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Original Article

From displacement to integration: mitigating the distributional effect of immigration through an amnesty program

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Abstract

We examine how the massive exodus of Venezuelans and an amnesty program aimed at their integration affected income distribution in Colombia. Using RIF regressions in an instrumental variables approach, we find that the exodus had a negative effect on the lower tail of native Colombians' income distribution, while the amnesty program partially mitigated this impact. Our findings posit downgrading as the driving mechanism. Employment restrictions forced Venezuelan migrants into lower-paying, more routinized jobs despite their qualifications, exacerbating pressures on the low-skilled labor segment in Colombia. The regularization program mitigated the extent of downgrading, thereby alleviating the unequalizing impact of migration.

Keywords: migration; income; inequality; labor markets; downgrading; Colombia, Venezuela; Latin America.

JEL classifications: D30, F22, J31, J42, J61, O15

1. Introduction

Driven by severe economic crises, food shortages, insecurity, and human rights violations, millions of people are compelled to leave their home countries every year. In 2022, more than 1 per cent of the world's population was forcibly displaced, marking a staggering 112 per cent increase compared to 2013, from 51.2 to 108.4 million (UNHCR 2013, 2022).[1] This unfolding situation has caused a significant surge of undocumented immigrants worldwide. For instance, the USA had 10.5 million undocumented immigrants in 2017, making up 23 per cent of its migrant population, while European countries had between 3.9 and 4.8 million, accounting for 16–20 per cent of non-EU-EFTA immigrants (Pew Research Center 2019, 2020). Given these figures, the economic integration of undocumented immigrants has emerged as an issue of much debate and concern and a top priority for governments, especially in host countries. In this article, we study the distributional effects of the Venezuelan exodus in Colombia and how a massive amnesty program that granted work permits and integrated undocumented immigrants shaped its economic impact.

[1] As per UNHCR (2022), while 1 in 142 individuals were forcibly displaced in 2013, this figure shifted to 1 in 74 in 2022.

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The Venezuelan exodus is the fourth most important refugee crisis in the world: 5.5 million people left their home country due to the social and economic crisis; 18 per cent of Venezuela's population in 2015 before the crisis started (UNHCR 2022).[2] Colombia became the primary sanctuary, with nearly 2.5 million Venezuelans settling there by 2022, 1.7 million of whom arrived between 2016 and 2019. However, the resettlement was fraught with challenges: despite often matching or surpassing Colombians in skills, Venezuelans earned 28 per cent less, faced 40 per cent higher unemployment, and were 60 per cent more likely to live in poverty. In response to this escalating humanitarian and economic concern, the Colombian government took an unprecedented step in 2018, introducing an amnesty program, known as the *Permiso Especial de Permanencia—Registro Administrativo de Migrantes Venezolanos* (PEP). This initiative was designed to facilitate the transition of Venezuelan immigrants into the formal labor market and provide them with access to essential public services, including healthcare and education. This program extended residence permits to approximately 16 per cent of Venezuelans living in Colombia.

To study the effect of the massive immigration of Venezuelans and the ensuing amnesty program on the Colombian income distribution, we implement a novel combination of Recentered Influence Function (RIF) regressions, Bartik-type instrumental variables (IV), and differences-in-differences estimates. First, RIF regressions allow us to estimate the distributional effects of immigration for each unconditional quantile of the Colombian income distribution and for different inequality indicators. Second, to analyze the distributional effect of the Venezuelan exodus, we exploit the cross-municipality variation of the share of Venezuelan immigrants in Colombia relative to the local labor force over time (municipalities are similar to US counties). To address the endogeneity concerns, we apply an IV approach based on the distance from each municipality in Colombia to the states in Venezuela, the historical population density in each geographic unit of Venezuela, and the total stock of Venezuelan migrants in Colombia. This IV is arguably exogenous and explained by push factors due to the economic collapse of the Venezuelan economy rather than pull factors from Colombia. Intuitively, this IV predicts a larger share of Venezuelan migrants relative to the local labor force for those Colombian municipalities closer to the most historically populous Venezuelan States. Finally, to estimate the effect of the amnesty program, we take advantage of the unexpected announcement and implementation of the program in 2018. We compare changes in our outcomes of interest, before and after the implementation of the program, which are explained by the share of undocumented immigrants who were granted an amnesty in each municipality.

We begin by showing that the Venezuelan exodus reduced the household incomes in Colombia, largely due to diminished labor earnings. Importantly, this reduction was concentrated in the lower end of the income distribution, amplifying income inequality. Secondly, we find that the amnesty program played a very important mitigating role. Our estimates suggest that an increase of 1 percentage point (p.p.) in the share of Venezuelan migrants in each municipality reduced the per capita household income (PCHI) of individuals in the 10th percentile of the Colombian income distribution by approximately 3 per cent. But if all migrants had been granted amnesty, this decline in income would have been entirely offset.

The Venezuelan migration to Colombia has had a distinct characteristic, unlike other refugee episodes of similar magnitude, especially toward developed countries: immigrants have skills comparable to native workers, therefore, in principle, we would not expect an asymmetric impact along the earnings distribution in the host country. Our findings suggest otherwise: the impact of the Venezuelan exodus on labor incomes was substantially stronger in the lower segment of the earnings distribution. We propose a mechanism to explain this puzzling result, namely, the downgrading of Venezuelan migrants in terms of the tasks they perform and the wages they earn. Using counterfactual density functions, we evaluate downgrading in terms of wages and tasks, comparing immigrants to natives with similar sociodemographic profiles. Our results show that Venezuelan immigrants work in more routine tasks and occupations and earn lower wages than natives with similar educational and sociodemographic characteristics. Moreover, a significant majority have jobs in the informal sector. We attribute this pattern to the constraints they face in the formal job market: notably, skilled Venezuelan migrants lacking the required permits are excluded from the high-skilled segment of Colombia's labor

[2] By 2022, the top crises involved Syria, Ukraine, and Afghanistan, with displacements of 6.6, 5.7, and 5.7 million, respectively (UNHCR 2022).

market. The evidence that extending the regularization program to all migrants would have offset the unequalizing effect is consistent with these frictions.

Building on the framework proposed by Elias et al. (2018), we envision Colombia's labor market as segmented into two imperfectly substitutable segments: a high- and a low-skilled one. In the high-skilled segment, informal employment is either nonexistent or highly restricted, making it challenging for firms to hire informally. In our setting, despite their skills, immigrants are compelled to downgrade, resorting to the informal sectors within the low-skilled segment, where both formal and informal employment occurs. This skewed distribution of the labor supply shock due to the constrained choice set of Venezuelan workers in the Colombian labor market explains the excess pressure on the low-skilled segment of the Colombian labor income distribution and, therefore, the unequalizing effect of the Venezuelan exodus. Empirically, we find a dual phenomenon in the lower tail of the native income distribution: an over-representation of immigrant workers (disproportionate to their qualifications) and an exacerbated negative income effect due to immigration.

To provide further evidence that downgrading is a key driver behind our results, we examine its changes following the amnesty program. Specifically, we show that this program mitigated the extent of downgrading in wages and task routinization of Venezuelan immigrants. Additionally, it boosted the likelihood of immigrants securing skill-intensive jobs, indicating an improvement in skill-job matching. In essence, the amnesty expanded the employment options for refugees. Before the amnesty, many were constrained, having to downgrade and seek employment in the low-skilled informal sector. After the policy was implemented, they found themselves in a better position to find jobs in the formal labor market that aligned more closely with their skills. This positive shift helped alleviate the undue strain on lower-income groups, thereby diminishing the unequalizing impact of the exodus.

Our article makes three contributions to the existing body of literature. First, we contribute to a growing branch that examines the effects of amnesty programs for undocumented migrants on the outcomes of both natives and immigrants in the host economies (Cascio and Lewis 2019; Elias et al. 2018; Ibañez et al. 2022).[3] In a closely related paper, Bahar, Ibáñez, and Rozo (2021) explore the impact of the PEP amnesty program on labor market outcomes of Colombian and Venezuelan workers. Our article goes beyond the analysis of the average wage impact, becoming the first of its kind to assess the distributional effect of a regularization program. On top of that, we establish a link between the amnesty program and the prior migration that prompted the call for regularization. We further investigate how regularization programs can alleviate the potential negative effects of refugee waves on inequality.

Additionally, we contribute to the literature that examines the relationship between labor market frictions and migration. To the best of our knowledge, only few papers consider the impact of migration while accounting for labor market frictions (Naidu, Nyarko, and Wang 2016; Elias et al. 2018; Amior and Manning 2020). Among these, the work by Elias et al. (2018) is the only one that draws from the labor market friction literature to analyze the impacts of amnesty programs specifically. In their study, the authors analyze labor market and tax-efficiency outcomes of a Spanish amnesty program. They do this by modeling a pre-policy economy, where undocumented migrants had their set of choices limited to only supplying their labor to the informal sector. Our article stands out as the first to analyze how an amnesty program in a developing country can alleviate the impacts of labor market frictions, particularly the downgrading of migrants that inhibits their full integration into the labor market. In essence, we empirically explore how the regularization enhanced this integration in terms of wages, routinization of performed tasks, and, more generally, job opportunities.

Finally, the impact of migration and refugee waves on labor market outcomes has been extensively studied in the context of both developed and developing countries.[4] Existing evidence for developed countries suggests that the influx of refugees has notable short-term distributional effects. This can primarily be attributed to downgrading and low native-migrant elasticity of substitution in high-skill jobs (Card 2009; Dustmann, Frattini, and Preston 2013; Borjas and Monras 2017). For developing countries, however, evidence of the impact of migration on inequality is scarce. Our article contributes to

[3] Ibañez et al. (2022) focus on the PEP amnesty program's impact on Venezuelans' well-being and find an increase in consumption and income.

