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Immigration, labor markets and discrimination: Evidence from the Venezuelan Exodus in Perú

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ABSTRACT

Venezuela is currently experiencing the biggest crisis in its recent history. This has led more than 7.3 million Venezuelans to emigrate, at least 1.5 million of those to Peru, which amounted to an increase of over 4 percent in the Peruvian population. Venezuelan immigrants in Peru are relatively similar in cultural terms, but, on average, more skilled than Peruvians. In this paper, we first examine Venezuelans' perceptions of being discriminated against in Peru. Using an instrumental variable strategy, we document a causal relationship between the level of employment in the informal sector – where most immigrants are employed – and reports of discrimination. We then study the impact of Venezuelan migration on local's labor market outcomes, reported crime rates, and attitudes using a variety of data sources. We find that inflows of Venezuelans to particular locations led to increased employment and income among locals, decreased reported crime, and improved reported community quality. We conduct a heterogeneity analysis to identify the mechanisms behind these labor market effects and discuss the implications for Peruvian immigration policy.

1. Introduction

Crisis-driven migration flows have significantly increased in the past two decades (Bhabha, 2018). The arrival of a large number of migrants and refugees has triggered fierce political disputes over its impact on local labor markets and has been at the center of much discussion in the academic literature and in the media. While locals' perceptions about the effects of immigration on the labor market determine their behavior and attitudes towards immigrants, the way in which these perceptions are formed is less well understood.

In this paper, we study the economic underpinnings of hostility and discrimination against Venezuelan immigrants in Peru prior to the Covid-19 pandemic.[1] The current crisis in Venezuela has led about 7.3 million people to emigrate (R4V, 2023). This migration wave intensified in 2017, when political instability added to the worsening economic situation in the country. While many Venezuelans chose neighboring Colombia, Brazil, and Ecuador as their destinations, at the time, the Peruvian economy was experiencing sustained economic growth, thus about one million Venezuelans were attracted to the country. The pull factors were strengthened by the fact that the Peruvian government facilitated the legal immigration of Venezuelans. This large inflow of immigrants potentially put pressure on local labor markets, especially in urban areas, and increased the negative public discourse against immigrants in the media (Freier et al., 2021; Winter, 2020). Some of these sources not only claimed that the large wave of newcomers had led to an increase in unemployment, but also that it had contributed to an upsurge in urban violence.

Studying the economic underpinnings of discrimination against migrants is typically hard since large migration waves affect the dynamics of the labor market, and the latter, in turn, affects discrimination. This implies that researchers need separate sources of exogenous variation to

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[1] The pandemic had enormous impacts on the Peruvian labor market, on the inflows and outflows of Venezuelans from Peru, and the general functioning of the country. We believe including the post-pandemic period in our analysis would decrease the generalizability of our findings, since it is not possible to abstract from this enormous shock and still be able to shed light on our main questions of interest.

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identify the causal effect of labor market outcomes on discrimination, as well as the effects of migration on the labor market. In this paper, we use a specialized survey of Venezuelan immigrants in Peru to identify the causal effect of the quality of local labor markets on discrimination against immigrants. Then, we turn to the economic determinants of attitudes towards immigrants and study the flip side of the first analysis, namely, how the presence of immigrants affects Peruvians' labor market outcomes, overall criminal activity, and their perceptions of crime and their local community. In both analyses, the main identification issue is that Venezuelans are not randomly allocated to specific locations in Peru and hence unobserved characteristics of both the location and the Venezuelans there might be correlated with local economic conditions and individual outcomes for both Venezuelans and Peruvians in the same location. We account for this using different instrumental variables strategies combined with detailed controls on the local economic environment.

In the first part of the analysis, we examine whether Venezuelans who live in local areas with a stronger informal labor market experience different levels of discrimination. A large majority of Venezuelans arriving in Peru have taken up jobs in the informal sector, directly competing with relatively low-skilled native workers. To causally identify the relationship, we use a shift-share instrumental variable strategy that exploits local exposure to exogenous national-level export shocks (Jaeger et al., 2018). As informal employment and discrimination could both be related to other local characteristics, we also control for the local industrial structure, household expenditure, population size, distance from the capital and center of economic activity (Lima), and, importantly, the number of Venezuelans based in each location prior to the current immigration wave, which we show to be a significant pull factor for where Venezuelans choose to settle.

Our results show that weaker informal labor markets lead to a significant increase in the discrimination reported by Venezuelans in Peru. A 10% increase in the informal employment rate decreases discrimination by 6.6%, on aggregate. This effect is larger for men than for women, with 7% and 5.8%, respectively. To put these numbers into perspective, a 10% increase in the informal employment rate is equivalent to moving from the first to the third quartile of the distribution of informal employment rates across districts. The data we use also collects information on where discrimination occurs. We find that weaker informal labor markets lead to more discrimination against men in public places and on public transit. Instead, we do not find evidence of an impact on workplace discrimination for either gender. This suggests that weaker informal labor markets generate generalized discrimination, rather than one that is workplace-based. One interesting pattern is that more educated Venezuelans are more likely to report being discriminated against when informal employment decreases. A potential explanation for this, which is consistent with the previous results, is that higher-skilled Venezuelans are disappointed with their situation in Peru, especially when they settle in areas with weak informal labor markets, and the lack of opportunity is either caused by or perceived as discrimination (Guerrero-Ble et al., 2020).

We then turn to examine the impact of immigration (as measured by changes in the number of Venezuelans as a share of the local population) on labor market outcomes and locals' perceptions on the current situation. We rely on administrative data to measure the number of Venezuelans newly registered in each district in Peru on a monthly basis between January 2015 and December 2020. We aggregate this information at the labor market level and rely on a time-varying measure of the presence of Venezuelans in each labor market, which allows us to use repeated cross-sectional data on outcomes for Peruvians and control for location and time fixed effects, as well as, location-specific time trends. Hence, we identify the impact of the presence of Venezuelans by examining how outcomes for Peruvians change when more Venezuelans arrive in a labor market, conditional on the trend in the outcome.

It is possible that local shocks impact both the destination choice of Venezuelans and outcomes for Peruvians, we thus use an instrumental variable strategy where we instrument the number of Venezuelans in a location with the presence of Venezuelans in that location in the past, interacted with the year of observation. This is a semi-parametric version of the traditional migrant network instrument, as recommended by Goldsmith-Pinkham et al. (2020), and allows the strength of the network effect to potentially vary by year. An overidentification test can be used to examine whether the instrument has a consistent relationship over time.

We find robust evidence that increased immigration from Venezuela has a *positive* impact on labor market outcomes for Peruvians, with increased employment rates, incomes, and expenditures. Additionally, locations that receive more immigrants have *lower* levels of reported non-violent crime, improved reported quality of local services, greater reported trust in neighbors, and higher reported community quality. On the other hand, we find evidence that in locations with more Venezuelans, Peruvians report that their community likes diversity less.

Taken together, our results imply that local labor markets in Peru that are more informal are better able to adapt to large migration inflows both in terms of migrant assimilation and the impacts on locals. While the migration of Venezuelans to Peru is quite specific, this evidence suggests that there are perhaps unexpected downsides to labor market formalization in less-developed countries.

Our main contribution is to the recent literature on the impact of crisis-driven migration in less developed countries.[2] A large group of studies in this literature has focused on examining the impact of Syrian refugee immigration on natives in Turkey and Jordan. The results show that these inflows of migrants and refugees reduce the employment and wages of low-skilled natives (Ceritoglu et al., 2017; Del Carpio & Wagner, 2015; Tumen, 2016). There is also a growing literature studying the effects of the current Venezuelan exodus on neighboring countries in Latin America. Results are more mixed than in the Syrian case, and the diversity of the findings appear to relate to the conditions in the receiving economy.[3] Unlike most of the previous studies which find negative or null effects, we find that inflows of Venezuelans to Peru lead to *positive* labor market effects for natives in general, with increased employment, incomes, and expenditures among Peruvian households. We conduct a heterogeneity analysis by natives' gender and skill level to shed light on the mechanisms behind this effect: the results suggest that the effects stem mainly from increased informal employment among secondary-educated men and increased formal employment among tertiary-educated men. High-skilled women also seem to benefit through increases in employment, potentially as a result of improved child care services provided by Venezuelan immigrants.

[2] While there is a long-standing and rich literature in economics concerned with the effects of immigration on labor markets in developed countries (Borjas, 1983; Card, 2001), much less work has looked at the impact of (forced) migration in developing countries. For a general review of the literature of the impact of forced migration on host communities, see Verme and Schuettler (2021).

[3] For Colombia, existing studies have mostly identified negative (Bahar et al., 2021; Delgado-Prieto, 2021; Lebow, 2020; Lebow et al., 2021) or null effects (Santamaria, 2022) on labor market outcomes of native workers. For Ecuador, Olivieri et al. (2020) do not find any effects on natives' labor market outcomes on average, but identify a deterioration of employment quality and earnings among young and low-educated natives in high immigration regions. For Peru, Boruchowicz et al. (2021) find null effects, whereas (Morales & Pierola, 2020) find small positive effects on formal employment for high-skilled and negative effects on employment and monthly earnings for secondary educated natives and those with informal jobs. Vera and Jiménez (2022) find evidence of a substitution of formal with informal employment among natives in Peru in reaction to Venezuelan immigration.

We also contribute to the literature on the effects of immigration on popular opinion and discrimination. While most of the literature concentrates on developed countries (e.g., Alesina et al., 2022; Hangartner et al., 2019), there is only a small literature on the effects of the Venezuelan exodus on popular opinion in Latin America. For Chile, Ajzenman et al. (2023) find negative effects on natives' security perceptions, despite null effects on the objective crime rate.[4] For Colombia, Chatruc and Rozo (2021) find that economic concerns, despite a lack of objective evidence on negative labor market effects, are another important driver of anti-immigrant sentiment. Additionally, Rozo and Vargas (2021) identify strategic electoral misinformation in Colombia as an additional channel. Exploiting rich opinion polls, we contribute to this literature by estimating the causal impact of migration on both attitudes and perceptions of natives and immigrants in the same context.

