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# COVID-19 and assimilation: an analysis of immigration from Venezuelan in Colombia

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## Abstract

The increase in global immigration phenomena has impacted local labor markets. The process of social and economic assimilation is crucial to ensure the well-being of both natives and immigrants. This article analyzes the impacts of immigration from Venezuela to Colombia, differentiating the effects of recent and long-term immigration on natives and immigrants. We find that immigration has decreased employment and hourly wages; and increased informality, while the impact on unemployment is null. These effects are higher among immigrants in comparison with the native population. Our results show that even when adverse effects on labor market outcomes are estimated, there is evidence of adaptability to the immigration shock and that an assimilation process is taking place.

**Keywords:** Migration, labor market, assimilation, Colombia.

**JEL Codes:** F22, O15, R23, J61

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# 1 Introduction

The Venezuelan economy has drastically deteriorated in the last decade, driving an unprecedented exodus of international migration in Latin American history. As a result, as of 2020, 5.2 million Venezuelans had left the country. Colombia has been one of the primary destinations hosting around 1.8 million Venezuelan immigrants ([UNHCR, 2020](#)). The magnitude of this immigrant influx motivates us to assess the impact on the labor market for both local and immigrant populations. Recent literature addressing this topic studying the case of Colombia finds negative effects on the wages for natives ([Delgado-Prieto, 2020](#); [Caruso et al., 2019](#)) and positive effects on the hours worked for natives and immigrants ([Martínez Moya et al., 2020](#)). While other studies evidence negligible reduction on the wages in the informal sector and a well-being loss close to zero for Colombian workers ([Santamaria, 2019](#)).

Unexpected aggregate shocks might disproportionately affect immigrants. Existing literature documents that immigrants are more vulnerable to negative shocks as natural disasters, business cycles, and the Coronavirus disease (COVID-19) is not an exception ([Peguero, 2006](#); [Morando, 2021](#)). The International Organization of Migration (IOM) documents that immigrants worldwide have been more vulnerable to economic shocks due to personal, social, situational, and structural factors, and their vulnerabilities are exacerbated by events such as COVID-19 ([IOM, 2020](#)).

In this paper, we assess the impact of immigration from Venezuela on labor market outcomes in Colombia between 2016 and 2021. We analyze how the effect of immigration varies over time, which also allows us to understand whether the effect of immigration varied during the pandemic. That is, we study how the pandemic shapes the impact of immigration on labor market outcomes. To carry out our analysis, we use Colombian household surveys, national censuses, and a novel survey focused on the Venezuelan population. To estimate the effect of the immigration from Venezuela on the native and immigrant population, we implement an event study and use an instrumental variables identification strategy to face endogeneity concerns related to the self-selection of immigrants's settling decisions. Our instrumental variable exploits the variation of past settlements of Venezuelans across states (departments) and the distance between

Venezuelan borders and Colombian departments. To provide some insights on how labor market adapts to immigration influx, our estimates distinguish between recent and long-term immigration rates, considering their time living in Colombia.

On the other hand, our specification enables us to estimate how the impact of immigration varies as a consequence of the pandemic. It allows to identify whether a high incidence of immigration from Venezuela relates to a disproportional impact of the COVID-19 pandemic. Besides, using available information on immigrants' labor market outcomes, perceptions and decisions during the COVID-19 pandemic, we provide evidence of the economic and assimilation process. Our paper contributes to the analysis of economic and social assimilation of immigrants in the global south context. Additionally, the distinction between recent and long-term immigration allows for the analysis of labor market assimilation, which is a crucial factor in determining the urgent demands of immigrants, as well as understanding the impacts on growth and productivity in the long term.

Colombia is an interesting case of study because of the magnitude of the immigration influx and the structural issues of the labor market characterized by persistent unemployment and high informality. In particular, Colombia experienced a rapid increase in the number of Venezuelan immigrants in a short period. According to [Migración Colombia \(2020a\)](#) the number of Venezuelan immigrants in Colombia increased from 31,471 in 2015 to 403,702 in 2017 and 1.8 million in 2020. Second, Colombia exhibits a high unemployment rate, double the average among the Organization for Economic Cooperation and Development -OECD- countries, and a high informality rate (48.7%, [DANE, 2020](#)). Moreover, as a consequence of the social distancing restrictions, the unemployment rate doubled, affecting mainly vulnerable populations and informal workers, where immigrants are mainly represented.

Our findings suggest that immigration from Venezuela had a negative effect on the employment rate and the labor participation, while the effect on unemployment is negligible. Besides, negative effects on hourly wages and positive in informality are also found. Although these effects have similar trends in the two measures of immigration, there are larger effects associated with the recent immigration. This finding implies that the impacts of immigration are not permanent, i.e., there is a sort of adaptation of

the Colombian labor market to the immigration shock. Consequently, even though the long-term immigration rate has increased over time, its effect on the labor market has reduced over time.

Our results are similar when Colombians and Venezuelans are analyzed separately, but with a greater variation for the latter group. For this group we also observe significant variations related to hourly wages. The results imply that there is a greater labor market adjustment among immigrants, which may be related to a higher competition for job opportunities. This is consistent with higher rates of informality and a significant price effect, i.e., a significant drop in labor income. These results contrast with the evidence of economic and social assimilation of immigrants in Colombia. First, it is observed that labor market outcomes improve according to the time of arrival in Colombia, which coincides with expectations of long-term permanence, identification with the Colombian culture, and the construction of social networks. This is also related to pandemic mitigation mechanisms that reflect that immigrants gain degrees of freedom to mitigate impacts of economic shocks. In other words, immigrants with more time in Colombia had the capacity to manage expenses and assets to face the pandemic.

The rest of the paper is organized as follows. Section 2 briefly presents related literature, while Section 3 provides a general context on the immigration from Venezuela to Colombia. Section 4 describes the data and presents the empirical strategy. We present results in Section 5 and 6. Finally, concluding remarks are presented in Section 7.

## 2 Related literature

This paper contributes to three threads of literature. First, it adds to the ample evidence about the impact of immigration on the labor market outcomes in developing economies. In this line, pioneer studies focus on South-North migration. For instance, for the case of Cuban migration to the U.S., [Card \(1990\)](#) finds that immigration affects neither wages nor unemployment rates of less-skilled native workers. In turn, [Borjas and Monras \(2017\)](#) revisit [Card \(1990\)](#)'s results and find that Cuban immigration reduced wages for the low-skill native workers (whose substitutes workers are the immigrants) but had

a favorable effect on high-skilled (whose complementary workers are the immigrants). Similarly, [Ottaviano and Peri \(2012\)](#) show that immigration from 1990 to 2004 had a positive effect on the average wage of native workers in the U.S.

More recent research for developing countries shows contrasting results. For instance, [Ceritoglu et al. \(2017\)](#) and [Tumen \(2016\)](#) show that Syrian migration affects the informal sector in Turkey, especially among the most vulnerable groups such as women, youth, and less-educated workers. However, [Fallah et al. \(2019\)](#) do not find significant effects of the Syrian immigrants on Jordan's labor market outcomes. In Latin America, immigration from Venezuela has motivated a similar analysis. Studies like [Olivieri et al. \(2020\)](#) for Ecuador and [Boruchowicz et al. \(2021\)](#) for Perú find negligible effects on occupation status and hours worked. The latter also shows that immigration from Venezuela generates reallocation of local workers toward low-skilled jobs. [Shamsuddin et al. \(2021\)](#) find negative effects on employment for women but not for men in an analysis of immigration from Venezuela to Roraima (a Brazilian city that borders Venezuela).

Regarding the Colombian case, mixed and heterogeneous impacts across formality status, skills, and gender has been reported. For instance, [Caruso et al. \(2019\)](#) study the consequences of immigration from Venezuela on labor and poverty outcomes for Colombians between 2013 and 2017. Its sample considers immigrants who moved from Venezuela to Colombia in the preceding 12 months, which is the same definition we use to determine the recent immigration and is consistent with the definition of [DANE \(2019\)](#). Using a shift-share instrument variable, authors report that an increase of one percentage point (pp.) in immigration rate reduces informal sector wages by 10 pp. in urban areas, and that is higher for men. Negative impacts on income and poverty are also documented.

[Delgado-Prieto \(2020\)](#), considering an instrumental variable strategy based on the distance between capital cities in Colombia and Venezuela and the past settlement, also finds a negative effect on wages and employment. [Delgado-Prieto \(2020\)](#) argues that firms reallocate employment from formal to informal workers as a response to the reduction in informal wages. The latter is consistent with the findings of [Santamaria \(2019\)](#) that shows that the reduction on employment in the formal sector is mostly explained by a transition of Colombians from the formal to the informal sector. [Lebow \(2021\)](#) provides evidence that in a scenario where immigrants do not experience occupational downgrading, less

educated natives substantially increase their hourly wages.

[Bonilla-Mejía et al. \(2020\)](#) demonstrate that Venezuelan migration does not significantly affect the unemployment of natives, but it increases the unemployment of immigrants. This is explained because job losses for natives are mostly driven by self-employed workers. Focusing on heterogeneous effects by gender, [Pedrazzi and Peñaloza-Pacheco \(2020\)](#) find that Venezuelan migration reduced employment for low-skilled women natives but increased employment for high-skilled, especially those with children. A redistribution of time use explains the latter where high-skilled women substitute between paid and unpaid work. Further work like [Martínez Moya et al. \(2020\)](#), [Lombardo et al. \(2021\)](#) and [Lombardo and Peñaloza Pacheco \(2021\)](#) study the Venezuelan immigration effect on other outcomes such as productivity, income distribution, and exports, respectively.

The second thread of literature relates to the growing studies that investigate the economic consequences of the COVID-19 pandemic on immigrants ([Atkeson, 2020](#); [Jordá et al., 2020](#); [Ramelli and Wagner, 2020](#)). In Jordan and Lebanon, [ILO \(2020\)](#) explores the employment conditions and COVID-19 consequences for immigrants. They conclude that immigrants are more vulnerable to the shock as they usually work in the more affected sectors, characterized by high informality, and therefore, experienced stronger lay-offs and income drops. Indeed, other institutions like [United Nations \(2021\)](#) document that this pandemic increased xenophobia in the host countries. [Bossavie et al. \(2020\)](#) show that immigrants in European Union experienced higher exposure to income and health shocks triggered by COVID-19. In the case of U.S., [Béland et al. \(2020\)](#) find that immigrants' employment rate, hours worked and wages were disproportionately affected by COVID-19. Analogous results are also reported by [Morando \(2021\)](#) in the UK. Overall, these findings are explained by the activity and occupation segregation of immigrants (see also [Dustmann et al., 2010](#); [Orrenius and Zavodny, 2010](#)).

