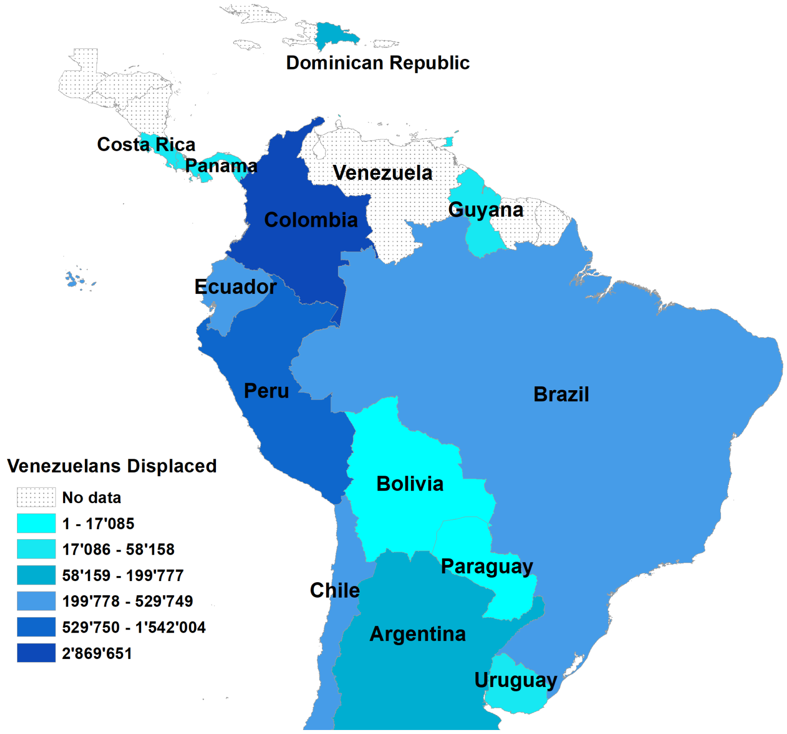
In 2013, a terminally ill Hugo Chávez appointed Nicolás Maduro as his successor. Following Maduro's election, Venezuela suffered a sharp drop in international oil prices, triggering a severe external shock to the economy (Figure 1). In response, Maduro's government sought financing to cover its deficit, leading to hyperinflation (Panel B, Figure A.1). Together, the oil price collapse, preexisting macroeconomic imbalances, and authoritarian policies induced a complete shutdown of international financing and the imposition of stringent sanctions (Panel C, Figure A.1). Consequently, the country plunged into crisis, with GDP sinking by over 70 percent between 2013 and 2018 (Morales-Arilla and Traettino 2023).

ENCOVI data from 2014 to 2021 document the severity of Venezuela's collapse. By 2021, more than 94 percent of the population living below the poverty line and 74 percent below the extreme poverty line (Figure A.2). The crisis extended beyond economic and political dimensions to public services. As shown in Figure A.3, power and water supply interruptions became widespread (Panels A and B). By 2021, at least 75 percent of the population had ceased to maintain a healthy diet and was subsisting on a limited variety of foods (Panel C). Health services were also decimated, with coverage dropping from 45.8 percent to just 3.4 percent between 2014 and 2021. By then, roughly 60 percent of those with chronic illnesses had little to no access to essential medications (Figure A.4).

2.2 Forced Migration and Colombian Networks

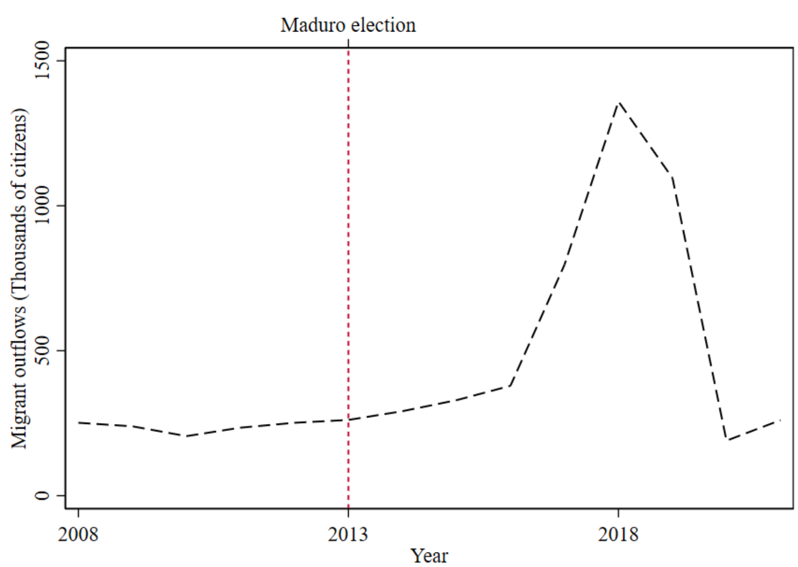
The 2013 collapse in international oil prices set in motion an unprecedented exodus from Venezuela. According to the latest figures from the United Nations Refugee Agency (UNHCR), nearly eight million people have left Venezuela—more than 38.8 percent of the country's population in 1990 (the last population census before Chávez election). Most Venezuelan migrants have settled in neighboring Colombia, with more than 2.8 million residing there by 2024 (Figure 2). Figure 3 illustrates annual inflows of Venezuelan migrants to Colombia, which almost quintupled from 2013 to their peak in 2018.

Figure 2: Top Host Countries for Venezuelan Migrants in Latin America



Notes: Data on Venezuelan migrant outflows to Latin American countries until May 2024 by host country come from R4V (2024) (downloaded on June 10, 2024).

Figure 3: Venezuelan Migration to Colombia



Notes: Data on migration outflows between 2008 and 2021 come from the Colombian migration agency (Migración Colombia, 2023).

3 Data

This section describes the data used in the study. Appendix B provides details on outcome construction and Appendix C presents descriptive statistics for the main variables employed in the analysis. Our analysis period is 1992–2021, in line with available remote-sensing data.

3.1 Municipal-Level Data

To define which municipalities were mainly affected by forced migration, we use Venezuelan census data to quantify the presence of foreign residents in municipalities during 1990, the last census before Chávez's election. We construct the foreign settlement measure as the share of foreigners living in each municipality in 1990 as a percentage of the total number of foreigners in Venezuela that year. Since 1990 was the last population census before Chávez's election, the location of foreigners at that time should be unaffected by the migration crisis.[13] Figure 4 illustrates the geographic distribution of foreign settlement shares.

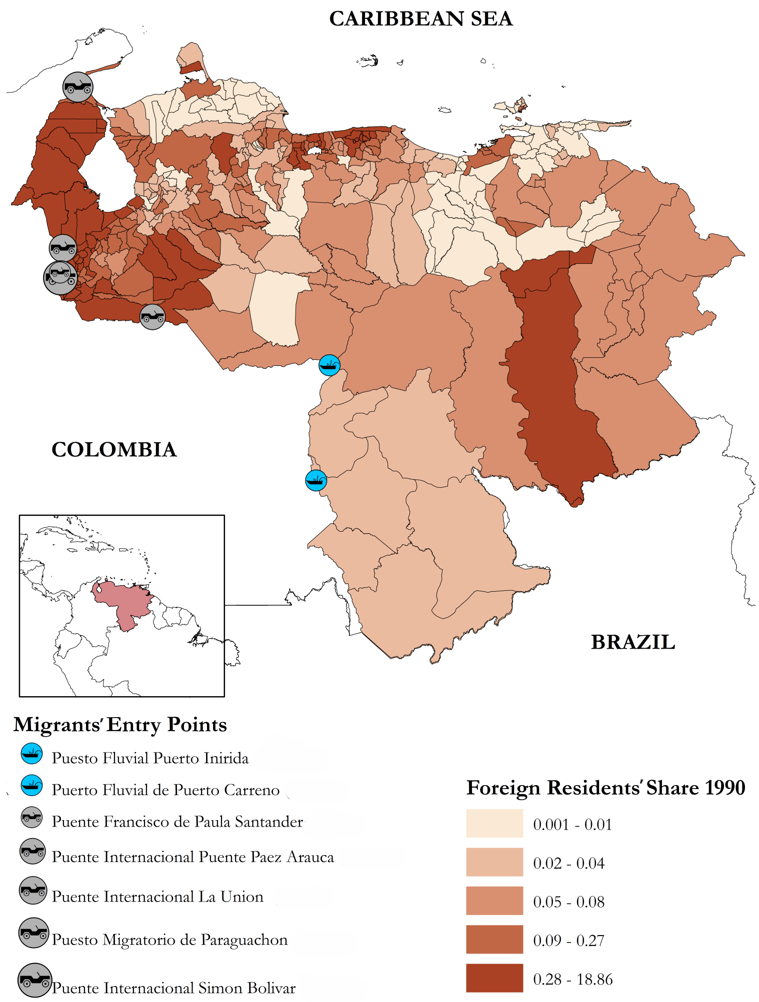
Table D.1 presents results on the nationality of origin of foreigners living in Venezuela in 1990, as well as the host countries of relatives living abroad as reported by Venezuelan households interviewed in the ENCOVI between 2017 and 2021. The overwhelming majority of foreigners living in Venezuela in 1990 had been living in Colombia five years earlier. Moreover, these households reported that most of their relatives abroad were also living in Colombia. As such, our measure of foreign settlements aims to capture a push factor after 2013 that increased the likelihood of migration from municipalities with a higher share of foreigners by facilitating more network support abroad and providing more information on the migration process. In particular, we exploit the fact that most forced migration from Venezuela after 2013 came from municipalities with more foreigners in the 1990s. Section 4 validates this by examining if Venezuelans arriving in Colombia after 2013 were more likely to come from those areas.

[13] Although the census does not permit the direct identification of foreigners, it collects individual information on whether each person had been living outside of Venezuela in the last five years. We use this measure as a proxy for foreign nationality.

Tables D.2 and D.3 characterize foreigners living in Venezuela in 1990. In addition to predominantly Colombian nationality, these individuals were mostly employed and had higher education levels and ages than Venezuelans (Table D.2). On average, they also had incomes three times greater than those of the Venezuelan population in 1990 (Table D.3).[14]

[14]Since the main specification follows a difference-in-difference design, any imbalance in the outcome levels between high and low shares of foreign settlements in municipalities does not threaten the empirical strategy, because they are absorbed by the municipality fixed effect in the empirical specification. Nevertheless, we rule out the concern that these characteristics could trend differently by controlling for time trends in socioeconomic baseline characteristics.

Figure 4: Municipal Variation – Historic Foreign Settlement Shares, 1990



Source: Data on administrative boundaries of Venezuela come from Instituto Geográfico de Venezuela (2015), location data for migration posts are from Migración Colombia (2023), and data on the share of foreign residents are from IPUMS (2023). Legends express the number of foreign residents per municipality as a percentage of the total national foreign residents in Venezuela in 1990 multiplied by 100.

3.2 Time-Level Data

We compile data on annual Venezuelan forced migration outflows to Colombia from 1992 to 2021, combining two data sources. For 1992–2002, we use information from the 1993 and 2005 Colombian population censuses, which record the year when each Venezuelan migrant arrived in Colombia. These data represent the number of Venezuelan nationals living in

Colombia each year, as reported by respondents in the retrospective censuses. From 2003 to 2021, our data are based on records from official Colombian migration checkpoints.

3.3 Remote-Sensing Data

To create a proxy of Venezuela's economic growth and inequality, we construct a municipality-year-level longitudinal dataset of satellite night-light density for 1992–2021. This information is processed by the National Oceanic and Atmospheric Administration using images collected by the U.S. Defense Meteorological Satellite Program Operational Linescan System (1992–2013) and the Visible Infrared Imaging Radiometer Suite remote sensor (2012–2021). These sources are inconsistent due to differences in spatial and radiometric resolution, spectral responses, the spread function of the sensors, local overpass time at night, radiance range, and on-board calibration (Li et al. 2017; Sahoo et al. 2020; Chiovelli et al. 2023, 2025). Hence, we harmonize the night-light series for 1992–2021 following the process outlined by Li et al. (2020, 2017). Figure C.1 shows the spatial distribution of night-light density in 2014 (right after the oil price decline) and in our last period of analysis (2021). It illustrates a stark reduction in night-light density over a remarkably short period of time.[15]

To measure spatial inequality, we construct a novel spatial Gini index that corresponds to the traditional Gini formula estimated for each municipality and year, using the night light of each *parroquia* (county) within each municipality as the unit of observation. Tables B.1 and B.2 show that our measure correlates with the traditional measure of income inequality constructed using population censuses for Venezuela (1990) and Colombia (1993 and 2005).

We also use other remote-sensing variables as controls that are listed in Table C.1. These capture baseline economic characteristics and their linear trajectories. They include annual tree-cover loss from Global Forest Watch (2023) and data on urban coverage and areas

[15]We confirm the validity of this measure as a proxy for economic growth in Table B.2 and test the sensitivity of our main results to controlling for oil production in order to account for concerns related to biases due to brightness from gas flares in the satellite data.

covered by water from MODIS Land Cover (2023) (see Appendix B for details). All variables are recorded in 2001, the first year in which they were available.

3.4 Electoral Data

Presidential elections. We web-scrape information to construct longitudinal data at the municipal-election-year level for the four presidential elections from 2006 to 2018. The data come from the Consejo Nacional Electoral (2023) and the Venezuela 360 (2023) project. Specifically, we analyze two outcomes: turnout (total votes divided by the electoral census) and opposition support (votes for candidates other than Chávez or Maduro as a percentage of the electoral census).[16]

Table B.3 describes the four presidential elections within the study period, the elected candidate, and the type of election (ordinary or due to an extraordinary event). Appendix B provides detailed information on the outcome construction and data sources. Figures C.2 and C.3 present results for the geographic distribution of the outcomes in the elections before and after 2013, showing a sharp nationwide reduction in electoral turnout and opposition support.

One relevant concern is the possibility of data manipulation. To address this, we search for abnormal data patterns consistent with manipulation, following the analysis first proposed by Klimek et al. (2012). The authors propose a test that consists of making two-way scatterplots of election results, illustrating the relationship between electoral turnout and support for the incumbent by municipality, which in our case means support for Chávez and Maduro. Manipulation is evident graphically when there is a clear linear positive trend with concentration along the diagonal, indicating that for each vote added to the electoral turnout, support for the incumbent systematically increases by one vote as well. Elections

[16] We fix the electoral census at the year 2000 to keep the denominator constant in our estimates and facilitate interpretation of the coefficients. Nevertheless, we also verify that our main results are not mechanical and remain consistent when using the contemporaneous electoral census that accounts for the population decline.

with no manipulation typically show no obvious correlation between the variables.

The results of this exercise, illustrated in Figure B.1, suggest there was no systematic manipulation before 2018. In fact, the results are consistent with international electoral reports from the Carter Center for 1998–2021 (Carter Center, 2024). However, there seems to be evidence of potential electoral manipulation in 2018.[17] Consequently, we re-estimate our specifications for the 2024 presidential elections in order to validate our results. The opposition directly collected results of the 2024 elections and thus address concerns about manipulation by the incumbents.[18] This exercise supports our main findings and we complement it with robustness checks using the results of municipal elections as outcomes.

Mayoral elections. We web-scrape data for the 2004–2021 municipal elections, covering five election years in 335 municipalities and producing a total of 1,675 independent election observations. The original data come from the Consejo Nacional Electoral. We examine effects in the same two outcomes: electoral turnout and opposition support. To construct the share of opposition votes, we classify each candidate based on party affiliation and policy program. Appendix B provides details on each candidate's classification process.

3.5 Additional Data

Colombian VenRePs Adult Study, 2018. The Venezuelan Refugee Panel Study was collected in 2018 as a representative national sample of Venezuelans living in Colombia in 2018—the peak of the forced migration inflows from Venezuela to Colombia. It includes approximately 3,000 Venezuelan households in Colombia. We use the sample to determine migrants' municipality of origin in Venezuela before migration. This enables us to validate the measure of foreign settlements as a pull factor for Venezuelan forced migration to Colombia. Although the data are not representative of all Venezuelan forced migrants and municipalities for use in the main analysis, they nonetheless are useful for verifying our hypothesis and for interpret-

[17] These results align with qualitative evidence that suggests the opposition boycotted those elections.

[18] The data are publicly available at Resultados con VZLA (2024).

ing the coefficients.[19] Reassuringly, the share of foreigners residing in a municipality in 1990 is positively and significantly correlated with the share of Venezuelan migrants in Colombia in 2018 who originated from that same municipality (Pearson correlation coefficient = 0.41, p-value = 0.000; Figure 5).

ENCOVI (2014–2021). These annual cross-sectional surveys of independent households are drawn each year, representative at the national and state level, and available for the main urban centers. As previously noted, they include a migration module that characterizes the relatives of Venezuelans abroad between 2017 and 2021. They are the analogous of labor force surveys, typically available in other countries in the region.

Organized Crime. We also construct an annual municipal panel spanning 1993–2024 that combines information on violent events and the presence of organized crime and non-state armed actors. These data come from the Armed Conflict Location and Event Data (ACLED) and the Global Terrorism Data Base (GTD).

Other variables. Last, we employ other data from multiple sources to examine the validity of the main results. These include municipal measures on the intensity of the 2019 energy blackouts, coverage of social welfare programs for 2016–2017, and measures of political repression under the Chávez regime in 2004.[20] We also use annual municipal data on private firm expropriations by the government and annual data on inflation and global sanctions for our whole period of analysis. All data sources are described in Appendix B.

[19]The survey, carried out by Ibánez et al. (2024), examined the effects of Colombia's 2018 migrant regularization program and was constructed to be representative of irregular migrants in Colombia at that time, whether or not they were eligible for the program.

[20]These data come from Hsieh et al. (2011).

4 Empirical Design

4.1 Using Past Settlements of Foreigners as a Migrant Pull Factor

Migrants are often said to "vote with their feet," meaning they leave struggling areas in search of more prosperous and stable regions. Consequently, we cannot simply compare municipalities with higher versus lower outflows of forcibly displaced populations, as this comparison would be biased and likely suggest large negative impacts of forced displacement on economic activity. Moreover, such comparisons are typically restricted by data limitations, especially in origin locations that are undergoing social, political, and economic upheaval.

We address these issues by exploiting quasi-exogenous variation from changes in outcomes observed by municipalities with varying levels of foreign settlements in 1990, before and after the onset of the international oil price and migration crises in 2013.