Another important contribution of this study is to the nascent literature using digital trace data for measurement of migration (Böhme et al., 2020; Hausmann et al., 2018; Palotti et al., 2020; Santamaria, 2022). One of the main difficulties in examining the impact of forced migration in host countries is typically the lack of data on where migrants are settling. To solve this issue, we develop a publicly available Google Trends proxy for the concentration of Venezuelan immigrants across Peruvian regions. We then estimate our preferred specification using this proxy – instead of the administrative data from Peruvian authorities – and compare the results obtained. We find that the results from the two approaches are surprisingly similar, both in qualitative and quantitative terms. We believe that our approach can be directly applied to measure the local presence of Venezuelan immigrants in other major host economies. Furthermore, the proposed method can be adapted flexibly to help measure other immigrant concentrations in any country by varying the choice of keywords adequately. Our study can therefore help ease data limitations affecting immigration studies in general.

The paper proceeds as follows. In Section 2, we describe the context and institutional background. Section 3 describes the data we use in our analysis as well as our empirical model and identification strategy. We then present the results in Section 4, and finally we discuss policy implications and conclude in Section 5.

2. Background

Venezuela is currently experiencing the biggest crisis in recent history. A deep economic, political and humanitarian crisis started ramping up with the fall in oil prices and the death of former president Hugo Chavez in 2013 (Chaves-González & Echevarría Estrada, 2020). This has led to what some authors have called the great Venezuelan exodus (Hausmann et al., 2018; Rozo & Vargas, 2021). In mid-2016, large waves of migrants started to leave the country, by 2019, the main destination of migrants were Colombia (1'700,000), Peru (870,000), Ecuador (385,000), and Chile (371,000) (data reported in Boruchowicz et al. (2021) up to June 2019). According to recent estimates, there are a total of 7.3 million Venezuelan immigrants worldwide, and the number of Venezuelans living in Peru has increased from 6615 in 2016 to more than 870,000 by June 2019 (see Fig. 1), and went up to over 1.5 million by 2023 (R4V, 2023). This wave of immigration has increased Peru's population by over 4 percent.

Traveling from Venezuela to Peru entails a journey of over 4500 kilometers, and before 2017 Peruvian authorities required all immigrants to be in possession of a passport (without any visa requirements). However, obtaining a passport in Venezuela at the time was difficult, as processing times were extremely long and required high fees. In light of this situation, in 2017, the Peruvian government made it easier

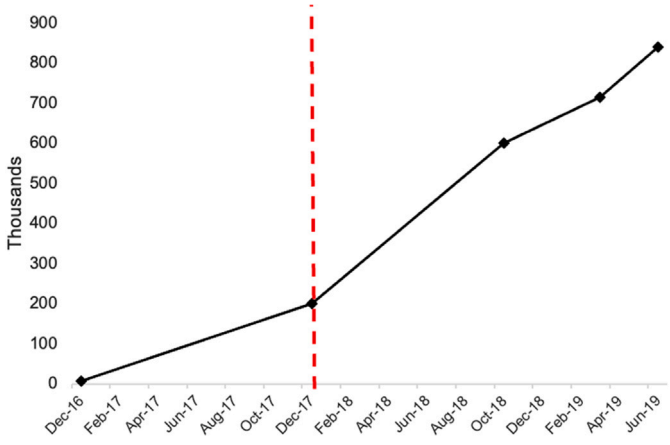


Fig. 1. Evolution of Venezuelan immigrant stock in Peru.
Source: Peruvian National Superintendence of Migrations.

for Venezuelans to enter the country and implemented a temporary residence permit (ironically called *Permiso Temporal de Permanencia*, henceforth PTP). This permit allowed immigrants to legally work and study in the country, pay taxes, and open a bank account. According to the national statistical institute (INEI), 50.2% of Venezuelan immigrants applied for the PTP and were waiting for the decision, while 26.7% reported having obtained it before the ENPOVE survey interview in February 2018 (Instituto Nacional de Estadística e Informática, 2019). Given the fact that PTP applicants were legally allowed to stay in Peru and that most applications in 2018 were successful up to that point, the large majority of Venezuelan immigrants had a legal status in Peru and were able to work in the informal or formal sector.

Unlike in other episodes of crisis migration, such as that of Syrian refugees during the recent civil war or Central American immigrants in the US, Venezuelan immigrants are not only very similar to Peruvians in cultural terms, but are, on average, also more skilled than Peruvians. As of December 2018, 47.8% of Peruvians had less than secondary education which was true of only 17.2% of Venezuelan immigrants (see Table 1). However, there is anecdotal evidence that Peruvians view Venezuelans as contributing little to the economy and that their presence in the country has increased criminal activities (Janetsky, 2019). Furthermore, there is some evidence that this has started to lead to political backlash (Winter, 2020).

Before the pandemic, the Peruvian economy was averaging around a 5% annual growth rate, which made it an attractive destination for migrants. Moreover, the labor market is highly informal (and therefore flexible): in 2018, only 21% of Peruvians held a formal job. Boruchowicz et al. (2021) show that the Venezuelan exodus had negligible effects on the Peruvian labor market, and argue that this is precisely due to the flexibility associated with the high levels of informality in the labor market.[5]

Very little is known about the actual discrimination affecting Venezuelan immigrants in the country. Still, it is plausible that part of the discrimination reported by immigrants is related to the way they are portrayed in the media. Freier et al. (2021) provides a detailed analysis of how the Peruvian written media has referred to Venezuelan immigrants. They show that 46% of articles refer to Venezuelan immigrants in a neutral fashion, while 28% (26%) have a negative (positive) tone.

[4] On the effects of immigration on crime, see also: Bell et al. (2013) and Bianchi et al. (2012).

[5] There is some contrasting evidence that the increase in Venezuelan immigrants in Peru led to small decreases in employment rates and earnings of low-skilled (and especially female) Peruvian workers in the informal sector (Asencios & Castellares, 2020; Morales & Pierola, 2020).

Table 1
Descriptive statistics.

	ENPOVE Dec 2018		ENAHO Dec 2018		ENAHO 2007–2020		LAPOP 2010–2019		Gallup 2013–2020	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Community characteristics:										
Informal employment rate (2017)	0.312	0.064								
District population (2017)	298,000	242,000								
Share Venezuelan immigrants			0.014	0.011	0.004	0.009	0.003	0.009	0.006	0.120
Individual characteristics:										
Female	0.469	0.499	0.527	0.499	0.524	0.499	0.510	0.500	0.574	0.495
Age	30.8	9.7	42.4	13.0	40.9	13.0	36.6	12.9	40.1	17.4
Months in Peru	8.19	6.90								
Education: Less than secondary	0.172	0.382	0.478	0.499	0.474	0.499	0.250	0.499	0.179	0.384
Education: Complete secondary	0.256	0.437	0.265	0.441	0.247	0.432	0.337	0.473	0.697	0.459
Education: Technical	0.186	0.389	0.123	0.328	0.132	0.339	0.085	0.279		
Education: University	0.385	0.487	0.134	0.341	0.146	0.353	0.328	0.470	0.123	0.329
Marital status: Married/Cohabitation	0.576	0.494	0.626	0.484	0.627	0.484	0.592	0.492	0.499	0.500
Marital status: Formerly married	0.042	0.202	0.199	0.399	0.176	0.381	0.074	0.262	0.113	0.316
Marital status: Never married	0.382	0.486	0.175	0.380	0.197	0.398	0.334	0.472	0.386	0.487
Formal employment	0.080	0.271	0.214	0.410	0.205	0.404				
Labor income	941	633	1482	1346	1265	1306				
Occupation										
Not working	0.133	0.340	0.161	0.368	0.200	0.400	0.413	0.400	0.349	0.477
Military/Police	0.000	0.000	0.004	0.060	0.005	0.073				
Managers	0.000	0.016	0.004	0.060	0.005	0.068				
Professionals	0.017	0.127	0.058	0.233	0.058	0.234				
Technicians and Ass professionals	0.061	0.239	0.046	0.209	0.043	0.204				
Clerical support workers	0.048	0.214	0.037	0.189	0.036	0.187				
Services and Sales workers	0.266	0.442	0.139	0.346	0.120	0.325				
Skilled agricultural and fishery	0.001	0.032	0.162	0.368	0.169	0.375				
Craft and Related trades workers	0.094	0.292	0.052	0.222	0.055	0.227				
Operators, Assemblers, Construction	0.068	0.252	0.072	0.259	0.064	0.246				
Elementary occupations	0.312	0.463	0.266	0.442	0.245	0.430				
HH characteristics:										
Low socioeconomic status	0.098	0.297								
Medium socioeconomic status	0.446	0.497								
High socioeconomic status	0.456	0.498								
Household size	3.28	1.90	3.81	1.86	4.03	1.95	4.15	2.15	3.95	2.04
Number of people who share bedroom	2.46	0.89								
Individuals	7,869		2,201		336,109		8,049		8,005	

Descriptive statistics are presented from four surveys used in the paper, ENPOVE, ENAHO, LAPOP and Gallup. More details are available in the paper.

Still, a high proportion of articles (44%) mention a problem associated with immigrants, with the most prominent ones being crime (26%), the contribution to unemployment (7%), and their effects on wages (4%).

3. Research design and data

3.1. Data

Our empirical analysis relies on an innovative combination of different data sources ranging from the Peruvian census, immigrant and labor force surveys, opinion polls, and digital trace data:

Encuesta Dirigida a la Población Venezolana que Reside en El País (ENPOVE) is a specialized survey of Venezuelans living in Peru conducted by the National Institute of Statistics (INEI) in December 2018. The sample covers five main urban areas in the country where Venezuelan immigrants were most likely to be present. The survey collects data on the immigrant's origin, migration date, and details on their current employment. Importantly, a full module asks about the immigrant's experiences with locals, which includes questions about discrimination and hostile attitudes towards them. The respondent's current location is identified down to the centro poblado level, which roughly corresponds to an urban neighborhood or a rural town. 48% of sample resides in Lima. We focus on variation in labor market opportunities at the district level. Districts are the smallest administrative areas in Peru and are akin to counties in the US.[6] According to ENPOVE, 70% of Venezuelans work in the same district in which they live.[7]

Encuesta Nacional de Hogares (ENAHO) is the Peruvian version of the Living Standards Measurement Survey, e.g. a nationally representative household survey collected monthly on a continuous basis. For our analysis, we use data from January 2007 to December 2020. The survey covers a wide variety of topics, including basic demographics, educational background, labor market conditions, crime victimization, and a module on respondent's perceptions about the main problems in the country and trust on different local and national level institutions. Observations are also spatially identified at the district level, but here we focus on variation in the Venezuelan share of the population at the province level, of which there are 198, as these are best representative of local labor markets for Peruvians.

Latin American Public Opinion Project (LAPOP) is a opinion survey conducted bi-annually in all countries in Latin America and designed to be representative of urban populations. This was fielded in Peru in 2010,

[6] Overall, there are 1857 districts in the country, which are grouped in 198 provinces.