[4] For developed countries, some salient examples are: Card (1990), Hunt (1992), Borjas (2003), and Foged and Peri (2016). For developing-developing studies on forced migration such as (i) the case of Venezuela, see Caruso, Canon, and Mueller (2019), Morales and Pierola (2020), Olivieri et al. (2021), Lombardo and Peñaloza-Pacheco (2021), Peñaloza-Pacheco (2022), Delgado-Prieto (2024), or (ii) the case of Syria, see Tumen (2016), Malaeb et al. (2018), Altındağ, Bakış, and Rozo (2020), and Cengiz and Tekgüç (2022).

this literature by assessing the distributional impact of one of the largest forced migration episodes in the world, where migrants possess notably high levels of skill compared to natives. We employ a novel empirical framework known as RIF regressions, which enables us to analyze the effect of immigration at different points of the income distribution and on specific inequality measures. This granular analysis provides a more refined characterization of the impact of migration on income distribution compared to previous studies. Importantly, our approach allows us to engage in a crucial discussion concerning potential strategies and policy interventions for mitigating the negative impacts of migration.

The rest of the article is organized as follows. Section 2 shows information on the Venezuelan social and economic crisis and the subsequent migratory exodus and describes the PEP amnesty program. Section 3 presents the data sources used in the article and some descriptive statistics. Section 4 introduces the empirical strategy. Section 5 analyzes the effect of the Venezuelan migratory exodus and the mass amnesty program on different income distribution indicators. Section 6 discusses the mechanisms explaining the effects of the Venezuelan exodus and the mass amnesty program on inequality. Section 7 provides evidence of the impact of the amnesty program on the integration of migrants and the reduction of their downgrading in the labor market. Section 8 discusses some potential concerns about the empirical strategy as well as alternative mechanisms. Finally, Section 9 concludes.

2. Context

2.1 The Venezuelan exodus

The *Chavismo* movement, led by Hugo Chávez, began governing Venezuela in 1999. During Chávez's administration, which lasted until his death in 2013, high oil prices fueled increased public spending and domestic consumption. However, when Nicolás Maduro succeeded Chávez, oil prices dropped from nearly USD 100 per barrel in early 2012 to around USD 25 in early 2016, leading to a severe economic crisis (Rozo and Vargas 2021). Between 2013 and 2019, Venezuela's GDP shrank by 62.2 per cent, exacerbated by public debt, macroeconomic imbalances, and government mismanagement (ECLAC 2019). This crisis, marked by food shortages, insecurity, and human rights violations, triggered an exodus of 5.5 million Venezuelans, with over 2.5 million migrating to Colombia between 2017 and 2022 (Castillo Crasto and Reguant Álvarez 2017; UN 2019; UNHCR 2022).

The reopening of the borders between Colombia and Venezuela in August 2016, after nearly a year of being closed due to political tensions between the governments of the two countries, boosted the massive exodus. Panel (a) of Fig. 1 shows the monthly stock of Venezuelan immigrants living in Colombia over the 2013-2019 period. After the borders re-opened (represented by the vertical dashed line), the number of Venezuelans settled in Colombia increased significantly, reaching its maximum in 2019.

As expected, the location of the new migrants in Colombia was not random. Panel (b) of Fig. 1 shows the share of Venezuelans relative to the local population for each municipality of Colombia in 2019. This share ranges between 0 per cent in some municipalities in the south and west of the country to more than 30 per cent in municipalities located close to the border with Venezuela, such as those in the departments of La Guajira and Norte de Santander. This pattern, whereby the closer municipalities to the Colombian-Venezuelan border have higher shares of Venezuelan immigrants, is explained by the forced nature of the Venezuelan exodus and is crucial for our identification strategy.

Due to the involuntary character of this migration, Venezuelan immigrants initially faced challenges in regularizing their migration status in Colombia and formally integrating into society. Immigrants did not have access to public services such as health and education, and could not participate actively in the formal labor market nor validate the educational credentials attained in their country of origin (Bahar, Ibáñez, and Rozo 2021).

2.2 The PEP amnesty program for Venezuelan immigrants

The Colombian government undertook various initiatives aimed at both integrating Venezuelan immigrants and formalizing their migration status within the nation. While Venezuelans are allowed entry into Colombia, their stay is sanctioned solely as touristic and limited to a maximum of 180 days. Following this time window, their visa expires and their presence becomes irregular.

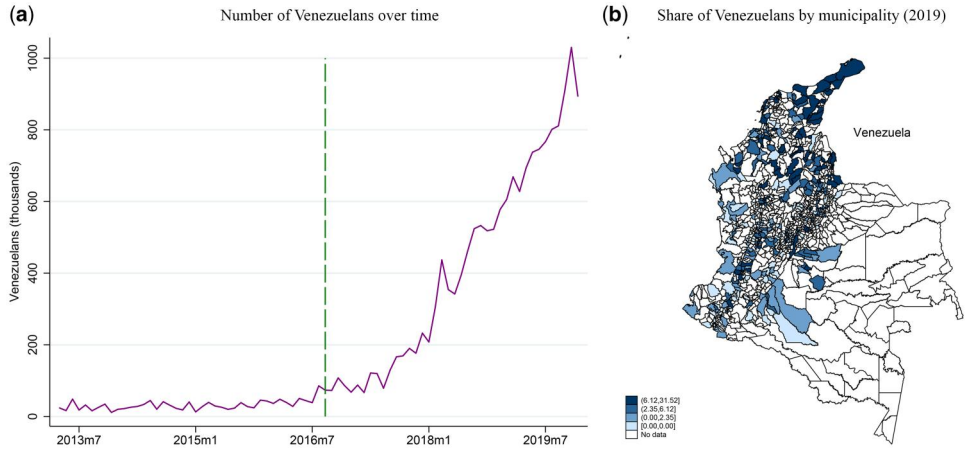

Figure 1. Venezuelan exodus in Colombia.

Notes: Panel (a) shows the stock of Venezuelan-born people in Colombia over time. The dashed vertical line indicates the moment in which the borders between Colombia and Venezuela were re-opened. Panel (b) exhibits the share of Venezuelan-born people relative to the local municipality population. Municipalities with no data are mainly part of departments in the Amazon region with a low population density and small main cities in which data is unavailable. According to the last available census in Colombia (2018), the population in the Amazon region represents less than 3 per cent of the total population in Colombia.

Source: Own elaboration based on data from DANE

To regularize the situation of those Venezuelans whose tourist visas had expired, the Colombian government implemented an amnesty program consisting of a migration status known as *Permiso Especial de Permanencia (PEP)*. This designation serves as a provisional residency authorization, allowing them to engage in the official job market. Additionally, the PEP permit provided eligibility for subsidized healthcare, public education, cash transfers, and child-oriented public programs (Ibañez et al. 2022). This permit was first implemented in January 2017 and then again in February 2018, but in these first waves the government was only able to regularize a limited number of immigrants whose tourist visas had expired.

Later on, between April and June 2018, the Colombian government conducted a large-scale and voluntary census of Venezuelan undocumented immigrants known as the *Registro Administrativo de Migrantes Venezolanos (RAMV)* to measure the size of this migrant population. The census was carried out in 441 Colombian municipalities out of 1,122, particularly in municipalities with a large presence of Venezuelan immigrants, those located close to the border with Venezuela, and those in which local governments requested the implementation of the RAMV (Bahar, Ibáñez, and Rozo 2021).

The government explicitly announced that the registration in the RAMV was not going to have any legal consequences for those Venezuelan immigrants with irregular migratory status in Colombia nor any benefit such as the issuance of a residence permit similar to the PEP. The RAMV registered 442,462 Venezuelan immigrants, around half of the total number of Venezuelans estimated to be living in Colombia at that time. According to Bahar, Ibáñez, and Rozo (2021), 49.7 per cent of the Venezuelans registered in the RAMV were women, their average age was close to 26 years, 34.7 per cent were married or cohabiting, and 52.4 per cent were heads of household. Also, on average, the registered Venezuelans had 10.5 years of education. However, the educational degree of about 89 per cent of the surveyed Venezuelans was not officially recognized by the Colombian government. 62.6 per cent participated in the labor force, 32 per cent were informal workers, 24.4 per cent were unemployed, and only 1.1 per cent had access to the health system.

Later, shortly before the end of his term (2010-2018), President Juan Manuel Santos unexpectedly decided to grant amnesty to those Venezuelan immigrants who registered in the RAMV through the issuance of PEPs. To receive the PEP, Venezuelans had to apply for amnesty. The requirements were simple: they had to be registered in the RAMV, they had to be in Colombia when the announcement was made, and they could not have any criminal record or deportation order. The process was

voluntary and 63.8 per cent of Venezuelans registered in the RAMV received a PEP (Bahar, Ibáñez, and Rozo 2021). Our article focuses on this large-scale amnesty program. We refer hereinafter to this massive integration intervention as just "PEP" for simplicity.