To mitigate the pandemic's impacts, households might react by adjusting their labor market and consumption decisions. In this regard, [IOM \(2021\)](#) reports that immigrants in Libya reduced investment in health and education as well as remittances to their home country. In turn, [Sohel et al. \(2021\)](#) find that immigrants in Dhaka city (Bangladesh) reduced food consumption. [Tang and Li \(2021\)](#) also document that

immigrants in China, in response to COVID-19, reacted by reducing their housing costs, searching for a secondary job and returning to the origin city.

Third, we also contribute to the literature related on labor market outcomes gaps and their relation to economic and social assimilation factors. In this context, assimilation refers to the overtime convergence in the labor market or other economic outcomes between natives and immigrants (Albert et al., 2021; LaLonde and Topel, 2007; Cadena et al., 2015; Borjas, 1985). In this branch of literature, Chiswick (1978) and Borjas (1985) provide evidence showing that the wages of immigrants get closer to the natives in the U.S. after 10-15 years of migration. In additional evidence for the U.S., Albert et al. (2021) and LaLonde and Topel (2007) explain that the wage gap between natives and immigrants depends on the magnitude of the immigration influx and the substitution between local and immigrant labor. Fernández and Ortega (2008) present evidence of economic convergence between immigrants and natives in Spain. Specifically, authors demonstrate that immigrants initially had higher labor participation rates, unemployment rates and temporary contracts, however after five years, labor participation and employment rates start to converge to the natives' level.

In contrast, Abramitzky et al. (2014) and Alcobendas and Rodríguez-Planas (2009) find little evidence of convergence in labor market outcomes between immigrants and natives in the U.S. and Spain, correspondingly. Abramitzky et al. (2014) observe a permanent initial earnings gap between European immigrants and natives between 1850 and 2013. According Lee et al. (2022) in Western European countries, immigrant men are more likely to have an employment probability equal to or greater than natives with similar characteristics after ten years, unlike women who do not fully converge in that period of time. Similarly, Alcobendas and Rodríguez-Planas (2009) find that wages between immigrants and natives in Spain do not converge with time after controlling by occupation. Instead immigrants are segregated in terms of occupations due to the imperfect substitution of native and immigrant labor. Moreover, there are factors different from the human capital of immigrants that also determine assimilation. In particular, it might be conditioned by the age at arrival (Friedberg, 1992; Bacolod and Rangel, 2017; Aydemir and Duman, 2021), country or region of origin (Rendall et al., 2008; Amuedo-Dorantes and De la Rica, 2007), the economic conditions at time of arrival



(Barsbai et al., 2022), and the regularization and citizenship policies (Gathmann and Keller, 2018).

Assimilation from a social perspective has also been analyzed. Social assimilation is commonly measured as self-perceived local identity, local language proficiency, happiness living in the host country, social interactions, and related outcomes (Cai and Zimmermann, 2020; Piracha et al., 2022; Constant et al., 2006). Among other measures, Gagliarducci and Tabellini (2022) use intermarriage, residential integration and naturalization rates as measures of social integration.

Likewise, Cai and Zimmermann (2020) investigate the impact of local identity on the labor market performance of internal immigrants in China. Results suggest that a strong local identity increases wage and weekly hours worked. Besides, a strong local identity rises the likelihood of using local networks in the job search. Piracha et al. (2022) show that immigrants' assimilation in Australia is positively correlated with the formation of networks and plays a more relevant role for immigrants in good times than during economic downturn. Networks also help immigrants to mitigate negative shocks. OECD (2020) highlights the importance of immigrants' networks during the pandemic, however, Burton-Jeangros et al. (2020) and Srivastava et al. (2021) show that internal immigrants in Israel and India make a low use of networks which is a sign of lack of trust (see also Yen et al., 2021; Sabar et al., 2021, for related discussion).

But there is also a relationship between economic and social integration. Economic integration facilitates social integration in the way that workplace favors inter-ethnic social relationships, specially for less educated immigrants (Hannafi and Marouani, 2022; Kokkonen et al., 2015; Carillo et al., 2022). Likewise, they show that language proficiency, having a child in Germany, and more acquaintances from other countries increase social integration. However, it has been also find no link between social and economic integration (Eisnecker, 2019).

## 3 Context

### 3.1 Immigration from Venezuela to Colombia

In the last two decades, the Venezuelan government raised expenditure based on oil revenues. However, in 2014 the oil price went down, and consequently Venezuelan economy contracted dramatically (see [OECD, 2018](#); [Lombardo et al., 2021](#); [Alhadeff, 2021](#)). In particular, this shock produced a rapid increase in the inflation rate, a shortage in basic needs, and a reduction in the GDP growth (-3%) ([Caruso et al., 2019](#); [Ramoni Perazzi et al., 2017](#)).<sup>1</sup> This was couple with the political issues between the Colombian and Venezuelan governments. In 2015, Nicolas Maduro, The Venezuelan president, decided to close the border causing significant economic losses, but protests and international pressure forced to re-open it in July 2016.

As a result of a worsening socioeconomic and political situation, immigration from Venezuela increased substantially until becoming the largest exodus in Latin American history and worldwide after the Syrian immigration. Between 2015 and 2019, around 5 million Venezuelans have migrated to neighboring countries such as Colombia, Peru, Ecuador, Chile, Brazil, and Argentina ([CMS, 2021](#)). The two main destinations for Venezuelan immigrants outside Latin America in 2018 were Spain and the U.S. ([Inter-American Development Bank and OECD, 2021](#)).

Figure 1 shows that Venezuelan migration remained relatively stable until 2015, when the stock reached a total of 180,000 immigrants. From this year onwards, there has been a remarkable upward trend and as of 2020, Colombia has received approximately 1.8 million immigrants.

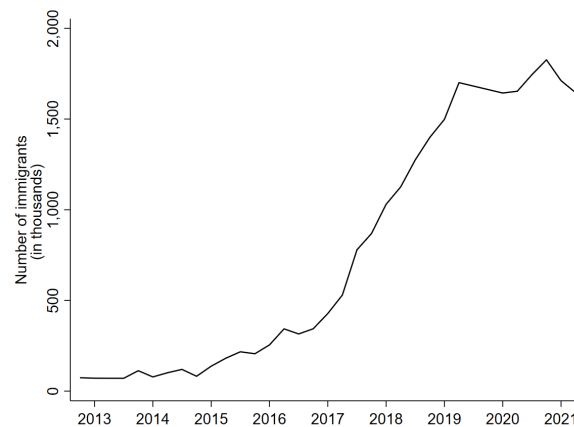
In general, there are two critical moments in this timeline, 2017 and 2020. In both, we observe an inflection in the influx growth. In 2017 the immigration from Venezuela started growing rapidly as a consequence of the economic situation and the political violence (as response to the protests due to the defeat of the opposition party in the local government elections). This growth trend vanished during 2020, i.e., a relevant number of Venezuelans

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<sup>1</sup>Venezuelan inflation rate was 929.8% in 2019 ([Shamsuddin et al., 2021](#)).

returned to their country. From March 14 to August 3 around 95,000 Venezuelans returned to their country mainly because of the loss of employment ([Graham and Guerrero, 2020](#); [Migración Colombia, 2020b](#)). Notably, the sociodemographic characteristics of the immigrants have varied overtime. The first wave of immigrants, post-2017, corresponded to highly educated immigrants, while 2018 and 2019 were characterized by the inflow of low-income immigrants.

Figure 1: Stock of Venezuelan immigrants in Colombia



*Notes:* The sample is restricted to working age-immigrants. We apply interpolation techniques for the first and second quarter of 2020 to address the missing data issues that affected household surveys collection during pandemic confinement.

*Source:* Authors' calculations using the GEIH, DANE.

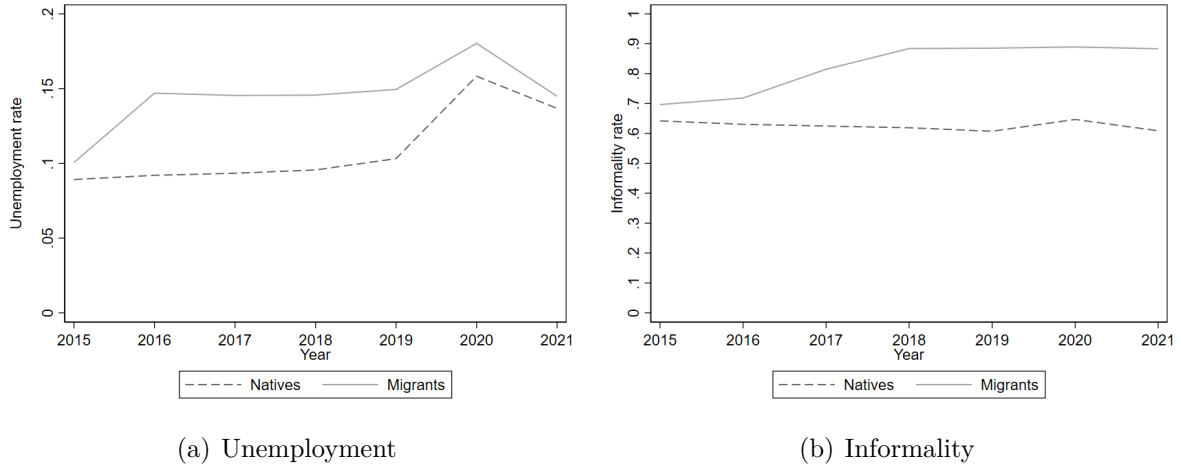
### 3.2 COVID-19 in Colombia

Globally, COVID-19 infection started in December 2019, but the first positive case in Colombia was reported on March 6, 2020 ([Rosselli, 2020](#)).<sup>2</sup> On March 23, 2020, the Colombian government ordered a mandatory and national lockdown which implied schools closures, prohibition of mass events, among other restrictions. Indeed, Colombian lockdown was one of the strictest in the world ([Cárdenas et al., 2020](#)). On August 30, 2020, after 150 days of mandatory lockdown, the Colombian government announced the gradual reopening of public establishments. Until October 2020, Colombia was the second country with the highest cumulative cases in Latin America and the fifth highest in the world ([World Health Organization, 2020](#)).