[7] ENPOVE does not cover enough provinces to examine cross-sectional variation at this geographical aggregation, as we do for our analysis of the impacts on Peruvians.

2012, 2014, 2017 and 2019 and consists of about 2000 observations from mostly urban areas. The survey questions are centered around politics, governance and opinions on current events. Observations are also spatially identified at the district level, and again we focus on variation in the Venezuelan share of the population at the province level, the relevant labor market for Peruvians.

Gallup World Poll (GWP) is a nationally representative opinion survey and has been conducted annually since 2006 in a wide range of countries around the world. The sample collected in Peru is a repeated cross-section of about approximately 1000 observations each year. For our analysis, we use data from 2013 to 2020. The survey questions are centered around politics, governance, and opinions on current events. We make use of several opinion indices provided by Gallup, which measure individual opinions on various domains. Observations are spatially identified at the region level for Peru, which is our level of analysis in this case (there are 25 regions in Peru).

PTP We measure the location of Venezuelan immigrants on a monthly basis from January 2015 to December 2020 using administrative data on the district Venezuelan immigrants register at with the Peruvian authorities to obtain access to social services. There are strong incentives to register as this is also a prerequisite for applying to obtain the PTP. This data only records monthly gross arrivals so we do not know the outflows of Venezuelans to other locations within Peru or out of the country. In ENPOVE, 84% of Venezuelan immigrants in Peru report having lived in the same district during their entire time since arriving in the country. The data shows the arrival of 511,223 Venezuelans as of December 2020, which, while somewhat lower than estimates of the actual number of Venezuelans living in Peru, is quite substantial.

We also use data from the *National Census 2007 and 2017*. We use the 2017 Census data to measure the share of workers in the formal and informal sector in each district as well as the total local population in each district, province and region. We use the 2007 data to construct both of our instruments (discussed in more detail below) as well as to create additional controls for the local economic environment. More precisely, in the first part of our analysis, we use information on the industrial distribution (using detailed four-digit codes) in each district, while in the second part, we use information on the total number of Venezuelans in each province in Peru.

To construct the *Trade shock* instrument for the first part of our analysis, we also use trade data from the reports of TradeMap. From this website, we are able to identify export and import values for Peru on a monthly basis since 2006 at the HS 6-digit product revision. In addition, correspondence tables of HS 6-digit product revision to ISIC 3.1 revision (United Nations) are used to harmonize products with their corresponding industry sector in order to be matched with census data. This allows us to create a year-ISIC panel with information about exports and imports for 86 industry sectors in Peru.

We also create a measure of Venezuelan immigrant concentration using *Google Trends* in different regions of Peru in each year to be used as a robustness check. In the face of severe data limitations on immigration in many countries, Google trends has recently been proposed as a tool for the measurement and prediction of migration (Böhme et al., 2020). We select keywords that Venezuelan immigrants in Peru search for through the Google search engine to proxy for immigrant stocks at the regional level.[8] We expect these terms to be frequently consulted by all Venezuelan immigrants abroad (and not by Peruvians) and, hence, their relative search frequencies to be indicative of the distribution of Venezuelan immigration in Peru across regions and time. We follow Santamaria (2022) in calculating a relative measure of Venezuelan immigrant concentration by region and year in Peru. We then use this measure in our preferred specification, replacing the administrative data on the location of Venezuelans to estimate the impact of Venezuelan immigration on Peruvian labor market outcomes.

3.2. Outcome variables

In the first part of our analysis, we examine the impact of local labor market conditions on self-reported information on experiencing discrimination as reported by Venezuelans surveyed in ENPOVE. Overall, 36.4% of Venezuelans report having experienced discrimination, with this being slightly more common among women (38.1%) than men (35.0%). Fig. 2 shows the distribution of reported discrimination in different districts in Peru. There is clearly variation both across and within regions. Report discrimination is least common in Tumbes (23.4%), which is the typical entry point to Peru for Venezuelans and currently hosts 5% of ENPOVE sample, while Cusco and Lima, where 7% and 48% of Venezuelans are located, show the highest (47.8%) and median levels (37.1%) of reported discrimination, respectively. Individuals who experienced discrimination are then asked in which locations did the episode took place. Among all Venezuelans surveyed in ENPOVE, including those not reporting being discriminated against, the three most common locations are, at work (20.0%), on the streets/in public places (25.0%), and on public transit (9.8%).

In the second part of our analysis, we examine the impact of Venezuelans on a wide variety of outcomes for Peruvians. First, we examine the impact on labor market outcomes, specifically employment, formal employment, log wages if employed, log household income, and log household expenditure. Second, we examine the impact on reported crime and opinions about personal safety. Specifically, we look at the reported (log) number of crimes in each district from administrative data split into non-violent and violent crimes (data starting in 2011, means 3.54 for log violent crime and 3.31 for log non-violent crime), from ENAHO whether crime is a major national problem (12.7%), from LAPOP whether they have been a crime victim in the last two months (32.0%), and standardized variables from LAPOP on opinions about neighborhood safety and from Gallup on personal security. Lastly, we examine the impact on community outcomes. Specifically, we look at standardized indices measuring the quality of local services and trust in neighbors from LAPOP and indices from Gallup on community attachment, the quality of the local community, and whether the community likes diversity.

3.3. Control variables

Table 1 shows the descriptive statistics for the control variables used in each analysis. The information we have available from each dataset varies, but we can always control for age, gender, education, marital status, whether employed, and household size. ENPOVE collects additional relevant data about Venezuelans including how long they have been in Peru, whether they work in the formal sector, their labor income, their occupation, and the socioeconomic status of their household. ENAHO collects very similar data from Peruvians. Neither LAPOP nor Gallup collect detailed data on employment and occupation.

We now describe our main explanatory variables.

In the first analysis, the main explanatory variable is the informal employment rate measured in the 2017 census in the district in which Venezuelans reside, which has a mean of 31.2%. This is noticeably lower than the overall informal employment rate of 59.9% among Peruvians surveyed in ENAHO, indicating that Venezuelans are generally settling in areas in Peru with less formal unemployment. Only 8.0% of Venezuelan immigrants surveyed in ENPOVE are employed in the formal sector (i.e., they have an employment contract with social security benefits), hence the employment rate in the informal sector

[8] Particularly, we extract Google Trends at the region-year level for the combination of the following acronyms/keywords: "PTP" (*permiso temporal de permanencia* - work permit for immigrants in Peru), "SAIME" (*Servicio Administrativo de Identificación, Migración y Extranjería* - Venezuelan agency for civil registry services including passport issuance for migrants abroad), and "La Patilla" (Venezuelan news agency).

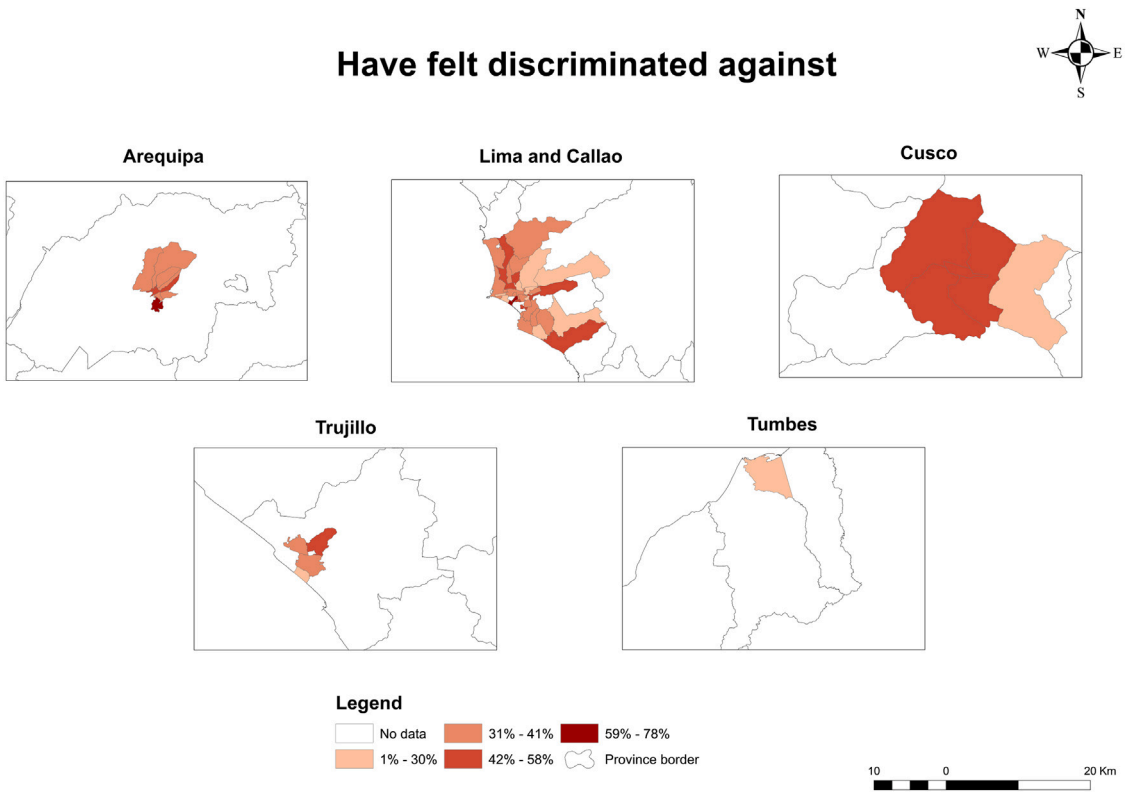


Fig. 2. Spatial Variation in Reported Discrimination in ENPOVE.
Source: Own calculations ENPOVE.

among Peruvians in a particular location is a good measure of the availability of job opportunities for Venezuelans and the competition with Peruvians for these jobs. We hypothesize that locations with higher informal sector employment rates have more opportunities and less competition with Peruvians for jobs. For this reason, we sometimes describe locations with high informal employment rates as having 'strong' informal labor markets.

In the second analysis, our main explanatory variable is the number of Venezuelan immigrants in a particular month and province (as measured in administrative data) as a share of the total local population measured in the 2017 census.[9] Over the full sample period of our analysis, the mean share of Venezuelans in the population is very low, 0.4% in the ENAHO sample, 0.3% in the LAPOP sample, and 0.6% in the LAPOP sample. However, if we just look at ENAHO in December 2018, we see that the share has risen to 1.4%.