Specifically, we estimate the following equation:

$$y_{mt} = \gamma_m + \alpha_t + \beta\Big[\text{I(t>=2013)} \times \text{Foreigners Share}_{m1990}\Big] + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \varepsilon_{mt}, \qquad (1)$$

where m stands for the municipality and t denotes the year. y_{mt} represents the main outcomes of analysis, including economic growth, spatial inequality, electoral outcomes, and organized crime. $I(t >= 2013)$ represents an indicator variable equal to one after 2013, and Foreigners Share_{m1990} is the share of foreign settlements in each municipality in 1990, constructed as the ratio of foreigners in the municipality over total foreigners in the country, multiplied by 100 to facilitate interpretation. Additionally, X'_m is a vector of baseline control variables (before the beginning of the crises in 2013). These pre-shock municipal characteristics are interacted with year fixed effects to flexibly control for differential municipal trends. The variables in this vector include baseline night-light density measured in 1992; urban coverage, water bodies, and tree-cover loss observed in 2001; and proxies for political repression collected in 2004.[21] γ_m and α_t are municipality and year fixed effects, respectively. Standard errors are clustered at the municipality level to account for potential serial correlation within municipalities. As such, β, our coefficient of interest, measures the change in outcomes when the share of foreign settlements increases by one percent, before and after the onset of the international oil price and migration crises in 2013.[22]

To quantify the effects, we exploit Colombian data on the number of Venezuelan migrants per year. In particular, we estimate the same specification in equation (1) but replace the year dummy with a continuous measure of imputed outflows:

$$y_{mt} = \gamma_m + \alpha_t + \beta \text{Imputed Outflows}_{mt} + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \varepsilon_{mt}, \tag{2}$$

where

$$\text{Imputed Outflows}_{mt} = \Big[\text{Outflows to Colombia}_t \times \text{Foreigners Share}_{m1990}\Big] \tag{3}$$

Imputed Outflows is our quasi-experimental variation on forced migration outflows, constructed as the interaction of total annual outflows of migrants from Venezuela to Colombia and the share of foreigners living in each municipality in Venezuela in 1990. *Foreigners Share* is multiplied by 100 to facilitate interpretation. The variable is scaled by the total population of 1990 to approximate the share of individuals leaving each municipality as a percentage of its total population in 1990.[23] Our coefficient of interest, β, measures the change in outcomes when the share of imputed outflows increases by one percent of the municipal population of

[21] As described in Appendix B, these measures correspond to the municipal count of the individuals who opposed the Chávez regime in an open letter and subsequently received fewer economic opportunities through lower employment and access to the social welfare system. The data come from Hsieh et al. (2011).

[22] In this specification we are not dividing the foreign settlement share by total municipal population because doing so would yield small values. Instead, we use this variable in the next specification as the shift factor to allocate the total out-migration from Venezuela to Colombia across municipalities of origin, which requires that it sum to one hundred.

[23] Even if migrants do not plan to stay in Colombia, they are likely to leave Venezuela through Colombia as the other routes are more difficult (i.e., they need to cross the Amazon Rainforest).

1990.

Our estimates are valid as long as there are no time-varying covariates which are not controlled for that correlate with the share of foreign settlements and might affect our outcomes of interest. We test the validity of this assumption by verifying that municipalities with a high and low share of foreign settlements in 1990 showed similar time trends in the outcomes of interest before the onset of the crises in 2013. We show that this is the case graphically in Figures 6 and 7.[24] In addition, for equations (1) and (2) to identify the effect of forced migration on the outcomes of interest, the 2013 shock must have significantly increased the number of outflows in municipalities with a more extensive share of foreign settlement. We start by examining this issue in the next section.

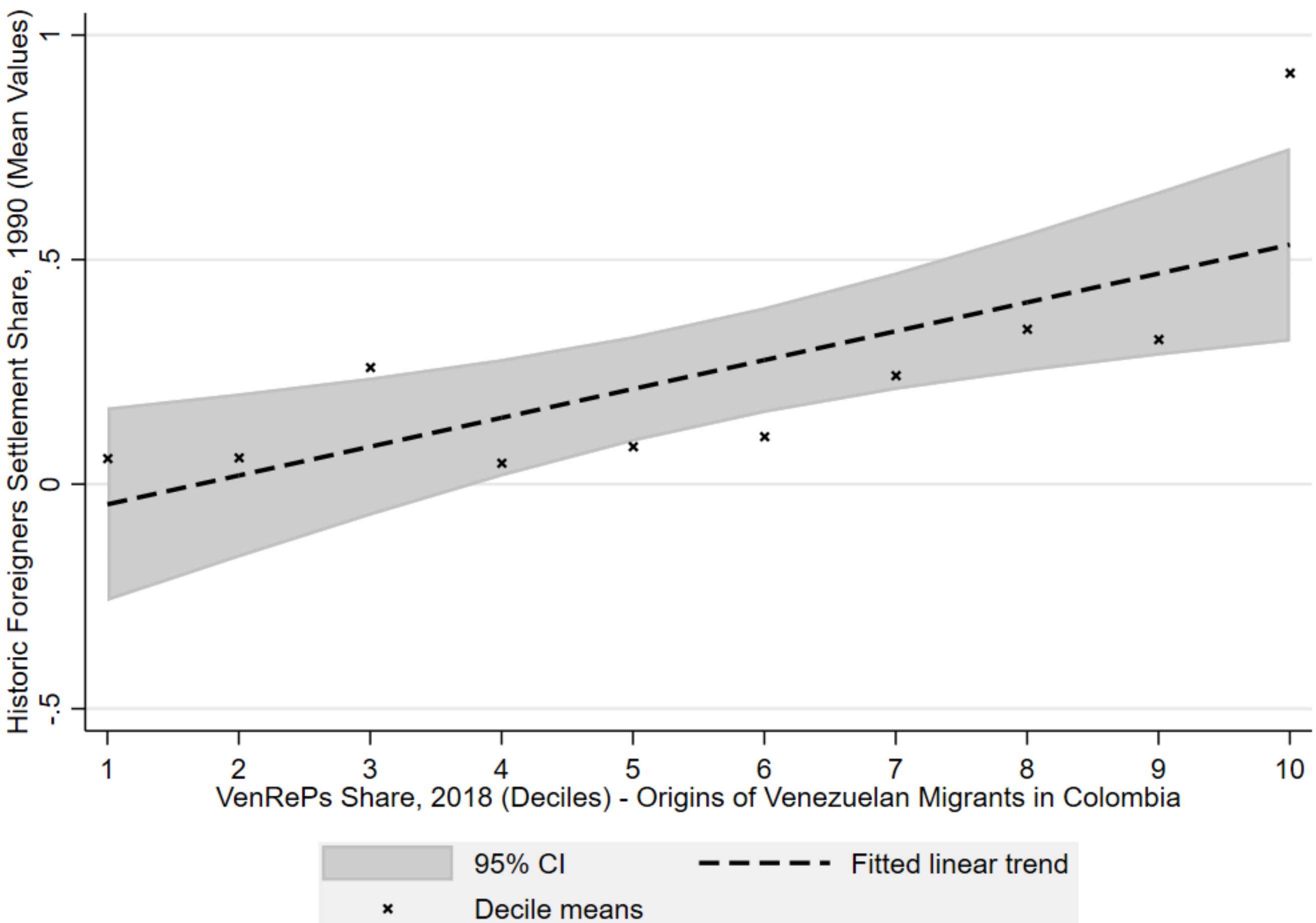
4.2 Foreign Settlement Shares as Predictors of Forced Migration

In this subsection, we show that our measure of foreign settlement shares in 1990 correctly approximates the municipal variation in actual forced migration outflows from Venezuela.

First, we use data from the VenReps Adults study in Colombia collected in 2018—at the peak of forced migration inflows from Venezuela to Colombia—to show that our measure foreign settlement shares of 1990 correlates both positively and statistically significantly with the origin municipalities interviewed in Colombia in 2018 (correlation coefficient = 0.41, p-value = 0.000). Figure 5 illustrates the strength and positive direction of this relationship. In our results section, we leverage this variation in a two-stage least squares specification to facilitate interpretation of the magnitude of forced migration's effects on our outcomes of interest. However, because the VenRePs Adult Study is not representative of the 7.7 million people who migrated out from Venezuela, but only of the ones living in Colombia in 2018 which amount to approximately 2.8 million, we use this specification only as a robustness check and to ease interpretation of the coefficients.

[24]We estimate equation (1) replacing $I(t > 2013)$ with year dummies (the omitted category is 2012).

Figure 5: Historical Foreign Settlements and the Origins of Venezuelan Migrants in Colombia



Notes: The figure includes information from 334 Venezuelan municipalities. The horizontal axis divides municipalities into deciles of the VenRePs Share of 2018 (illustrating the origins of Venezuelan migrants in Colombia), and the vertical axis shows the average share of foreign settlements in 1990 within each decile. Black crosses represent bin averages, the solid line shows the fitted linear trend, and the shaded area corresponds to the 95 percent confidence interval. The analysis excludes El Libertador as it is an outlier municipality.

We also employ ENCOVI data that identifies households from Venezuela in which individuals report if they had a member who migrated abroad and in which year. Table D.1 shows that our measure of imputed outflows also correlates with the number of households reporting a relative living abroad in the ENCOVI data between 2017 and 2021.[25]

[25] Although the ENCOVI allows validation of the measure of imputed outflows, it has too few municipalities to be useful for a more rigorous econometric analysis.

5 Forced Migration and Development in Weak States

Table 1 depicts the results of estimating equations (1) and (2) using three outcomes: night-light density (column (1)), the logarithm of night-light density (column (2)), and the spatial Gini measure based on night-light (column (3)). Panel A illustrates the estimates of equation (1), and Panels B and C illustrate the estimates of equation (2) with and without controls. Consistently, all the estimates show that municipalities with a higher share of foreign settlements saw sharp reductions in night-light density after 2013.

Table 1: Forced Migration and Development

	Night Light (1)	Log(Night Light) (2)	Spatial Gini (3)
Panel A: Diff-in-diff estimates including controls			
I(Year $\geq$ 2013) $\times$ Foreigners Share	-0.356***	-0.126***	0.012*
	(0.120)	(0.038)	(0.006)
Panel B: Imputed outflows, including baseline controls $\times$ time trends			
Imputed Outflows	-0.036***	-0.016***	0.001*
	(0.009)	(0.003)	(0.001)
Panel C: Imputed outflows, excluding controls			
Imputed Outflows	-0.037***	-0.015***	0.001*
	(0.009)	(0.004)	(0.001)
Observations	10,020	9,974	10,020
Dependent Mean 1992	3.77	0.034	0.27
Municipality Fixed Effects	✓	✓	✓
Year Fixed Effects	✓	✓	✓

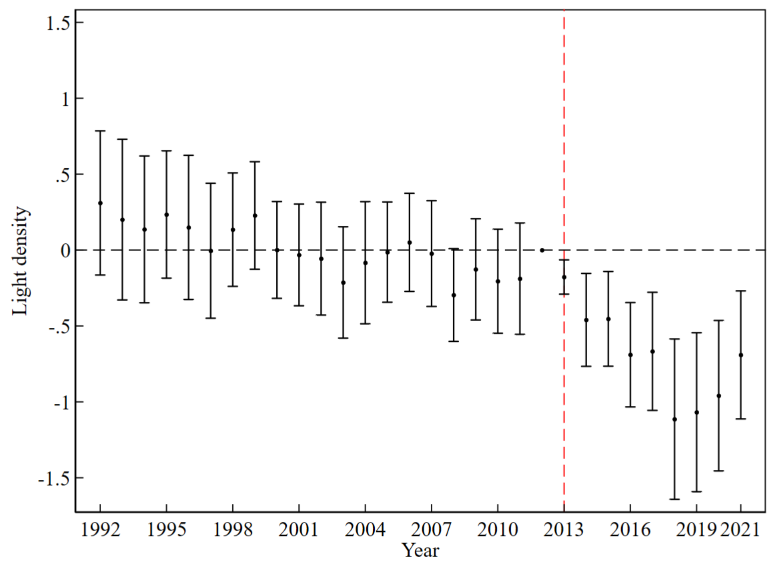
Notes: The table illustrates the estimated coefficients of equation (1). *Imputed Outflows* is defined in equation (3) as the product of the share of foreign settlement in each municipality in 1990 and annual outflows of Venezuelans to Colombia. It is rescaled by the total municipal population of 1990. Controls in the baseline are interacted with time trends and include urban coverage, water bodies, and tree-cover loss for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Standard errors clustered by municipality are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Our preferred results are those in column (2) and Panel A. They suggest that municipalities with a 1 percent higher share of foreign settlements in 1990 experienced a 12.6 percent average reduction in night-light density after 2013, relative to the prior period. These estimates align with those in Panels B and C, which suggest that when imputed outflows increase by 1 percent of the total municipal population of 1990, night-light density decreases by approximately 1.6 percent. Additionally, municipalities with a 1 percent higher share of foreign settlements in 1990 experienced a 0.012 increment in spatial inequality after 2013, relative to the prior period. These are large effects considering the baseline spatial inequality in 1992 was 0.27.

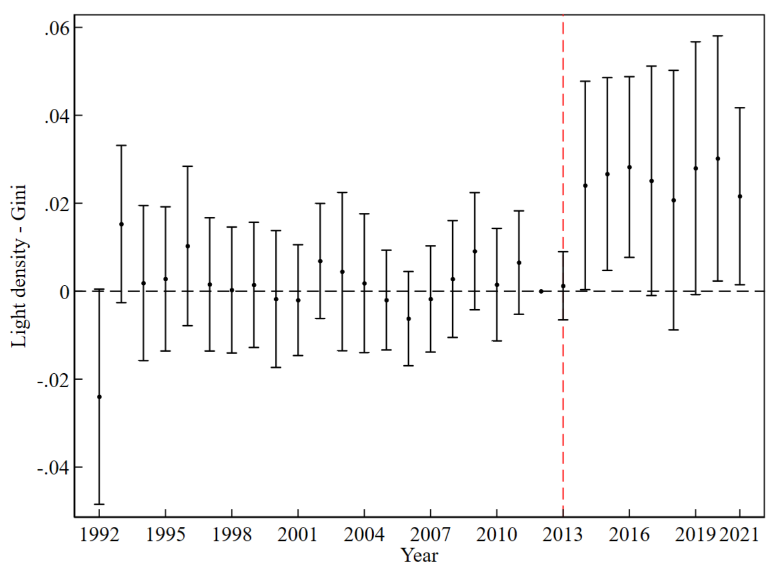
In terms of timing, Figure 6 shows that before 2013, there were no differences in economic development across municipalities with different shares of foreign settlement. In line with the idea that out-migration mostly occurred in municipalities with a large foreign network, we observe an immediate decline in economic conditions after 2013. Moreover, the effects are accentuated after 2017-2018, when forced migration peaked.

Figure 6: Forced Migration and Development, Event Study

(a) Night-Light Density



(b) Spatial Inequality



Notes: The figure illustrates an event study of the change in night-light density and spatial Gini between 1992 and 2021 for municipalities with varying levels of foreign settlement shares in 1990. *Foreign Shares* is constructed for each of the 335 municipalities using data from the 1990 population census; it corresponds to the ratio of foreigners living in each municipality to the total foreigners living in Venezuela in 1990. All estimates include fixed effects by year and municipality. Bars illustrate 95 percent confidence intervals, and 2012 is the omitted (reference) year. Standard errors are clustered at the municipality level.

5.1 Testing the Robustness of the Estimated Effects

Effects are not driven by oil production differential pre-trends. We first verify if the effects emerge from differential time trends in municipalities with higher or lower oil production. Reassuringly, the results show that our main estimates do not change when we control for the location of oil fields interacted with time trends (Table E.1).[26]

Ruling out the influence of government actions on foreigner-dense municipalities. Another relevant concern is that our results might be affected by governmental actions that could disproportionately target municipalities with more or less foreign settlement shares in 1990. For example, the government might have used social programs to gain more political support or disproportionately alienated the private sector in municipalities with more foreigners in 1990. Three salient economic policies and events took place during our analysis period: the Venezuelan social welfare program (centralized through an ID called *Carnet de la Patria*), mass energy blackouts, and expropriations from the private sector. We collect approximate municipal temporal variation measures for each of these from multiple sources and control for their variation in Tables E.3 and E.4.[27] Our main results remain unchanged, suggesting that these policies and events did not alter the main effects of forced migration.

Other specification alternatives. Importantly, our core results remain consistent across a number of additional robustness tests, including approximating the municipal variation of imputed outflows with the linear and road inverse distance of each municipality to the main entry points in Colombia (Tables E.5 and E.7); using alternative difference-in-difference estimators, in line with the latest methods in the literature (Table E.9); employing only the Colombian foreign shares in Venezuela in 1990, instead of total foreigners share, to

[26]Oil fields geographic variation come from the Global Oil and Gas Features Database, which includes information on the development of global oil and gas infrastructure, from Sabbatino (2018). The data standardize and integrate information on disparate oil and gas infrastructure from over 380 sources worldwide, encompassing more than 4.8 million features for 2018. This control also addresses concerns about the effect of gas flaring on night-light density.

[27]See Appendix B for a description of all data sources.

approximate the variation in foreign settlement share and imputed outflows (Table E.10); and correcting the standard errors for clusters at the municipality-year level (Table E.11).

Effects are not mechanically driven by the population decline. To validate that our main results are not mechanically driven by the population decline, we estimate the effects of forced migration using annual ENCOVI data to calculate income per capita and inequality by state and year between 2017 and 2021.[28] The results point to a reduction in real total and per capita income at the household level (Tables E.13 and E.15), supporting our main findings. Moreover, we also observe increments in poverty and declines in employment (Tables 4 and E.15). However, the coefficients are smaller given that real income is extremely low for the period for which microdata exist (2017–2021). In fact, income nationwide declined dramatically and hyperinflation caused a complete generalized loss of purchasing power in this period. In fact, as noted earlier, by 2021, most individuals (94 percent) had an income below the poverty line (Figure A.2).