3. Data and descriptive statistics

3.1 Data

To conduct our analysis, we use the national household survey of Colombia, the Gran Encuesta Integrada de Hogares (GEIH, by its acronym in Spanish). This survey is conducted by Colombia's national Statistical Office (DANE, by its acronym in Spanish) every year in urban and rural areas. The GEIH is a repeated cross-sectional survey that includes socio-demographic and economic information on employed, unemployed, and inactive individuals. Since April 2013, the GEIH also includes detailed information on respondents' place of birth and area of residence 1 and 5 years ago. We consider the period 2013–9 and restrict the sample to native individuals (i.e., we exclude from our sample individuals who report being born in a foreign country). The final sample is composed of 4,017,663 observations from 340 municipalities of 24 departments of Colombia (municipalities are similar to US counties).[5]

Data on the amnesty program come from Bahar, Ibáñez, and Rozo (2021) and the Migration Unit of the Colombian government. Since data at the individual level are confidential, we use aggregate figures of Venezuelans who were granted the PEP amnesty in each Colombian municipality throughout the whole implementation of the program. We rely on Bahar, Ibáñez, and Rozo (2021) for descriptive statistics.

To analyze the degree of the routinization of tasks in each worker's occupation, we use the Routine Task Content (RTC) indices constructed by Brambilla et al. (2023) with data from the Programme for the International Assessment of Adult Competencies surveys conducted by the OECD. (For further details, see Supplementary Appendix O.1.)

3.2 Socio-demographic characteristics of Venezuelan immigrants

We begin by exploring socio-demographic differences between the sample of Venezuelans and native Colombians. Appendix Table A.1 exhibits sample means of different characteristics for these groups with their corresponding standard deviations and tests for differences. We group descriptive statistics into two categories: Panel A shows socio-economic characteristics (age, sex, living conditions, among others) for all individuals, while Panel B presents labor characteristics for those individuals who were working when surveyed.

We find that Venezuelan immigrants are, on average, younger and possess a comparatively lower socio-economic status, while predominantly residing in urban settings. Additionally, Venezuelans exhibit a greater likelihood of participating in the labor force compared to natives, albeit facing higher probability of unemployment. These features correspond to the anticipated self-selection tendencies of forced migrants venturing from Venezuela in search of new opportunities abroad. They also correlate with the challenging labor market conditions that migrants face upon arriving in a foreign country. They contribute to elevated rates of both poverty and extreme poverty among Venezuelan immigrants—56.3 per cent and 15.5 per cent, respectively—surpassing the corresponding figures for Colombians—35.7 per cent and 9.8 per cent, respectively.

A particularly noteworthy aspect of this episode of forced migration compared to those usually studied in the economic literature refers to the educational composition of immigrants relative to that of natives. Panel A of Table A.1 shows that Venezuelan immigrants have, on average, at least the same years of education as Colombians. When classifying individuals by educational level, we find that the main difference arises in completed high school: there is a significantly higher proportion of Venezuelan immigrants with completed secondary school (25.5 per cent) compared to Colombians (20.5 per cent).

Despite the similar educational composition of Venezuelan immigrants and Colombians, one might argue that the quality of education between the two countries might be significantly different, a gap

[5] We exclude from our analysis eight departments (Amazonas, Vaupés, Guainía, Guaviare, Vichada, Arauca, Casanare, and San Andrés), in which the GEIH is not carried out with the same periodicity as in the rest of the country. According to the latest Census in Colombia (2018), the population of these eight departments represents about 3 per cent of the population in Colombia because they are mainly rural regions.

that could affect the performance of Venezuelan workers in the Colombian labor market.[6] Unfortunately, there are not many reliable measures that allow us to compare the quality of education between these two neighboring countries. Lebow (2023) relies on the last result of the 2009 Programme for International Student Assessment (PISA), a worldwide standardized system of evaluation for 15 year-old students evaluating knowledge on reading, math, and science, to approximate quality of education. When comparing Colombia and Miranda State in Venezuela (the only state in Venezuela for which there is data on PISA), the average scores in the three fields of evaluation are very similar.[7] Furthermore, the comparability of Colombian and Venezuelan education systems is also reinforced by the fact that degrees earned by Venezuelan immigrants in their home country are typically validated by the highest authority in Education of the Colombian government, the Ministry of Education (MEN). According to MEN, in the 2015–9 period, out of 12,800 validation requests for post-secondary degrees made by Venezuelan immigrants, 88 per cent were granted. (For a further discussion on the comparability of the Colombian and Venezuelan education system, see, for instance, Lebow 2023.)

In Panel B of Table A.1, we compare labor market variables of the native and migrant working population. Venezuelans earn 28 per cent lower hourly wages than their Colombian counterparts. Venezuelans in the labor market work, on average, 5.6 hours per week more than Colombian workers, and they have jobs with a higher level of RTC compared to native workers. All in all, despite having a similar (or even higher) level of education compared to Colombians, Venezuelan immigrants experience significantly higher unemployment rates and lower income levels and, consequently, live in much tougher conditions in terms of poverty.

Finally, the distribution of Colombian and Venezuelan workers by economic sector shows that Venezuelan immigrants are significantly more concentrated in commercial activities and construction than Colombian workers. Moreover, although the education levels of Venezuelans are similar to those of Colombians, they are less represented in high-skilled economic sectors, such as skilled services. In turn, the participation of Venezuelan workers in public administration is nearly zero. This evidence is consistent with the fact that immigrants are less likely to participate in economic sectors characterized by higher levels of formality due to the barriers they face in terms of regularization. These legal constraints might be pushing them to economic sectors with more flexible admission and participation processes, such as commerce and construction, where higher rates of informality prevail.

In Appendix B, we provide a brief description of the income distribution in Colombia, its evolution over the last decade and analyze the heterogeneity of income inequality across departments.

4. Empirical strategy

4.1 Our model

To explore the effect of the Venezuelan immigration and the amnesty program on the income distribution of Colombia, we implement a novel combination of RIF regressions, differences-in-differences estimates, and Bartik-type instrumental variables (Firpo, Fortin, and Lemieux 2009; Rios-Avila 2020). Intuitively, RIF regressions allow us to estimate the effect of changes in our explanatory variables of interest on the unconditional distribution of the dependent variables under analysis, such as, for example, income (In Supplementary Appendix O.1, we provide a brief explanation of RIF regressions). We use the RIFs of different distributional statistics of natives' income such as the Unconditional Quantiles or the Gini coefficient as dependent variables and estimate the following model:

$$\text{RIF}(y_{imt}, \nu_Y) = \beta M_{mt} + \lambda PEP_{mt} + X'_{imt}\delta + \Gamma[Z_m \times \pi_t] + \omega_m + \pi_t + \mu_{imt} \quad (1)$$

where ν_Y : {Unconditional quantile, Gini coefficient, Atkinson index, Entropy index} and y_{imt} is the per capita household income (PCHI) of individual i living in Colombian municipality m and year t.

[6] The structures of the educative systems in Venezuela and Colombia are very similar. In the former, the education comprises five levels: initial education (4 years), primary education (6 years), secondary education (5–6 years), and post-secondary education, which includes technician programs (3 years), university programs (4-6 years), and post-graduate programs such as masters and doctorates (1–5 years). In the case of Colombia, it comprises initial education (3 years), primary education (5 years), secondary education (6 years), and post-secondary education, which can be either technician or technologist (1–3 years), university programs (4–5 years), and postgraduate programs (1–5 years).

[7] For the case of reading, the average score (standard deviation) for Colombia is 413 (3.7) and for Venezuela is 422 (5.3); in Math, the scores are 381 (3.2) and 397 (4.3), respectively, and for Science 402 (3.6) and 422 (4.9), respectively. Miranda comprises approximately 10 per cent of the Venezuelan population.

Our first variable of interest is M_{mt}, the share of Venezuelan immigrants in each municipality-year relative to the local labor force in 2013. β then captures the marginal average effect of an increase in the share of immigrants of 1 p.p., on the distributional statistic ν. The interpretation for the Gini Coefficient, the Atkinson, and the Entropy Index is straightforward: our estimates show how an increase in the share of immigrants affects each inequality indicator. For the case of the Unconditional Quantiles, we estimate the Unconditional Quantile Partial Effect (UQPE) for each ventile of the PCHI distribution.

We implement a difference-in-difference strategy to estimate the effect of the PEP amnesty program. We closely follow Bahar, Ibáñez, and Rozo (2021) and exploit the exogeneity of the timing according to which the amnesty program was announced and the number of Venezuelans granted amnesty under the PEP initiative. To do so, we include the PEP_{mt} variable, which is equal to the interaction between an indicator variable of the program's implementation period (a dummy that takes a value equal to 1 for each observation from 2018 onward and 0 otherwise) and the share of PEP holders relative to the local labor force in each municipality in 2013 (before the Venezuelan exodus).[8] Our second parameter of interest in Equation (1), λ, estimates the effect of the PEP amnesty program on the distributional statistic ν. It should be interpreted as the average effect on our dependent variable of an increase of 1 p.p. in the share of Venezuelan immigrants who were granted the PEP amnesty relative to the local labor force. The main identifying assumption of our PEP_{mt} independent variable is that, in the absence of the PEP amnesty program, there would have been no differential trends in our outcome variables after the program's implementation attributable to the intensity of the amnesty program in each municipality. We provide evidence that supports this assumption by showing that there are no differential trends in our main outcome variables before the announcement of the amnesty program in 2018, which are explained by the share of Venezuelans who were granted amnesty relative to the labor force in 2013. We present these estimates in Appendix Figures A.1 and A.2.