<sup>2</sup>COVID-19 is a viral infection that can cause severe respiratory syndrome with severe pneumonia ([Coccia, 2020](#)). Despite some infected people has no symptoms, most of the infected could present a clinical picture with fever, cough, loss of taste and smell, muscle pain, fatigue, diarrhea and difficulty breathing, among other symptoms ([Malagón-Rojas et al., 2021](#)).

COVID-19 pandemic has placed extreme pressure on the health system but also on the labor market outcomes. Figure 2 displays the evolution of unemployment and informality rates for Colombians and Venezuelans between 2015 and 2021. We define informality following the approach proposed by [OECD \(2019\)](#).<sup>3</sup> Figure 2 indicates that unemployment and informality rates were similar in 2015 but the difference became higher after 2016. This trend remained until 2020, when the pandemic reduced the difference in both variables between natives and immigrants. In the case of unemployment, immigrants experienced an increase in the unemployment rate, but the rise for natives was higher. In turn, the informality gap between natives and immigrants also decreased in 2020 because of the higher increase in informality for Colombians.

Figure 2: Unemployment and informality rates of natives and immigrants



*Notes:* Informality rate is constructed using [OECD \(2019\)](#) definition.  
*Source:* Authors' calculations using the GEIH, DANE.

There is evidence that COVID-19 affected immigrants from Venezuela and natives differently in Colombia. In 2019, 90% of employed Venezuelans worked as informal compared to the 60% of employed Colombians. And, sectors with high levels of informality tend to be the most affected by COVID-19 ([Dempster et al., 2020](#)). According to [Graham and Guerrero \(2020\)](#), using data from Colombian household surveys of 2020, 64% of Venezuelan immigrant workers were working in highly impacted sectors compared to the 47% of Colombians; while only 3% of immigrants were working in the least impacted

<sup>3</sup>This definition differentiates between informal employment and informal sector by analyzing specific characteristics of the firm (i.e bookkeeping, registration, place of work, among others) and the employment (i.e status in employment, economic unit, social security contributions and paid annual/sick leave). See [OECD \(2019\)](#) for details. We adapted the definition as information on destination destination is not available in GEIH.

sectors, compared to the 13% natives.

It is worth mentioning that the Colombian government implemented cash transfers, tax deferrals and subsidies for businesses and low-income households to face the economic impact of the pandemic. Colombian government included immigrants to be beneficiaries of cash transfers, health services, access to COVID-19 testing, and treatment in public hospitals.

## 4 Data and empirical strategy

### 4.1 Data

We use three pieces of information: Gran Encuesta Integrada de Hogares (GEIH) from 2016 to 2021, Pulso de la Migración, and the Colombian national census of 2005. GEIH is the Colombian household survey that is collected in rural and urban areas every month. This survey provides information about population characteristics, housing characteristics, employment conditions, migration, among others. These modules allow to have rich information about employment status, whether the individual is immigrant, wages, as well as education level, gender, and other sociodemographic features. Our analysis includes the following outcomes of interest: employment, unemployment, labor participation, weekly hours worked (in logs), hourly wage (in logs)<sup>4</sup>, and informality.<sup>5</sup>

We consider immigrants as those who were in Venezuela either 12 months or 5 years ago, without considering their nationality. This means that we are including also Colombians and other nationalities citizens that migrated from Venezuela to Colombia. The migration module provides information about the origin country and whether the immigrant is recent (less than 12 months) or a long-term immigrant (between 12 months and 5 years).

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<sup>4</sup>We consider wage for salaried workers and labor income for employers and self-employed.

<sup>5</sup>Labor participation outcome is a dummy variable that takes the value of one when the respondent is either employed or unemployed. For hourly labor income we exclude domestic employees, unpaid family worker and unpaid worker in companies or businesses of other household. Informality is defined following [OECD \(2019\)](#).

In turn, *Pulso de la Migración* consists of a Venezuelan immigrants panel data collected by the Colombian national statistics institute, DANE. This survey is representative at national level and is gathered by phone bimonthly interviews since July 2021. The sample is selected from the first semester of 2021 respondents of the GEIH's migration module. PM aims to take the pulse of the immigrant population and capture relevant information about the immigration process, adaptation to Colombian society, and perceptions about the future. For our purpose, we use three waves which cover from July 2021 to February 2022.

Lastly, we consider the national census for 2005 to build an instrumental variable for the immigration rate based on past settlements. This instrumental variable, that will be discussed later, follows [Card \(2001\)](#) and [Caruso et al. \(2019\)](#), that use the proportion of immigrants in a specific department (state) as a predictor of the current geographical distribution of immigrants. Preliminary descriptive analysis, using the last two national census, shows a correlation of 0.87 between the shares of immigrants at the department level between 2005 and 2018.

Considering annual cohorts of GEIH, we study how the immigration impacts labor market outcomes. This makes it possible to investigate how this impact changes with the pandemic and subsequent recovery. To provide some insights into the changes in immigrant characteristics and their labor market outcomes, a comparison is made between 2016 (before the largest exodus), 2019 (after influx shock and before the pandemic), and 2020 (pandemic period). [Table 1](#) shows the main labor market outcomes and sociodemographic characteristics, considering working age-population and data for the last quarter of each year. In general, Venezuelan immigrants exhibit worse labor market outcomes than local population, i.e., higher unemployment rate, higher informality and lower wages. Differences between natives and immigrants turn out statistically significant. It also reveals the significant increase in immigration influx, i.e., between 2016 and 2020 the stock of working age-immigrants multiplied by 10.

The massive immigration between 2017 and 2018 changed the profile of the Venezuelan immigrants in Colombia. Between 2016 and 2019, it is observed a decrease of 8 pp. in the proportion of immigrants with high education. While in terms of the labor market outcomes, we observe a higher informality and a lower unemployment, which is consistent

with a drop of 43% in average labor income (in real terms) in the same period. The comparison between 2019 and 2020 does not show important differences in the immigrant characteristics in terms of age, gender and education. As expected, unemployment grows for immigrants and locals, with a higher increase for the latter. Although, average labor income decreased of 1.5% for natives and 3.4% for immigrants. This result shows possible differences in labor market adjustment mechanisms between the two populations as a consequence of the pandemic. While for Colombians there may be an important quantity effect that is consistent with an increase in the unemployment rate, in the case of immigrants there seems to be a sort of relevant price effect, which is consistent with the higher reduction in labor income.

Table 1: Socioeconomic characteristics of Venezuelan immigrants and Colombians. 2016-2020.

	2016			2018			2020		
	Natives	Immigrants	Mean diff.	Natives	Immigrants	Mean diff.	Natives	Immigrants	Mean diff.
<b>Labor outcomes</b>									
Employment rate	68.56	63.39		67.07	69.89	***	61.24	66.57	***
Unemployment rate	8.49	17.64	***	9.38	14.93	***	14.17	14.98	*
Labor participation	74.93	76.97	**	74.01	82.16	***	71.35	78.29	***
Weekly hours worked	44.92	51.66	***	44.48	50.40	***	44.41	48.80	***
Monthly labor income	949,732	1,177,981	**	1,001,135	659,331	***	967,845	631,604	***
Informality rate	61.57	86.56	***	60.52	89.15	***	59.91	89.79	***
<b>Sociodemographic characteristics</b>									
Age	35.94	27.10	***	36.31	29.76	***	36.61	30.64	***
% Female	51.17	48.28	**	51.24	49.50	***	51.05	50.46	**
<b>Education</b>									
% None	3.59	1.63	***	3.45	1.33	***	2.82	1.17	***
% Primary	21.98	8.54	***	21.01	7.05	***	19.36	12.16	***
% Secondary	48.09	58.77	***	49.34	63.45	***	50.29	64.56	***
% Higher education	26.30	31.06	*	26.19	28.16	***	27.53	22.08	***
N	128,713	486		122,372	3,165		118,505	5,097	
Population	30,936,054	125,890		31,056,281	811,015		31,067,146	1,448,191	

*Notes:* Data used for estimations corresponds to the fourth quarter for every year. We use sampling weights for calculations, including population estimates. Calculations are based on working age-population. Monthly labor income is 2018 constant prices. \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%.

*Source:* Authors' calculations using the GEIH-DANE, 2016-2020.

To complete the picture in the analysis of the pandemic, we analyze the same variables between 2019 and 2021 (see Table 2). In addition, we compare changes between recent and long-term immigrants. This comparison is informative about the adaptation of immigrants and labor market assimilation. Table 2 shows that recent immigrants present an unemployment rates that is twice as high as that for both locals and long-term immigrants in 2019. These differences are also present in labor income where recent immigrants present an average that is equivalent to 80% of their counterpart immigrants and 52% of native workers. The arrival of COVID-19 doubled the local population's

unemployment rate. A greater impact is observed for long-term immigrants with an increase of 16.4 pp., almost three times with respect to the level in 2019. For recent immigrants, this effect was more attenuated, 12.1 pp. Besides, a significant variation in the employment-intensive margin is noticed. In particular, the average weekly hours worked are reduced for the two groups of immigrants by about 5 hours, while little variation is observed for native workers. These results are consistent with an important decline in labor income.