5.2 Assessing the Magnitude of the Effects

Because there are no direct measures of municipal-level population outflows in Venezuela, it is difficult to interpret the magnitude of our main estimated coefficients. To address this limitation, we use data from the Venezuelan Refugee Panel Study for Adults (VenRePs Adults), collected in Colombia in 2018 by Ibánez et al. (2024). This study is constitutes a representative sample of Venezuelans residing in Colombia. Because approximately 2.8 million Venezuelan migrants resided in Colombia, compared to more than 7.7 million who have left Venezuela, the VenRePs Adults sample is not representative of all out-migration from the country. Nonetheless, it offers the most reliable available proxy for national outflows, given that Colombia is the main destination for Venezuelan migrants and that the survey was fielded during the peak of inflows from Venezuela to Colombia.

[28] We cannot use data beginning in 2014 due to the low number of cities covered for those initial years.

We first show that our measure of municipal variation, the foreign settlement share in 1990, is strongly and positively correlated with the municipalities of origin of Venezuelans residing in Colombia in 2018, as recorded in the VenRePs Adults data. For this purpose, we construct a variable that captures the share of migrants from each Venezuelan municipality among all individuals in the VenRePs Adults sample. The correlation between the municipal VenRePs and foreign settlement share is 0.41 (p-value = 0.00). Figure 5 illustrates this positive relationship.

To interpret the magnitude of the effects of migration outflows on development we estimate a two stage least squares (2SLS) regression using the following specification:

$$y_{mt} = \gamma_m + \alpha_t + \beta \text{IO } \widehat{\text{VenReps}}_{mt} + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \varepsilon_{mt}, \tag{4}$$

$$\text{IO VenReps}_{mt} = \gamma_m + \alpha_t + \beta \text{Imputed Outflows}_{mt} + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \varepsilon_{mt}, \tag{5}$$

where

$$\text{IO VenReps}_{mt} = \left[\text{Outflows to Colombia}_t \times \text{VenRePs Share}_{m2018} \right] \tag{6}$$

In this specification all the symbols represent the same variables as in equations (2) and (3). Additionally, VenRePs Share is the share of Venezuelans living in Colombia in 2018 coming from municipality m, constructed as the ratio of number of Venezuelans coming from municipality m over total Venezuelans in the VenRePs Survey in 2018, multiplied by 100 to facilitate interpretation. *IO VenReps* is scaled by the total population of 1990 to approximate the share of individuals leaving each municipality as a percentage of its total population in 1990.

The results of these estimates are presented in Table 2. Columns (1) and (2) report the ordinary least squares regression results, while Columns (3) and (4) show the two stage least squares results without and with additional control variables. The Kleibergen-Paap Wald F-statistic largely exceeds 10 in all specifications, indicating a strong first stage. The results in Column (4) indicate that a one percent increase in Venezuelan outflows, relative to the municipal population of 1990, is associated with a 7.5 percent reduction in night light density. This decrease is equivalent to a contraction of 2.1 percent (=7.5 × 0.28) in GDP (Henderson et al. 2012).

According to UNHCR figures, about 7.7 million Venezuelans have left the country since 2013. Of these, approximately 2.8 million are registered as living in Colombia (UNHCR, 2024a). Relative to Venezuela's 1990 census population of 19.83 million—the last census before Chávez's election—this represents 14 percent (= 2.8 / 19.83). So, for the municipality that lost 14 percent of its 1990 population to Colombia, applying the estimated elasticity of GDP with respect to population (2.1) suggests that such a loss would translate into a GDP contraction of 29.4 percent (= 2.1 × 0.14).

Table 2: Forced Migration and Night Light (2SLS Estimates)

	OLS		**2SLS**	
	(1)	(2)	(3)	(4)
Panel A: Dependent Variable: Log(Night Light)				
Second Stage				
IO VenRePs	-0.032***	-0.025***	-0.073***	-0.075***
	(0.006)	(0.005)	(0.023)	(0.020)
Observations	9,974	9,974	9,974	9,974
F Statistic (excluded instrument)	–	–	664.48	786.67
Panel B: Dependent Variable: IO VenRePs				
First Stage				
Imputed Outflows	–	–	0.205***	0.209***
	–	–	(0.054)	(0.052)
Observations	–	–	10,020	10,020
Log(Night Light), Mean 1992	0.035	0.035	0.035	0.035
Municipality and Year FE	✓	✓	✓	✓
All controls		✓		✓

Notes: Column (1) and (2) reports and ordinary least square (OLS) regression as described in equation (4). Columns (3) and (4) report the two-stage least square (2SLS) estimates of the specification presented in equations (5), (4), and (6). Robust standard errors clustered at the municipality level are in parentheses. ***p <0.01, **p <0.05, *p <0.1.

5.3 Do Remittances Mitigate the Development Losses?

A key question concerns the remittances sent by Venezuelans abroad to their families at home (Amuedo-Dorantes and Pozo 2006; Giuliano and Ruiz-Arranz 2009; Portes 2009; Ambler et al. 2015). In Table 3, we find that remittances have increased in municipalities affected by forced migration. While remittances may help partially offset the economic loss of the most productive members of the labor force, broader effects depend on how recipients use these funds. Using data from the 2019 and 2021 ENCOVI, we analyze how households used remittances. These are the only two nationally representative surveys that categorize such spending.

As illustrated in Figure E.1, the vast majority of households used remittances for subsistence needs such as food and housing rather than for investment or business activities. Consequently, these remittances were less likely to stimulate long-term economic growth.

Table 3: Forced Migration and Household Remittances

	Probability of Receiving Remittances
	(1)
Panel A: Remittances	
Imputed Outflows	0.00140***
	(0.00017)
Observations (State-Year)	120,014

Notes: Imputed Outflows is defined as explained in equation (2). Controls in baseline interacted with time trends include urban coverage, water bodies, and tree-cover loss for year 2001; night-light density for 1992; social welfare program (*Carnet de la Patria*) participants 2016–2017; number of *parroquias* (counties) with rationed energy at the municipality level (April 2019) and blackout intensity (March 2019); and number of enterprises acquired by the Venezuelan state. Controls from the ENCOVI include gender of household head and members, age and marital status, and number of household members. To calculate the probability of receiving remittances we create a dummy variable equal to 1 if the household has received remittances between 2017-2021. ***p<0.01, **p <0.05, *p<0.1.

5.4 Forced Migration and Human Capital Investments

As forced migration intensifies and economic opportunities become scarce, investments in human capital at origin locations might be disproportionately discouraged. This could be due to changes in the returns to education locally, to the substitution of subsistence activities for education, or to the desire to invest only in education abroad. We explore this possibility by using data from the ENCOVI and assessing the role of imputed outflows on the average years of education for individuals older than 18 years, and school attendance for children and adolescents.[29] The results in Table 4 support the idea that areas with higher imputed outflows also experienced lower education investments and school attendance. Moreover, in Table 5 we document that these effects are concentrated on children ages 12-14 years old who might contribute economically to household's

[29] We cannot estimate equation (1) because the ENCOVI data are only available after 2014.

income or even join illicit crime groups as documented by Sviatschi (2022). Moreover, these results are not driven by selective out-migration of the individuals who are the most educated out of Venezuela as the results are only observed for individuals on schooling age during the mass forced migration shock. In fact, we do not observe the same effects of forced migration on school attendance for those individuals younger than 6 or older than 17 years of age in the ENCOVI sample in 2013 (Table E.16).

Table 4: Forced Migration and Reduced Human Capital Investments

	Years of Education	**School Attendance**
	(1)	(2)
Panel A: Education Outcomes		
Imputed Outflows	-0.00285***	-0.00139***
	(0.00036)	(0.00025)
Observations (State-Year)	73,995	46,812
Dependent Mean (2014)	7.93	0.65

Notes: Imputed Outflows is defined as explained in equation (2). Controls in baseline interacted with time trends include urban coverage, water bodies, and tree-cover loss for year 2001; night-light density for 1992; social welfare program (*Carnet de la Patria*) participants 2016–2017; number of *parroquias* (counties) with rationed energy at the municipality level (April 2019) and blackout intensity (March 2019); and number of enterprises acquired by the Venezuelan state. Controls from the ENCOVI include gender of household head and members, age and marital status, and number of household members. For column (1), the estimates include only individuals over 23 years old, and for column (2), they only include individuals aged 6–17 in 2013. Bootstrap standard errors are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table 5: Forced Migration and School Attendance by Schooling Age

	6-14	6-11	12-14	6-17
Panel A: School Attendance by Schooling Age	(1)	(2)	(3)	(4)
Imputed outflows	-0.00105***	0.00017	-0.00329***	-0.00109***
	(0.00032)	(0.00038)	(0.00054)	(0.00030)
Observations (State and Year)	23,117	15,714	7,403	30,057

Notes: Imputed Outflows is defined as explained in equation (2). Controls in baseline interacted with time trends include urban coverage, water bodies, and tree-cover loss for year 2001; night-light density for 1992; social welfare program (*Carnet de la Patria*) participants 2016–2017; number of *parroquias* (counties) with rationed energy at the municipality level (April 2019) and blackout intensity (March 2019); and number of enterprises acquired by the Venezuelan state. Controls from the ENCOVI include gender of household head and members, age and marital status, and number of household members. For column (1), the estimates included only individuals between 6 and 14 years old in 2013, column (2) only included individuals aged 6-11 in 2013, column (3) only included individuals aged 12-14 in 2013, and column (4) only included individuals aged 6-17 in 2013. Bootstrap standard errors are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

6 Forced Migration and the Perpetuation of Autocratic Leadership

In this section, we examine how forced migration enabled autocratic leaders to endure despite profound economic and social crises. Our evidence suggests that in weak institutional settings, mass departures reshape the political and economic landscape in ways that reduce pressures for change reinforcing autocratic regimes. First, out-migration weakens political opposition by disproportionately removing dissatisfied citizens from the electorate. Second, it facilitates the expansion of organized crime and illicit economies, as shrinking local oversight and expanding transnational networks create new opportunities for criminal actors. Together, these dynamics reduce demands for reform while providing alternative sources of revenue and providing armed enforcement that strengthens the regime's hold on power.

6.1 Silencing Political Opposition through Forced Migration

Forced migrants are likely to oppose governments they perceive as responsible for the crises they are fleeing. However, their departure may deplete opposition support and diminish popular will to fight for change.

We explore this idea by examining the effects of forced migration on electoral turnout and support for the political opposition, using them as outcomes in the specifications in equations (1) and (2). Presidential turnout is defined as the total votes in each election divided by the electoral turnout of 2000—the earliest available before the 2013 oil price shock. We keep the electoral turnout fixed as it may be affected by migration flows; hence, we only measure changes in the numerator. Opposition support is defined as the ratio of opposition votes (votes for candidates besides Chávez or Maduro) to the electoral turnout of 2000. The year 2000 serves as a natural baseline because forced migration was negligible at this time, when Venezuela was benefiting from surging oil prices. Importantly, these results are not mechanically driven by population loss, as the estimates are unchanged when using contemporaneous electoral censuses—which are available for the whole period of study (Table

E.17). In our view, however, fixing the denominator in 2000 both simplifies interpretation and yields more conservative estimates, as it provides a lower bound on the effects.

Table 6: Forced Migration and Presidential Electoral Outcomes

	Turnout (1)	Opposition (2)
Panel A: Diff-in-diff estimates including controls		
I(Year $\geq$ 2013) $\times$ Foreigners Share	-4.471***	-2.624***
	(1.416)	(0.705)
Panel B: Imputed outflows, including baseline controls $\times$ time trends		
Imputed Outflows	-0.663***	-0.358***
	(0.158)	(0.073)
Panel C: Imputed outflows, excluding controls		
Imputed Outflows	-0.649***	-0.351***
	(0.158)	(0.076)
Observations	1,324	1,324
Dependent Mean 2006	31.4	10.2
All Controls	✓	✓
Municipality Fixed Effects	✓	✓
Year Fixed Effects	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). Turnout in column (1) is defined as the total votes for each presidential election held in Venezuela between 2006 and 2018, divided by the electoral census of 2000. In column (2), opposition is the total votes of unofficial parties divided by the electoral census of 2000. *Imputed Outflows* is defined in equation (3) as the product of shares of foreign settlement in each municipality in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline are interacted with time trends and include urban coverage, water bodies, and tree-cover loss for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador, and standard errors clustered by municipality are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table 6 presents results. The findings in Panel A suggest that municipalities with a 1 percent higher share of foreign settlements in 1990 experienced an average drop of 4.5 percentage points in electoral turnout and 2.62 percentage points in opposition support after 2013, relative to the previous time frame. Similarly, the results from Panels B and C suggest that when imputed migration outflows rose by 1 percent of the population in 1990, presidential turnout and opposition support fell by about 0.66 and 0.34 percentage points, respectively.

Due to concerns about manipulation in the 2018 elections, we also estimate the effects of mass forced migration using the last presidential elections of 2024, for which we have results for over 83.5 percent of the country. The opposition parties collected and published these results, which should attenuate these concerns.[30] The remain unchanged when we add data from these elections to our main estimates (Table E.18).

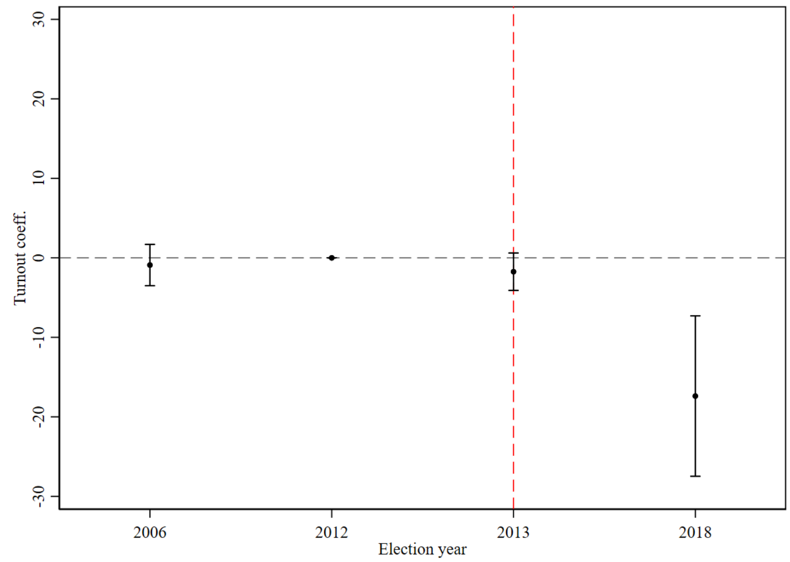
We also find consistent effects for mayoral elections (see Table E.19). Although the coefficients indicate smaller effects, they are negative and statistically significant. This is a remarkable consistency test since these estimates evaluate forced displacement outflows over five years of elections in 335 municipalities, totaling 1,675 independent municipal elections.

Overall, our results consistently suggest that forced migration lessened both opposition to the incumbent regime and political turnout, both of which are key factors for social change.

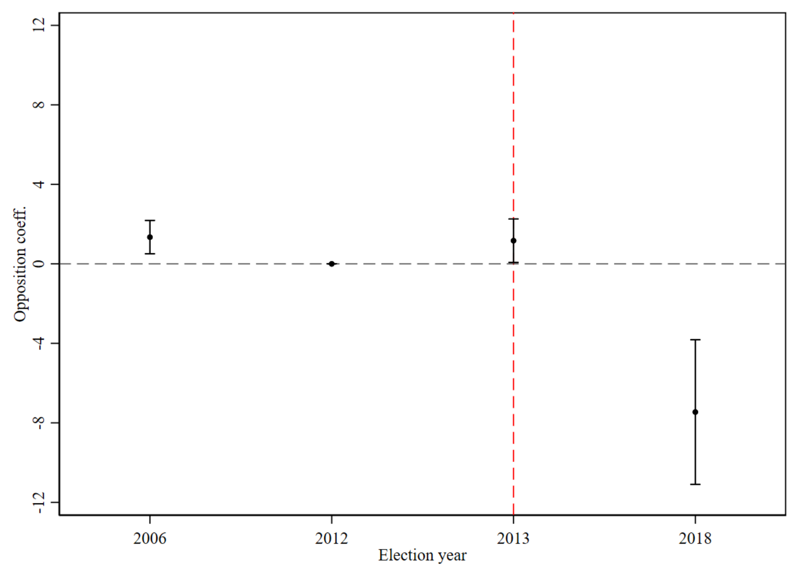
[30] The data come from Resultados con VZLA (2024).

Figure 7: Forced Migration and Presidential Electoral Outcomes, Event Study

(a) Electoral Turnout



(b) Opposition Support



Notes: The figure illustrates an event study of the change in turnout and opposition support in the presidential elections (measured in votes for candidates other than Maduro or Chávez over the electoral census of 2000) between 2006 and 2021 for municipalities with varying levels of foreign settlement shares in 1990. *Foreign Shares* is constructed for each of the 335 municipalities using data from the 1990 Venezuelan population census, and it corresponds to the ratio of foreigners living in each municipality to the total number of foreigners living in Venezuela in 1990. All estimates include fixed effects by year and municipality. Bars illustrate 95 percent confidence intervals, and 2012 is the omitted (reference) year. Standard errors are clustered at the municipality level.

Approximating the magnitude of the effects: To gauge the magnitude of forced migration's impact on electoral outcomes, we estimate a two-stage least squares specification analogous to equations (5), (4), and (6), using opposition support and electoral turnout as dependent variables. The results, reported in Table 7, indicate that each additional percentage point of the population migrating from Venezuela to Colombia led to a reduction of 1.34 percentage points in opposition support and 2.9 percentage points in electoral turnout. If migration had been evenly distributed across municipalities, for a Venezuelan municipality that lost 14 percent of its 1990 population to Colombia after the onset of the crises in 2013, the estimated coefficients imply that the average municipality experienced a decline of 18.76 (=14× 1.34) in opposition support and 41.3 percentage points (=14× 2.95) in electoral turnout due to total out-migration from Venezuela to Colombia. These effects are large enough to induce changes in electoral results.