The remainder of Table 1 shows the means and standard deviation for the control variables for Venezuelan immigrants in December 2018, as captured in the ENPOVE (Columns 1 and 2), and for the average Peruvian respondents in ENAHO in two periods: December 2018 and 2007–2020 (Columns 3 and 4, and 5 and 6, respectively). Additionally, we also provide descriptive data for the LAPOP and Gallup opinion surveys.

Venezuelan immigrants were slightly less likely to be female (46.9% vs. 52.7%) and are younger than their local counterparts (31 vs. 42 years old). As mentioned above, Venezuelans are more educated than Peruvians: only 17.2% had less than secondary education and 38.8% had a university education, compared to 47.8% and 13.4% only, respectively, among Peruvians. Despite the differences in human capital, immigrants had worse labor market outcomes: 13% were unemployed, 8% had a formal job and the average income was of S/ 941. On the other hand, Peruvians had a slightly higher unemployment rate (16.1%), but were almost three times as likely to have a formal employment (21.4%) and earned 50% more than immigrants (S/1482). Despite being more educated, Venezuelans work in less skilled jobs than Peruvians, especially in sales and services and elementary occupations. The big exception is agriculture and fishing which is the occupation for 16.2% of Peruvians, and where we see almost no Venezuelans.

3.4. Empirical model and identification

We first examine the impact of local labor market conditions on immigrants' reports of experiencing discrimination. More specifically, we estimate the following regression model:

$$y_{ij} = \alpha + \beta_1 lnEmp_j + \delta X_{ij} + \theta Z_j + \alpha_o + \varepsilon_{ij} \quad (1)$$

where y_{ij} equals one if individual i in district j reports having experienced discrimination in the 2018 in the ENPOVE (in general, or in a particular location) and zero otherwise. $lnEmp_j$ is the log informal employment rate in the same district measured in the 2017 census. We control for a variety of individual (X) and district (Z) level controls.[10]

[9] In our regressions, we take the log of share variable. In order to include provinces with no Venezuelans prior to 2015, we add 1 to both the number of Venezuelans and the total population of each province. The median province has 55,000 inhabitants and the smallest has nearly 3000, hence this transformation should be immaterial. As the Venezuelan share of the population is very low in most provinces but highly skewed, it is important to measure this variable in logs.

[10] Individual level controls in the regression include gender, age, education, marital status, months living in Peru, household socioeconomic strata, household size, and number of people sharing one's bedroom. Employment and occupation controls include total income, whether in formal employment, and occupation including not working. District-level controls include log population in 2017, the log number of Venezuelans (+1) in 2007, log mean household expenditure in 2013, log agricultural rate in 2007, log manufacturing rate in 2007, and log travel distance to Lima.

We also include origin municipality (in Venezuela) fixed effects (α_o) to control for any origin-specific factors that could affect perceptions of discrimination (e.g. skin color, accent). ε_{ij} is an error term clustered at the district level, as this is the level of aggregation of our main explanatory variable.

Among our district-level controls (Z_j), we include the (log) number of Venezuelans (+1) who lived in district j in 2007 (as identified in the census).[11] Clearly, the number of immigrants in a certain location is an important determinant of discrimination, but including the current number of immigrants in the regression would introduce additional endogeneity problems. Previous literature has shown that immigrants are more likely to move to locations where they have a network of peers from the same country. We show below that this is true among Venezuelans in Peru as well.

Our main interest is on β_1, which represents the impact of the labor market conditions in district j on the discrimination experienced by Venezuelans. Venezuelans who arrive to the country clearly evaluate where to settle based on the labor market opportunities (among other reasons), and therefore to causally identify β_1 we need a source of exogenous variation for the labor market at the local level. We use an instrumental variable strategy that exploits variation in the share of workers employed in different industries in 2007, along with national level shocks to trade in specific industries between Oct 2016 and Oct 2017, when the census was collected. More precisely, the first stage regression is given by:

$$lnEmp_j = \alpha + \nu Exportshock_j + \eta X_{ij} + \nu Z_j + \alpha_o + \epsilon_j \quad (2)$$

where $Exportshock_j$ is the shift-share instrument calculated by multiplying the share of workers in district j employed in industry k in 2007 with the log change in national level exports in industry k between 2016 and 2017, aggregating over each industry within districts.[12] The remaining control variables are similar to those in Eq. (1). The identifying assumption in this instrumental variables regression is that the change in trade in specific sectors at the national level affects the local labor market conditions without directly having effects on the discrimination and hostilities reported by immigrants in a specific location. Importantly, we also control for other local level economic characteristics, such as the importance of agriculture and manufacturing, which could be related to both exposure to export shocks and experiencing discrimination.

We then turn to examine the impact of receiving a larger population of Venezuelan immigrants on natives' labor market outcomes and different dimensions of locals' perceptions. To do this, we estimate the following regression:

$$y_{ipt} = \alpha + \beta ln(ImmigrantShare)_{pt} + \delta X_{ipt} + \alpha_t + \alpha_p + time * \alpha_p + \varepsilon_{ipt} \quad (3)$$

where y_{ipt} represent a particular outcome for individual i living in province p interviewed at time t, $ln(ImmigrantShare)_{pt}$ is the (log) of the number of Venezuelan immigrants in province p at time t as a share of the total population of province p in December 2017, and X_{ipt} include a series of individual level controls, including age, education, marital status, and household size for all models, and employment status and occupation for non-labor market outcomes measured in ENAHO. ε_{ipt} is an error term clustered at the province level, as we measure the number of Venezuelan immigrants at this level and suspect there is strong serial correlation in many of our outcomes.

Table 2
Impact of local labor market conditions on reported discrimination by Venezuelans.

	OLS			IV
Overall: Have felt discriminated – Mean outcome = 0.364				
Log local informal Emp rate	0.003	−0.002	−0.030	−0.660*
	(0.095)	(0.094)	(0.085)	(0.360)
F-stat weak identification				693
R-squared	0.023	0.032	0.071	
Observations	7869	7869	7869	7869
Men: Have felt discriminated – Mean outcome = 0.350				
Log local informal Emp rate	0.059	0.059	0.044	−0.704**
	(0.109)	(0.108)	(0.098)	(0.345)
F-stat weak identification				318
R-squared	0.022	0.027	0.093	
Observations	4176	4176	4176	4176
Women: Have felt discriminated – Mean outcome = 0.381				
Log local informal Emp rate	−0.060	−0.077	−0.120	−0.568
	(0.108)	(0.106)	(0.104)	(0.403)
F-stat weak identification				370
R-squared	0.027	0.042	0.101	
Observations	3693	3693	3693	3693
Sociodemographic characteristics	Yes	Yes	Yes	Yes
Employment and Occupation	No	Yes	Yes	Yes
Origin municipality FE	No	No	Yes	Yes

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at district level in parentheses. Local informal employment rate is measured in the 2017 census. The predicted export shock in each district in year prior to Oct 2017 is used to instrument for the informal employment rate. Sociodemographic controls include gender, age, education, marital status, months living in Peru, household socioeconomic strata, household size and number of people sharing one's bedroom. Employment and occupation controls include total income, whether in formal employment, and occupation including not working. All regression also control for the following variables measured at the district level: log population in 2017, the log number of Venezuelans in 2007, log mean household expenditure in 2013, log agricultural rate in 2007, log manufacturing rate in 2007 and log travel distance to Lima.

β identifies the effect of the number of Venezuelan immigrants in year t in province p. Importantly, we also control in all models for time (either year or month*year) fixed effect (α_t), and province fixed effects (α_p). Hence, we control for any time-invariant differences in outcomes across provinces and aggregate changes in outcomes, both of which may be related to the location choice decisions of Venezuelans. In our preferred specification, we also control for province-specific time-trends ($time * \alpha_p$) which account for any local trends in the outcome variable. In this model, the impact of the presence of Venezuelans is identified by examining how outcomes for Peruvians change when more Venezuelans arrive in an area conditional on the trend in that outcome.[13]

It is possible that local shocks impact both the destination choice of Venezuelans and outcomes for Peruvians, hence we also use an instrumental variable strategy where we exploit the intuition that immigrants are more likely to move to localities where immigrants from the same nationality are located. We therefore instrument our measure of the number of Venezuelans in a province p with the presence of Venezuelans in that province as recorded in the 2007 census interacted with year dummy variables. This is a semi-parametric version of the traditional immigrant network instrument as recommended by Goldsmith-Pinkham et al. (2020) as it allows the strength of the network effect to potentially vary in each year. An overidentification test can be used to examine whether the instrument has a consistent relationship over time.

Our instrument will be valid as long as the location of Venezuelans in Peru in 2007 does not impact outcomes for Peruvians nearly ten

[11] Our results are qualitatively similar if we instead control for the number of Venezuelans living in each district in 2007 in levels.

[12] To be more precise, this shift-share instrument is calculated as follows: $\sum_{k=1}^{N}(Share_{jk(2007)} \times \Delta Export_k)$. We first multiply the share of workers employed in a particular industry in each district in the baseline year 2007 (the "shares") by the national change in exports in that industry in the year prior to Oct 2017 (the "shifters"). We then sum this up over all industries in each district to create a measure of the predicted export shock in each district.

[13] Our results are robust to controlling for district fixed effects and time-trends.