Table 2: Socioeconomic characteristics of Venezuelan immigrants in Colombia before, during and after pandemic

	2019			2020			2021		
	Natives	Recent Immigrants	Long-term Immigrants	Natives	Recent Immigrants	Long-term Immigrants	Natives	Recent Immigrants	Long-term Immigrants
<b>Labor market outcomes</b>									
Employment rate	65.59	59.07	71.88	51.86	38.46	50.62	54.84	51.15	62.69
Unemployment rate	10.07	23.77	10.98	20.80	35.88	27.42	15.19	31.55	16.67
Labor participation	72.94	77.49	80.75	65.48	59.98	69.74	69.38	74.73	75.23
Weekly hours worked	44.09	48.37	51.44	44.47	43.47	46.36	44.50	50.27	50.38
Monthly labor income	994,744	519,292	643,195	842,068	415,312	474,315	949,345	536,480	628,804
% Informality	58.25	94.74	86.96	61.94	95.45	90.74	58.25	96.14	88.93
<b>Sociodemographic characteristics</b>									
Age	36.49	30.33	29.67	36.56	29.90	29.97	36.73	29.25	30.80
% Female	51.04	53.34	49.06	50.95	51.68	53.41	51.00	51.54	50.53
<b>Education</b>									
% None	3.44	0.93	1.37	2.89	1.30	1.23	3.06	0.36	1.02
% Primary	20.24	10.66	9.27	18.88	12.15	7.62	18.89	7.80	7.83
% Secondary	48.31	62.06	64.30	51.18	63.84	66.62	49.34	77.07	69.37
% Higher education	28.01	26.34	25.05	27.05	22.72	24.53	28.70	14.77	21.75
N	81,848	1,268	1,885	83,888	399	2,810	76,074	394	3,165
Population	30,834,871	502,306	660,722	31,003,338	191,849	1,059,776	31,043,477	172,579	1,495,555

*Notes:* Data used for estimations corresponds to the May and June for every year. We use sampling weights for calculations, including population estimates. Calculations are based on working age-population. Monthly labor income is in 2018 constant prices.

*Source:* Authors' calculations using the GEIH, DANE.

In 2021 there has been a remarkable recovery of the Colombian economy. The unemployment rate has been gradually reduced from 24.2% in May 2020 and to 16.3% in June 2021. Although this level is above that observed in 2019. The unemployment rate is significantly reduced for the three populations. The pace of recovery is more pronounced for long-term immigrants, a reduction higher than 10 pp. This indicates that arrival time facilitates adaptation to labor market, but the responds to the shock is considerably more volatile. On the other hand, there is also a recovery of the intensive margin of employment for immigrants, in both cases the average is above 50 hours. Finally, labor income also increases, specially for long-term immigrants.



## 4.2 Identification strategy

To estimate the impact of immigration on labor market outcomes and their differential behavior during lockdown and recovery periods, we use an instrumental variable identification strategy and an event study specification. The immigration rate in a particular location is neither exogenous nor random. Hence it is necessary to remove confounders from the migration decision. This has been overcome in the literature using instruments correlated to immigration rate but unrelated to unobservable variables determining the labor market outcomes, e.g., the fact that immigrants self-select in regions with better economic outcomes.

Our general estimating equation considers an event study centered in 2020 to facilitate interpretation, as follows:

$$Y_{idrt} = \alpha + \beta_0 M_{dt} + \sum_{\tau=2016}^{2021} \beta_{\tau} M_{dt} D_{\{\tau=t\}} + \gamma_t + \gamma_r + \delta X_{idt} + \epsilon_{idrt} \quad (1)$$

where  $i$  stands for individual,  $d$  refers for department,  $r$  for region, and  $t$  represents year.  $Y_{idrt}$  is our labor market outcome of interest, in our case, is either labor status or job conditions. The immigration rate  $M_{dt}$  is the share of the working-age immigrants in the department  $d$  in period  $t$  related to the total stock of the working-age population in the department. We measure two immigration rates, one referring to recent immigrant stock and the other considering long-term immigrants.<sup>6</sup> The idea behind is to study whether labor market adapts to immigration shocks, so that a larger shock of recent immigrants would imply deeper adjustments, while if longer-term immigrants have a higher level of assimilation, implying lower impacts.  $\gamma_t$  are the year fixed effects, and  $\gamma_r$  are the region fixed effects.

The  $\beta_{\tau}$  is the interaction coefficient between the immigration rate  $M_{dt}$  and year dummies,  $D_{\{\tau=t\}}$ , that capture the impact of the immigration rate on the outcome of interest. Therefore,  $\beta_0$  corresponds to the effect in 2020.  $X_{idt}$  is a set of individual characteristics including gender, age, age squared, education, a dummy variable for head

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<sup>6</sup>The recent immigrants are those immigrants who lived 5 years and 12 months ago lived in Venezuela, while long-term immigrants are those who lived in Venezuela 5 years ago but 12 months ago were already living in Colombia.

of household, a dummy for rural areas, the dependency ratio of the household, and the GDP growth at the department level, and unemployment rate. The latter variables allow us to control for pull factors affecting migration settling decisions. Lastly,  $\epsilon_{idrt}$  is the error term.

The immigration rate is potentially endogenous because immigrants self-select where they settle according to unobservable factors such as better economic opportunities, networks, violence, or political conditions (Card, 1990; Del Carpio and Wagner, 2015; Morales, 2018; Caruso et al., 2019; Delgado-Prieto, 2020; Bohnet et al., 2021). To estimate the causal impact of immigration, we build an instrument using the distance to a Venezuelan official entry point and the past settlements of immigrants as a source of exogenous variation. This class of instruments are known as shift-share or Bartik instrument (see Bartik, 1991). The intuition behind this is that the immigration rate can be instrumented by combining the spatial distribution of a shock (shift), the number of immigrants in this case, and an exogenous characteristic (share). In this case, our instrument is defined as follows:

$$IV_{dt} = \frac{\theta_{d2005}}{T_{bd}} P_t \quad (2)$$

Where  $b$  refers to the Venezuelan border.  $T_{bd}$  is the minimum distance between the capital city of each department and an official entry point.  $\theta_{d2005}$  is the share of Venezuelans in each department in 2005, which is computed based on the national census.  $P_t$  is the total immigrant stock from Venezuela to Colombia in year  $t$ . Therefore,  $IV_{dt}$  is the predicted number of immigrants that would arrive in a particular department  $d$  in a year  $t$ .<sup>7</sup>

The validity of the instrument lies in the fact that immigrants tend to settle in places where other immigrants have previously arrived. This idea has been documented by Hoover et al. (1999); DaVanzo (1983) and Rodríguez-Pose and von Berlepsch (2020). In addition, it is required that settlement patterns are not related to other

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<sup>7</sup>Validity of the instrument also depends on how networks determine immigrants settlement decisions. We compare the distribution of immigrants reported by national census in 2005 and 2018 (see Figure 10). It shows that regions close to the border host a high proportion of the immigrants, but also the four main cities (Bogota, Medellin, Cali, and Barranquilla) are important. Moreover, the correlation between the percentage of Venezuelan immigrants in 2005 and 2018 is 0.87. This support the hypothesis that past settlement of immigrants works well to predict the current immigration flows.

factors determining immigrant settling decisions, i.e., a threat to this identification strategy is that endogeneity might not be solved by the instrument if there are serially correlated labor market demand shocks (Cho, 2019). This appears when unobservable factors might determine the economic conditions and employment of the immigrants (Costas-Fernandez, 2018). Therefore, to control for local labor demand shocks, our model controls by GDP growth rate and the unemployment rate at the department level (see also Caruso et al., 2019).

## 5 Impact of immigration on the labor market

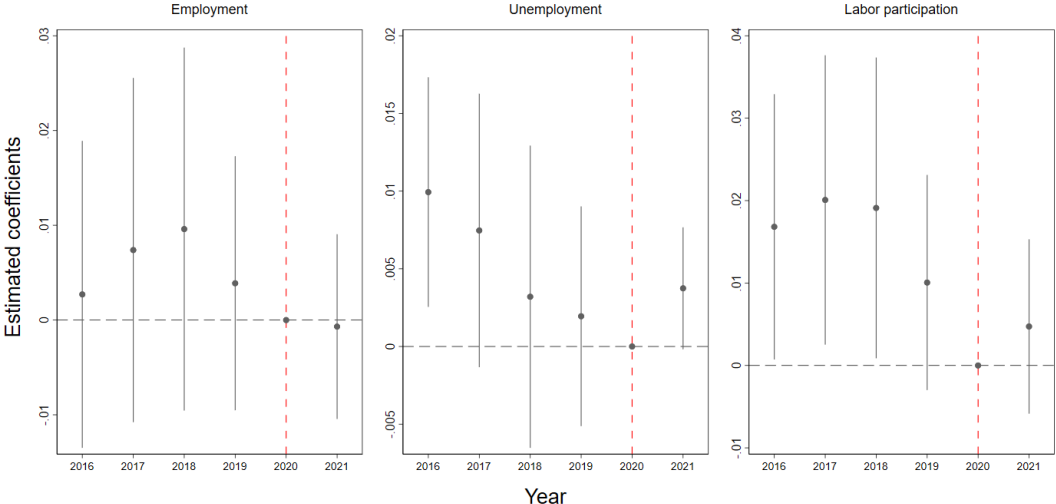
Following the specification in Equation 1, we estimate the impact of recent and long-term immigration on labor markets for the whole labor market and also separating by natives and immigrants. We estimate both OLS and IV regression, however we will focus on the latter. We report in the Appendix the complete estimates. To provide evidence of the relevance and validity of our instrument, we present results for the first stage (see Table 6 in Appendix). These results show a strong and positive relationship between the past settlements of immigrants and the current immigration rate.

We first study the effect on labor status. The estimation for these groups is presented in Figures 3, 4 and 5, respectively. In general, the results that recent immigration has a higher influence on labor market status (see Table 9). Employment and labor market participation turn out negative and significant, while unemployment is not significant, although positive. For instance, for 2020, an increase of 1 pp. in the recent immigration rate reduces the employment rate by 2.45 pp. and labor participation by 3.34 pp. For long-term immigration, the magnitude is significantly lower, 0.39 pp. and 0.55 pp., respectively. This might suggest that the labor market adapts to migratory shocks so that the greatest impact is explained by recent immigration.