Table 7: Forced Migration and Electoral Outcomes (@SLS Estimates)

	OLS		**2SLS**	
	(1)	(2)	(3)	(4)
Panel A: Dependent Variable – Turnout				
Second Stage: IO VenRePS	-0.432***	-0.464***	-2.941***	-2.908***
	(0.137)	(0.151)	(1.000)	(0.938)
Observations	1,984	1,984	1,984	1,984
F Statistic (excluded instrument)	–	–	131.50	163.78
Panel B: Dependent Variable – Opposition				
Second Stage: IO VenRePS	-0.153***	-0.193***	-1.359***	-1.344***
	(0.056)	(0.064)	(0.473)	(0.440)
Observations	1,984	1,984	1,984	1,984
F Statistic (excluded instrument)	–	–	131.50	163.78
Panel C: First Stage (Dependent Variable: IO VenRePS)				
Imputed Outflows	–	–	0.205***	0.210***
	–	–	(0.054)	(0.052)
Observations	10,020	10,020	10,020	10,020
Mean 1998	25.83	11.26	25.83	11.26
Municipality and Year Fixed Effects	✓	✓	✓	✓
All Controls		✓		✓

Notes: Panel A reports OLS (Columns 1–2) and the second stage of the 2SLS regression (Columns 3–4), where the Imputed RAMV Share is calculated following Eq. 3 but using the RAMV migration share instead of the foreign share. The coefficients capture the effect of the Imputed RAMV Share on voter turnout. Panel B reports the corresponding estimates when the dependent variable is the opposition vote share: OLS (Columns 5–6) and 2SLS (Columns 7–8). Panel C presents the first-stage regression, where the Imputed Outflows (constructed from Eq. 3) are used as instruments for the Imputed RAMV Share. Columns 11 and 12 report results for the first stage of the IV with and without controls, respectively. The Kleibergen-Paap rk Wald F-statistics (reported in Panels A and B) test the strength of the excluded instrument. Robust standard errors clustered at the municipality level are reported in parentheses. ***p <0.01, **p <0.05, *p <0.1.

6.2 Forced Migration and Criminal Networks in Weak States

Migration typically advances connections between individuals in origin countries, those who leave, and those in destination countries. Previous work has shown that migration networks can promote knowledge diffusion, trade, and foreign direct investment (Javorcik et al. 2011; Parsons and Vézina 2018). Yet, these beneficial effects are unlikely to materialize in settings with weak institutions and limited rule of law. In such environments, forced migration may expedite connections for organized criminal networks at both origin and destination locations (Kapur 2014; Sviatschi et al. 2025). This occurs, for example, when criminals exploit and recruit forced migrants by capitalizing on their vulnerability or relying on them to help fund, inform, and expand illegal activities. The growth of these networks provides autocratic regimes with both illicit revenue and armed enforcement, thereby reducing pressures for reform and ultimately enabling the regime's perpetuation.

In fact, abundant qualitative evidence suggests that human trafficking is a significant criminal enterprise in these contexts, with forced migrants—especially women and children—becoming victims (Insight Crime, 2023d, 2021b,a). For instance, one article suggests that "migrants using irregular border crossings also represent a source of income for armed groups and predatory criminals, who extort the migrants as they cross their territory and, in some cases, also rob or kidnap them or force them into roles such as human couriers for drug trafficking. Human traffickers have also capitalized on the crisis, tailoring their recruitment of Venezuelan women and girls by offering false offers of jobs, scholarships, or even religious charity as bait for what ends up being coerced sexual exploitation." (Insight Crime 2023c).

Journalistic reports also report that forced migration outflows go hand in hand with the expansion of drug-trafficking groups from Colombia to Venezuela. Oftentimes, this expansion comes from employing forced migrants in the lower ranks of these organizations or from charging them extortion fees en route (Insight Crime, 2023a,b, 2019). For example, one report states that "(...) Venezuelans have to choose between hunger or joining the ranks of organized crime groups, which is helping them strengthen and reorganize their criminal structures while also facilitating the spread of their illegal activities into Venezuela." (Insight Crime, 2018).

We examine these hypotheses using longitudinal municipal-level data on violent and crime events by actor type, sourced from the GTD (1992–2021) and the ACLED (2018–2024). Specifically, we examine the effect of forced migration outflows on the growth of Colombian and Venezuelan organized criminal groups and non-state armed actors. Table 8 presents the results.[31] The findings in Panel A largely support these hypotheses. They imply that forced migration is associated with an increased number of events by the largest non-state armed actors from Colombia, including the Revolutionary Armed Forces of Colombia (FARC) and the National Liberation Army (ELN), both of which are largely involved in drug trafficking. The findings also indicate an increase in violent events linked to Venezuelan organized criminal groups, including gangs such as *El Tren de Aragua*, which is known for its involvement in human trafficking.[32]

Table 8: Forced Migration and the Expansion of Organized Crime

	FARC (1)	ELN (2)	Organized Crime (3)
Imputed Outflows	0.002**	0.008**	0.052**
	(0.001)	(0.004)	(0.022)
Observations	11,022	11,022	11,022
Dependent Mean (Baseline)	0.009	0.003	2.10
Municipality Fixed Effects	✓	✓	✓
Year Fixed Effects	✓	✓	✓

Notes: Column (1) represents the total number of conflict events involving the Revolutionary Armed Forces of Colombia (FARC) in Venezuela from 1992 to 2024. Column (2) shows the total conflict events associated with the Colombian National Liberation Army (ELN) during the same period. Column (3) captures the total conflict events carried out by non-terrorist but criminal armed groups—such as gangs, colectivos, sindicatos, and drug-trafficking cartels—between 2018 and 2024. Standard errors clustered by municipality are in parentheses. ***p<0.01, **p <0.05, *p<0.1. The estimates exclude the outlier municipality El Libertador.

The validity of the estimated effects are further illustrated in Figure 8, where all data are aggregated to have a longer time series.[33] The figure shows a spike in the likelihood of an event being associated with non-state actors in municipalities with higher concentrations of foreign settlements after 2017, coinciding with the peak of Venezuelan forced migration to Colombia and with reports

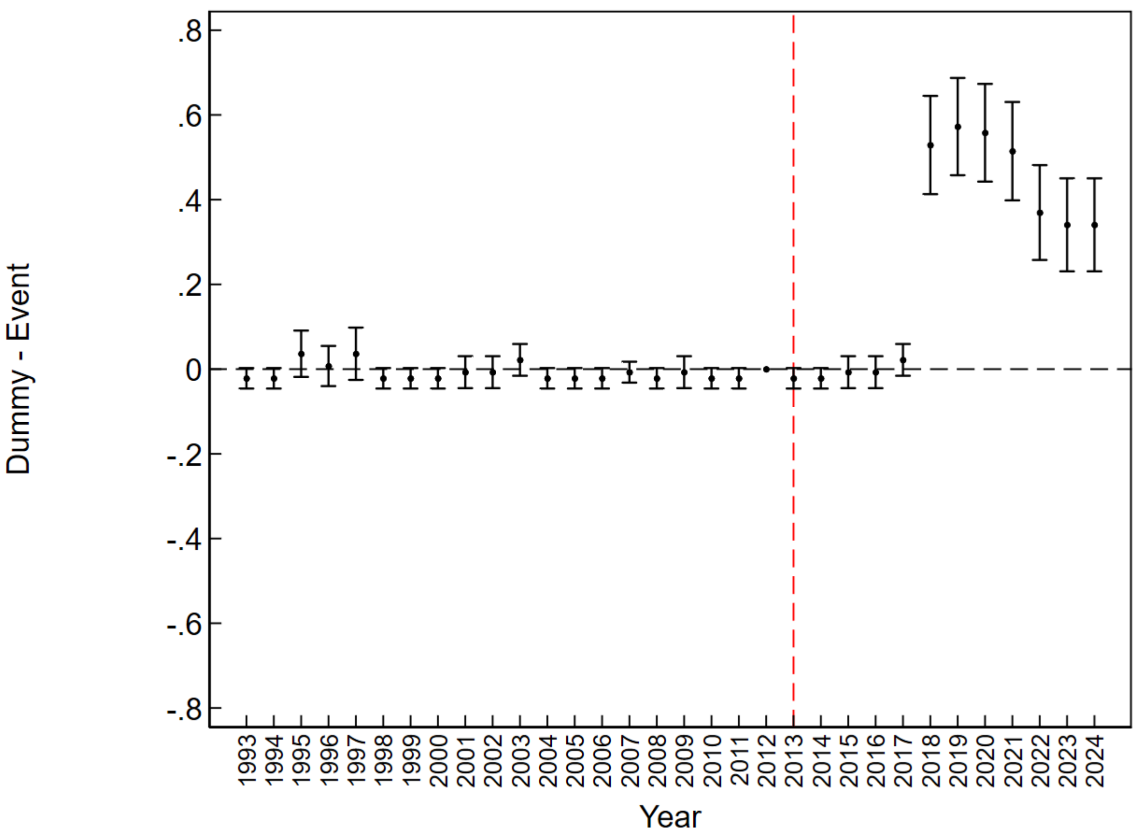
[31] We only present estimates using imputed outflows as the source of quasi-exogenous variation, as detailed actor-level disaggregation in the data is only available from 2018 onward to enable this analysis.

[32] We also examine the effects on irregular armed groups—such as small street gangs and criminal organizations not related to drugs, human smuggling, or the regime—and find no effects, demonstrating that the results are not due to an increase in overall crime.

[33] Before 2018, the data excluded information on gangs to allow for their separation in analysis.

indicating that migrants increasingly relied on local criminal networks to flee, while armed groups such as the ELN and FARC relocated from Colombia to Venezuela. Thus, the resulting mass forced migration created conditions that allowed these groups to extend their influence in areas with higher concentrations of foreign settlements, especially after 2017, when forced migration was at its peak. In fact, there is ample qualitative evidence that highlights how the rise of the Venezuelan gang *Tren de Aragua* coincided with the peak of the Venezuelan economic crisis in 2018, which pushed millions of vulnerable Venezuelans to migrate.

Figure 8: Indicator Variable for Non-State Actors



Notes: The figure illustrates an event study of the change in the probability that an event associated with non-state actors occurred between 1993 and 2024 with varying levels of foreign settlement shares in 1990. *Foreign Shares* is constructed for each of the 335 municipalities using data from the 1990 Venezuelan population census, and it corresponds to the ratio of foreigners living in each municipality to the total number of foreigners living in Venezuela in 1990. All estimates include fixed effects by year and municipality. Bars illustrate 95 percent confidence intervals, and 2012 is the omitted (reference) year. Standard errors are clustered at the municipality level.

6.3 Mediating Effects of these Channels on Development

In this subsection we examine the roles of weak political opposition and strong organized criminal groups to explain the negative effects of forced migration on development outcomes. To do this, we apply the methodology introduced by Acharya et al. (2016), which estimates the average controlled direct effect (ACDE) of a treatment. The ACDE is the effect of forced migration on development after partialing out the effect of forced displacement on political opposition and organized crime. This exercise is estimated by partialing out the effect of political opposition and organized crime and then estimating the ACDE by regressing the de-mediated night-light density on imputed outflows. This is done through a two-stage model as follows:

$$Y_{mt} = \delta_0 + \delta_1 \text{Imputed Outflows}_{mt} + \delta_2 \text{Opposition}_{mt} + \delta_3 \text{Organized Crime}_{mt} + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \epsilon_{mt}, \quad (7)$$

$$\hat{Y}_{mt} = \gamma_0 + \gamma_1 \text{Imputed Outflows}_{mt} + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \upsilon_{mt}, \quad (8)$$

which follows the same notation as the one used in our main analysis. In the first stage, Y_{mt} denotes night-light density, Opposition_{mt} denotes opposition support (estimated as the share of votes for the opposition), and $\text{Organized Crime}_{mt}$ is an indicator variable for the presence of organized criminal groups. In the second stage, $\hat{Y}_{mt}$ is the de-mediated night-light density estimated as $\hat{Y}_{mt} = [Y_{mt} - (\hat{\delta}_2 \text{Opposition}_{mt} + \hat{\delta}_3 \text{Organized Crime}_{mt})]$, and υ_{mt} is the error term estimated through bootstrapping.

Figure E.2 presents the results of this exercise, which suggest that the standard estimated effect of imputed outflows on night-light density falls from –0.037 to –0.022 when the variation explained by the decline in political opposition and increase in organized crime is accounted for.[34] These two channels therefore explain approximately one-third of the effect of forced migration on development.

[34] Table E.21 presents the point estimates.

7 Concluding Remarks

This paper examines the impact of forced migration on the development of origin countries, a topic historically constrained by limited quality data because these nations are often in crisis. To overcome these challenges in the case of Venezuela, we leverage satellite data, web-scrape online data, employ observational data, and use unique individual surveys. To identify causal changes resulting from forced migration, we compare municipalities with a higher share of foreign settlements before and after the onset of the 2013 oil price shock. Our findings show that these areas had a disproportionate number of Colombian foreigners who provided crucial information and network support abroad, enabling Venezuelans to migrate more easily to Colombia, where the majority of those migrants now live.

Our first key finding is that municipalities with a higher proportion of foreign settlements, which we also document as having higher outflows of forced migration, experienced significant reductions in economic growth and increased inequality after 2013, relative to other areas. Importantly, these effects are not a mechanical result of the population decline and are mirrored in reductions in income per-capita and employment and increments in poverty.

How does a regime stay in power amid such appalling economic and social conditions? We document two main ways in which forced migration perpetuates autocratic leadership in contexts with weak rule of law. First, we find that forced migrants disproportionately backed the opposition and thus their departure reduced voter turnout and diluted opposition strength. Second, forced migrants created fertile ground for the expansion of organized crime and illicit income sources, particularly for those involved in drug and human trafficking. Criminal groups help finance the autocratic regime and provided armed enforcement. Hence, both of these dynamics reinforced the political status quo and deflated pressure for socioeconomic reform in the medium term.

Our results underscore the significant impact of forced migration on the countries where these flows originate and on their political leadership. Our findings suggest that political leaders and ruling parties in contexts with weak rule of law may actually benefit from these migration flows and thus have little incentive to restrict or prevent them.

Historically, many governments have promoted the emigration of high-profile individuals and larger groups as a way to relieve political tensions. Examples include Japan, which disproportionately encouraged emigration from a handful of southwest regions in the nineteenth century (Endoh 2010), the Soviet Union's exile of Aleksandr Solzhenitsyn, China's exile of Chen Guangcheng, and Cuba's and Zimbabwe's strategy of "venting disgruntled groups" through emigration (Kapur 2014). Another example is Russia, where 1.1 million individuals left in the 1990s and another 1.25 million left in the 2000s, reflecting the alienation of professionals and entrepreneurs. Yet, the "Kremlin couldn't care less if the most talented, the most active Russians are emigrating, because their exodus lifts the social and political tension in the country and weakens the opposition" (Loiko, 2011). In the words of Hirschman (1970), "exit has [been] shown to drive out voice." Our study documents the price of this strategy: overall economic growth in these countries is likely to be notably lower.

A relevant policy implication of our findings is that, considering that autocratic governments derive rents from organized crime including human trafficking, any actions that regularize and regulate migration in host destinations might help reduce the rents derived from these networks. Additionally, organized crime needs to be understood as a transnational system through coordinated cross-border intelligence and actions, as criminal organizations can migrate to areas where the enforcement and institutional background is weak and expand and strengthen from there. Finally, to prevent forced migration from silencing political accountability, governments and election authorities should facilitate out-of-country voter registration, consular or mobile voting, and secure diaspora voter rolls.

As this paper reports, forced migration outflows have the power to transform cultural values, economic systems, and political landscapes in both origin and destination countries. As more time passes and additional data become available, future research can explore the medium- to long-term impacts of these flows and offer valuable insights into their broader consequences for the development paths of affected countries.

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Part

Appendix

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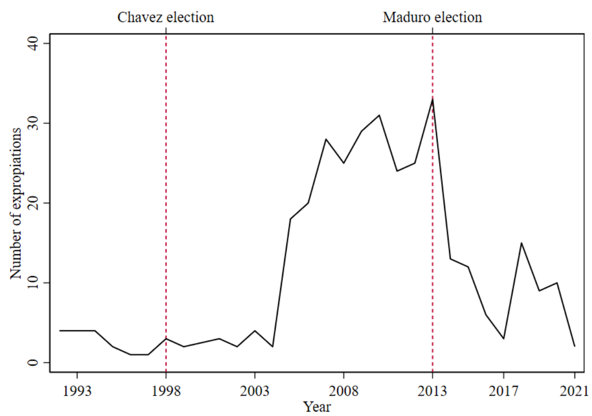
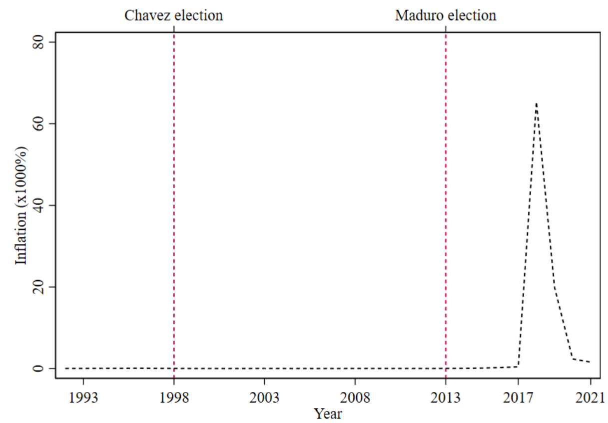
A Appendix A: The Venezuelan Crisis

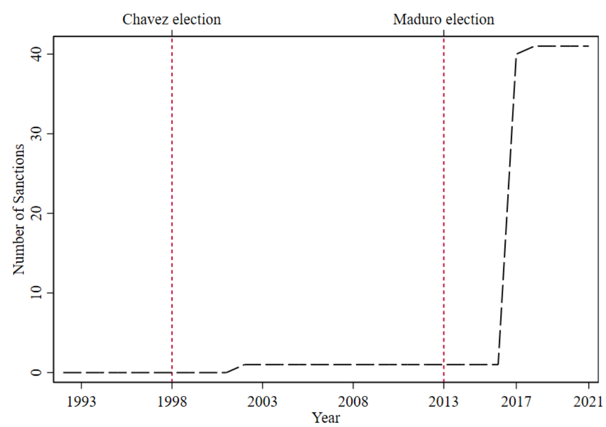
Figure A.1: Expropriations, Hyperinflation, and International Sanctions