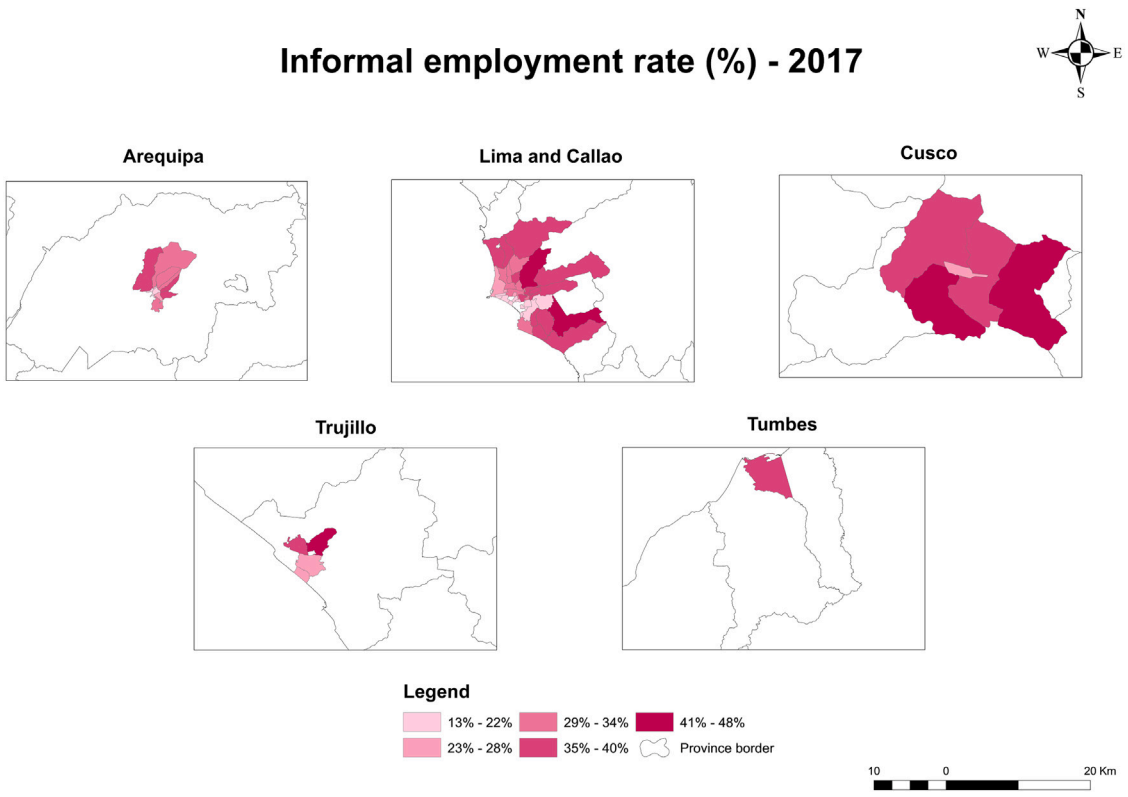


Fig. 3. Spatial Variation in Informal Employment in 2017 in ENPOVE.
Source: Own calculations ENPOVE.

years later, except via its impact on the location choice of Venezuelans after 2015. One worry is that Venezuelans now may be attracted to places for similar reasons as Venezuelans in 2007. However, being able to control for province level fixed effects as well as long-run provincial trends should alleviate this concern as our IV strategy still focuses on the relationship between increased local inflows of Venezuelans over time and changes in labor market outcomes for Peruvians in the same locations.

4. Results

4.1. Labor market conditions and discrimination

Table 2 shows our main results on the effects of local labor market conditions on self reported discrimination. We first present the OLS results, and then turn to comment on the estimates from our IV specification. Importantly, given that the types of jobs in which men and women work differ, we show the main results for the full sample of immigrants who responded to the survey and split the sample by gender.

Columns (1)–(3) show the OLS relationship between the (log) local informal employment rate and the reports of discrimination. In the three panels, this relationship shows small and insignificant coefficients. As discussed above, these OLS results cannot be interpreted as causal due to an endogeneity issue that arises from the fact that immigrants make their location decisions based on the local labor market conditions. To overcome this problem, we use an instrumental variable strategy in which we exploit exogenous variation in the impact of national level export shocks on local (informal) employment rates depending on detailed measures of the local industry composition.

Spatial variation in both the informal employment rate in 2017 and the instrument are shown in Figs. 3 and 4, respectively. Importantly, there is clear variation in both dimensions, across and within regions. The first stage relationship is shown graphically in Fig. 5. An increase in predicted local exports has a positive relationship with *formal* employment rates. Consequently, higher predicted exports imply that a lower share of people work in the informal sector, where most Venezuelan immigrants are employed. The full results of the first stage relationship between export shocks and informal employment rates are provided in Table A.1. Using a linear specification for the first stage yields a very strong instrument, with an F-stat for the excluded instrument that ranges between 318 and 693, even while controlling for a number of other measures of the local economic environment.

Column (4) in Table 2 shows the second stage results from our IV strategy. The first thing to note is that the IV coefficient is much larger than the OLS one. This difference indicates that Venezuelan immigrants are selecting themselves into labor markets where there is more discrimination. This is consistent with the idea that immigrants are willing to deal with more discrimination as long as the labor market offers better opportunities and higher wages. The selection seems more relevant for men than for women.

Higher employment rates in the informal sector cause a reduction in the level of discrimination reported by Venezuelan immigrants. On average, a 10 percent increase in informal employment in a district causes a 6.6% reduction in discrimination. Furthermore, the results show that men are more likely to suffer from discrimination due to changes in the informal employment rate: a 10% increase in employment reduces discrimination against men by 7%, while for women, the point estimate indicates a decrease of 5.7% which, however, is not statistically significant.

Importantly, the reduction in discrimination as a response is not explained by having more exposure in the labor market: as we show in Table A.2, variation in local informal employment is unrelated to the Venezuelan immigrants' probability of being employed. While this may be a bit surprising, we have to take into account that 94% of Venezuelan immigrants are employed, so there is little margin for improvement. Additionally, for men, we observe a negative effect on wages with the point estimate indicating a reduction of 9.5% for a 10%

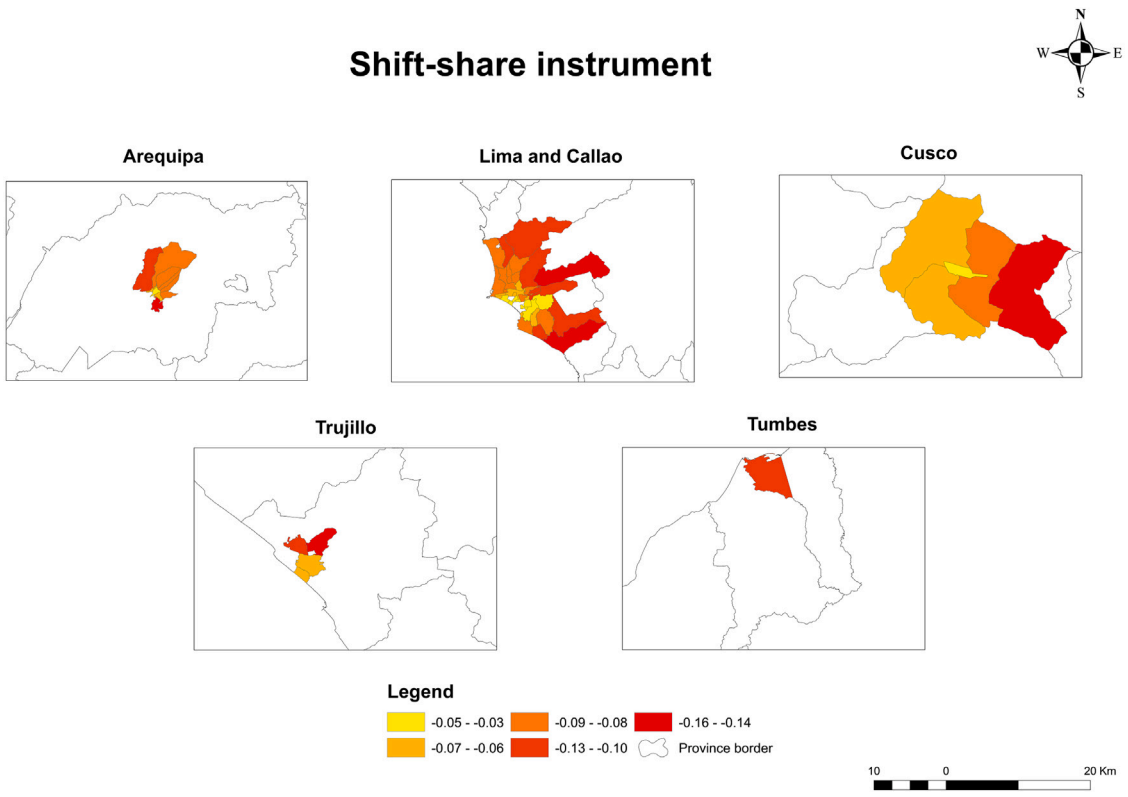


Fig. 4. Spatial Variation in 2016–2017 Log Export Shock in ENPOVE. The instrument allocates national level changes in exports at the industry level to different locations based on local industry structure in 2007.

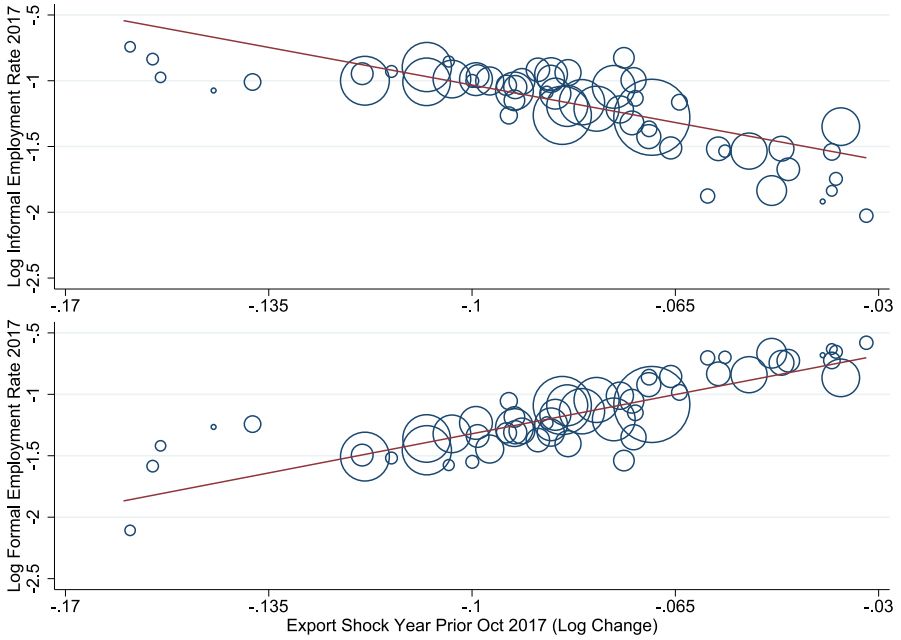


Fig. 5. First stage: Local trade shocks and employment.

increase in the informal employment rate. This may be indicative of strong competition in tight informal labor markets. We do not observe any wage effect for women.

The fact that discrimination against men shows a stronger response to labor market conditions is potentially related to the types of interactions immigrants have with locals. In Table 3, we present the full results from the IV specification. For both men and women, reported discrimination increases with time spent in Peru, education, and household socioeconomic status. It is also higher for individuals in lower-skilled occupations, in particular for women. This is consistent with reported discrimination reflecting a lack of progress in the labor market for richer and more educated Venezuelans. Whether report discrimination reflects being disappointed or actually being discriminated against is difficult to quantify.