Finally, in Equation (1), X_{imt} is a vector of individual variables including age, sex, marital status, and years of education of individual i ; ω_m and π_t are municipality and year fixed effects, respectively. The term $[Z_m \times \pi_t]$ are pre-shock municipality characteristics (in the 2000s) interacted with year dummies, which allow us to control for different trends in our outcome variables that are explained by these pre-shock municipality variables. The variables included are the log of the total hectares cultivated with coca, the number of terrorist attacks, municipal tax income, municipal government expenditure, homicide rate, total population, per capita GDP, and the Gini coefficient. Finally, μ_{imt} is the error term. We cluster standard errors at the municipality level to account for potential serial correlation between individuals in the same municipality over time.

4.2 IV identification strategy

Given that the location of Venezuelan immigrants in each Colombian municipality is not random, we address this endogeneity concern by implementing an instrumental variable approach. The instrument for M_{mt} is a well-known shift-share instrument that has been used in several papers analyzing episodes of forced migration (see, for instance, Del Carpio and Wagner 2015; Morales 2018; Caruso, Canon, and Mueller 2019; Pedrazzi and Peñaloza-Pacheco 2022). This instrument exploits the fact that given the forced nature of the migration, the location of Venezuelan migrants was especially concentrated in Colombian municipalities close to the Venezuelan state from which the displaced people fled. Formally:

$$IV_{mt} = V_t \sum_s \frac{\alpha_s^{2011}}{K_{ms}} \tag{2}$$

where V_t is the stock of Venezuelan immigrants living in Colombia in year t and provides time variation to our IV; α_s^{2011} is the share of Venezuelans living in the Venezuelan state s according to the 2011

[8] Given that the PEP program was implemented in August 2018 and we consider yearly data, our estimates of λ represent a lower-bound of the actual effect of the amnesty program because we are considering as treated periods the months in the January–July of 2018 period. However, we also estimated the same model using monthly data, and the estimates remain unchanged (results available upon request). The main reason for using yearly data instead of monthly data is that, given the way in which the GEIH is carried out, not all municipalities are surveyed every month in a year (although all of them are surveyed every year). Therefore, by using yearly data, we work with a balanced panel of municipalities. Given that we include year fixed effects in our specification, we omit the $Post_t$ variable of the interaction because they are perfectly collinear.

Venezuelan census (pre-crisis); and K_{ms} is the driving distance in kilometers between Colombian municipality m and Venezuelan state s.

The intuition behind the instrument is that those Colombian municipalities located near the border with Venezuela and, specifically, near Venezuelan states with historically high population density are expected to face higher immigration than those far from the borders. Appendix Table A.2 shows the first-stage correlation between the instrument and the share of Venezuelan immigrants, which appears to be strong, supporting the relevance condition of the instrumental variable approach proposed in this article. The instrument is significant at the one percent level in every specification we estimate, and the F-statistic is well above the standard levels.

In Supplementary Appendix O.2, we discuss the internal validity of our IV identification strategy. First, we follow Goldsmith-Pinkham, Sorkin, and Swift (2020) and we test whether the share component of our IV, namely the distance-density shares $\left(\sum_s \frac{a_s^{2011}}{K_{ms}}\right)$ which represent the differential exposure of each municipality to the common shock of the Venezuelan exodus, explain a differential trend in our outcomes before the beginning of the Venezuelan refugee crisis in 2015. Our analysis provides evidence supporting the validity of our IV, as it does not explain any pre-shock trend in the outcome variables.

Secondly, in that same appendix, we discuss how our municipality fixed effects and the full set of predetermined socioeconomic control variables prior to the Venezuelan exodus, interacted with year fixed effects, help to ensure the validity of the IV. Finally, we discuss the exogeneity of the shock driving the Venezuelan exodus. In Section 8, we perform additional checks to address some potential concerns of our empirical strategy.

5. The results

In this section, we present and discuss our findings regarding the impact of the Venezuelan exodus and the amnesty program on the Colombian income distribution. We begin by presenting the results on the income distribution and then proceed to examine a set of inequality indicators.

Table 1 exhibits the effect of Venezuelan forced migration on the (log) PCHI and (log) hourly wages. The effect of immigration on both outcomes is negative and statistically significant in our different specifications. Our estimates with the full set of controls suggest that an increase in the share of immigrants relative to the local labor force of 1 p.p. reduced PCHI by 2.2 per cent. The effect on hourly wages for working native individuals is also negative and somewhat larger (2.8 per cent).[9]

The table also shows that the effect of the amnesty is positive and statistically significant for both outcomes. The PEP amnesty was successful in alleviating the negative consequences of the massive migration on household incomes and wages. Interestingly, an increase of 1 p.p. in the share of undocumented immigrants who were granted amnesty in Colombia relative to local population increases the average PCHI by a similar magnitude as the negative effect of the exodus. Intuitively, this implies that if a municipality had granted amnesty to all migrants (a scenario that did not materialize), the negative effect of the exodus on income would have been completely offset by the PEP program.

To analyze these effects along the income distribution of native Colombians, we estimate the UQPE of the Venezuelan exodus and the amnesty program for each ventile of the native PCHI distribution. Our results are shown in panel (a) of Fig. 2. The effect of immigration on income is negative for all quantiles. The magnitude of the effect decreases (in absolute value) as we move toward higher income quantiles. Our estimates indicate that, once we control for individual characteristics and the nonrandom location pattern of Venezuelan immigrants through our IV strategy, the negative effect on individuals below the 25th percentile of the income distribution almost doubles compared to those on the right tail of the distribution.

The figure also shows that the effect of the PEP amnesty is positive and decreasing in size as we consider higher income quantiles. Again, the size of the negative effect of migration seems to be very similar to the size of the positive effect of the implementation of the amnesty program. This similarity

[9] Given the size of the effect on wages and the fact that labor income represents 80 per cent of total income, it is likely that most of the negative effect of migration on household income is due to the negative impact on the labor market.

Table 1. Effect of immigration and the mass amnesty program on PCHI.

	PCHI (logs)			Hourly wage (logs)		
Share of immigrants	−0.020***	−0.019***	−0.022***	−0.032***	−0.031***	−0.028***
	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)	(0.007)
Share of immigrants with amnesty	0.020***	0.019***	0.018***	0.041***	0.038***	0.030***
	(0.007)	(0.007)	(0.006)	(0.014)	(0.014)	(0.009)
F-statistic	41.41	41.41	70.73	34.04	34.04	67.00
Observations	4,017,663	4,017,663	4,017,663	1,874,261	1,874,261	1,874,261
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	Yes	Yes	No	Yes	Yes
Past controls × Time FE	No	No	Yes	No	No	Yes

Notes. Each column represents the estimated coefficients of the share of Venezuelan immigrants relative to the labor force and the share of Venezuelans who were granted amnesty relative to the municipality labor force according to Equation (1) on each column outcome. The sample corresponds to native individuals. Clustered standard errors at the municipality level in parenthesis. The F-statistic corresponds to the Kleibergen–Paap rk Wald statistic. ***, **, * denote significance at the 1, 5, and 10 percent significance level.

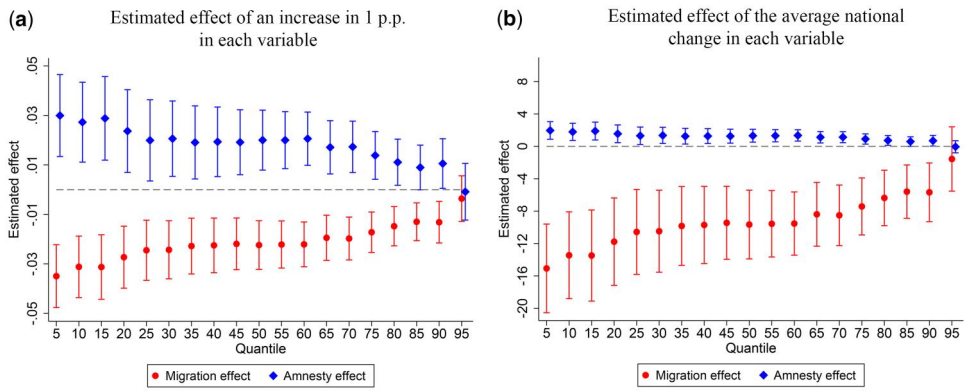

Figure 2. UQPEs of immigration on native PCHI.

Notes: Each dot represents the estimated UQPE according to the Equation (1) for each PCHI ventile. The sample corresponds to native individuals. The corresponding 95% confidence intervals are included for each point estimate. Standard errors were clustered at the municipality level.

Source: Own elaboration based on data from DANE.

applies to almost all ventiles of the income distribution, except for those at the far right, for which the effect seems to be non-statistically significant.

Note that the coefficients in panel (a) of Fig. 2 represent the average effect of an increase of 1 p.p. in both independent variables (the share of immigrants and the share of undocumented Venezuelans who were granted amnesty). The results then imply that if a municipality had granted amnesty to all migrants, the negative effect of the exodus on incomes would have been completely offset by the PEP program, along almost the entire income distribution. However, this scenario did not materialize, as the share of regularized immigrants was significantly lower than the proportion of Venezuelans who settled in each municipality. Panel (b) of Fig. 2 adjusts for this fact by plotting the estimated effect of the average national change in each variable. In that panel, we multiply the coefficients shown in Panel (a) by the average change in the share of migrants and regularized migrants at the national level (i.e., averaging the shares across municipalities) between 2016 and 2019 for the share of migrants and between 2018 and 2019 for the share of regularized migrants. The figure clearly shows that the amnesty program was successful in alleviating the adverse impact of the migration along the income distribution, but, given the incomplete take-up, it fell short of completely offsetting the negative effects of the exodus. These results also suggest that the larger the coverage of the amnesty program relative to the magnitude of the exodus in each municipality, the lower the fall in mean income and the increase in inequality.