(a) Number of Expropriations



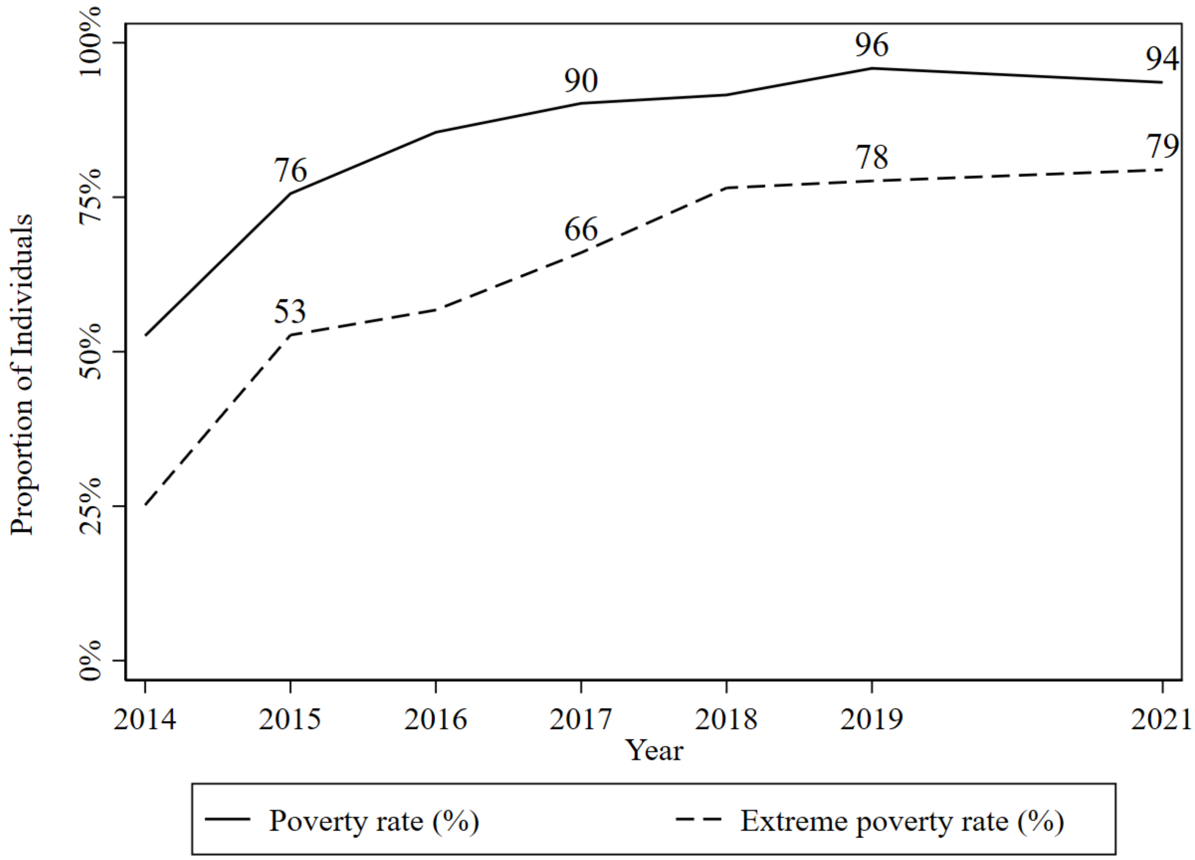
(b) Inflation Rate



(c) Sanctions

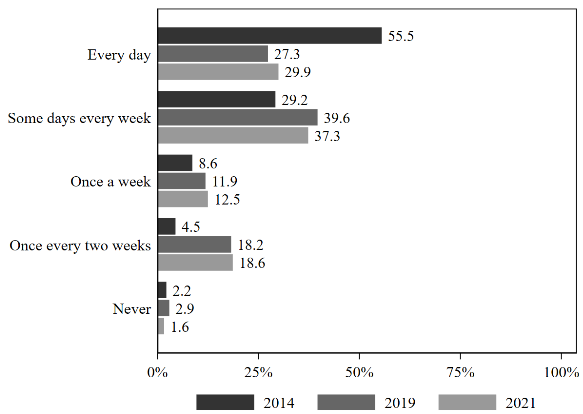
Notes: Records on the number of expropriations to private firms came from Vendata (2024). Inflation rate was estimated as the annual change in the average consumer price taken from International Monetary Fund (2024). Data on the number of international sanctions imposed on Venezuela were obtained from the Global Sanctions Database (2023).

Figure A.2: Poverty Rates in Venezuela, 2014–2021

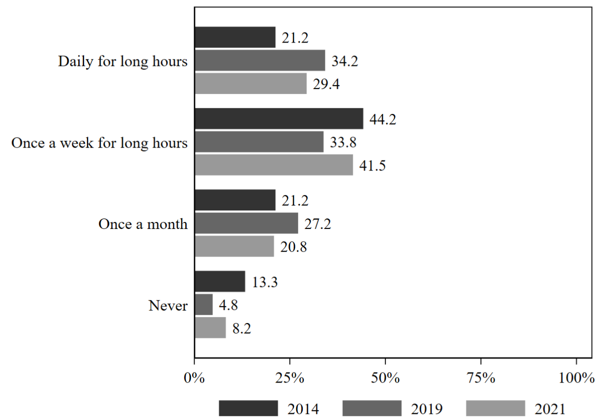


Notes: The figure depicts the proportion of individuals whose per capita household monetary income fell below the official moderate and extreme poverty thresholds over the specified years. The poverty and extreme poverty lines were calculated by the World Bank. *Source:* Authors' estimates using data from ENCOVI.

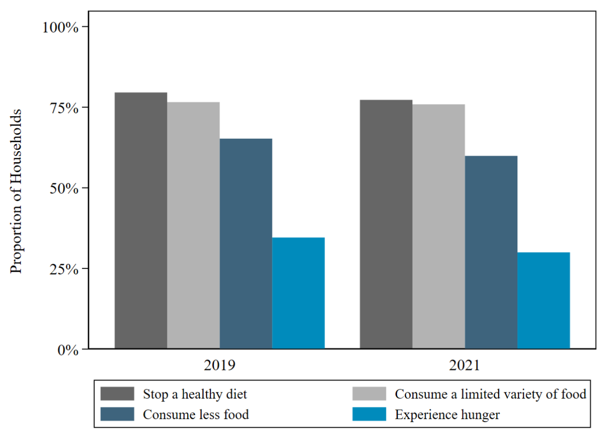
Figure A.3: Trends in Public Service Provision and Accessibility, 2014–2021



(a) Frequency of Water Supply



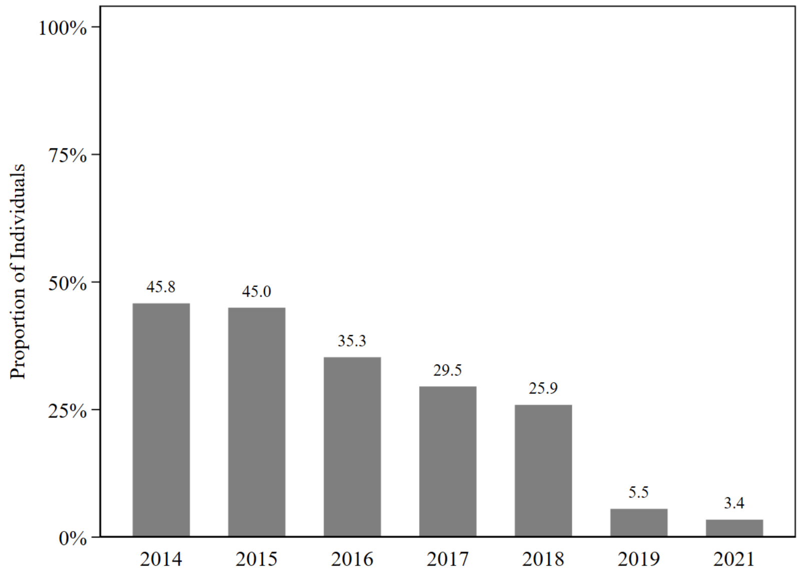
(b) Frequency of Electricity Interruptions



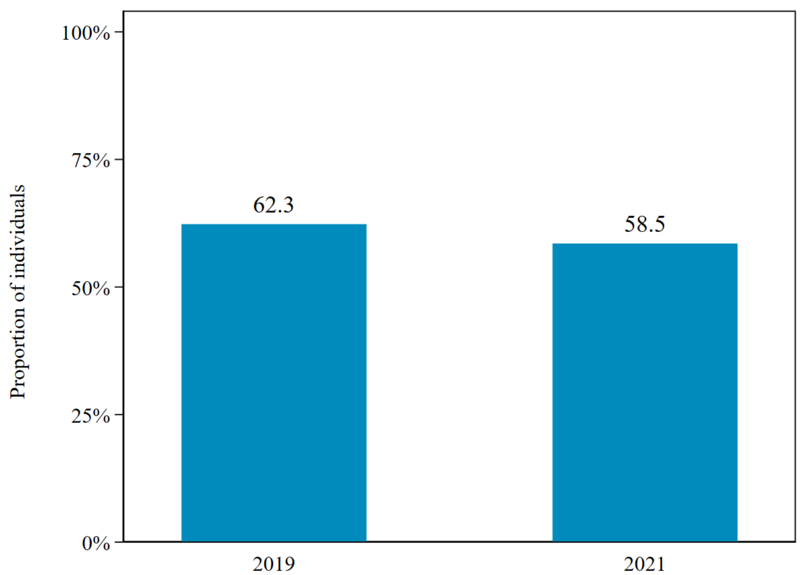
(c) Food Security

Notes: The top panel shows the proportion of households according to the frequency of water supply from the pipeline over the last three months. Similarly, the second panel illustrates the frequency of electric power interruptions during the same period. Finally, the third panel presents the proportion of households in which at least one adult has had to stop a healthy diet, consume a limited variety of food, consume less food, or experience hunger due to a lack of money or resources. *Source:* ENCOVI.

Figure A.4: Health Care Access in Venezuela



(a) Proportion of Individuals with Health Insurance



(b) Proportion of Individuals with a Chronic Disease

Notes: The top panel displays the proportion of the population affiliated with public or private health insurance. Additionally, the bottom panel depicts the proportion of individuals with chronic diseases who have limited or no access to medication. We examine the following chronic diseases: hypertension, rheumatoid arthritis, hypothyroidism, diabetes, epilepsy, and cardiovascular conditions. *Source:* ENCOVI.

B Appendix B: Data Sources and Construction of Key Variables

B.1 Satellite Data

B.1.1 Night-Light Density

Data on night-light luminosity comes from two sources: the Defense Meteorological Satellite Program Operational Linescan System (DMSP-OLS) and the Visible Infrared Imaging Radiometer Suite (VIIRS). The former spans data from 1992 to 2013, and the latter, from 2012 to the present. Despite the availability of data, both series are inconsistent due to differences in spatial and radiometric resolution, spectral responses, the spread function of the sensors, local overpass time at night, radiance range, and on-board calibration (Li et al., 2017; Sahoo et al., 2020). Further, the DMSP-OLS sensor measures night-light density annually in digital numbers (DN), while the VIIRS sensor measures monthly in radiance (units of nanoWatts/cm^2/sr) (Gibson et al., 2021).

Due to the night-light problem outlined above, we use the harmonized night-light series (1992–2021) elaborated by Li et al. (2020). The authors follow four steps to intercalibrate DMSP-OLS and VIIRS sensors: DMSP-OLS calibration, the annual composition of VIIRS, and VIIRS conversion like DMSP-OLS. In the first step, the authors calibrated the stable DMSP-OLS night lights from 1992 to 2013. This calibration process aimed to ensure consistency and accuracy in the DMSP-OLS data. In the second step, the authors addressed the noise in the VIIRS data caused by factors such as clouds, auroras, and temporary lights like fires and boats. They applied noise-removal techniques to improve the quality of the VIIRS data. In the third step, the authors converted the higher resolution of VIIRS (15 arc-seconds) to match the resolution of DMSP-OLS (30 arc-seconds) using the Kernel density approach, which is similar to the method described in Li et al. (2017). This conversion ensured consistency between the two datasets. Finally, to convert the processed data into digital numbers (DN), the authors employed a sigmoid function proposed by Zhao et al. (2019). As a result, consistent and calibrated night-light data are accessible.

Night-light density at various administrative levels for Venezuela. Spatial coordinates for the second administrative levels (*municipios*) and third administrative levels (*parroquias*) were obtained from OCHA (2023). The global rasters of harmonized night-light series, developed by Li et al. (2020), were clipped to the boundaries of Venezuela's administrative levels. This ensured that we analyzed only the relevant region of interest. Subsequently, we computed night-light density by calculating the simple mean of night-light luminosity across all pixels within each administrative level. This approach enabled the derivation of a consistent and calibrated measure of night-light luminosity for 1992 to 2021.

The processing of night-light data at the grid cell level in Venezuela involved two distinct steps. First, we created grid cells covering the entire territory of Venezuela. Then, we calculated the night-light luminosity for each grid cell. In the initial step, the spatial coordinates of Venezuela's third administrative levels *(parroquias)* were transformed from their original WGS84 degree measurements into metric coordinates using the UTM zone 18N projection. This conversion facilitated the subsequent segmentation of each parroquia's polygon into 4 km square grids, which was accomplished using the Geopandas library in Python. As a result, a total of 75,605 grids encompass the entirety of Venezuela's territory. In the second step, we clipped the annual global raster dataset of harmonized night lights to match the boundaries of Venezuela's territory. Finally, we calculated the night-light density for each grid cell by computing the simple mean of the night-light density across all pixels contained within the respective grid cell. This process provided a comprehensive assessment of the night-light intensity within each grid cell.

Night-light density for various administrative levels for Colombia. The second administrative level in Colombia is known as *municipio* while its territorial subdivision is called *vereda*. We obtained the spatial information at *municipio* level, in the form of shapefile, from OCHA (2023). For the *vereda* level, spatial data come from two sources, OCHA (2023) and Colombian Spatial Data Infrastructure (2023). Similarly to the process described above, we computed the night-light density by calculating the simple mean of the night-light density across all pixels within each *municipio* and *vereda*, respectively.

B.1.2 Spatial Inequality

Inequality is approximated at the municipal and annual levels by calculating a Gini index for each municipality and year using the NLD at the *parroquia* level as a unit of observation. Particularly, we use the *S-Gini* user-written Stata command STATA that computes classic relative (scale-invariant) Gini indices of inequality by default but can be requested to produce absolute (translation-invariant) indices or aggregate welfare S-Gini indices (Kerm, 2020).

Table B.1 shows that the spatial measure of inequality is correlated with the traditional measure of income inequality constructed using the 1990 Venezuelan population census. Moreover, Table B.2 shows that our spatial measure of inequality also correlates with traditional measures of municipal income inequality constructed using the Venezuelan population censuses of 1993 and 2005.

Table B.1: Correlation between Gini and NLD Inequality Measures

Correlation	(1) Pre-Chávez	(2) Post-Chávez	(3) All years
Income gini using 1990 census data	0.721*** (0.124)	0.722*** (0.056)	0.722*** (0.051)
Observations	2,010	8,040	10,050

Notes: Income Gini is only available for 1990 and is constructed using Venezuela's census data from IPUMS (2023)

Table B.2: Correlation between Gini and NLD Inequality Measures

Correlation	NLD Gini (1)
Income Gini (sum all years)	1.486***
	(0.158)
Income Gini (first year 1993)	0.442**
	(0.216)
Income Gini (last year 2005)	2.781***
	(0.226)

Notes: Income Gini at the municipal level is only available in Colombia for 1993 and 2005 when population censuses were collected.

B.1.3 Type of Land Cover

Areas of urban land and water bodies come from MODIS Land Cover (2023). MODIS Land Cover Type data cover a longer period, from 2001 to 2020, and have a coarser resolution of 500 meters (Friedl et al., 2010). Additionally, this dataset incorporates several supervised classification methodologies, including the International Geosphere-Biosphere Programme (IGBP), University of Maryland (UMD) Leaf Area Index (LAI), BIOME-Biogeochemical Cycles (BGC), and Plant Functional Types (PFT). For the analysis, we computed the area of land type (hectare units) at the second administrative level (*municipio*) from 2001 to 2020. We do this using the Google Earth Engine code editor.

B.1.4 Deforestation

We downloaded an Excel dataset of annual tree-cover loss for the period 2001–2021 from Global Forest Watch (2023). This dataset provides information on annual tree-cover loss measured in hectares at both the national and the second administrative levels *(municipios)*. Finally, we merged this data with the municipality's shapefile using the first and second administrative-level names and fuzzy matching methods.

B.2 Electoral Data

B.2.1 Presidential elections

For electoral outcomes, we use data from all Venezuelan presidential elections between 1998 and 2018 from the Consejo Nacional Electoral (2023) and the Venezuela 360 (2023) project (see Table B.3). Specifically, we web-scraped data on the electoral census, total votes, and votes for ruling and opposition parties at the municipal level. Data for the period 2000–2013 are from the VE360 project whereas data for the 1998. The current web portal of Consejo Nacional Electoral (2023) does not include data at municipal level for this year, but by using WayBackMachine, we were able to recover the records except for the electoral census. Data for the 2018 elections are from the CNE.