To explore further the mechanisms underlying these effects, in Table 4 we exploit the fact that ENPOVE collects detailed information

Table 3
Regression correlates of reported discrimination by Venezuelans.

	Men		Women	
Age	−0.001	(0.001)	−0.002***	(0.001)
Log months in Peru	0.047***	(0.013)	0.081***	(0.013)
Education: Complete secondary	0.011	(0.023)	0.035	(0.028)
Education: Technical	0.059***	(0.023)	0.031	(0.030)
Education: University	0.074***	(0.024)	0.058**	(0.028)
Married/Cohabitation	0.024	(0.017)	0.021	(0.020)
Formal employment	−0.017	(0.025)	0.001	(0.036)
Labor income (Thousands)	−0.005	(0.014)	−0.011	(0.021)
Managers	−0.346**	(0.152)	−0.348***	(0.066)
Professionals	0.042	(0.088)	0.035	(0.055)
Technicians and Ass professionals	−0.028	(0.051)	−0.001	(0.038)
Clerical support workers	−0.020	(0.054)	0.067*	(0.039)
Services and Sales workers	0.006	(0.039)	0.116***	(0.023)
Skilled agricultural and fishery	0.038	(0.042)		
Craft and Related trades workers	−0.017	(0.043)	0.135***	(0.050)
Operators, Assemblers, Construction	0.008	(0.041)	0.214*	(0.111)
Elementary occupations	0.060	(0.038)	0.158***	(0.029)
Medium socioeconomic status	0.112***	(0.036)	0.087**	(0.041)
High socioeconomic status	0.064	(0.039)	0.069*	(0.041)
Household size	−0.007	(0.006)	−0.009*	(0.005)
Number of people who share bedroom	0.013	(0.014)	0.004	(0.009)
Log local informal employment rate in 2017	−0.704**	(0.345)	−0.568	(0.403)
Log local population in 2019	0.000	(0.027)	0.031	(0.031)
Log local Venezuelans in 2007	−0.027	(0.023)	−0.048*	(0.026)
Log local household expenditure PC 2013	−0.327	(0.230)	−0.251	(0.262)
Log proportion in agriculture in 2007	−0.020	(0.039)	−0.028	(0.031)
Log proportion in manufacturing in 2007	0.218**	(0.095)	0.177*	(0.094)
Log travel duration to Lima	0.037*	(0.019)	0.028	(0.020)
Mean dep. var	0.350		0.381	
Observations	4176		3693	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors clustered at district level in parentheses. Local informal employment rate is measured in the 2017 census. The predicted export shock in each district in year prior to Oct 2017 is used to instrument for the informal employment rate. The default category for the occupation variables is not working. All regressions also control for origin municipality in Venezuela fixed effects.

on where discrimination episodes took place. We show the OLS and IV results for our preferred specification, the one that includes all controls and fixed effects. Discrimination at work seems to respond the least to local employment, with a coefficient that implies that a 10% increase in informal employment leads discrimination to decrease by 2.8%, although the relationship is not statistically significant. Interestingly, there is a clear gender split on whether discrimination occurs in streets and public spaces. A 10% increase in informal employment causes a decrease in discrimination against men in streets and public spaces of about 10%, with no significant change in discrimination against women in these spaces. Finally, discrimination in public transit responds similar regardless of the gender, with reductions of about 4.5%–5% in discrimination for a 10% increase in the informal employment rate.

These results are consistent with a situation in which weak local labor markets create general resentment towards Venezuelan immigrants, which leads to discrimination by people who do not share a workplace with Venezuelans. There are many reasons why this could then lead to more perceived discrimination 'on the streets' and in 'public transit', rather than 'at work'. One explanation in line with the intergroup contact theory is that working with immigrants implies repeated interactions and typically creates a bond that can lead to reductions in natives' discriminatory attitudes towards immigrants (Steinmayr, 2021).[14]

[14] We also examined whether the results varied depending on how long Venezuelans had been in Peru. We found that the impact of local labor markets is larger for individuals (in particular men) who arrived more recently in Peru (after February 2018). However, it is difficult to know how to interpret these results because of the potential changing selection of migrants over time, in other words separating cohort and time in the country effects.

4.2. Immigration and local's labor market outcomes

In the previous section, we established that labor market conditions have a causal effect on the way Venezuelan immigrants perceive to be treated by locals: lower unemployment in the informal labor market leads to a decrease in discrimination. We now turn to study the flip-side of this question, namely, the way in which the presence of Venezuelans affect Peruvians' labor market outcomes and their perceptions about crime, corruption, and public good provision at the local level. To conduct this analysis we estimate Eq. (3).

Table 5 shows the results on the impact of the presence of Venezuelan immigrants on Peruvian's labor market outcomes. We report our OLS estimates with different sets of controls (Panels A and B). We then report our aggregate IV estimates (Panel C), along those from a subgroup specification by gender (Panels D and E, respectively). A higher number of Venezuelan immigrants in a given province correlates with higher levels of employment (but not formal employment) for Peruvians once we include province and time fixed effects as well as province-specific trends (Panel B). Additionally, households in provinces with more immigrants report higher incomes and expenditures. As mentioned above, the OLS estimates may suffer from an endogeneity problem, and the associations observed in Panels A and B could be caused by the fact that immigrants sort into more dynamic labor markets.

We introduce our instrumental variable estimates in Panel C of Table 5. Recall that in these regressions we instrument the log share of Venezuelans at the province-year level with the log share of Venezuelans in the same province in 2007 interacted with year dummies. The relationship between our instrument and the endogenous regressor is depicted in Fig. 6, where it is clear that immigrants are more likely to move to locations where there is an established network of compatriots

Table 4
Impact of local labor market conditions on discrimination in different locations.

	At work		Streets/Public places		Public transit	
	OLS	IV	OLS	IV	OLS	IV
			Overall			
Log local informal Emp rate	−0.034	−0.275	0.051	−0.749*	−0.047	−0.509*
	(0.073)	(0.247)	(0.085)	(0.383)	(0.072)	(0.296)
Observations	6810	6810	7869	7869	7869	7869
R-squared	0.064	0.061	0.063	0.030	0.076	0.052
Mean dep. var	0.201		0.250		0.098	
			Men			
Log local informal Emp rate	0.007	−0.141	0.126	−0.994**	−0.017	−0.521*
	(0.076)	(0.251)	(0.111)	(0.473)	(0.077)	(0.314)
Observations	3923	3923	4176	4176	4176	4176
R-squared	0.085	0.083	0.081	0.016	0.109	0.081
Mean dep. var	0.191		0.233		0.095	
			Women			
Log local informal Emp rate	−0.118	−0.472	−0.031	−0.452	−0.071	−0.445
	(0.112)	(0.375)	(0.084)	(0.333)	(0.076)	(0.282)
Observations	2887	2887	3693	3693	3693	3693
R-squared	0.101	0.094	0.096	0.087	0.103	0.089
Mean dep. var	0.215		0.269		0.100	

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at district level in parentheses. Local informal employment rate is measured in the 2017 census. The predicted export shock in each district in year prior to Oct 2017 is used to instrument for the informal employment rate. All regressions control for gender, age, education, marital status, months living in Peru, household socioeconomic strata, household size, number of people sharing one's bedroom, total income, whether in formal employment, occupation including not working and origin municipality in Venezuela fixed effects and the following variables measured at the district level: log population in 2017, the log number of Venezuelans in 2007, log mean household expenditure in 2013, log agricultural rate in 2007, log manufacturing rate in 2007 and log travel distance to Lima.

Table 5
Impact of Venezuelans on the labor market outcomes of Peruvians.

	Employment	Formal employment	Log wages if employed	Log household income	Log household expenditure
		(a) OLS: Month ∗ Year and Province fixed effects			
Log Share Venezuelans	−0.001	0.003***	−0.002	−0.008***	−0.014***
	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
R-squared	0.145	0.236	0.434	0.469	0.528
		(b) OLS: Month ∗ Year and Province fixed effects and Province time-trends			
Log Share Venezuelans	0.003**	−0.001	0.005	0.014***	0.013***
	(0.001)	(0.001)	(0.004)	(0.004)	(0.003)
R-squared	0.149	0.237	0.438	0.474	0.534
		(c1) IV: Month ∗ Year and Province fixed effects and Province time-trends			
Log Share Venezuelans	0.006***	−0.000	0.001	0.022***	0.014**
	(0.002)	(0.002)	(0.007)	(0.005)	(0.006)
		(c2) Men: IV: Month ∗ Year and Province fixed effects and Province time-trends			
Log Share Venezuelans	0.006***	0.003	−0.002	0.017***	0.010
	(0.001)	(0.002)	(0.010)	(0.006)	(0.007)
		(c3) Women: IV: Month ∗ Year and Province fixed effects and Province time-trends			
Log Share Venezuelans	0.006	−0.003	0.005	0.027***	0.019***
	(0.004)	(0.003)	(0.007)	(0.006)	(0.007)
Mean outcome	0.801	0.205	6.75	9.93	9.44
Men	0.898	0.245	6.92	9.47	9.97
Women	0.712	0.169	6.50	9.41	9.88
Individuals	337,725	337,725	106,744	337,718	337,680
Men	160,699	160,699	63,833	160,694	160,682
Women	177,006	177,006	42,696	177,004	176,978

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at province level in parentheses. Log Share Venezuelans is relative to the 2017 population of the province. Log Share VZs in the province in 2007 interacted with year fixed effects are used as instruments for Log Share of Venezuelans. All regressions include controls for a quadratic in age, education, marital status, and household size.

and that this relationship is stable over time, even though there has been a large increase in the Venezuelan immigrant share over time. This is true even though the number of Venezuelans in Peru in 2007 was quite small. The F-stat for the excluded instrument is 2300, showing the strong relationship in the first-stage robustness of the instrument. We also fail to reject that our model is over-identified which is an indication that the shift-share instrument is truly picking up the impact of increasing the number of Venezuelans who are being pulled to locations where Venezuelans previously settled.

Our IV estimates in Panel C tell the same qualitative story as those in Panel B, yet the point estimates become larger in magnitude. A doubling in the share of Venezuelans in a province increases the probability of a Peruvian being employed by 0.6%, increases household income by 2.2%, and expenditures by 1.4%. The effects on income and expenditure are nearly twice as large for women as for men. These positive impacts on natives' labor market outcomes are sizeable, given the large overall increase in the Venezuelan share of the population.

Table 6
Robustness check using Google Trends proxy of Venezuelan immigration: Impact of Venezuelans on the labor market outcomes of Peruvians.