5.1 Inequality

We have shown that Venezuelan immigration negatively affected the incomes of native Colombians, that the implementation of the PEP amnesty program mitigated this impact, and that both effects were highly asymmetric, suggesting an important effect on the income distribution. To test for these effects on inequality, Table 2 shows RIF-regression estimates of Equation (1) with inequality indicators as outcomes. (For further details on the differences between the inequality indicators used here, see Supplementary Appendix O.1.)

Our estimates indicate that the Venezuelan exodus increased income inequality in Colombia regardless of the inequality indicator. For instance, a 1 p.p. increase in the share of Venezuelan immigrants increased the Gini coefficient by 0.529 points (on a scale from 0 to 100). This effect is close to a 1 per cent increase relative to the national Gini coefficient in Colombia in 2013 (See Appendix Table B.1).

Table 2 also shows that the effect of the amnesty program on inequality is negative, statistically significant, and roughly of the same size as the effect of the exodus. Therefore, had the government granted amnesty to all migrants, we could have expected no aggregate impact on inequality. These results are robust to the use of alternative inequality indicators such as the Atkinson and Entropy indices (Table 2).

In the following section, we explain our results through a mechanism based on downgrading. Despite being at least as skilled as Colombian workers, Venezuelan immigrants had limited choices in terms of jobs upon their arrival in the country because they were undocumented and did not have access to the formal labor market. This downgrading put additional pressure on the wages of Colombian low-skilled and informal workers, thereby increasing inequality. The implementation of the PEP amnesty program granted work permits to Venezuelan workers who were now able to work in better jobs, alleviating the pressure on the left tail of the wage distribution and ameliorating the unequalizing effect of the exodus. In the following section, we show evidence supporting this mechanism.

6. Mechanisms

Downgrading of immigrants in the labor market is the situation in which immigrant workers (in our case, Venezuelan workers) are employed in worse jobs (in terms of wages, routinization, and skills) than the jobs of native individuals with equivalent observable characteristics (Dustmann, Frattini, and Preston 2013; Dustmann, Schönberg, and Stuhler 2016). This can be attributed to several factors. On the one hand, there are informal or non-legal reasons, such as a language barrier, which requires investment in learning the native language upon arrival in order to qualify for working in more skilled jobs. In this case, it is expected that, once immigrants succeed in acquiring these skills, they will be able to better integrate into the labor market and upgrade their jobs. On the other hand, there are formal or legal reasons that prevent immigrants from effectively participating under the best conditions in the labor market due to formalization barriers or restrictions that do not allow them to validate their educational credentials or to obtain legal migratory status.

Table 2. Effect of immigration and the mass amnesty program on inequality.

	Gini	Atkinson (0.5)	Atkinson (1)	Entropy (0)	Entropy (1)
Share of Immigrants	0.529***	0.004***	0.006***	0.009***	0.012***
	(0.128)	(0.001)	(0.002)	(0.002)	(0.003)
Share of immigrants with amnesty	−0.572***	−0.005***	−0.007***	−0.010***	−0.013***
	(0.142)	(0.001)	(0.002)	(0.003)	(0.004)
F-statistic	70.73	70.73	70.73	70.73	70.73
Observations	4,017,663	4,017,663	4,017,663	4,017,663	4,017,663
Municipality FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes
Past controls × Time FE	Yes	Yes	Yes	Yes	Yes

Notes. Each column represents the estimated coefficients of the share of Venezuelan immigrants relative to the native labor force and the share of Venezuelans who were granted amnesty relative to the municipality labor force according to Equation (1) on our inequality outcomes. The Gini coefficient is rescaled to a scale of 1 to 100. The sample corresponds to native individuals. Clustered standard errors at the municipality level in parenthesis. The F-statistic corresponds to the Kleibergen–Paap rk Wald statistic. ***, **, * denote significance at the 1, 5, and 10 percent significance level.
Source: Own elaboration based on data from DANE.

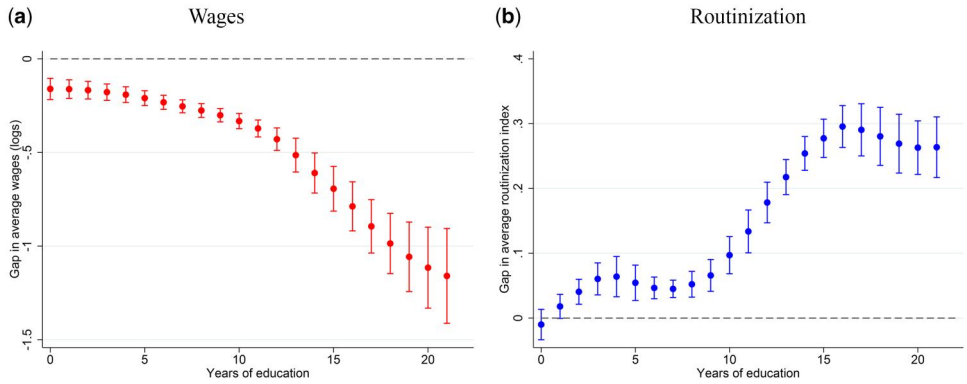

Figure 3. Gap in wages and routinization between Venezuelan immigrants and natives in Colombia by years of education, 2019.

Notes: Each point on the graph represents the difference in the average wage (in logs) and routinization index (in logs) of immigrants and natives for each year of education. In the case of wages, a negative value means that the average wage (in logs) of immigrants is lower than that for natives for a given year of education. In the case of routinization, a positive value means that the average routinization index (in logs) of immigrants is higher than that for natives for a given year of education. 95% confidence intervals were included for each point estimate.

Source: Own elaboration based on data from DANE.

In our setting, Venezuelan immigrants are very similar to native Colombian workers (they speak the same language and have quite similar cultural backgrounds compared to Colombians). However, due to the lack of legal mechanisms for their regularization upon arrival, they could not legally integrate into the Colombian economy and had to participate mainly in informal, low-skilled, and routine jobs.

We propose that downgrading is the main driver of the inequality effect of the Venezuelan exodus in Colombia. Figure 3 shows the unconditional gap in terms of wages and routinization between immigrants and Colombian workers for each year of education in 2019. Both figures mirror each other. Panel (a) shows that immigrant workers earn hourly wages that are consistently lower compared to those of native with equivalent years of education. Moreover, the higher the number of years of education of immigrants and natives, the larger the wage gap between the two groups. We find a similar pattern in panel (b) for the routinization index: Venezuelan workers are, on average, in more routine jobs compared to native workers with the same years of education.[10] Consistent with panel (a), the higher the years of education of Venezuelan and Colombian workers, the greater the gap in the routinization index.

The calculations in Fig. 3 suggest the presence of downgrading of Venezuelan immigrants vis-à-vis Colombian workers with the same skill level. Given their years of education, Venezuelan immigrants have jobs with significantly lower wages and more routine tasks. Moreover, this gap intensifies for higher years of education, indicating that they are downgrading in the labor market due to potential restrictions that make them work in the informal sector and, therefore, in less complex and worse-paying jobs. However, one might argue that these differences are explained by differences in the labor market experience between Colombian and Venezuelan workers. As was shown in the descriptive statistics section, Venezuelans are significantly younger than Colombians, which means that, on average, they have less experience, and therefore, their wages should be lower. In the following subsection, we analyze this issue in greater depth by controlling for different observable characteristics.

6.1 Downgrading of Venezuelan immigrants

We estimate the downgrading in wages and routinization of Venezuelan immigrants by implementing a methodology similar to the one used by Dustmann, Frattini, and Preston (2013) and Dustmann, Schönberg, and Stuhler (2016). Intuitively, we construct a predicted value for the wages and routinization levels of Venezuelan workers in Colombia, assuming they were employed in similar jobs as Colombians with comparable observable characteristics such as gender, age, education, and

[10] See the Supplementary Appendix O.1 for details on the construction of the routinization index.

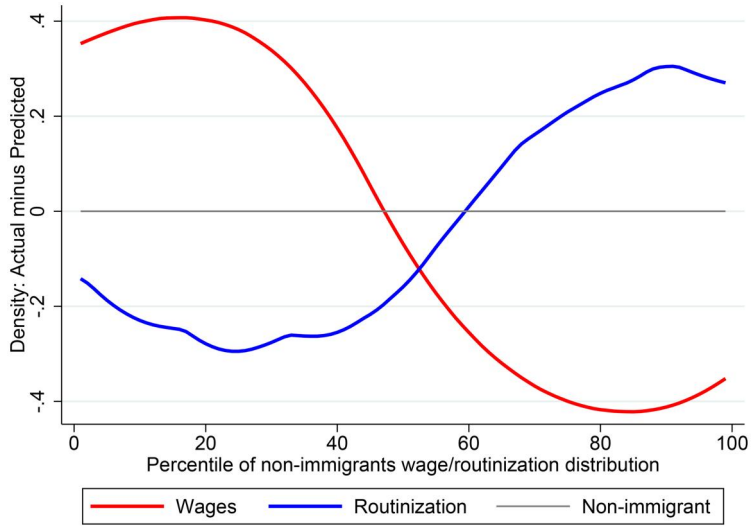

Figure 4. Downgrading of Venezuelan immigrants in Colombia.