Table B.3: Presidential Elections in Venezuela 1998–2018

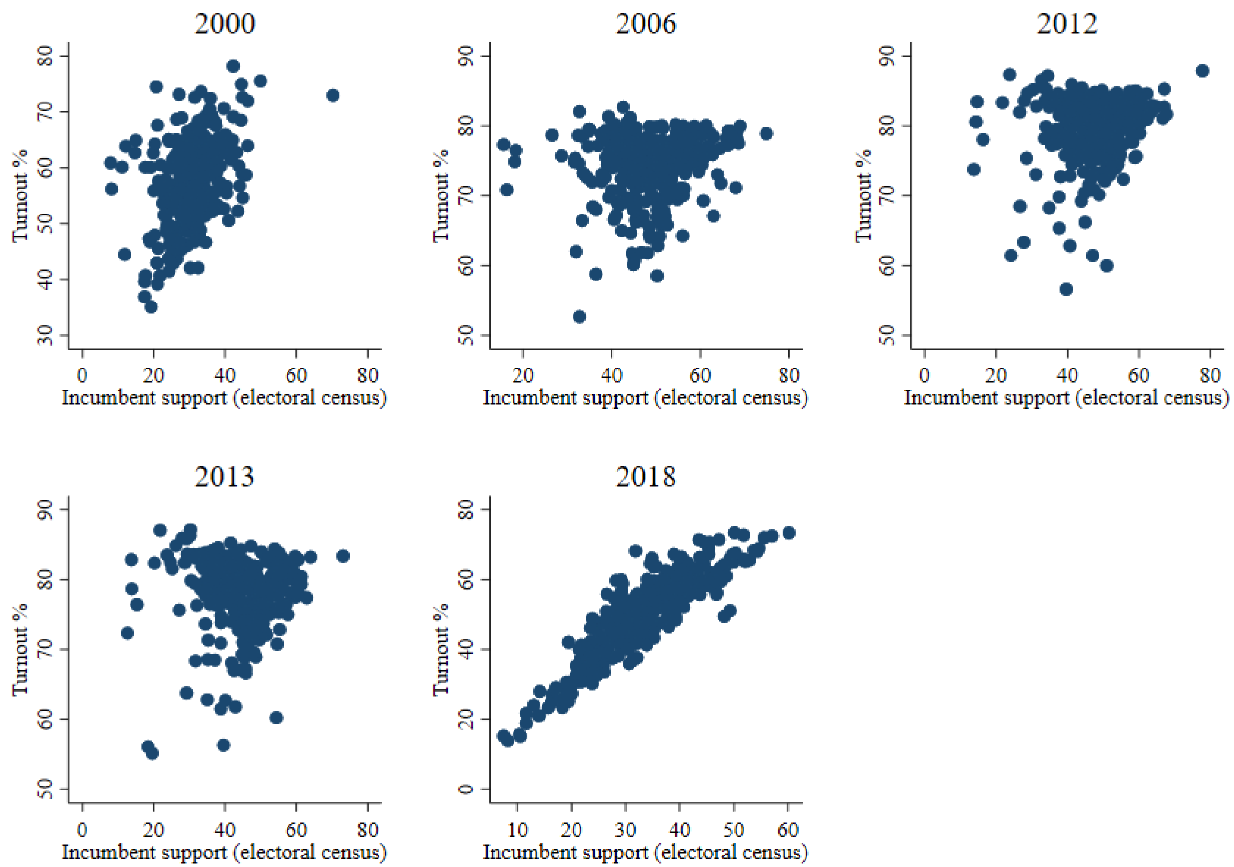
Year	Elected president	Type of election
2006	Hugo Chávez Frias	Ordinary
2012	Hugo Chávez Frias	Ordinary
2013	Nicolás Maduro Moros	Chávez's death
2018	Nicolás Maduro Moros	Ordinary

B.2.2 Mayoral elections

We web-scraped data from the Venezuelan National Electoral Council (CNE) website, collecting information on total votes and the electoral register at both the candidate and political-party levels for mayoral elections between 2006 and 2021. Afterward, we cleaned and classified the data, categorizing each political party based on whether it supported or opposed the governments of Hugo Chávez and Nicolás Maduro.

B.3 Manipulation Test for the Presidential Elections

Figure B.1: Manipulation test



Notes: This test follows the methodology outlined by Klimek et al. (2012).

B.4 Other Municipal Data Sources

Inflation. We estimated inflation rate as the annual change in the average consumer price taken from International Monetary Fund (2024). It corresponds to annual variation for the whole period of analysis.

Sanctions. We obtained data on the number of international sanctions imposed on Venezuela from the Global Sanctions Database (2023). They correspond to annual variation in the number of sanctions for the whole period of analysis.

Expropriations. Records on the number of expropriations from private firms come from Vendata (2024). We have complete records on the location of each firm that we impute to each municipality and the year. The comprises our whole period of analysis.

Energy blackout, 2019. Data on blackouts correspond to the number of *parroquias* that reported an energy blackout within each municipality in the large blackout that occurred in March/April 2019. We have discrete variation in the number of *parroquias* and in the average duration of the blackout. The data come from Morales-Arilla (2021).

Social welfare program coverage, 2016/2017. Data on the coverage by number of individuals of the social protection programs grouped under an ID called *Carnet de la Patria* by municipality come from Morales-Arilla and Traettino (2023). This ID centralizes all the government welfare programs. It is available only for one time period.

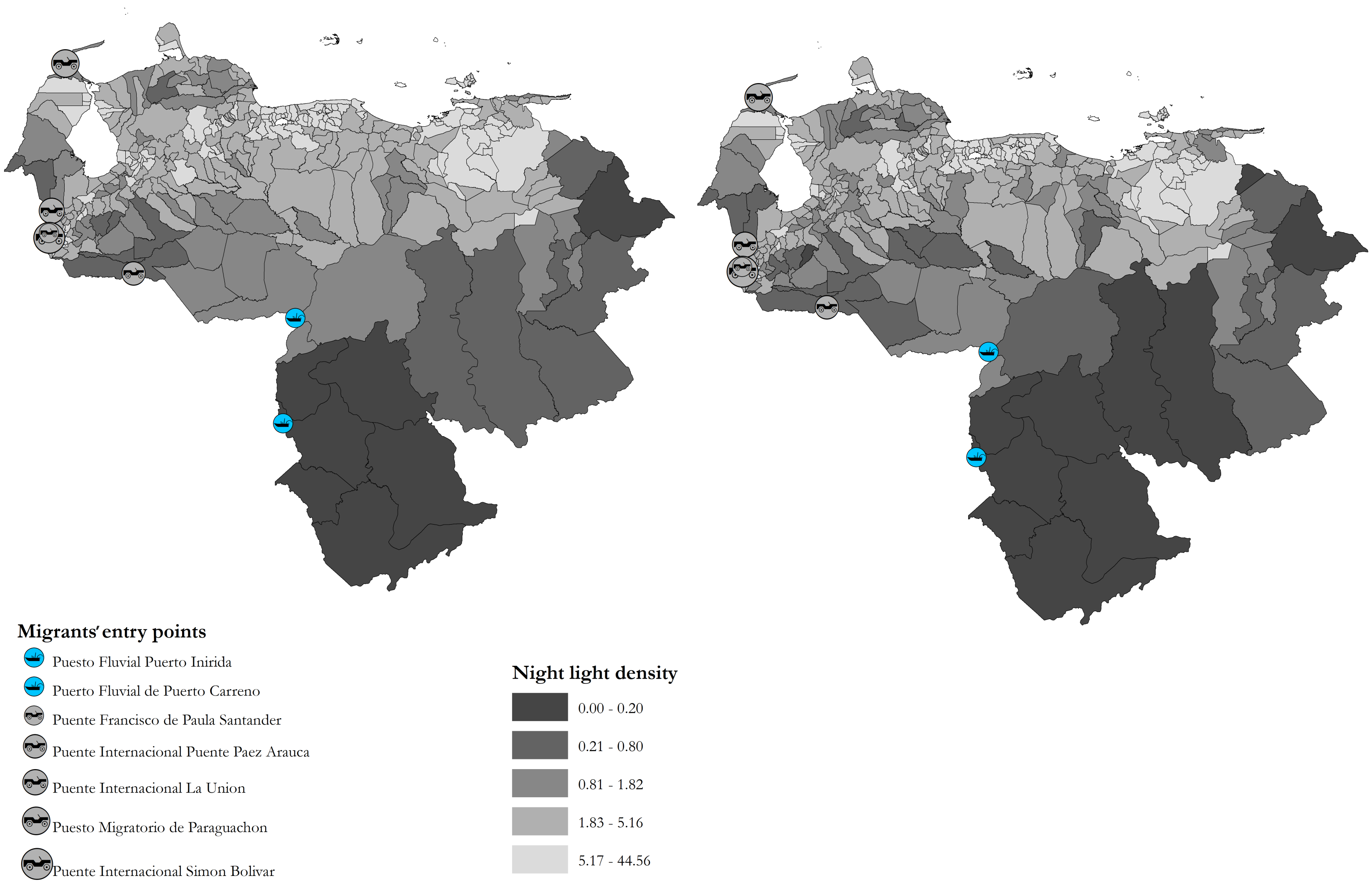
Repression, 2004. Records of repression come from Hsieh et al. (2011). They correspond to a list published in 2004 by the Chávez regime with the names of several millions of voters who attempted to remove him from office. The authors show that these individuals saw a 5 percent drop in earnings and a 1.3 percentage point drop in employment rates after the voter list was released. We have data on the number of individuals listed in each municipality for 2004.

C Appendix C: Descriptive Statistics of Variables in the Main Analysis

Figure C.1: Geographic Distribution of Night-Light Density

(a) 2014

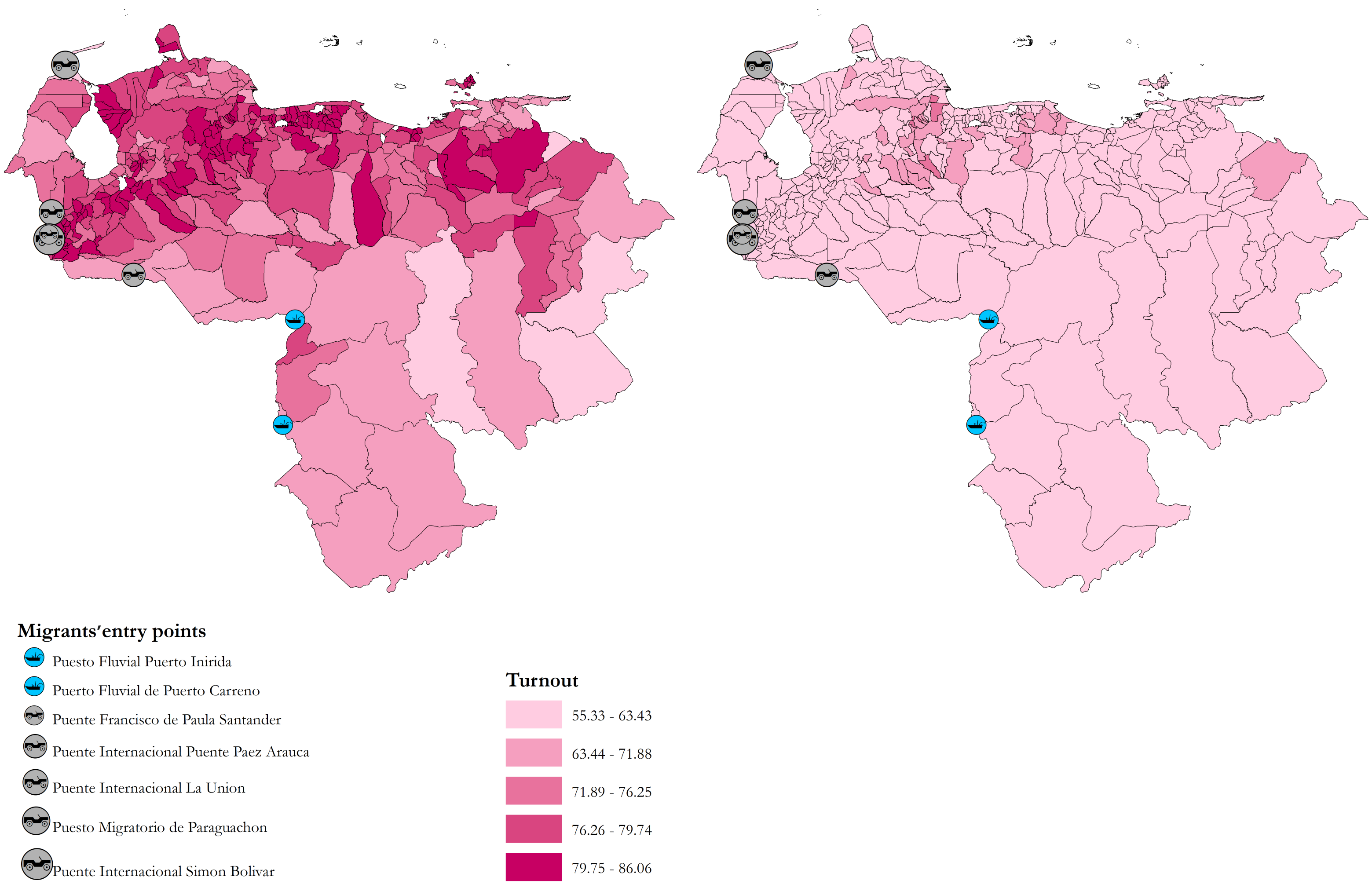
(b) 2021



Source: Data on Venezuela's administrative boundaries come from Instituto Geográfico de Venezuela (2015), location data for migration posts are from Migración Colombia (2023), and night-light density data come from Li et al. (2020).

Figure C.2: Geographic Distribution of Electoral Turnout (Presidential Elections)

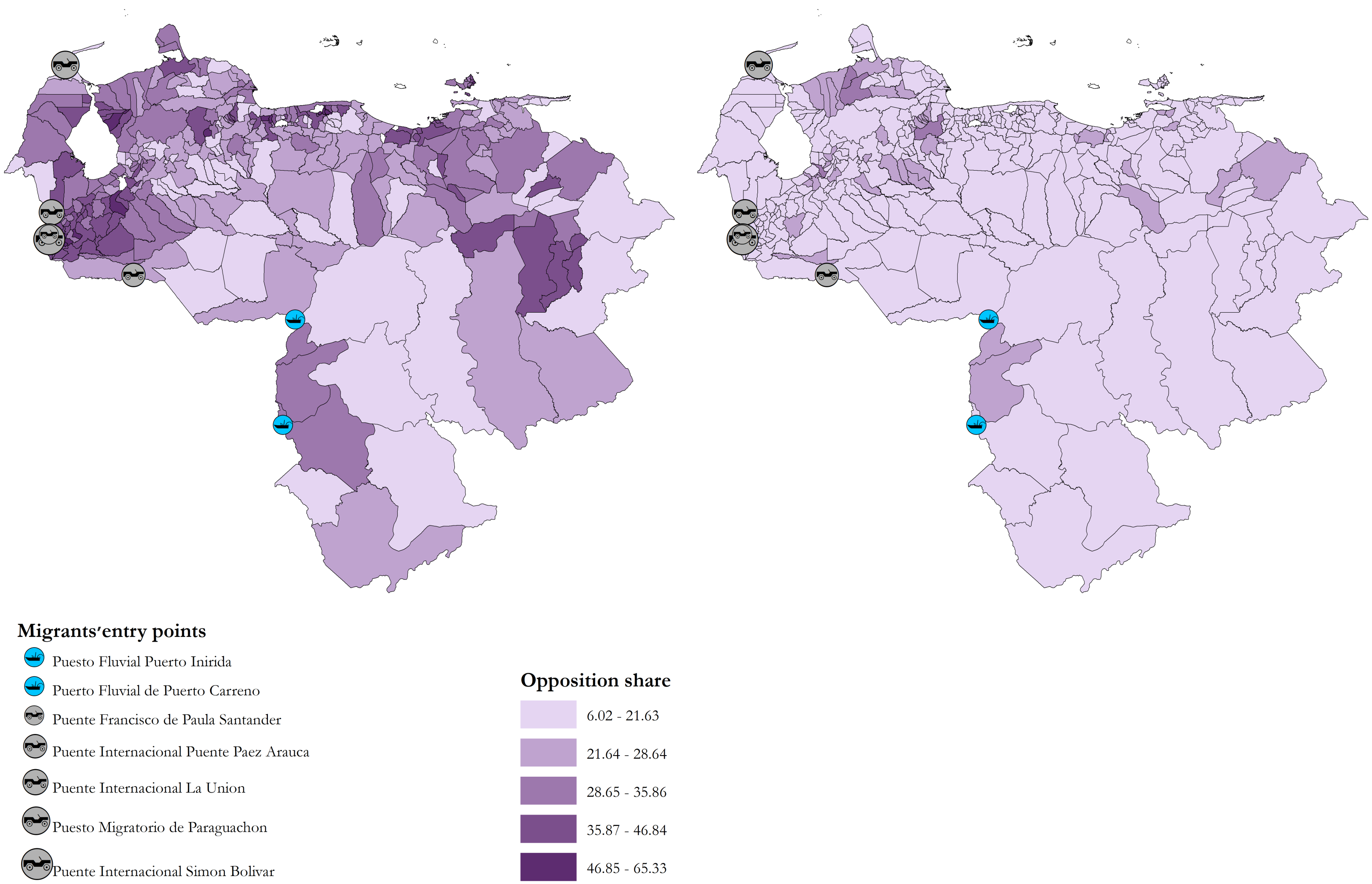
(a) 2006 (b) 2018



Source: Data on Venezuela's administrative boundaries come from Instituto Geográfico de Venezuela (2015), location data for migration posts are from Migración Colombia (2023), and electoral data are from Consejo Nacional Electoral (2023) and Venezuela 360 (2023). Legends express the turnout percentage as a share of the electoral census in Venezuela's presidential elections between 2006 and 2018.

Figure C.3: Geographic Distribution of Votes for the Opposition (Presidential Elections)

(a) 2006–2013 (b) 2018



Source: Data on Venezuela's administrative boundaries come from Instituto Geográfico de Venezuela (2015), location data for migration posts are from Migración Colombia (2023), and electoral data are web-scraped from Consejo Nacional Electoral (2023) and Venezuela 360 (2023). Legends express the opposition percentage as a share of the electoral census in Venezuela's presidential elections between 2006 and 2018.