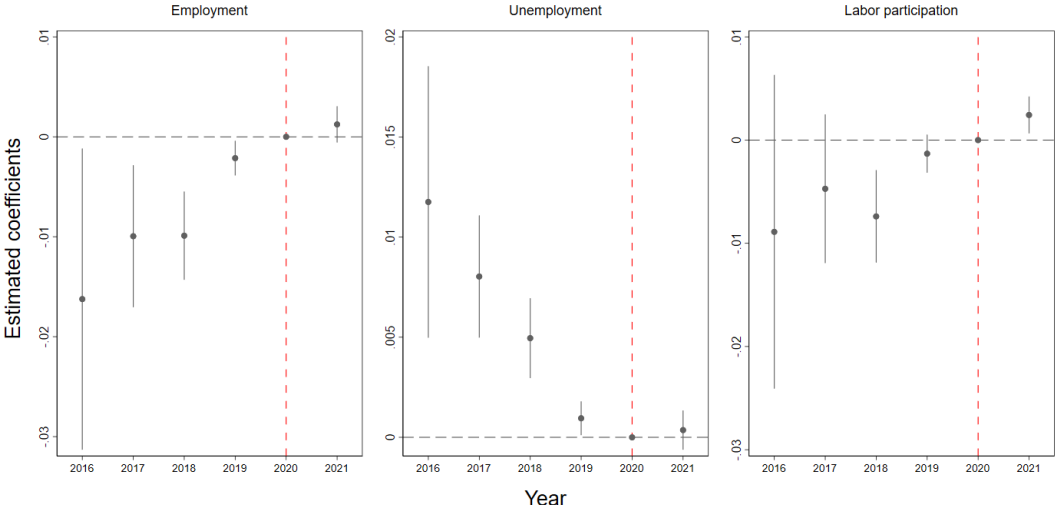
Significant differences in the magnitude of the impact have been observed yearly, mainly for the long-term immigration. The recent immigration has a greater effect on unemployment and labor participation in 2016. This impact has been monotonically decreasing for unemployment, while the impact on labor participation has been deepening

up to 2018. In turn, in the post-pandemic year, there are no significant differences with respect to 2020. In the case of long-term immigration, greater volatility is observed compared to 2020. The negative impact on employment and unemployment appears to be higher before the pandemic, which is consistent with our previous findings. In contrast, the changes in participation do not appear to be significant. The fact that most of the coefficients for 2021 are not significant indicates that the impact of immigration has not been shaped by the rapid recovery of the economy, which can be interpreted as the recovery is not unequal with respect to the immigration shock.

Figure 3: Impact of immigration on labor market status



(a) Impact of recent immigrants

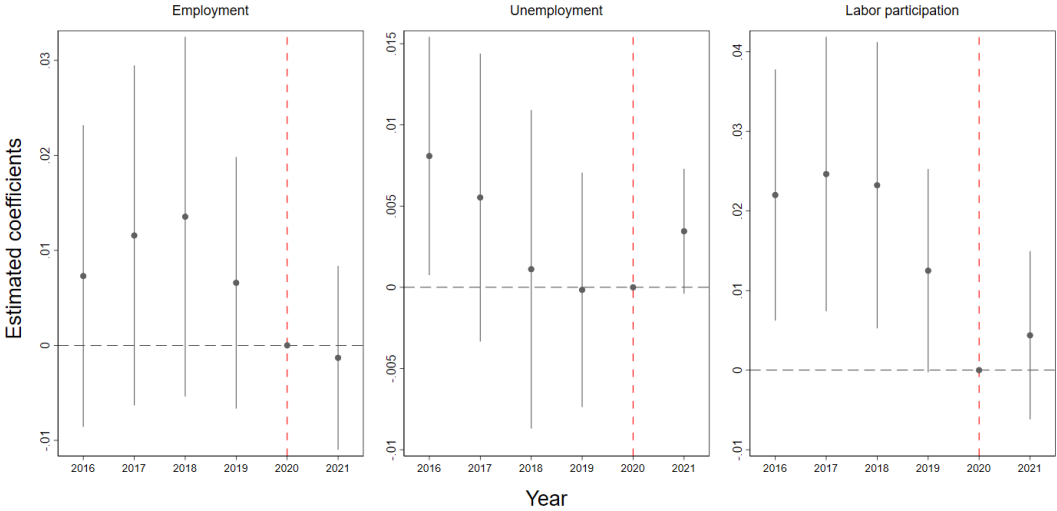


(b) Impact of long-term immigrants

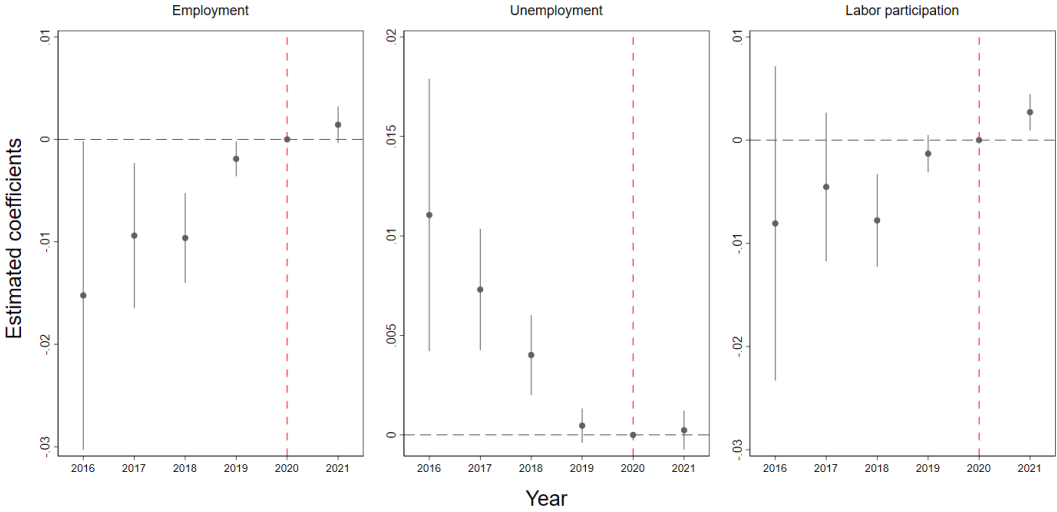
Source: Authors' calculations using the GEIH, DANE.

Regarding the differences between Colombians and Venezuelan immigrants, we find interesting facts. First, the effects are greater among immigrants in 2020, especially when considering recent immigration's impact. For instance, in terms of employment, the impact is 1.4 pp. greater for Venezuelan immigrants and is even more significant when considering the labor participation outcome, where the difference is 1.65 pp. With respect hypothesis of competition in the labor market, these results imply that increased immigration generates greater competition among immigrants for employment opportunities (see also [Bonilla-Mejía et al., 2020](#)).

Figure 4: Impact of immigration on labor market status for natives



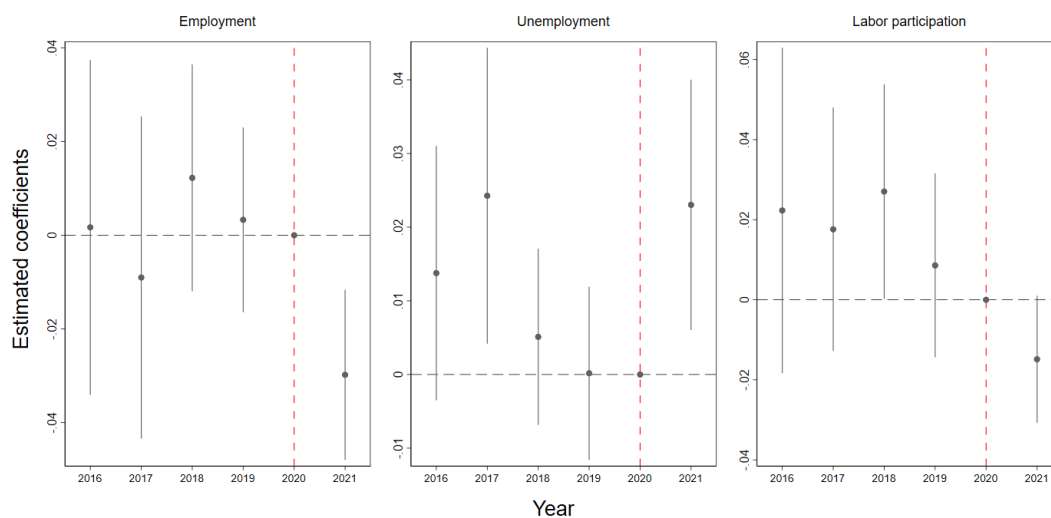
(a) Impact of recent immigrants



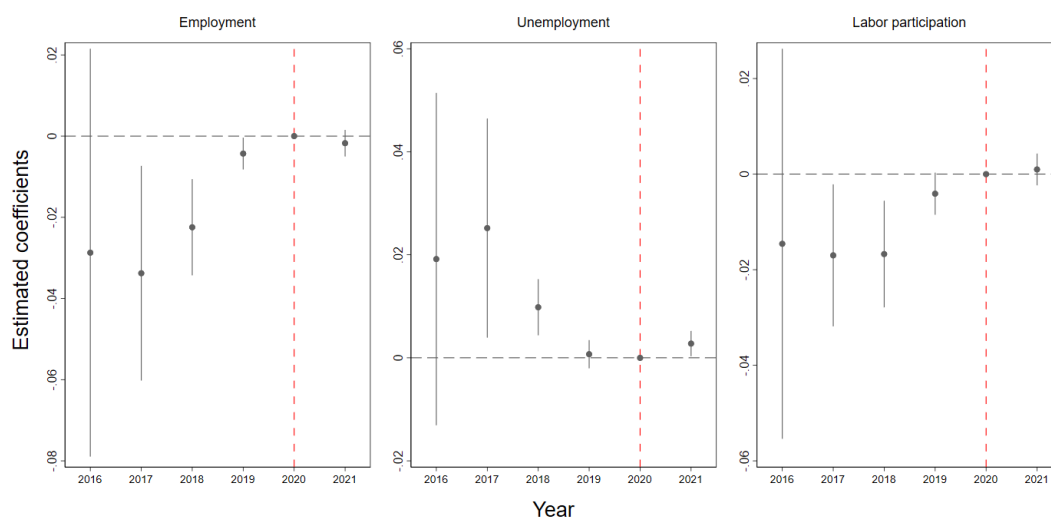
(b) Impact of long-term immigrants

Source: Authors' calculations using the GEIH, DANE.

Figure 5: Impact of immigration on labor market status for immigrants



(a) Impact of recent immigrants



(b) Impact of long-term immigrants

Source: Authors' calculations using the GEIH, DANE.