Notes: The figure shows the difference between the actual and the predicted density of immigrants located in each of the percentiles of the native wage and routinization index distribution, respectively. By definition, the horizontal gray line represents native workers since they are equally distributed at each wage (routinization index) percentile. Therefore, the difference between the actual and predicted density equals 0.

Source: Own elaboration based on data from DANE.

municipality of residence. The measure of downgrading is then determined by the gap between the predicted outcomes (wages or routinization index) and the actual outcomes for Venezuelan workers. (For further methodological details, see the Supplementary Appendix O.1.)

Figure 4 shows the difference between the actual and the predicted density of immigrants in each of the percentiles of the native wage and routinization distributions. The horizontal line at zero corresponds, by definition, to natives. For the case of wages, the figure can be read as follows: a density value equal to 0.4 at the 10th percentile indicates that Venezuelans are 40 percent more likely to be in the 10th percentile of the native wage distribution compared to their expected position in the native wage distribution according to their age, education, and gender. Similarly, for the case of routinization, a density value close to 0.3 at the 90th percentile indicates that Venezuelan workers are 30 percent more likely to be in the 90th percentile of the native routinization distribution compared to their expected position, i.e., they are more likely to be in jobs with highly routine tasks.

Our estimates strongly suggest the presence of downgrading among Venezuelan workers in Colombia. Venezuelan workers are significantly concentrated in low-wage jobs, particularly below the 50th percentile, compared to their predicted values given their observable characteristics. They are also heavily concentrated in jobs in the right tail of the routinization index distribution (i.e., approximately above the 50th percentile), compared to the predictions based on their observable characteristics.

The fact that Venezuelan workers were downgraded upon their arrival in Colombia and were placed in low-paying jobs, possibly due to formal barriers or restrictions in the labor market, may explain the stronger negative effect on the left-hand side of the labor income distribution found above (Fig. 2). In other words, Venezuelan immigrants in Colombia were limited to low-paying jobs involving routine tasks due to their irregular migration status and the resulting inability to work in the formal sector. We argue that this added further strain to the low-income segment of the labor market, lowering incomes and increasing inequality.

If downgrading was the main mechanism at play, then the PEP amnesty program should have mitigated the negative effects of the exodus. We will show that the implementation of the PEP program increased the probability of high-skilled Venezuelan workers working in high-skilled economic activities, hence reducing the scope of downgrading.

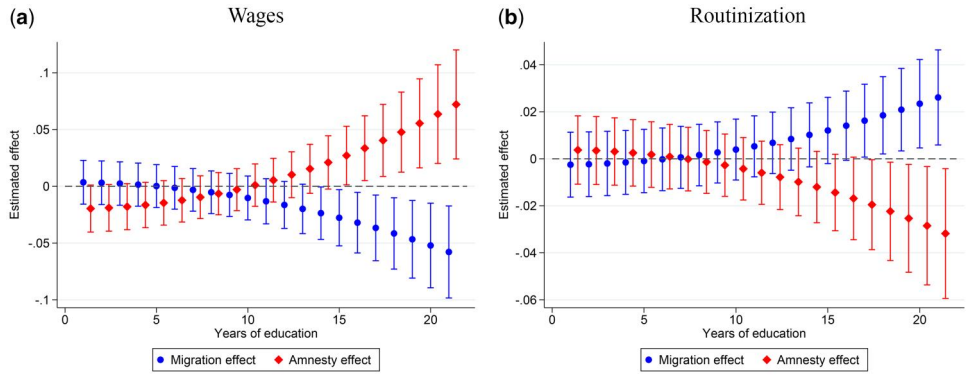

Figure 5. Effect of migration and the amnesty program on downgrading.

Notes: The dependent variable for Panel (a) is the difference between the actual wage of the individual and the predicted one, based on their characteristics, according to Equation (2) of Supplementary Appendix O.1. Similarly, for Panel (b), the dependent variable is the difference between the actual routinization index of the individual and the predicted index following Equation (2) of Supplementary Appendix O.1. Considering equation (3), the blue dots with the corresponding CIs represent the linear combination of $\beta_1 + \beta_2 Educ^2_{imt}$ for years of education ranging from 1 to 21. Similarly, the red dots with the corresponding CIs represent the linear combination of $\lambda_1 + \lambda_2 Educ^2_{imt}$ for the years of education from 1 to 21.

Source: Own elaboration based on data from DANE.

7. The integration of immigrants

To estimate the effect of the Venezuelan exodus and the PEP mass amnesty program on the integration of Venezuelan workers in Colombia, we estimate the following model[11]:

$$y^{v}_{imt} = \beta_1 M_{mt} + \beta_2 [M_{mt} \times f(Educ_{imt})] + \lambda_1 PEP_{mt} + \lambda_2 [PEP_{mt} \times f(Educ_{imt})] + \cdots \\ \cdots + X'_{imt}\delta + \Gamma[Z_m \times \pi_t] + \omega_m + \pi_t + \mu_{imt} \quad (3)$$

where y^{v}_{imt} represents a measure of downgrading or the probability of working in a high-skilled occupation. (See Supplementary Appendix O.1 for further details on the construction of these variables)

We interact our variables of interest (M_{mt} and PEP_{mt}) with a function of years of education to analyze whether or not the effect of migration and the mass amnesty program varied depending on the education level of Venezuelan individuals. Our coefficients of interest are then β_1, β_2, λ_1, and λ_2. We expect that high-skilled workers are the ones most affected by the massive exodus and the amnesty program in terms of downgrading and mismatching in the labor market. The effects might not be linear. In our specification, the interaction term for education $f(Educ_{imt})$ is a quadratic function of the number of years of education of individual i. The remaining terms in Equation (3) are similar to those in Equation (1). We estimate these results for the sample of Venezuelan immigrant workers.

7.1 Downgrading

The results of the effect of the Venezuelan exodus and the PEP amnesty program on downgrading by years of education are shown in Fig. 5. The downgrading measure is the difference between the actual wage (routinization index) and the predicted corresponding variable. Therefore, for the case of wages (Panel a), an increase in this gap is a sign of less downgrading. The same reasoning, but with opposite signs, applies to the routinization index.

Figure 5 shows that while the exodus increased the downgrading of Venezuelan immigrants, the amnesty program had a mitigating effect, especially for Venezuelan workers with higher levels of education. In other words, the PEP amnesty program seems to have offset the unequalizing effect of the

[11] Alternatively, we estimated a model that excluded the PEP variable and included an interaction term between the share of migrants and a binary variable indicating municipalities with a high predicted share of regularized migrants compared to those with low predicted amnesty coverage. This predicted variable was derived from a regression of the share of regularized Venezuelans at the end of the analysis period (2019) on the share of Venezuelans in Colombia before the amnesty program (2017), instrumented using the same instrumental variable employed in the main analysis. The results from this exercise align with those presented in this section, indicating that the PEP program mitigated downgrading (as measured by the outcome variables). These estimates are available upon request. We thank an anonymous referee for this valuable suggestion.

exodus by reducing the downgrading of Venezuelan immigrants and alleviating the pressure on the left tail of the labor income distribution.

7.2 Probability of working in a skill-intensive job

We have argued that by substantially reducing the barriers to the integration of immigrants, the PEP amnesty significantly offset the downgrading caused by the Venezuelan exodus. If this story is true, we should observe a better job matching for Venezuelan migrants; in particular, the probability for high-skilled migrants working in a skill-intensive job should have been positively affected by the amnesty program. We assess this possibility in Fig. 6, where we present the effect of the Venezuelan exodus and the PEP amnesty program on the probability of Venezuelans with different years of education working in a skill-intensive sector. Three patterns emerge that remain robust regardless of the skill-intensity measure considered. First, all the effects presented in the figure are significant for the most skilled Venezuelan workers, consistent with the fact that this group of workers downgraded the most due to the exodus. Second, in the absence of the amnesty program, the Venezuelan exodus would have had a negative effect on the probability of migrants getting a job in skill-intensive sectors, particularly for those with higher levels of education. Finally, the amnesty program had a significant positive effect on the probability of Venezuelan individuals having a skill-intensive job, which would have completely offset the negative effect of the exodus if all immigrants were granted amnesty.

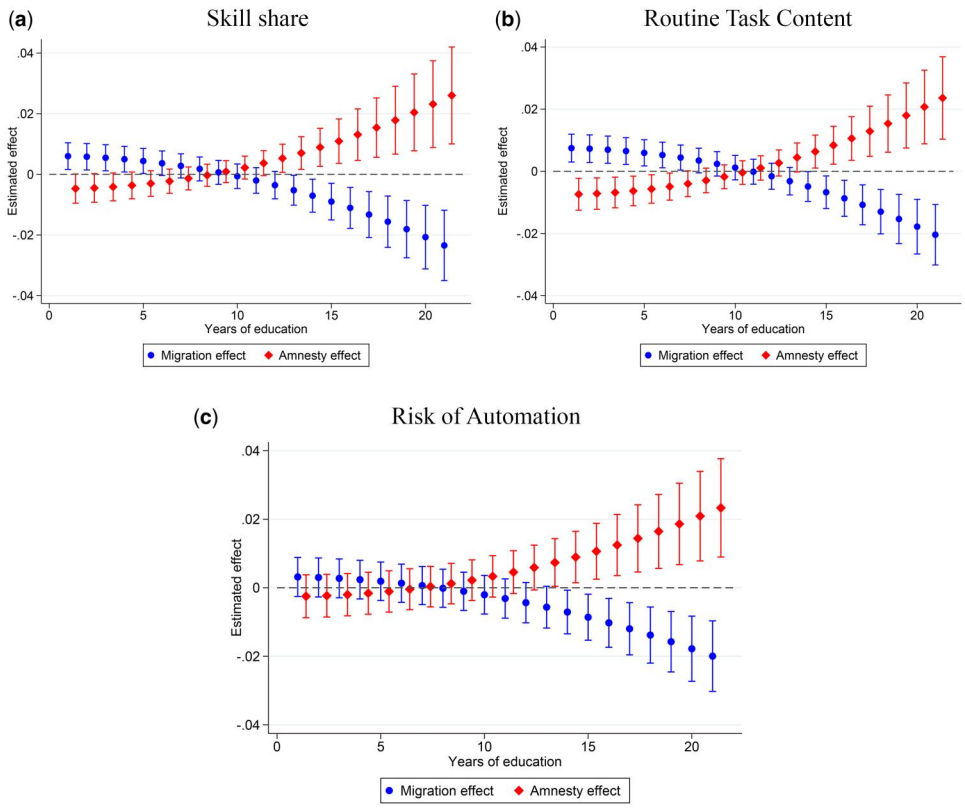

Figure 6. Effect of the mass amnesty program on the probability of working in a skill-intensive job.