	Employment	Formal employment	Log wages if employed	Log household income	Log household expenditure
(a) OLS: Month ∗ Year and Province fixed effects					
Google Trends VZ immigration	−0.001	0.004***	0.007**	0.004	−0.008*
(STD)	(0.001)	(0.001)	(0.004)	(0.004)	(0.005)
R-squared	0.145	0.236	0.434	0.469	0.528
(b) OLS: Month ∗ Year and Province fixed effects and Province time-trends					
Google Trends VZ immigration	0.004***	0.001	0.010***	0.017***	0.008***
(STD)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
R-squared	0.149	0.237	0.438	0.474	0.534
(c1) IV: Month ∗ Year and Province fixed effects and Province time-trends					
Google Trends VZ immigration	0.009***	0.000	0.005	0.019***	0.008
(STD)	(0.003)	(0.002)	(0.006)	(0.005)	(0.006)
(c2) Men: IV: Month ∗ Year and Province fixed effects and Province time-trends					
Google Trends VZ immigration	0.005***	0.002	0.003	0.013**	0.004
(STD)	(0.002)	(0.002)	(0.007)	(0.005)	(0.005)
(c3) Women: IV: Month ∗ Year and Province fixed effects and Province time-trends					
Google Trends VZ immigration	0.012**	−0.002	0.004	0.026***	0.013*
(STD)	(0.005)	(0.003)	(0.009)	(0.006)	(0.007)
Mean outcome	0.801	0.205	6.75	9.93	9.44
Men	0.898	0.245	6.92	9.47	9.97
Women	0.712	0.169	6.50	9.41	9.88
Individuals	337,725	337,725	106,744	337,718	337,680
Men	160,699	160,699	63,833	160,694	160,682
Women	177,006	177,006	42,696	177,004	176,978

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at province level in parentheses. Share of Venezuelans as proxied by our Google Trends measure (standardized with mean zero and standard deviation one) at the region-year level as discussed in the paper. Log Share VZs in the province in 2007 interacted with year fixed effects are used as instruments for the Google Trends Venezuelan immigration measure. All regressions include controls for a quadratic in age, education, marital status, and household size.

To check the robustness of these results, we re-estimate the IV specification based on Eq. (3), but using our Google Trends measure instead of the administrative data from the Peruvian authorities to proxy for Venezuelan immigration. Note that in this approach the identifying variation comes from the more aggregate level of the Peruvian regions, as Google Trends is not available at our preferred level of analysis (provinces) in Peru. The results are presented in Table 6. Despite the differences in the source and construction of the immigration measure, the IV results in Panel C are remarkably similar, both in qualitative and quantitative terms. This suggests that measurement error and underreporting in the administrative data are not biasing our results. Perhaps more importantly, it also demonstrates that our approach is capable of measuring Venezuelan immigration in Peru successfully and likely could be used in other contexts to obtain reliable causal estimates of the impact of immigration on natives' labor market outcomes even in the absence of high-quality administrative data.

In the last part of our analysis, we shed more light on the potential mechanisms behind the positive effects of Venezuelan immigration on Peruvian labor market outcomes. To this end, we conduct a heterogeneity analysis by natives' gender and skill level, the results of which are presented in Table 7. Focusing on male labor market outcomes, we find larger impacts on the employment of medium- and high-skilled men (with completed secondary or tertiary education, respectively), as well as on income and expenditure. Interestingly, increased employment among high-skilled men seems to be driven mainly by increased formal employment which is not the case for medium-skilled men.

For women, the positive impacts on income and expenditure are concentrated among low and high-skilled individuals. For them, the results suggest that the effect is driven by increased (informal) employment. For the low-skilled, wage information is missing for most workers, so increased income and expenditure could reflect increased wages or hours of work or (as many of these women are not working full-time) increased earnings of their partner.

The positive impact of Venezuelan immigration on Peruvian labor market outcomes has a number of potential explanations. The arrival of Venezuelans may have generally expanded the economic opportunities for Peruvian because of their higher levels of potential productivity, due to higher human capital and concentration in low wage jobs. Furthermore, most of the informal jobs taken by Venezuelans are in the service sector which potentially could have freed up time, especially for Peruvian women to be more engaged in the labor market. This may explain the results for high skilled individuals in particular.

4.3. Immigration, crime and communities

One widespread claim mentioned in some media reports is that Venezuelan migration led to an increase in crime (Freier et al., 2021). We test whether this claim is supported by the data in Table 8, where we use administrative information on the number of non-violent and violent crimes reported in each municipality, the personal security index from Gallup, and reports on whether crime is perceived as a major problem in ENAHO. The structure of this table is the same as the previous one, with Panel C as our preferred specification.

Consistent with the idea that Venezuelan inflow lead to improvements in labor market conditions, we observe that locations that received a larger number of immigrants have lower number of reported non-violent crimes (column 2). This effect is large with a double of Venezuelans in a province leading to a 42% decline in reported non-violent crimes. Individuals are also less likely to report that crime is a major national problem, this is true for both men and women.

Finally, in Table 9 we examine the effects of immigration on local communities. Consistent with our previous findings, Peruvians living in areas with a higher share of Venezuelan immigrants report that the quality of local services and community quality are higher and that they have greater trust in their neighbors. However, in these locations they also report that the community is less likely to value diversity. In general, these findings are stronger for men than for women. It is important to note that these findings could be driven by the positive impact that Venezuelans have on the labor market outcomes of Peruvians.

Table 7
Heterogeneity analysis by gender and skill level of natives: Impact of Venezuelans on the labor market outcomes of Peruvians.

	Employment	Formal employment	Log wages if employed	Log household income	Log household expenditure
			Low skilled men		
Log Share VZs	0.005	−0.002	−0.015	0.011	0.005
	(0.003)	(0.004)	(0.016)	(0.015)	(0.015)
Mean outcome	0.938	0.078	6.44	9.52	9.01
Observations	66,578	66,578	17,751	66,577	66,563
			Medium skilled men		
Log Share VZs	0.010**	0.001	0.009	0.016**	0.006
	(0.004)	(0.004)	(0.009)	(0.006)	(0.006)
Mean outcome	0.886	0.237	6.83	10.04	9.59
Observations	46,239	46,239	19,777	46,238	46,237
			High skilled men		
Log Share VZs	0.005*	0.009***	−0.009	0.015**	0.010*
	(0.003)	(0.003)	(0.012)	(0.007)	(0.006)
Mean outcome	0.854	0.486	7.31	10.54	10.01
Observations	47,894	47,894	26,406	47,891	47,894
			Low skilled women		
Log Share VZs	0.011	−0.000	0.004	0.038***	0.034**
	(0.007)	(0.003)	(0.028)	(0.014)	(0.017)
Mean outcome	0.746	0.057	5.76	9.52	9.02
Observations	93,483	93,483	11,936	93,483	93,456
			Medium skilled women		
Log Share VZs	−0.002	−0.007	0.014	0.006	0.009
	(0.005)	(0.006)	(0.011)	(0.008)	(0.006)
Mean outcome	0.640	0.151	6.24	10.03	9.63
Observations	37,341	37,341	9151	37,340	37,340
			High skilled women		
Log Share VZs	0.006	0.000	0.005	0.026***	0.006
	(0.004)	(0.005)	(0.007)	(0.005)	(0.006)
Mean outcome	0.703	0.412	7.02	10.50	10.01
Observations	45,984	45,984	21,517	45,983	45,984

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors clustered at province level in parentheses. Log Share Venezuelans is relative to the 2017 population of the province. Log Share VZs in the province in 2007 interacted with year fixed effects are used as instruments for Log Share of Venezuelans. All regressions include controls for a quadratic in age, education, marital status, household size, and month * year and province fixed effects and province time-trends.

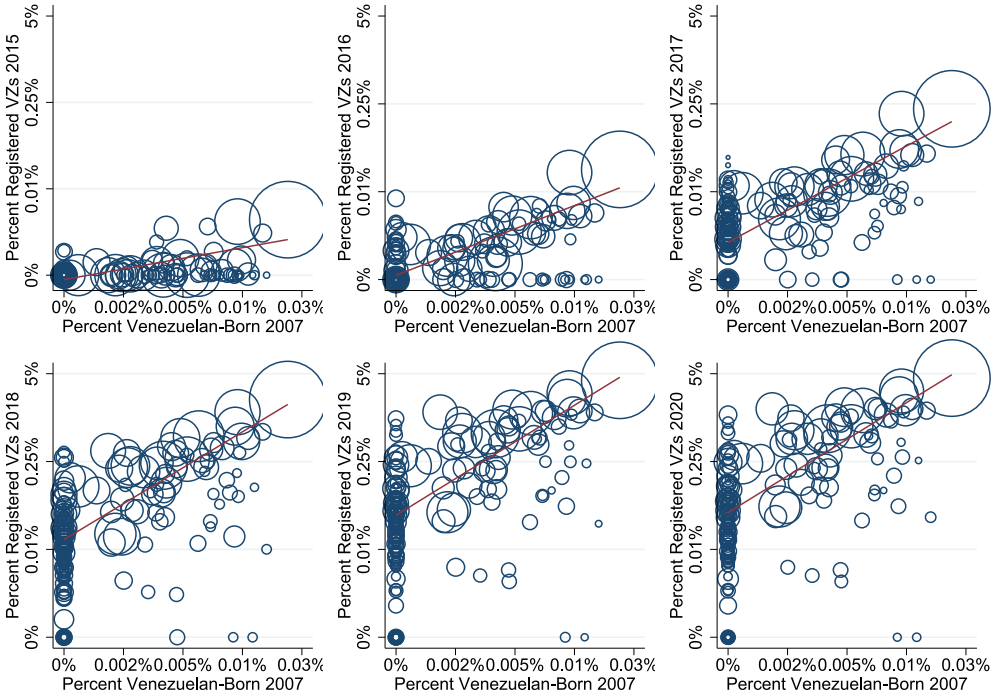


Fig. 6. First stage: Stocks of Venezuelans and immigration.

Table 8
Impact of Venezuelan immigration on crime and safety.