Analyzing the variation of the estimated impacts, greater volatility in the change of outcomes on immigrants is observed. Moreover, there are significant differences with respect to the pandemic period in the effect of immigration on the participation of Colombians. In particular, this effect was less pronounced before the pandemic. In contrast, the increase in unemployment was higher in the pre-pandemic periods. This result is similar when analyzing the effect of long-term immigration, as it generates a non-significant effect in 2020, but positive and relevant in magnitude between 2016 and 2018. In this case, there is also a significant reduction over time, which could be evidence

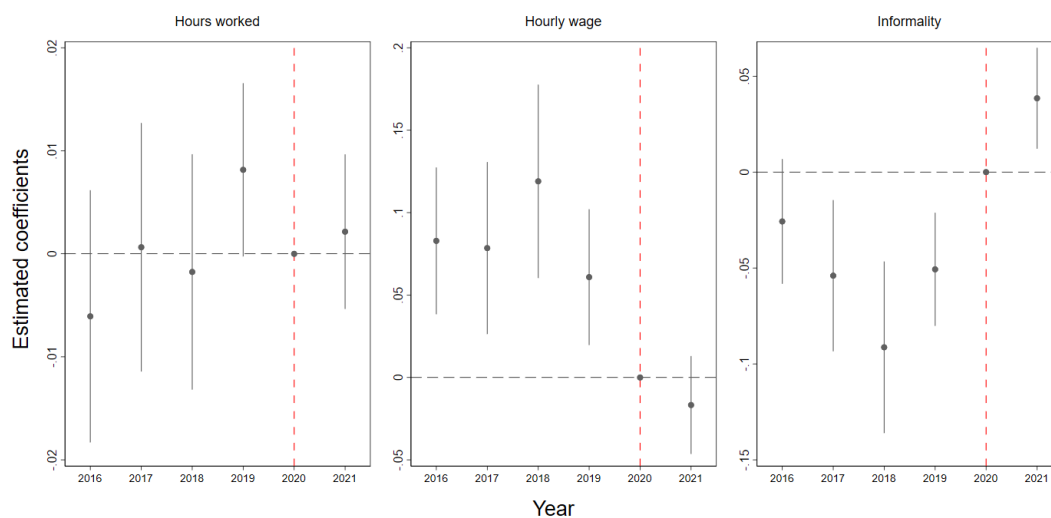
of a level of adaptation in terms of labor participation. The same trajectory is observed in the effect of long-term immigration on employment.

An important result is that the impact of recent immigration on unemployment appears to be null in general. Therefore the effect on Colombian unemployment is explained by longer-term immigrants. In general, trends for immigrants are similar with higher magnitudes. This is in addition to the fact that the greatest impact is during the pandemic, which is consistent with findings in [ILO \(2020\)](#) and [Béland et al. \(2020\)](#). This result suggests that immigrants are more vulnerable to the shock of the pandemic and more sensitive to changes in both recent and long-term immigration. Unlike the case of natives, the effect on unemployment for immigrants combines recent and long-term immigration impacts.

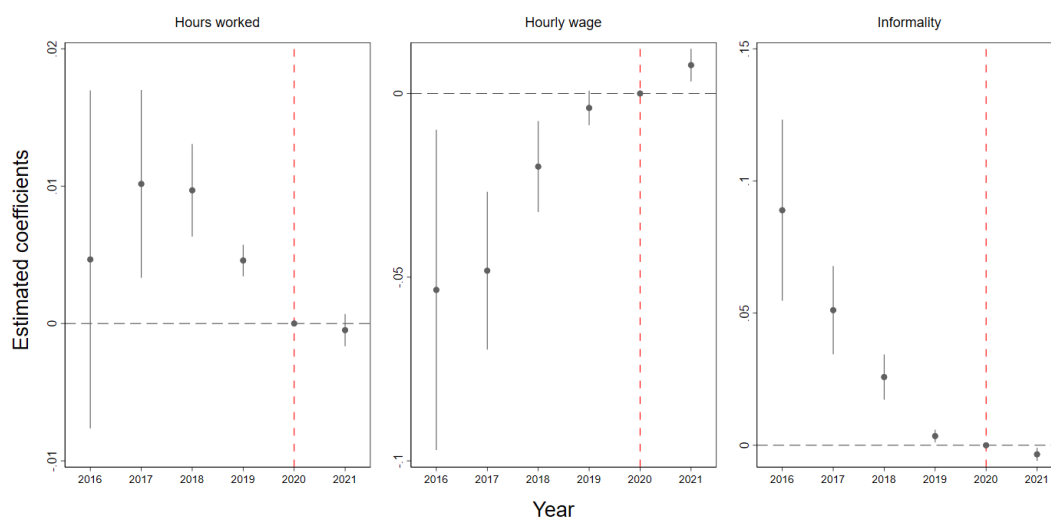
Migration has effects on employment status, but it can also affect variables associated with job quality. In this sense, we analyze the effects of recent and long-term immigration on the intensive margin, i.e., hours worked and the level of hourly wage and informality (see Figures 6, 7 and 8). The two types of immigration coincide in that in 2020 they worsen working conditions, i.e. longer working hours and informality and lower incomes, with higher impacts associated with the recent immigration. In particular, in 2020 an increase of 1 pp. in the recent immigration rate reduces the hourly wage by 17.5 pp. and rises the hours work and informality rate in 1.5 pp. and 14.8 pp., respectively. Similar findings are documented by [Caruso et al. \(2019\)](#); [Delgado-Prieto \(2020\)](#); [Santamaria \(2019\)](#).

The study of informality is important since there is an accentuated incidence of immigrants in informal employment, and this sector also constitutes the last resort of workers when face difficulties to find a job. In fact, our results indicate that the higher immigration, the higher reallocation between formal and informal workers (see also [Delgado-Prieto, 2020](#); [Santamaria, 2019](#)). This is found for both recent and long-term immigration. Nevertheless, the impact is more pronounced for the recent immigration.

Figure 6: Impact of immigration on job quality



(a) Impact of recent immigrants



(b) Impact of long-term immigrants

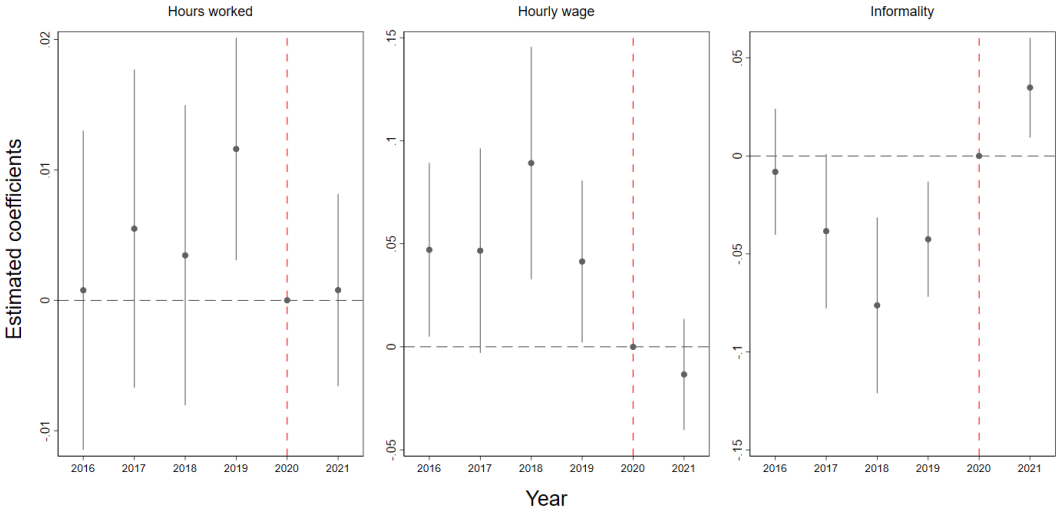
Source: Authors' calculations using the GEIH, DANE.

Regarding the variation of the estimated impact over time, both the recent and the long-term present relevant changes. First, there is an additional effect on hourly wage related to recent immigration, i.e., immigration reduces hourly wage, but the pandemic deepened this impact. Similar results are observed for the informality rate, where the impact seems to be higher in 2020 and 2021. Interestingly, this result contrast with the estimates for the long-term. On the other hand, during pandemic, the impact of immigration on hourly wage and informality were lower than in previous years. To some extent this also indicates that there is an adaptation of the market to the immigration

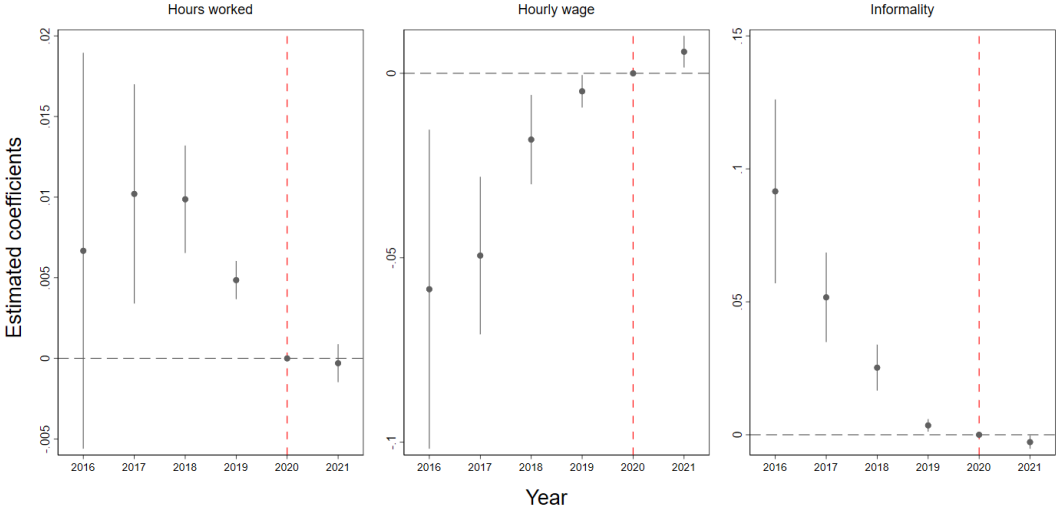


shock, and that the most of the negative effects is due to the recent immigrants who generate greater pressures on informality and hourly wage. It is important to note that the pandemic meant a variation in the impact of long-term immigration, while the effects of recent immigration did not vary importantly.