Notes: In the three cases, the dependent variable is a dummy variable that takes a value equal to 1 if the individual is working in a skill-intensive economic activity and 0 otherwise. The skill intensity of the economic activity was defined based on the share of skilled individuals (panel a), the mean RTC (panel b), and the mean risk of automation (panel c). See Section 7, for further details. Following equation (3), the blue dots with the corresponding CIs represent the linear combination of $\beta_1 + \beta_2 Educ^2_{imt}$ for years of education ranging from 1 to 21. Similarly, the red dots with the corresponding CIs represent the linear combination of $\lambda_1 + \lambda_2 Educ^2_{imt}$ for the years of education from 1 to 21.

Source: Own elaboration based on data from DANE.

According to our hypothesis, the fact that there were formal frictions in the labor market that impeded Venezuelan workers from formally integrating into the Colombian labor market generated an excess of pressure on the left tail of the Colombian income distribution, causing an increase in inequality. However, once the PEP amnesty policy was implemented, it allowed skilled Venezuelan workers to validate their educational degrees and certifications and compete in the high-skilled sector of the Colombian labor market, reducing the downgrading in terms of wages and routinization according to their observable characteristics and increasing the probability of working in skill-intensive jobs. Our results are consistent with these mechanisms.

8. Alternative mechanisms, internal validity, and general equilibrium effects

This section addresses potential concerns regarding our identification strategy and the mechanisms proposed in this article to explain the distributive impacts of the Venezuelan exodus in Colombia and the regularization program.

First, the downgrading effect on inequality we identify could be driven primarily by the lower substitutability between natives and migrants in high-skilled and high-wage industries as opposed to the absence of a legal framework for migrants to work formally. We discuss this in Supplementary Appendix Section O.3.1.

Second, Colombia is the country with the highest number of internally displaced persons (IDPs) globally (UNHCR 2022). The high level of internal mobility might have been influenced by the inflow of Venezuelan refugees, affecting the distributive impact of the exodus. This concern is addressed in Supplementary Appendix Section O.3.2.

Finally, the distributive impact of migration in the host economy is also influenced by general equilibrium effects on variables beyond the labor market, such as prices, rents, and demand for goods and services. While a comprehensive analysis of these factors is beyond the scope of this article, we briefly discuss this in Supplementary Appendix Section O.3.3.

9. Concluding remarks

Over the past decade, forced migration has surged dramatically in the world, with the number of displaced individuals increasing from 51.2 million in 2013 to 108.4 million in 2022 (UNHCR 2013, 2022). This increase poses a significant challenge for governments integrating these migrants, especially unauthorized ones, into their economies. In Latin America, a region known for high inequality, the distributional impact of migration is particularly relevant (Alvaredo and Gasparini 2015). The debate centers on the effects of migration on inequality and the appropriate policy responses.

This article examines the distributional impact of the massive Venezuelan migration to Colombia, one of the world's largest forced migration events, and the effects of a mass amnesty program aimed at integrating these migrants. By analyzing geographical differences in migration intensity and the timing of the amnesty announcement, we assess the impact on the distribution of income among Colombians. Despite Venezuelan immigrants being as skilled as Colombian workers, the migration disproportionately affected the lower end of the income distribution, increasing inequality. This is largely due to legal restrictions in the labor market that prevented Venezuelan migrants from working in jobs suited to their skills and characteristics, resulting in their downgrading into lower-paying, more routinized jobs and adding pressure on the low-income labor market.

However, we show that the 2018 mass amnesty program had an important impact on reducing the extent of downgrading and increasing the likelihood of high-skilled Venezuelan workers securing appropriate jobs. This improved job matching and helped mitigate the unequalizing impact of the migration, highlighting the potential for public policies to alleviate the short-term negative effects of large migration flows on the labor markets and income distributions in host countries.

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Supplementary data

Supplementary data are available at *Journal of Economic Geography* online.

Conflict of interest statement. None declared.

Data availability

The data underlying this article were provided by Departamento Administrativo Nacional de Estadística (DANE) of Colombia by permission.

Appendix A: Tables and Figures

Table A.1. Descriptive statistics—Colombians and Venezuelans, 2019.

	Colombians		Venezuelans			
	Mean	SD	Mean	SD	Difference	P-value
Panel A: Socio-economic characteristics						
Age (in years)	34.074	20.912	23.623	14.000	−10.451	[0.000]
Sex (Man = 1)	0.492	0.500	0.499	0.500	0.007	[0.271]
Head of household	0.323	0.468	0.218	0.413	−0.106	[0.000]
Socioeconomic level	2.031	1.293	1.940	1.223	−0.090	[0.033]
In a relationship	0.414	0.493	0.434	0.496	0.020	[0.209]
Living in an urban area	0.773	0.419	0.878	0.327	0.105	[0.000]
Poverty rate	0.357	0.479	0.563	0.496	0.207	[0.000]
Extreme poverty rate	0.098	0.297	0.155	0.362	0.057	[0.005]
Working age population	0.848	0.359	0.759	0.428	−0.089	[0.000]
Employment rate	0.565	0.496	0.631	0.483	0.066	[0.000]
Inactivity rate	0.314	0.464	0.199	0.399	−0.115	[0.000]
Unemployment rate	0.102	0.303	0.145	0.352	0.043	[0.000]
Years of education	7.715	5.055	7.774	5.070	0.060	[0.757]
Incomplete secondary	0.562	0.496	0.500	0.500	−0.062	[0.005]
Complete secondary	0.205	0.404	0.255	0.436	0.050	[0.000]
Incomplete post-secondary	0.105	0.306	0.093	0.291	−0.011	[0.208]
Complete post-secondary	0.094	0.292	0.086	0.280	−0.008	[0.305]
Panel B: Characteristics for working population						
Hourly wage (in logs)	8.387	0.843	8.058	0.693	−0.329	[0.000]
Routinization index	0.492	0.177	0.543	0.156	0.051	[0.000]
Hours of work per week	44.072	16.380	49.644	17.646	5.572	[0.000]
Primary activities	0.173	0.378	0.062	0.241	−0.111	[0.000]
Industry (low tech)	0.068	0.251	0.074	0.262	0.006	[0.198]
Industry (high tech)	0.050	0.218	0.040	0.196	−0.010	[0.139]
Construction	0.066	0.249	0.117	0.321	0.051	[0.000]
Commerce	0.264	0.441	0.462	0.499	0.198	[0.000]
Utilities and transportation	0.086	0.280	0.053	0.224	−0.033	[0.000]
Skilled services	0.091	0.287	0.047	0.211	−0.044	[0.013]
Public administration	0.032	0.177	0.001	0.033	−0.031	[0.000]
Education and health	0.139	0.345	0.104	0.306	−0.034	[0.000]
Domestic servants	0.031	0.173	0.039	0.194	0.008	[0.166]

Source: Own elaboration based on data from GEIH-DANE.

Table A.2. First stage estimates.

Panel A: All sample	**(1)**	**(2)**	**(3)**
Instrument	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.000)
F-statistic	41.41	41.41	70.73
Observations	4,017,663	4,017,663	4,017,663
Panel B: Employed individuals	(1)	(2)	(3)
Instrument	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.000)
F-statistic	34.04	34.04	67.00
Observations	1,874,261	1,874,261	1,874,261
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Individual controls	No	Yes	Yes
Past controls × Time FE	No	No	Yes

Notes. The coefficients correspond to estimates of a regression of the share of Venezuelan migrants in each Colombian municipality with respect to the local labor force on the instrumental variable defined in Equation 2. The rest of the estimated specification is defined in Equation (1). The sample in panel A includes all Colombian individuals; the sample in panel B is restricted to Colombian workers only. ***, **, * denote significance at the 1, 5, and 10 percent significance level. Source: Own elaboration based on data from DANE.