	Log reported violent crimes in municipality	Log reported non-violent crimes in municipality	Crime victim (0/1): LAPOP	Neighborhood safety (STD): LAPOP	Personal security (STD): Gallup	Crime major national problem (0/1): ENAHO
(a) OLS: Month ∗ Year (ENAHO) or Year (LAPOP/Gallup) and Province (ENAHO/LAPOP) or Region (Gallup) fixed effects						
Log Share VZs	0.012	−0.003	0.001	0.009	−0.017	−0.001
	(0.023)	(0.214)	(0.003)	(0.009)	(0.010)	(0.002)
R-squared	0.586	0.714	0.065	0.085	0.09	0.088
(b) OLS: Month ∗ Year (ENAHO) or Year (LAPOP/Gallup) and Province (ENAHO/LAPOP) or Region (Gallup) FEs and Time-trends						
Log Share VZs	−0.009	−0.373***	−0.010	0.009	−0.010	−0.012***
	(0.018)	(0.097)	(0.007)	(0.020)	(0.011)	(0.002)
R-squared	0.596	0.794	0.073	0.101	0.098	0.094
(c1) IV: Month ∗ Year (ENAHO) or Year (LAPOP/Gallup) and Province (ENAHO/LAPOP) or Region (Gallup) FEs and Time-trends						
Log Share VZs	−0.048	−0.420**	−0.008	0.016	−0.001	−0.013***
	(0.031)	(0.172)	(0.007)	(0.023)	(0.016)	(0.003)
(c2) Men: IV: Month ∗ Year (ENAHO) or Year (LAPOP/Gallup) and Province (ENAHO/LAPOP) or Region (Gallup) FEs and Time-trends						
Log Share VZs			−0.011	0.023	0.013	−0.011**
			(0.010)	(0.024)	(0.022)	(0.005)
(c3) Women: IV: Month ∗ Year (ENAHO) or Year (LAPOP/Gallup) and Province (ENAHO/LAPOP) or Region (Gallup) FEs and Time-trends						
Log Share VZs			−0.006	0.008	−0.005	−0.014***
			(0.009)	(0.027)	(0.018)	(0.003)
Individuals	234,002	213,093	7998	7962	7997	308,993
Men			3916	3908	3405	141,010
Women			4077	4049	4592	167,957

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at province level in parentheses. Log Share Venezuelans is relative to the 2017 population of the province. Outcome variables noted as STD are standardized. Log Share VZs in the province (region for Gallup outcomes) in 2007 interacted with year fixed effects are used as instruments for Log Share of Venezuelans. All regressions include controls for a quadratic in age, education, marital status, household size and whether employed. Outcomes from ENAHO include additional controls for whether in formal employment and one's occupation.

Table 9
Impact of Venezuelan immigration on local communities.

	Quality of local services (STD): LAPOP	Trust neighbors (STD): LAPOP	Community attachment (STD): Gallup	Community quality (STD): Gallup	Community likes diversity (STD): Gallup
(a) OLS: Year and Province (LAPOP) or Region (Gallup) fixed effects					
Log Share VZs	−0.007	0.017**	−0.012	0.014	−0.011
	(0.008)	(0.008)	(0.011)	(0.012)	(0.011)
R-squared	0.070	0.061	0.027	0.066	0.053
(b) OLS: Year and Province (LAPOP) or Region (Gallup) fixed effects and time-trends					
Log Share VZs	0.024	0.016	0.002	0.037***	−0.018*
	(0.017)	(0.013)	(0.013)	(0.013)	(0.009)
R-squared	0.085	0.076	0.033	0.075	0.062
(c1) IV: Year and Province (LAPOP) or Region (Gallup) fixed effects and time-trends					
Log Share VZs	0.033*	0.031*	0.011	0.043*	−0.018**
	(0.019)	(0.017)	(0.016)	(0.022)	(0.008)
(c2) Men: IV: Year and Province (LAPOP) or Region (Gallup) fixed effects and time-trends					
Log Share VZs	0.059**	0.059**	0.014	0.058*	−0.022*
	(0.023)	(0.024)	(0.018)	(0.029)	(0.011)
(c3) Women: IV: Year and Province (LAPOP) or Region (Gallup) fixed effects and time-trends					
Log Share VZs	0.006	0.006	0.011	0.028	−0.017
	(0.021)	(0.020)	(0.020)	(0.022)	(0.012)
Individuals	7717	7910	7997	7997	7997
Men	3807	3876	3405	3405	3405
Women	3900	4029	4592	4592	4592

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at province level in parentheses. Log Share Venezuelans is relative to the 2017 population of the province. Outcome variables noted as STD are also standardized. Log Share VZs in the province (region for Gallup outcomes) in 2007 interacted with year fixed effects are used as instruments for Log Share of Venezuelans. All regressions include controls for a quadratic in age, education, marital status, household size and whether employed.

Overall, we find that increased Venezuelan migration leads to improvements in both objective and subjective measures of the lives of Peruvians living in the same locations. This may explain why, even though some media has discussed Venezuelans in a negative light, there has been little political backlash against them in Peru up to this point in time.

5. Conclusion

In this paper, we study the economic underpinnings of hostility and discrimination against immigrants. In our analysis, we first use a specialized survey of Venezuelan immigrants in Peru to identify the causal effect of local labor market conditions on discrimination against immigrants. Then, we study the flip-side of this analysis, namely, how does the presence of Venezuelan immigrants affect Peruvians' labor market outcomes, local crime, and their perceptions about security and their local community.

We document a causal relationship between the level of employment in the informal sector – where most immigrants are employed – and reports of discrimination. While fears of political backlash and anti-immigrant sentiment persist, we do not find any evidence that Venezuelan immigration to Peru had negative labor market consequences for Peruvians or led to increased crime. In fact, the opposite seems to be true with higher local Venezuelan immigration leading to lower crime rates and more educated natives benefiting from higher employment and income, while low-skilled natives remain generally unaffected. These results stand in contrast to those published by the Peruvian Central Bank that identify negative effects on employment and earnings as a result of Venezuelan immigration, concentrated among Peruvian women (Asencios & Castellares, 2020).

Our results suggest that recent policy changes by Peruvian authorities to limit regular immigration from Venezuela are unnecessary.[15] The International Monetary Fund estimates that 0.4 percentage points of Peruvian real GDP can be attributed to Venezuelan immigrants in 2021 and argues that "the long-term benefits of this migration episode will depend on the speed of labor market integration of entrants [...]" (IMF, 2020, p. 6). In light of these results, a better approach would be to help facilitate their arrival, regularization, and (formal) labor market integration (Guerrero-Ble et al., 2020). This would help realize the benefits that the skilled Venezuelan labor force in Peru offers and potentially generate higher incomes, yield greater fiscal revenues, and also generate support for Peru's pension system.

Beyond this, taken together, our results imply that local labor markets in Peru that are more informal are better able to adapt to large migration inflows both in terms of migrant assimilation and the impacts on locals. While the migration of Venezuelans to Peru is quite specific, this evidence suggests that there are perhaps unexpected downsides to labor market formalization in less-developed countries.

Finally, our study also highlights a novel approach for measuring Venezuelan immigrant concentration across Peruvian regions using Google Trend for Venezuelan-specific keywords. Comparing the causal estimates based on this measure with those using our preferred measure from administrative records, we obtain remarkably similar results. We believe that the proposed approach holds promise to significantly ease data limitations for studies on the impact of immigration, especially in developing countries where reliable measures of immigrant settlement are often unavailable. Future work should investigate to which extent these findings can be generalized beyond the context of our study to provide further methodological guidance to empirical immigration studies.

[15] E.g., since June 2019, Venezuelans who want to legally enter Peru have been required to apply for a humanitarian visa in specific Peruvian consulates abroad and provide documentation that is difficult to obtain, such as passports.

Table A.1
First-stage regression for quality of local labor markets

	Overall	Men	Women
	Outcome: Log local informal Emp rate		
Export shock in year prior Oct 2017	−3.358**	−3.188**	−3.602**
	(1.315)	(1.297)	(1.351)
Log local total population 2017	0.032	0.029	0.034
	(0.024)	(0.026)	(0.024)
Log local Venezuelans 2007	−0.034*	−0.031	−0.035*
	(0.019)	(0.020)	(0.019)
Log mean local expenditure 2013	−0.433***	−0.440***	−0.424***
	(0.114)	(0.114)	(0.115)
Log agriculture rate 2007	−0.037	−0.033	−0.042
	(0.040)	(0.039)	(0.041)
Log manufacturing rate 2007	0.143**	0.156**	0.128*
	(0.067)	(0.069)	(0.067)
Log travel duration to Lima	0.034	0.037*	0.030
	(0.021)	(0.022)	(0.021)
R-squared	0.821	0.825	0.825
Observations	7869	4176	3693

Robust standard errors clustered at centro poblado level in parentheses. Local informal employment rate is measured in the 2017 census. All regressions also control for gender, age, education, marital status, months living in Peru, household socioeconomic strata, household size, number of people sharing one's bedroom, total income, whether in formal employment, and occupation including not working and original municipality in Venezuela fixed effects.

Declaration of competing interest

We declare no conflict of interest.

This manuscript is not under editorial review for publication at any other journal and has not been published elsewhere.

Data availability

The replication package can be accessed following this link:

Replication Data for: "Immigration, Labor Markets and Discriminati on: Evidence from the Venezuelan Exodus in Peru" (Reference data) (Dataverse).

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Appendix A. Figures and tables

See Tables A.1 and A.2.

Table A.2
Impact of local labor market conditions on the labor market outcomes of Venezuelans.

	Employment				Log wages if employed	
			Men			
Log local informal employment rate	0.018	0.033	−0.220	−0.051	−0.076	−0.950*
	(0.047)	(0.048)	(0.174)	(0.137)	(0.127)	(0.520)
R-squared	0.055	0.117		0.074	0.122	
Observations	4176	4176	4176	3909	3909	3909
Mean outcome		0.939			6.97	
			Women			
Log local informal employment rate	0.086	0.091	−0.144	−0.101	−0.098	−0.065
	(0.068)	(0.073)	(0.256)	(0.143)	(0.130)	(0.293)
R-squared	0.084	0.135		0.069	0.146	
Observations	3693	3693	3693	2869	2869	2869
Mean outcome		0.782			6.81	
Origin municipality FE	No	Yes	Yes	No	Yes	Yes
OLS/IV	OLS	OLS	IV	OLS	OLS	IV

*** p < 0.01, ** p < 0.05, * p < 0.1. Robust standard errors clustered at district level in parentheses. Local informal employment rate is measured in the 2017 census. The predicted export shock in each district in year prior to Oct 2017 is used to instrument for the informal employment rate. All regressions control for gender, age, education, marital status, months living in Peru, household socioeconomic strata, household size, and number of people sharing one's bedroom and the following variables measured at the district level: log population in 2017, the log number of Venezuelans in 2007, log mean household expenditure in 2013, log agricultural rate in 2007, log manufacturing rate in 2007 and log travel distance to Lima.

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