Figure 7: Impact of immigration on labor market status for natives



(a) Impact of recent immigrants



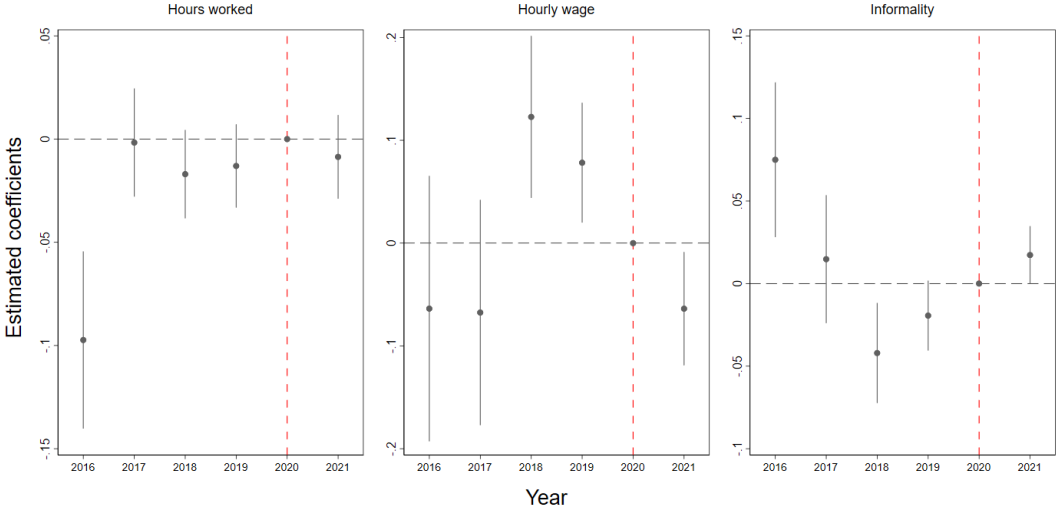
(b) Impact of long-term immigrants

Source: Authors’ calculations using the GEIH, DANE.

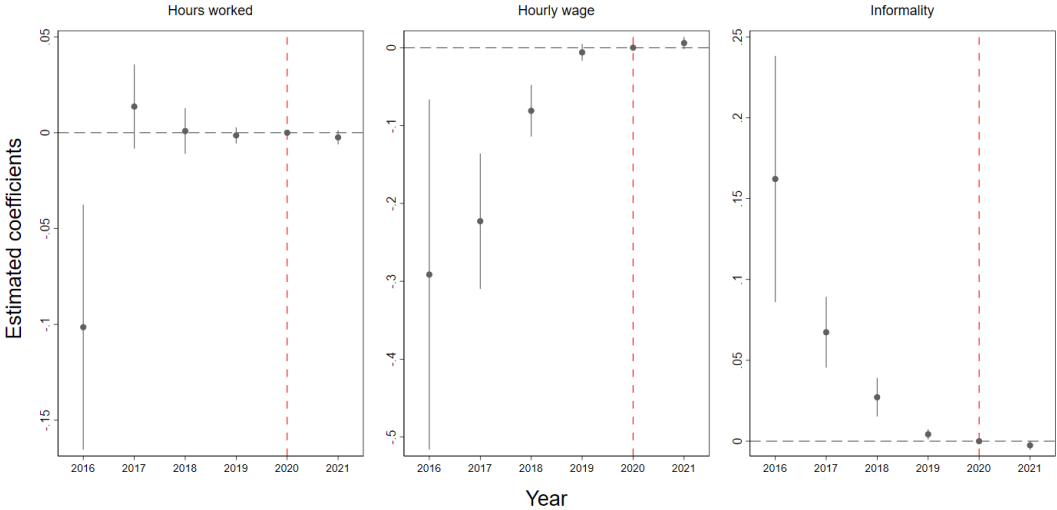
Furthermore, in the heterogeneous effects for Colombians and Venezuelan immigrants we find that the effect of immigration differs in the pandemic period and that higher variations are revealed for immigrants. First, the effect on informality is higher for Colombians in 2020, an increase in 1 pp. of the recent immigration rate increases

informality by 12.82 pp. for Colombians and 8.78 pp. for immigrants. While the impact on hourly wage is much higher for Venezuelans, a drop of more than 25 pp. This fact can be explained as a price effect since immigrants already have a sufficiently high incidence of informality, and therefore the adjustment observed during the pandemic is entirely on income.

Figure 8: Impact of immigration on job quality for immigrants



(a) Impact of recent immigrants



(b) Impact of long-term immigrants

Source: Authors' calculations using the GEIH, DANE.

On the other hand, in the case of Colombians, the higher immigration could generate a reallocation effect from formal to informal employment due to a greater competition for job opportunities. Besides informality and hourly wage, it is important to note that

the hours worked are not affected as pronounced, in most cases is not significant or has a small magnitude. In addition, the difference in the impact on hourly wage is remarkable as long-term immigration has a very attenuated effect on hourly wage. Lastly, the lower impacts over time of long-term immigration on hourly wage and informality suggest that the labor market internalizes the immigration shock and is more responsive to recent immigration.

## 6 Economic and social assimilation

A high influx of immigration imposes the need to implement policies aiming to promote integration of immigrants from an economic and social perspective. These policies cover to promote inclusion in the labor market, to facilitate access to essential services, and to encourage the incorporation into social networks. There are different ways of quantifying the level of assimilation of immigrants. For instance, it has been considered how the labor market gaps with respect to the native population and the level of participation of immigrants in social relate with the arrival time. In this regard, literature has demonstrated that first cohorts of immigrants experience a longer process of assimilation than those who recently arrived cohorts (see [Borjas, 2007](#)).

Household surveys usually allow to characterize the labor market, but generally do not collect information on the immigration process nor immigrants perceptions and networks. This is the case of GEIH, which does not contain information on the time of arrival in Colombia or immigrants' general perception of Colombia. *Pulso de la Migración*, on the other hand, emphasizes these aspects and collects information from a significant sample of immigrants. We use this information to study the extent to which time in Colombia determines differences in labor market outcomes with respect to natives and also how this relates to the construction of support networks, identification with the local culture, and the intention to stay in Colombia. All of the latter are indicators of the level of social assimilation.

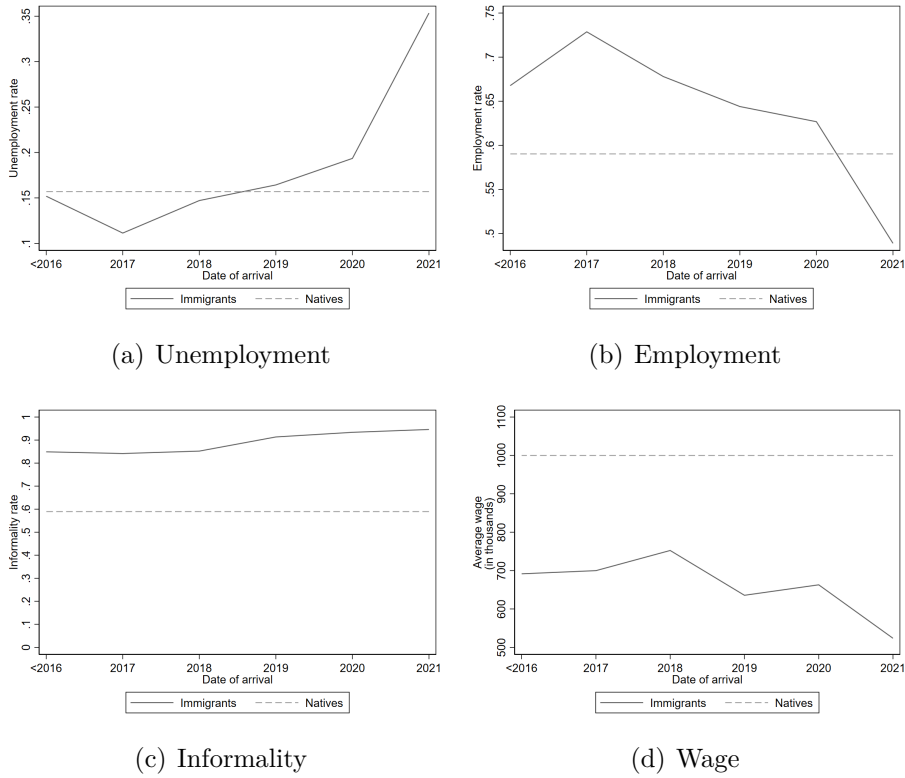
Our previous results show that the impact of long-term immigration is lower, which may be related to labor market adaptation. This adaptation would be related to a higher

level of assimilation of long-term immigrants, which can be corroborated using *Pulso de la Migración* data. Interestingly, *Pulso de la Migración* data provide additional evidence on the effects of COVID-19, specifically, how immigrants response to the impacts of the pandemic. This is an additional exploration of the level of vulnerability of immigrants to the pandemic shock as it allows us to understand whether a higher level of assimilation offers more alternatives to cope with this shock.

First, combining GEIH and *Pulso de la Migración* to determine the arrival date, we compute the gap of labor market outcomes between immigrants and the native population according to the arriving year. Figure 9 shows the labor market outcomes in 2021 from GEIH, for Colombians and immigrants. Immigrants who arrived between 2016 or before and 2018 exhibit a lower unemployment rate compared to the natives, and this indicator grows sharply for the most recent immigrants. In turn, the employment rate is generally higher for immigrants, which is consistent with a higher opportunity cost of unemployment and the greater need for income generation (see also Lee et al., 2022). In addition, the employment rate appears to have a decreasing trend, showing that long-term immigrants have higher employment levels.

Job conditions are also strongly related to the time of arrival. The higher employment rate is consistent with a lower informality rate, which is lower among the long-term immigrants, but higher than 80%. Moreover, in relative terms, informality is the variable with the largest gap between natives and immigrants. This gap is permanent and might be the response a segregation of immigrants into occupations, as documented by (Alcobendas and Rodríguez-Planas, 2009; Fernández et al., 2022). Finally, these job conditions translate into lower average labor income for immigrants, which is considerably lower for recently arrived immigrants. This analysis shows that, at first glance, there is a process of assimilation that allows immigrants to improve their conditions in the labor market; however, in terms of informality status and labor income, the gaps seem to be narrower and more permanent.

Figure 9: Labor market outcomes in 2021, according to the arriving year of immigrants



Notes: Comparison of labor market outcomes is based on GEIH for the period July to November 2021.

Source: Authors' calculations using GEIH and *Pulso de la Migración*, DANE.