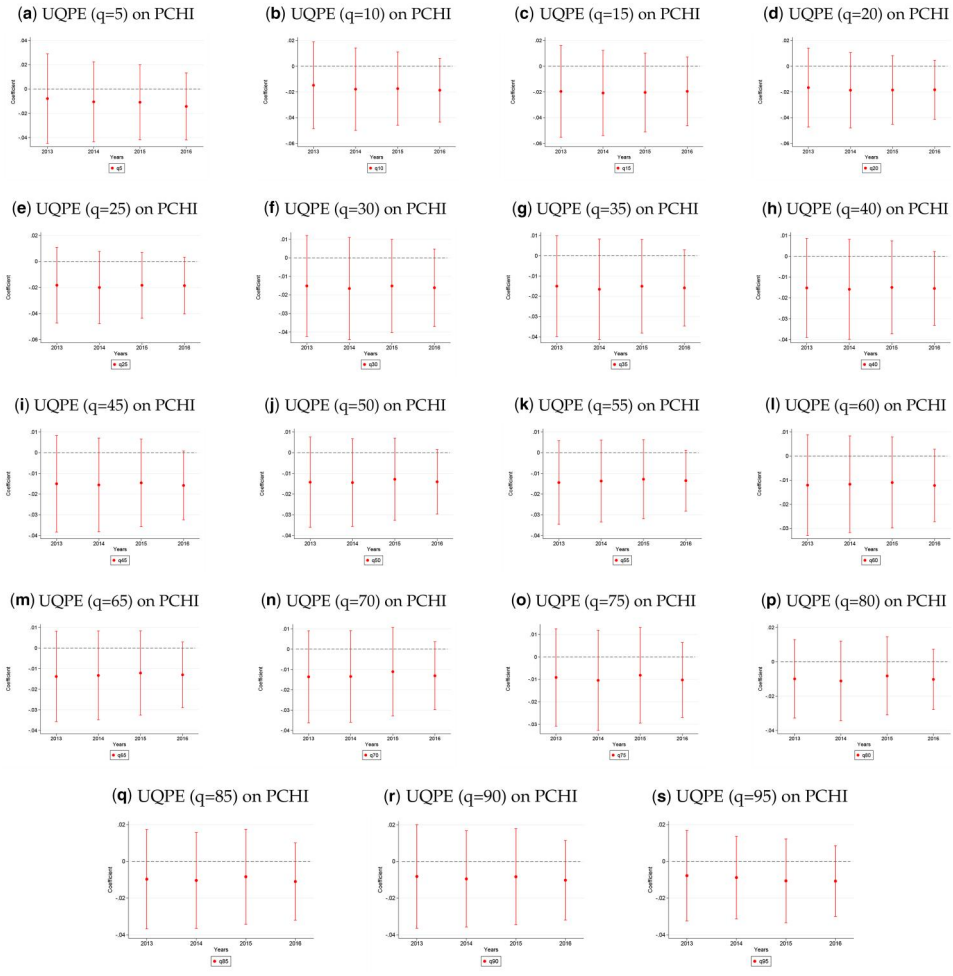

Figure A.1. PEP internal validity test (pre-trends): UQPEs.

Notes: The titles above each graph show the outcome of each regression. PCHI stands for PCHI. Each dot represents the coefficient of the interaction between the share of PEP holders relative to the local labor force for each municipality at the end of the program implementation and year dummy variables. Regressions control for municipality and year fixed effects. Confidence intervals at 95% are included. Standard errors were clustered at the municipality level.

Source: Own elaboration based on data from DANE.

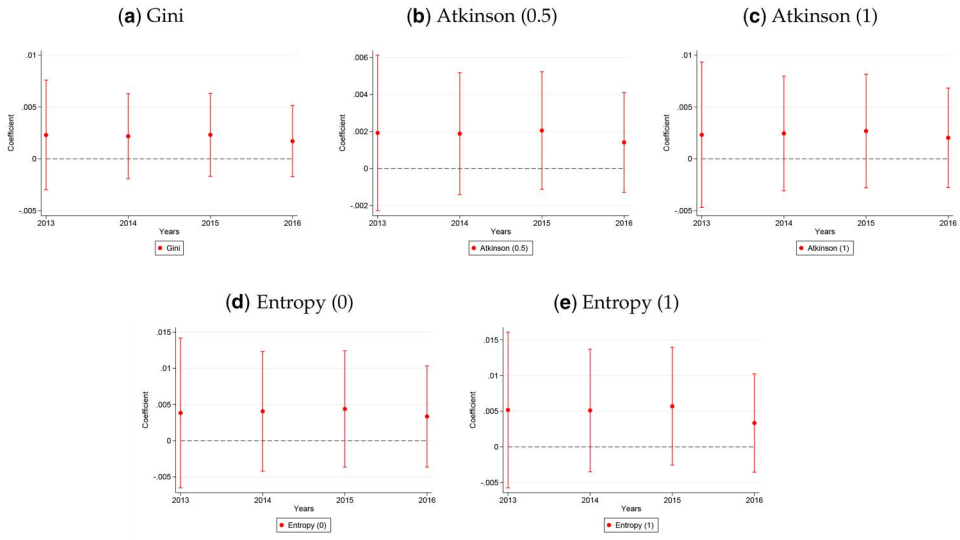

Figure A.2. PEP internal validity test (pre-trends): Inequality indicators.

Notes: The titles above each graph show the outcome of each regression. PCHI stands for PCHI. Each dot represents the coefficient of the interaction between the share of PEP holders relative to the local labor force for each municipality at the end of the program implementation and year dummy variables. Regressions control for municipality and year fixed effects. Confidence intervals at 95% are included. Standard errors were clustered at the municipality level.

Source: Own elaboration based on data from DANE.

Appendix B: Income distribution in Colombia

Colombia is one of the most unequal countries in Latin America (Tornarolli, Ciaschi, and Galeano 2018). According to data from SEDLAC (CEDLAS and World Bank), although the Gini coefficient in Colombia has been reduced in the last decade, it is still above the average value for the region.

In Table B.1, we show several inequality indicators for Colombia calculated with microdata drawn from GEIH. Regardless of the indicator considered, income inequality exhibited a decreasing pattern from 2013 to 2017. This reduction came to a halt in 2018 when inequality started to increase. This significant change in the trend occurred right after the Venezuelan exodus started and intensified (2016–2017). Of course, this piece of evidence is insufficient to argue that the increase in inequality is explained by Venezuelan immigration, but it points in the direction that is studied in the rest of the paper.

Figure B.1 shows the heterogeneity of income inequality and income level across departments in Colombia before the beginning of the Venezuelan migratory exodus (2013). There is significant variability in both variables across departments. There are departments where inequality is significantly below the national average, such as Sucre, Caquetá, and Atlántico; on the other hand, departments such as Chocó, La Guajira, and Cauca have the highest income inequality.

Table B.1. Income inequality indicators—Nationwide by year.

	Gini	A(0.5)	A(1)	GE(0)
2013	53.446	0.2377	0.4090	0.5259
2014	52.672	0.2307	0.3981	0.5076
2015	51.164	0.2181	0.3793	0.4768
2016	50.548	0.2132	0.3707	0.4631
2017	49.825	0.2064	0.3605	0.4471
2018	50.658	0.2138	0.3717	0.4648
2019	51.503	0.2207	0.3845	0.4853
	GE(1)	p90p10	p90p50	p50p10
2013	0.5689	11.991	3.4699	3.4557
2014	0.5494	11.316	3.3822	3.3457
2015	0.5167	10.446	3.2220	3.2420
2016	0.5057	9.9357	3.1573	3.1469
2017	0.4854	9.5556	3.1159	3.0667
2018	0.5069	9.9031	3.1538	3.1401
2019	0.5207	10.733	3.2225	3.3308

Notes. Each indicator was constructed using PCHI for each year. Sampling weights were used to calculate the indicators.
Source: Own elaboration based on data from DANE.

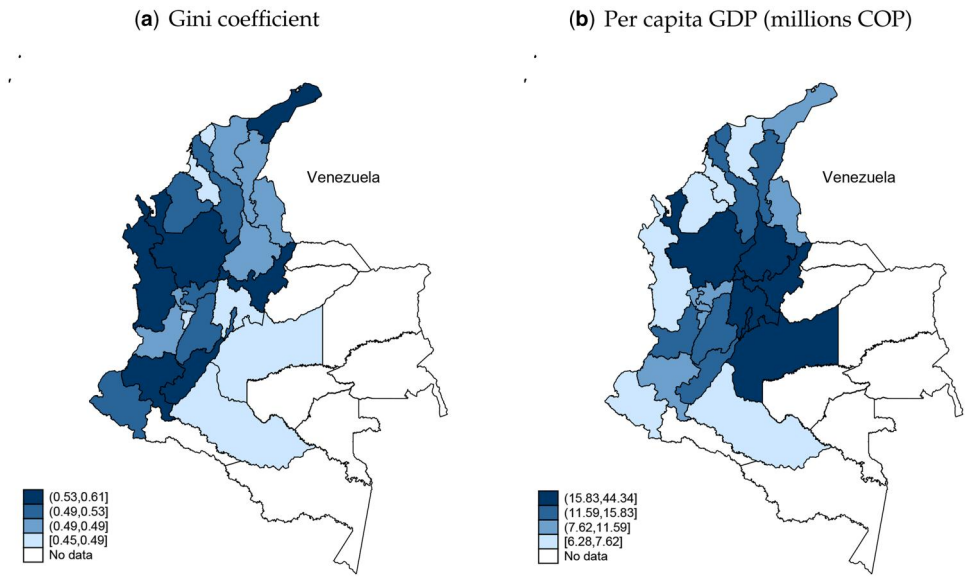

Figure B.1. Inequality and GDP, 2013.

Notes: Departments with no data in the figure are mainly departments in the Amazon region with a low population density and small main cities where data is unavailable. According to the last available census in Colombia (2018), the population in these departments represents less than 3 per cent of the total population in Colombia. We use survey weights to calculate the Gini coefficient.

Source: Own elaboration based on data from DANE.

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