Table C.1: Descriptive Statistics

Variable	Mean	SD	Min	Max	Obs	Years
Outcomes						
Night light density mean	5.19	6.77	0.00	45.13	10050	1992-2021
Log light mean	0.74	1.72	-9.92	3.81	10004	1992-2021
Gini measure from parroquia level 1992-2021	0.21	0.18	0.00	0.86	10050	1992-2021
Turnout %	67.76	14.12	13.87	87.89	1662	2000, 2006, 2012, 2013, 2018
Turnout % calculated by electoral census 2000	39.92	26.21	0.00	591.04	1990	1998, 2000, 2006, 2012, 2013, 2018
Electoral census 2000	92585	175341	848	1700000	9960	1992-2021
Presidential total votes	34824	77726	0	1100000	1996	1998, 2000, 2006, 2012, 2013, 2018
Presidential electoral census	58256	127412	0	1700000	1663	2000, 2006, 2012, 2013, 2018
% Oficialism share divided by total votes by year	58.40	12.62	13.01	97.51	1995	1998, 2000, 2006, 2012, 2013, 2018
Presidential votes to chavism	19109	40423	0	584221	1996	1998, 2000, 2006, 2012, 2013, 2018
Opposition votes as % of total votes	38.97	12.05	2.33	83.32	1995	1998, 2000, 2006, 2012, 2013, 2018
Opposition total votes	14879	37204	0	549722	1996	1998, 2000, 2006, 2012, 2013, 2018
Identification variables						
Number of foreign residents in Venezuela (1990)	474	1196	1	10465	10050	1992-2021
Foreign residents in Venezuela 1990/ total foreign residents	0.00	0.01	0.00	0.19	10050	1992-2021
Inflows of venezuelan citizens	225830	317756	947	1400000	10050	1992-2021
Total migrants outflows divided by municipality pop. 1990	10.25	19.12	0.00	178.60	10050	1992-2021
Municipality population in 1990	53997	120325	7614	1800000	10050	1992-2021
Migrants Imputed Outflows	0.01	0.07	0.00	3.78	10050	1992-2021
Interaction of high migration dummy and foreign settlements	0.00	0.00	0.00	0.19	10050	1992-2021
Control and Robustness Variables						
% Venezuelan inflows by year / total inflows of vn migrants	3.33	4.69	0.01	20.07	10050	1992-2021
Rate of venezuelan inflows per 1,000 citizens	7.72	10.69	0.04	45.59	10050	1992-2021
Interaction of inflows share and inverse net distance	0.00	5.75	-24.01	65.33	10050	1992-2021
Interaction of inflows 1k rate and inverse net distance	0.00	13.16	-54.54	148.40	10050	1992-2021
Linear distance mean in km	539.36	210.92	276.36	1115.38	10050	1992-2021
Interaction of high migration dummy and inverse network dist	0.00	0.32	-1.20	3.25	10050	1992-2021
Network distance mean in km	1277.38	421.11	832.39	2477.89	10050	1992-2021
Sumatory of weights k x linear distance m_k	532.05	296.67	118.68	1266.93	10050	1992-2021
Sumatory of weights x network distance	830.00	603.74	172.60	2477.89	10050	1992-2021
1/ Sumatory of weights k x linear distance m_k	0.00	0.00	0.00	0.01	10050	1992-2021
1/ Sumatory of weights k x NETWORK distance m_k	0.00	0.00	0.00	0.01	10050	1992-2021
Standarized: 1/ Sumatory of weights k x linear distance m_k	0.00	1.00	-1.05	3.08	10050	1992-2021
Standarized: 1/ Sumatory of weights k x NETWORK distance m_k	0.00	1.00	-1.20	3.25	10050	1992-2021
Lost forest hectares baseline (2001)	373.31	770.74	0.00	5569.50	10050	1992-2021
Urban and Built-up Lands (square km) into Municipio	15.96	27.09	0.00	259.79	10050	1992-2021
Water Bodies Area (square km) into Municipio	26.83	116.96	0.00	1324.15	10050	1992-2021
Light mean (Baseline 1992)	59.46	116.54	0.00	1228.80	10050	1992-2021

Note: This table presents summary statistics of most raw variables used in the analysis. The information comes from diverse sources. See Appendix A for more details.

D Appendix D: Characterizing Foreign Settlements of 1990

Table D.1: Foreign Settlements in 1990 vs Migrants' Hosting Countries in 2017–2021

Country	**% of total foreigners (Census 1990)**	**% of total migrants by host country (2017-2021)**
Colombia	59.02%	40.87%
Peru	2.48%	19.70%
Chile	1.50%	9.21%
Ecuador	2.38%	8.40%
United States	0.85%	3.35%
Brazil	0.32%	3.19%
Spain	6.90%	2.89%
Argentina	0.64%	2.82%
Panama	0.11%	1.98%
Mexico	0.25%	0.70%
Other	2.78%	4.34%
Unknown	1.02%	3%
No information in both surveys	22%	-

Notes: Authors' estimates using data from IPUMS (2023) and National Survey on Living Conditions (2021).

Table D.2: Characterizing Foreigners in Venezuela in 1990

	Mean		**Mean Difference Test**
	Foreigners	**Nationals**	**(p-value)**
Age	36.88	23.68	0.000
Years of schooling	5.91	4.65	0.000
Earned income ($BOL)	$ 678,196.00	$ 223,045.00	0.000

Table D.3: Characterizing Foreigners in Venezuela in 1990 (cont'd)

	Percent of foreigners	**Percent nationals**
Sex		
Male	53.26%	51.78%
Female	46.74%	48.22%
Employment status		
Employed	55.67%	27.48%
Unemployed	3.25%	4.18%
Inactive	35.23%	35.38%
Missing	5.85%	32.96%
Literacy		
Literate	87.14%	71.28%
Illiterate	10.76%	18.13%
Missing	2.10%	10.59%

E Appendix E: Robustness Tests

E.1 Accounting for Oil Fields in Assessing Forced Migration's Effects

We use the Global Oil Gas Features Database pertaining to the development of the Global Oil and Gas Infrastructure (GOGI) geodatabase from Sabbatino (2018). This dataset standardizes and integrates disparate oil and gas infrastructure data from over 380 sources worldwide, encompassing more than 4.8 million features for 2018. The project employed both manual searches by experts and machine learning algorithms to gather global data on oil and gas infrastructure, including production, transportation, and storage. The result is a comprehensive geodatabase that provides users with spatially explicit data. The GOGI database offers a unified platform to assess and visualize global oil and gas infrastructure, addressing key uncertainties and information gaps across nations that produce and consume hydrocarbons.

There are 194 countries in the GOGI geodatabase. The geodatabase contains physical information such as Fields, Mines, Platforms, Wells, Underground Storage, Pipelines, Ports, Railways, Basins, LNG facilities, Power Plants, Processing Plants, Refineries, Stations, and Storage Units.

Table E.1: Effects of Forced Migration on Development Outcomes
Adding Controls for Oil Fields × Time Trends

Panel A: Diff-in-diff estimates including controls	Night Light (1)	Log(Night Light) (2)	Spatial Gini (3)
I(Year>=2013) × Foreign Share	-0.234**	-0.127***	0.011*
	(0.100)	(0.038)	(0.006)
Panel B: Imputed outflows, including baseline controls × time trends			
Imputed Outflows	-0.025***	-0.017***	0.001
	(0.008)	(0.003)	(0.001)
Additional controls for all panels			
Observations	10,020	9,974	10,020
Dependent Mean 1992	3.77	0.034	0.27
Municipality Fixed Effects	✓	✓	✓
Year Fixed Effects	✓	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). *Imputed Outflows* is defined in equation (3) as the product of municipal foreign settlement shares in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline interacted with time trends: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; political repression records for 2004; *Carnet de la Patria holders* (2016–2017); number of *parroquias* with rationed energy at the municipality level (April 2019) and intensity of blackout (March 2019); number of enterprises acquired by the Venezuelan state; and oil field area as percentage of total in 2018. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table E.2: Effects of Forced Migration on Presidential Electoral Outcomes Adding Controls for Oil Fields × Time Trends

Panel A: Diff-in-diff estimates including controls	Turnout (1)	Opposition (2)
I(Year>=2013)× Foreign Share	-4.445***	-2.621***
	(1.419)	(0.702)
Panel B: Imputed outflows, including baseline controls × time trends		
Imputed Outflows	-0.705***	-0.369***
	(0.162)	(0.072)
Additional controls for all panels		
Observations	1,324	1,324
Dependent mean 2006	31.4	10.2
All controls	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). Turnout in column (1) is defined as the total votes for each presidential election held in Venezuela between 2006 and 2018 divided by the electoral census of 2000. (2) Opposition is the total votes of non-ruling parties divided by the electoral census of 2000. *Imputed Outflows* is defined in equation (3) as the product of municipal foreign settlement shares in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline interacted with time trends: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; political repression records for 2004; *Carnet de la Patria holders* (2016–2017); number of *parroquias* with rationed energy at the municipality level (April 2019) and intensity of blackout (March 2019); number of enterprises acquired by the Venezuelan state; and oil field area as percentage of total in 2018. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.2 Accounting for Government Actions: Social Welfare, Energy Blackouts, and Expropriations

Table E.3: Effects of Forced Migration on Development Outcomes
Adding Controls for Government Actions

Imputed Outflows	Night Light (1)	Log(Night Light) (2)	Spatial Gini (3)
Imputed Outflows	-0.043***	-0.018***	0.001*
	(0.012)	(0.003)	(0.0006)
Observations	10,020	9,974	10,020
Dependent mean	5.19	0.74	0.27
All controls	✓	✓	✓
Exclude outlier municipality (Libertador)	✓	✓	✓
Municipality FE	✓	✓	✓
Year FE	✓	✓	✓

Note: NLD in column (1) is defined as Night-Light Density, Log NLD in column (2) is the Log Night-Light Density, Gini in column (3) is the level of night-light concentration using Gini index. The term *Imputed Outflows* is defined as explained in equation 2. Controls in baseline interacted with time trends: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; repression records for 2004; *Carnet de la Patria* holders (2016–2017); number of *parroquias* with rationed energy at the municipality level (April 2019) and intensity of blackout (March 2019); number of enterprises acquired by the Venezuelan state. Clustered standard errors by municipality in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table E.4: Effects of Forced Migration on Presidential Electoral Outcomes Adding Controls for Government Actions

Imputed Outflows	Turnout (1)	Opposition (2)
Imputed Outflows	-0.699***	-0.371***
	(0.181)	(0.082)
Observations	1,324	1,324
Dependent mean 2006	31.4	10.2
All controls	✓	✓
Exclude outlier municipality (Libertador)	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Note: Turnout in column (1) is defined as the total votes for each presidential election held in Venezuela between 2006 and 2018 divided by the electoral census of 2000; (2) Opposition is the total votes of non-ruling parties divided by the electoral census of 2000. *Imputed Outflows* is defined as explained in equation 2. Controls in baseline interacted with time trends: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; repression records for 2004; *Carnet de la Patria* holders (2016–2017); number of *parroquias* with rationed energy at the municipality level (April 2019) and intensity of blackout (March 2019); number of enterprises acquired by the Venezuelan state. Clustered standard errors by municipality are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.3 Alternative Proxies for Municipal Variation: Inverse Network and Distance

As an additional exercise, we leverage the fact that migrants often choose destinations with lower migration costs. Consequently, we concentrate on municipalities located closer to road and major river networks, as these areas typically witness higher migration rates. We then explore the relationship between this geographical proximity and national migration from Venezuela to Colombia. Since national migration patterns do not perfectly mirror municipal migration trends, this creates an exogenous factor that we can employ as a shift-share instrument. In particular, we estimate the following specification:

$$y_m t = \gamma_m + \alpha_t + \beta Outflows_t \times InvNetDist_m + \sum_{z \subset X'_m} \eta(z \times \alpha_t) + \varepsilon_m t \tag{9}$$

Where $InvNetDist_m$ is defined by the following equation:

$$InvNetDist_m = \frac{1}{\sum_{i=1}^{7} \omega_i * netdist_{mi}} \tag{10}$$

In Equation 9, $y_m t$ is the economic growth, inequality or electoral outcome of interest for municipality m in year t, $Outflows_t$ is the outflow of Venezuelan migrants to Colombia for year t, $InvNetDist_m$ is the inverse network distance for each municipality m defined by Equation 10, X'_m is a control-variables vector at baseline and γ_m, α_t are municipality and time fixed effects, respectively. Pre-shock municipal characteristics are interacted with year fixed effects to flexibly control for differential municipal trends. Robust standard errors (ε_{mt}) are clustered at the municipality level to account for potential serial correlation within municipalities.

In Equation 10, ω_i is the weight of Venezuelan migrants' entry point i, calculated with the share of total entries between 2012 and 2022. $netdist_{mi}$ is the network distance from centroid of municipality m to entry point i using the road lines collected by Instituto Geográfico de Venezuela (2015). This index is standardized by subtracting the mean and dividing it by its standard deviation.

To calculate the network distance $netdist_{mi}$, we use an Origin Destination (OD) cost-matrix analysis. This method finds and measures the least costly paths along a network from multiple origins to multiple destinations. We use the Venezuelan road and major rivers network shapefile created by Instituto Geográfico de Venezuela (2015) to connect and calculate the minimum distance in kilometers from all centroids of municipalities to each of the seven entry points. Additionally, we calculate the inverse distance using the linear distance from each municipality's centroid to the nearest entry point.

Some municipalities do not have a full connected network road from their centroids to each entry point. Thus, we assign the maximum network distance with a penalty of 20 percent of network distance mean for disconnected municipalities.

This exercise basically amounts to replacing our municipal measure of foreign settlements with the inverse distance of each municipality to the main crossing points in Colombia.

E.3.1 Inverse Network Distance

Table E.5: Effects of Forced Migration on Development and Inequality Measures

Panel A: Difference-in-difference estimates including all controls	Night Light (1)	Log(Night Light) (2)
I(Year>=2013)× Network distance	-0.359***	-0.185***
	(0.106)	(0.029)
Panel B: Including baseline controls × time trends		
Outflows share × Network distance	-0.032***	-0.016***
	(0.008)	(0.002)
Panel C: Using inflows 1k rate, including all controls		
Outflows 1k rate × Network distance	-0.014***	-0.007***
	(0.004)	(0.001)
Observations	10,020	9,974
Dependent Mean 1992	3.77	0.034
Exclude Libertador municipality	✓	✓
Municipality Fixed Effects	✓	✓
Year Fixed Effects	✓	✓

Note: The table illustrates the estimated coefficients of equation (9). *Network distance* is defined in equation (10). Controls in the baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table E.6: Effects of Forced Migration on Electoral Outcomes

	Turnout (1)	Opposition (2)
Panel A: Difference-in-difference estimates including all controls		
I(Year>=2013)× Network distance	-3.407***	-1.351***
	(0.998)	(0.406)
Panel B: Including baseline controls × time trends		
Outflows share × Network distance	-0.376***	-0.161***
	(0.113)	(0.048)
Panel C: Using inflows 1k rate, including all controls		
Outflows 1k rate × Network distance	-0.167***	-0.071***
	(0.050)	(0.021)
Observations	1,324	1,324
Dependent mean 2006	31.4	10.2
Exclude Libertador municipality	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Note: The table illustrates the estimated coefficients of equation (9). *Network distance* is defined in equation (10). Controls in the baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.3.2 Inverse Linear Distance

Table E.7: Effects of Forced Migration on Development

Panel A: Difference-in-difference estimates including all controls	Night Light (1)	Log(Night Light) (2)
I(Year>=2013)× Linear Distance	-0.397***	-0.158***
	(0.109)	(0.027)
Panel B: Including baseline controls × time trends		
Outflows share × Linear distance	-0.034***	-0.014***
	(0.008)	(0.002)
Panel C: Using outflows 1k rate, including all controls		
Inflows 1k rate × Linear distance	-0.015***	-0.006***
	(0.004)	(0.001)
Observations	10,020	9,974
Dependent Mean 1992	3.77	0.034
Exclude Libertador municipality	✓	✓
Municipality Fixed Effects	✓	✓
Year Fixed Effects	✓	✓

Note: The table illustrates the estimated coefficients of equation 9 but using the inverse linear distance. *Linear distance* is analogue to the standardized measure of network inverse distance used in Equation 10 but using the linear distance from the municipality's centroid to each entry point. Controls in the baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table E.8: Effects of Forced Migration on Electoral Outcomes

Panel A: Difference-in-difference estimates including all controls	Turnout (1)	Opposition (2)
I(Year>=2013)× Linear Distance	-3.871***	-1.582***
	(1.062)	(0.422)
Panel B: Including baseline controls × time trends		
Outflows share × linear distance	-0.427***	-0.187***
	(0.120)	(0.049)
Panel C: Using outflows 1k rate, including all controls		
Outflows 1k rate × linear distance	-0.189***	-0.083***
	(0.053)	(0.022)
Observations	1,324	1,324
Dependent mean 2006	31.4	10.2
Exclude Libertador municipality	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Note: The table illustrates the estimated coefficients of equation 9 but using the inverse linear distance. *Linear distance* is analogue to the standardized measure of network inverse distance used in Equation 10 but using the linear distance from the municipality's centroid to each entry point. Controls in the baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.4 Validating Results with Alternative Difference-in-Differences Estimators

Table E.9: Alternative DiD estimators - Development Outcomes

	Night Light (1)	Log(Night Light) (2)	Spatial Gini (3)
Panel A: Doubly Robust Improved Estimator			
I(Year>=2013)× I(Imputed Outflows>= P_{80})	−1.264***	-0.178***	0.028***
	(0.17)	(0.05)	(0.008)
Panel B: Abadie (2005) IPW Estimator			
I(Year>=2013)× I(Imputed Outflows>= P_{80})	-2.852***	-.569***	0.028**
	(0.59)	(0.099)	(0.012)
Panel C: Standardized IPW estimator			
I(Year>=2013)× I(Imputed Outflows>= P_{80})	-1.577***	-0.341***	0.028**
	(0.466)	(0.076)	(0.012)
Observations	10,020	9,974	10,020
Dependent Mean 1992	3.77	0.034	0.27

Notes: Inverse Probability Weighted (IPW) estimators from Abadie (2005) and Sant'Anna and Zhao (2020). Doubly Robust Improved Estimator from Sant'Anna and Zhao (2020). We use STATA command *drdid* from Rios-Avila et al. (2021) for estimations. ***p<0.01, **p <0.05, *p<0.1.

E.5 Colombian Foreigners Share, 1990

Table E.10: large-scale Out-Migration and Development Employing Colombian Foreigner Shares, 1990

	Night Light (1)	Log(Night Light) (2)
Panel A: Diff-in-diff estimates including controls		
I(Year>=2013) × Foreigners Share	-0.297***	-0.111***
	(0.082)	(0.038)
Panel B: Imputed outflows, including baseline controls × time trends		
Imputed Outflows	-0.019***	-0.010***
	(0.005)	(0.002)
Panel C: Imputed outflows, excluding controls		
Imputed Outflows	-0.019***	-0.008***
	(0.005)	(0.002)
Additional controls for all panels		
Observations	10,020	9,974
Dependent Mean 1992	3.77	0.034
Municipality Fixed Effects	✓	✓
Year Fixed Effects	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1) but replacing the foreign settlements with the share of Colombian citizens living in Venezuela before 1990. Controls in the baseline interacted with time trends, including urban coverage, water bodies, and tree-cover loss for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Standard errors clustered by municipality are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.6 Standard Errors Correction: One-Way Clustering on Municipality-Year Interactions

Table E.11: large-scale Out-Migration and Development

	Night Light	Log(Night Light)	Spatial Gini
Panel A: Diff-in-diff estimates including controls	(1)	(2)	(3)
I(Year>=2013) × Foreigners Share	-0.356***	-0.126***	0.012***
	(0.050)	(0.015)	(0.002)
Panel B: Imputed outflows, including baseline controls × time trends			
Imputed Outflows	-0.036***	-0.016***	0.001***
	(0.004)	(0.002)	(0.000)
Panel C: Imputed outflows, excluding controls			
Imputed Outflows	-0.037***	-0.015***	0.001***
	(0.004)	(0.002)	(0.000)
Additional controls for all panels			
Observations	10,020	9,974	10,020
Dependent Mean 1992	3.77	0.034	0.27
Municipality Fixed Effects	✓	✓	✓
Year Fixed Effects	✓	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). *Imputed Outflows* is defined in equation (3) as the product of the share of foreign settlement in each municipality in 1990 and annual outflows of Venezuelans to Colombia. It is rescaled by the total municipal population of 1990. Controls in the baseline are interacted with time trends and include urban coverage, water bodies, and tree-cover loss for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Standard errors are clustered using the interaction of municipality and year (i.e., one-way clustering at the municipality-year level). ***p<0.01, **p <0.05, *p<0.1.

Table E.12: Large-Scale Out-Migration and Presidential Electoral Outcomes

Panel A: Diff-in-diff estimates including controls	Turnout (1)	Opposition (2)
I(Year>=2013)× Foreigners Share	-4.471***	-2.624***
	(1.443)	(0.783)
Panel B: Imputed outflows, including baseline controls × time trends		
Imputed Outflows	-0.663***	-0.358***
	(0.139)	(0.065)
Panel C: Imputed outflows, excluding controls		
Imputed Outflows	-0.649***	-0.351***
	(0.139)	(0.067)
Additional controls for all panels		
Observations	1,324	1,324
Dependent mean 2006	31.4	10.2
All controls	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). Turnout in column (1) is defined as the total votes for each presidential election held in Venezuela between 2006 and 2018, divided by the electoral census of 2000. In column (2), opposition is the total votes of unofficial parties divided by the electoral census of 2000. *Imputed Outflows* is defined in equation (3) as the product of shares of foreign settlement in each municipality in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline are interacted with time trends and include urban coverage, water bodies, and tree-cover loss for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Standard errors are clustered using the interaction of municipality and year (i.e., one-way clustering at the municipality-year level). ***p<0.01, **p <0.05, *p<0.1.

E.7 ENCOVI Estimates, 2014–2021

Table E.13: Forced Migration and Income and Inequality (State Level)

Panel A: No controls	Real total Income (IHS) (1)	Real total Income per capita (IHS) (2)
Imputed Outflows	-0.00131***	-0.00128***
	(0.00017)	(0.00015)
Panel B: Including baseline controls		
Imputed Outflows	-0.00138***	-0.00137***
	(0.00014)	(0.00013)
Observations (State and Year)	139,317	139,317
Dependent Mean 2014	915.80	0.34
State Fixed Effects	✓	✓
Year Fixed Effects	✓	✓

Notes: The term *Imputed Outflows* is defined as explained in Equation (2). Controls in baseline interacted with time trends include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; *Carnet de la Patria* holders (2016–2017); number of *parroquias* with rationed energy at municipality level (April 2019) and intensity of blackout (March 2019); and number of enterprises acquired by the Venezuelan state. Controls from ENCOVI: head of household gender, education level, marital status, and number of household members. Total and per capita income coefficients were estimated at the state level. Bootstrap standard errors in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table E.14: Forced Migration in Development Outcomes (State Level)

Development Outcomes	Poverty (1)	Employment (2)
Imputed Outflows	0.00007***	-0.00011***
	(0.00002)	(0.00003)
Observations	133,073	110,291

Notes: The term *Imputed Outflows* is defined as explained in Equation (2). Controls in baseline interacted with time trends include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; *Carnet de la Patria* holders (2016–2017); number of *parroquias* with rationed energy at municipality level (April 2019) and intensity of blackout (March 2019); and number of enterprises acquired by the Venezuelan state. Controls from ENCOVI: head of household gender, education level, marital status, and number of household members. Column (1) reports a binary indicator equal to 1 if the household is classified as poor. Column (2) is a dummy variable equal to 1 if the individual is employed. Column (3) indicates whether the individual reported experiencing any health issue or illness within the thirty days prior to the survey. Column (4) is a binary variable equal to 1 if the household has access to any method of water treatment. ***p<0.01, **p <0.05, *p<0.1.

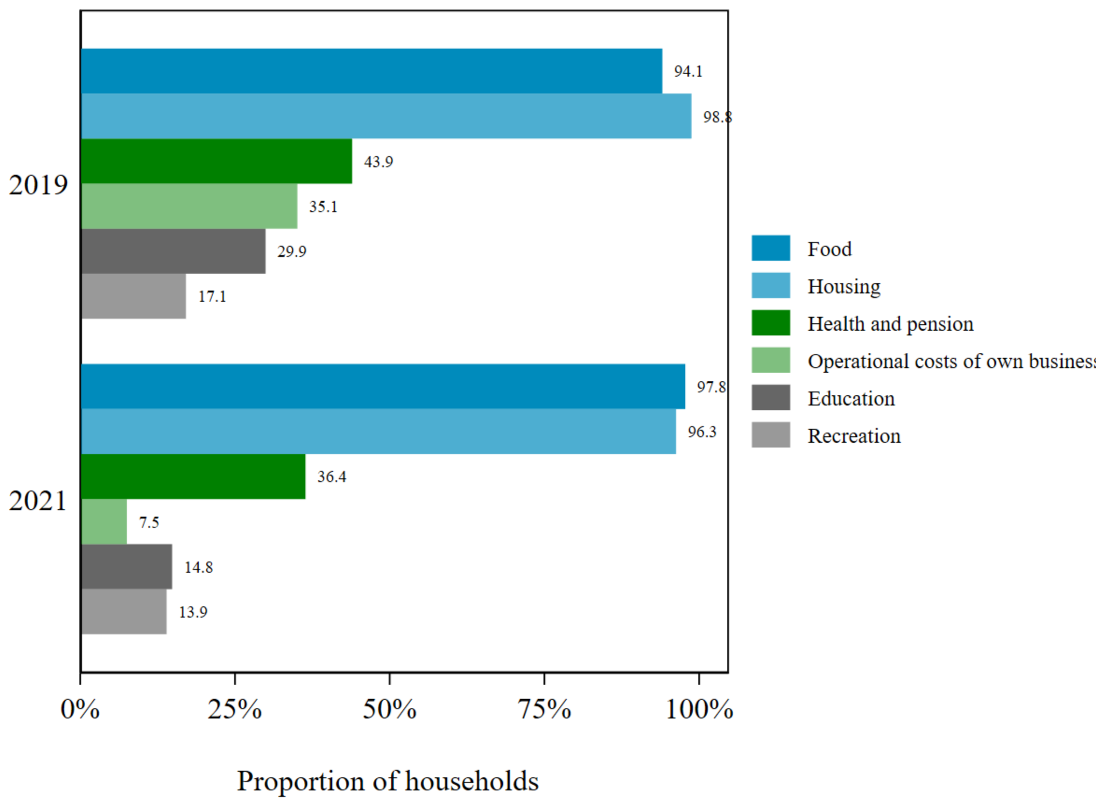
Table E.15: Forced Migration in Development Outcomes (State Level) - 2SLS Estimates

	Poverty	Employment	Real Total Income	Real Total Income Per Cápita
	(1)	(2)	(3)	(4)
IO VenRePS	0.00016***	-0.00024***	-0.00337***	-0.00328***
	(0.00003)	(0.00007)	(0.00032)	(0.00030)
Observations	133,073	110,291	150,505	150,505
F-Statistics	9.9e+04	8.9e+04	1.2e+05	1.2e+05
Municipality and Year Fixed Effects	✓	✓	✓	✓
All Controls	✓	✓	✓	✓

Notes: IO VenRePS is calculated following Eq. 3 but using the RAMV migration share instead of the foreign share. The coefficients capture the effect of the Imputed RAMV Share on voter development and income outcomes at state level. Controls in baseline interacted with time trends include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; *Carnet de la Patria* holders (2016–2017); number of *parroquias* with rationed energy at municipality level (April 2019) and intensity of blackout (March 2019); and number of enterprises acquired by the Venezuelan state. Controls from ENCOVI: head of household gender, education level, marital status, and number of household members. Total and per capita income coefficients were estimated at the state level. The Kleibergen-Paap rk Wald F-statistics test the strength of the excluded instrument. Robust standard errors clustered at the municipality level are reported in parentheses. ***p <0.01, **p <0.05, *p <0.1.

E.8 The Role of Remittances

Figure E.1: Household Utilization of Remittances, 2019 and 2021



Notes: The table describes the categories of expenditures of remittances by households interviewed in the ENCOVI of 2019 and 2021. The categories are non-exclusionary; households could mention one or more categories on which they spent the majority of the remittances they received from relatives abroad.

E.9 Placebo Test: School Attendance on No Schooling Age

Table E.16: School Attendance on No Schooling Age

Panel A: School Attendance	Age < 6 or > 17 (1)
Imputed Outflows	-0.00030
	(0.00019)
Observations (State and Year)	38,238
Dependent Mean 2014	7.93

Notes: Imputed Outflows is defined as explained in equation (2). For column (1), the estimates include only individuals in non-schooling age (less than 6 and more than 17 years old in 2013). Bootstrap standard errors are in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.10 Electoral Outcomes Using Contemporaneous Electoral Censuses

Table E.17: Effects of Forced Migration on Presidential Electoral Outcomes

	Turnout (1)	Opposition (2)
Panel A: Diff-in-diff estimates including controls		
I(Year>=2013)× Foreign Share	-3.613***	-4.389***
	(0.787)	(0.867)
Panel B: Imputed outflows, including baseline controls × time trends		
Imputed Outflows	-0.706***	-0.591***
	(0.075)	(0.069)
Panel C: Imputed outflows, excluding controls		
Imputed Outflows	-0.703***	-0.588***
	(0.081)	(0.076)
Additional controls for all panels		
Observations	1,323	1,323
Dependent mean 2006	31.4	10.2
All controls	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). Turnout in column (1) is defined as the total votes for each presidential election held in Venezuela between 2006 and 2018 divided by the electoral census. (2) Opposition is the total votes of non-ruling parties divided by the electoral census. *Imputed Outflows* is defined in equation (3) as the product of municipal foreign settlement shares in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses.

E.11 Including 2024 Presidential Election

Table E.18: Effects of Forced Migration in Presidential Electoral Outcomes

	Turnout (1)	Opposition (2)
Panel A: Difference-in-difference estimates including all controls		
I(Year>=2013)× Foreign Share	-4.845**	-3.623***
	(1.913)	(1.370)
Panel B: Including baseline controls × time trends		
Imputed Outflows	-0.612***	-0.330***
	(0.140)	(0.060)
Panel C: Imputed outflows, excluding controls		
Imputed Outflows	-0.576***	-0.309***
	(0.123)	(0.052)
Observations	1,648	1,648
Dependent mean 2006	31.4	10.2
All controls	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Notes: The table illustrates the estimated coefficients of equation (1). Turnout in column (1) is defined as the total votes for each Venezuelan presidential election between 2006 and 2018 divided by the electoral census of 2000. (2) Opposition is the total votes of non-ruling parties divided by the electoral census of 2000. *Imputed Outflows* is defined in equation (3) as the product of municipal foreign settlement shares in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

Table E.19: Forced Displacement Weakens Political Opposition, Mayoral Elections

Panel A: Diff-in-diff estimates including controls	Turnout (1)	Opposition (2)
I(Year>=2013)× Foreigners Share	-2.198***	-1.137*
	(0.731)	(0.654)
Observations	1,649	1,652
Dependent mean 2004	32.5	14.59
All controls	✓	✓
Exclude outlier municipality (Libertador)	✓	✓
Municipality FE	✓	✓
Year FE	✓	✓

Notes: Turnout in column (1) is defined as the total votes for each mayoral election divided by the electoral census of 2000, (2) Opposition is the total votes of non-ruling parties divided by the electoral census of 2000. *Imputed Outflows* is defined in equation (3) as the product of municipal foreign settlement shares in 1990 and annual outflows of Venezuelans to Colombia. Controls in baseline are interacted with time trends. They include: urban coverage, water bodies, and forest- loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.12 Impacts on Crime Events share per 100,000 inhabitants

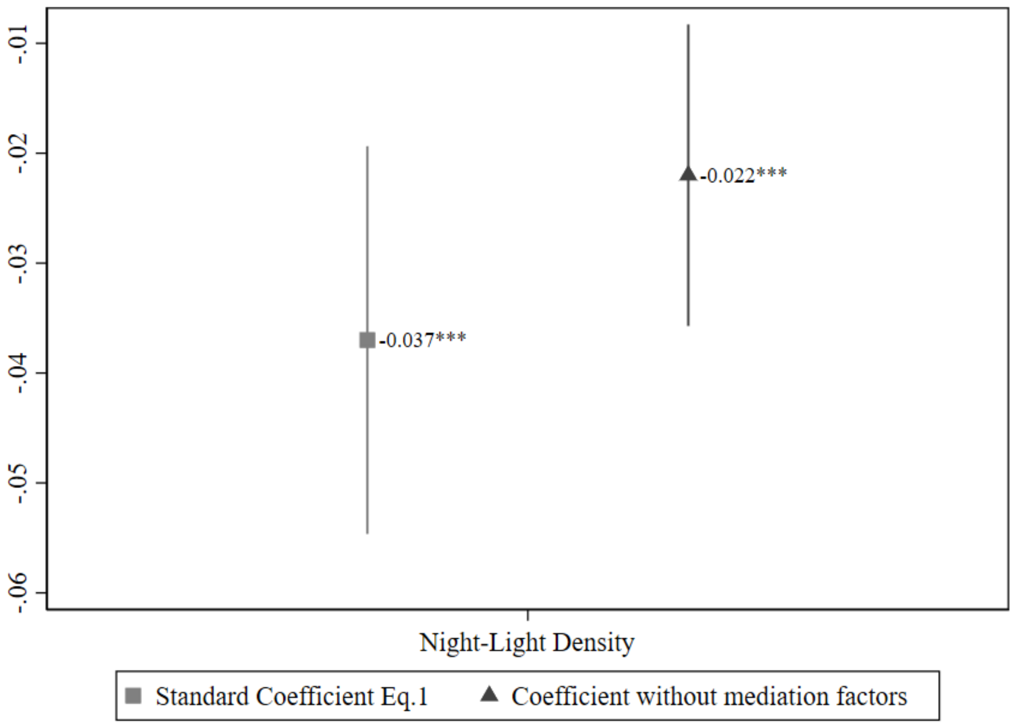
Table E.20: Effects of Forced Migration on Crime

	FARC	ELN	Organized Crime
Panel A: Total events share per 100,000 inhabitants	(1)	(2)	(3)
Imputed outflows	0.005*	0.022*	0.155**
	(0.003)	(0.012)	(0.060)
	Protest	Regime	Sindicato
Panel B: Total events share per 100,000 inhabitants	(1)	(2)	(3)
Imputed outflows	-0.017	0.109**	-0.003*
	(0.045)	(0.0506)	(0.001)
Observations	11,022	11,022	11,022
Dependent mean baseline	0.036	0.007	3.68
All controls	✓	✓	✓
Exclude outlier municipality (Libertador)	✓	✓	✓
Municipality FE	✓	✓	✓
Year FE	✓	✓	✓

Notes: In Panel A, column (1) represents the total number of conflict events involving the Revolutionary Armed Forces of Colombia (FARC) in Venezuela from 1992 to 2024, normalized by the Venezuelan municipality population in 1990 and expressed per 100,000 inhabitants. Column (2) reports the total conflict events associated with the Colombian National Liberation Army (ELN) during the same period, also normalized by the 1990 population and presented per 100,000 inhabitants. Column (3) captures the total conflict events carried out by non-terrorist but criminal armed groups—such as gangs, colectivos, sindicatos, and drug-trafficking cartels—between 2018 and 2024, similarly normalized by the 1990 population and expressed per 100,000 inhabitants. In Panel B, column (1) reports the total number of both peaceful and violent protests from 2018 to 2024, adjusted by the 1990 population of Venezuelan municipalities and presented per 100,000 inhabitants. Column (2) records the total number of events involving actors linked to the Venezuelan political regime between 1992 and 2024, also normalized by the 1990 population and expressed per 100,000 inhabitants. Finally, column (3) reflects the total number of events involving irregular armed groups engaged in illegal mining from 2018 to 2024, adjusted by the 1990 population and presented per 100,000 inhabitants. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.

E.13 Mediation Analysis

Figure E.2: Mediation Analysis: The Role of Political Opposition and Organized Crime



Notes: This figure presents coefficients for the two mediators, political opposition and organized crime, represented by squares. The triangle indicates the direct effect of imputed migration outflows on night-light density, excluding controls. Standard errors are clustered at the municipality level.

Table E.21: Development and Forced Displacement - Mediation Analysis

Panel A: Coefficient Equation 1, excluding controls	Night Light (1)	Log(Night Light) (2)	Spatial Gini (3)
Imputed outflows	-0.037***	-0.015***	0.001*
	(0.009)	(0.004)	(0.001)
Panel B: Coefficient without the variation explained by crime and opposition			
Imputed outflows	-0.022***	-0.011***	0.001*
	(0.007)	(0.002)	(0.000)
Observations Panel A	10,020	9,974	10,020
Observations Panel B	1,984	1,976	1,984
Dependent mean	3.77	0.034	0.27

Notes: The table illustrates the estimated coefficients of equation (1). *Imputed Outflows* is defined in equation (3) as the product of municipal foreign settlement shares in 1990 and annual outflows of Venezuelans to Colombia. Controls in the baseline are interacted with time trends. They include: urban coverage, water bodies, and forest-loss area for 2001; night-light density for 1992; and political repression records for 2004. All estimates exclude the outlier municipality Libertador. Clustered standard errors by municipality are presented in parentheses. ***p<0.01, **p <0.05, *p<0.1.