In order to study whether there is convergence in labor outcomes, we estimate regression models that relate the labor market outcomes and the equivalent in years of the number of days after arrival. In particular, the following model is estimated:

$$y_{id} = \alpha + \beta A_i + \gamma_d + \delta X_{id} + \epsilon_{id} \quad (3)$$

where  $Y_{id}$  is the outcome of interest,  $A_i$  is the time since arrival,  $\gamma_d$  is a set of department fixed effects and  $X_{id}$  is a set of covariates including gender, age, age squared, education, and whether individual lives in rural or urban areas.

Estimates of Equation 3 confirm the previous findings related to the convergence between natives and immigrants' outcomes (see Table 3). In particular, one additional year since arrival increases labor participation and employment by 0.4 pp. and 0.17 pp., respectively, and reduces unemployment by 1.3 pp. Informality also drops by 3.3 pp.

There is a remarkable increase in labor income of 4.8 pp. Regarding the latter, we also use a measure of labor income gap consisting of a ratio between the average labor income of natives and the immigrant’s labor income. Estimates indicate that time in Colombia reduces the gap by 0.07, i.e., a gap of 50% would close after approximately 7.1 ( $0.5/0.07$ ) years. These results reinforce the idea that the labor market in Colombia has adapted to the immigration shock. But there is a high persistence of informality, which makes it possible for immigrants to generate income but in scenarios of low productivity and low job quality.

Table 3: Relation between arrival time and economic assimilation outcomes

Variables	Labor participation	Unemployment	Employment	Informality	Labor income	Labor income gap
Years in Colombia	0.004*** (0.000)	-0.013*** (0.000)	0.017*** (0.000)	-0.033*** (0.000)	0.048*** (0.001)	-0.071*** (0.010)
Observations	7,751	5,910	7,712	4,354	4,072	4,072
Adjusted R-squared	0.0350	0.0350	0.0350	0.0350	0.0350	0.0350

*Notes:* The set of covariates including gender, age, age squared, education, and whether individual lives in rural or urban areas. \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses.

*Source:* Authors’ calculations using GEIH and *Pulso de la Migración*, DANE.

To the extent that immigrants improve their labor outcomes, it is also expected to observe greater social assimilation. For example, households consider investing in housing and establishing long-term plans. Social assimilation process turns out beneficial for the economy since it promotes investment decisions, human capital accumulation, tax payments, among others (see [Gathmann and Keller, 2018](#); [Cai and Zimmermann, 2020](#)). Considering a range of outcomes, we analyze whether arrival time also influences social assimilation. In particular, the Equation 3 is estimated using as dependent variables five aspects related to social assimilation: whether the immigrant expects to stay in Colombia, whether the immigrant feels identified with the local culture, whether immigrant has non-immigrant friends, whether immigrant participates in organizations,<sup>8</sup> and whether immigrants receives government assistance.<sup>9</sup> The first is related to long-term expectations, which depends on the level of economic security in the host country. The next three refer to building social networks, and the last one to formal relationships with the government.

<sup>8</sup>Number of activities within organizations in which the respondent or his family have participated, such as: recreation, religious, youth, older adults, community action, ethnic, political, worker unions, among others

<sup>9</sup>If the respondent received money from government programs such as: Familias en Acción, Jóvenes en Acción, Programa de Alimentación Escolar, Ingreso Solidario, Devolución del IVA and Colombia Mayor.

Results in Table 4 imply that the longer time in Colombia favors social assimilation. That is, it increases identification with the local culture, promotes the construction of social networks and improves access to government social programs. Therefore, economic assimilation goes hand in hand with social assimilation. It is worth noting that each additional year in Colombia increases the probability of receiving social assistance by 2.5 pp. and the probability of staying in Colombia by 1 pp.

Table 4: Relation between arrival time and social assimilation outcomes

Variables	Staying in Colombia	Identification with the culture	Non-immigrant friends	Activities/organizations	Government assistance
Years in Colombia	0.010*** (0.000)	0.012*** (0.000)	0.083*** (0.002)	0.003*** (0.000)	0.025*** (0.000)
Observations	7.946	5.989	5.988	7.946	7.946
Adjusted R-squared	0.0979	0.0979	0.0979	0.0979	0.0979

*Notes:* The set of covariates including gender, age, age squared, education, and whether individual lives in rural or urban areas. The number of observations changes from one regression to another due to the existing attrition between rounds 1 and 2 of the *Pulso de la Migración*. \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses.

*Source:* Authors' calculations using *Pulso de la Migración*, DANE.

A question of interest is whether the assimilation process is also related to the capacity to mitigate aggregate shocks. Combining information from GEIH and *Pulso de la Migración*, it is possible to perform this analysis. That is, we provide evidence of how the assimilation process may have improved the mitigation capacity of immigrants to face the COVID-19 shock (see Table 5). In particular, we have data available on the decisions households made as a result of the pandemic. This includes whether the household changed labor market decisions,<sup>10</sup> migration,<sup>11</sup> reduced spending,<sup>12</sup> reduced savings,<sup>13</sup> used borrowing mechanisms,<sup>14</sup> and received aid.<sup>15</sup>

According to Table 5, the longer time in Colombia is associated with greater household financial adjustment in response to the pandemic. That is, spending and savings reduced. Specifically, one additional year from arriving would increase saving reduction by 1.4 pp. and spending reduction by 0.7 pp. Similar results are found for housing spending by [Tang and Li \(2021\)](#) in China. This might mean that immigrants with more time in Colombia could have reached a higher level of asset accumulation and face less liquidity constraints

<sup>10</sup>If the immigrant got another job or worked more hours.

<sup>11</sup>If the immigrant moved to another city or returned to Venezuela.

<sup>12</sup>Reduced spending is measured by moving to cheaper housing and reduced remittances to Venezuela.

<sup>13</sup>Reduction in savings means that household has sold assets and spent savings.

<sup>14</sup>If the immigrant requested loans from the family or a bank.

<sup>15</sup>The aid received could be from foundations or the government.

which gives degrees of freedom to adjust household finances.

Table 5: Relation between arrival time and coping mechanism to face pandemic

Variables	Labor	Migrate	Reduce spending	Reduce savings	Apply for loans	Receive aid
Years in Colombia	-0.001*** (0.000)	-0.003*** (0.000)	0.007*** (0.000)	0.014*** (0.000)	-0.009*** (0.000)	0.013*** (0.000)
Observations	7,946	7,946	7,946	7,946	7,946	7,946
Adjusted R-squared	0.0483	0.0483	0.0483	0.0483	0.0483	0.0483

*Notes:* The set of covariates including gender, age, age squared, education, and whether individual lives in rural or urban areas. The number of observations changes from one regression to another due to the existing attrition between rounds 1 and 2 of the *Pulso de la Migración*. \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses.

*Source:* Authors' calculations using *Pulso de la Migración*, DANE.

On the other hand, time in Colombia reduces the application to loans as a mitigation mechanism. This, together with the above, implies that households have less preference for debt. Additionally, the adjustment in household finances is also more prevalent than changes in the employment status of household members. In particular, the probability of migrating to another city in Colombia or returning to Venezuela reduces by 0.3 pp., and the probability of working more hours or changing the job drops by 0.1 pp. This might be explained because relocation of activities to the home may have higher long-term costs. For example, additional workers at home may sacrifice processes of human capital accumulation, or immigration may cause high sunk and misallocation costs. Moreover, longer time in Colombia, the number of support networks and access to institutions is increasing.

## 7 Concluding remarks

The influx of immigrants to Colombia is one of the largest migratory phenomena in recent decades. The size of this process makes it interesting to analyze its impact on the labor market. This becomes more relevant in the context of the pandemic, in which immigrants are more vulnerable and, therefore can generate greater distortions in the labor market. For instance, increasing unemployment and informality both in the native population and among immigrants. We analyze the impacts of immigration on several labor market outcomes by differentiating between the impacts of recent and long-term immigration. Also, heterogeneous effects between Colombians and immigrants are studied.



Interestingly, recent immigrants have a greater negative effect on the level of employment and the participation rate. This might indicate that the labor market assimilates migratory shocks, to the extent that immigrants stay longer in Colombia, causing more attenuated effects. In other words, the high effects on the labor market outcomes of the recent immigration are not permanent and vanish over time. In addition, Colombians and immigrants react differently. First, the effects on immigrants are higher and tend to be more volatile; it also shows impacts with a higher magnitude on hourly wages. While there is some evidence of assimilation, the immigrant labor market is vulnerable to both increased immigration and shocks such as the pandemic. Therefore, protection mechanisms with a differential approach to immigrants seem necessary in these scenarios.

Notably, our results support the idea that labor market adaptation is accompanied by increased social assimilation. That is, better labor market outcomes are accompanied by social integration measured as greater identification with the local culture and the building of networks. This is an interesting result from a public policy perspective since immigration from Venezuela constitutes a demographic bonus that will have growth and productivity effects in the long run.

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# Appendix

Table 6: First stage regression

Variables	(1) Recent immigration	(2) Long-term immigration
IV immigration	13.6901*** (1.9929)	71.8778*** (5.0595)
D2016 × IV immigration	64.0030*** (4.9239)	20.8689 (15.4491)
D2017 × IV immigration	55.4005*** (3.6490)	16.7106** (7.7202)
D2018 × IV immigration	35.2961*** (2.9115)	-16.7474*** (2.3583)
D2019 × IV immigration	7.5262*** (1.3201)	-4.5431** (2.2487)
D2021 × IV immigration	-4.2586*** (0.8195)	-1.5213 (1.8078)
Constant	1.0125 (1.0667)	5.7158* (3.2424)
Observations	2,825,912	2,825,912
KP-stat	23.53	16.47
F-stat	2,182,000	1,402,000

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.

Table 7: OLS estimates of the impact of immigration on labor market status

Variables	(1) Employed	(2) Unemployed	(3) Labor Participation
Panel A. Impact of recent immigrants			
Recent immigration rate	0.0055 (0.0137)	-0.0055 (0.0082)	0.0013 (0.0163)
D2016 × Recent immigration rate	-0.0021 (0.0128)	0.0061 (0.0090)	0.0039 (0.0126)
D2017 × Recent immigration rate	0.0019 (0.0105)	0.0070 (0.0074)	0.0091 (0.0113)
D2018 × Recent immigration rate	-0.0015 (0.0093)	0.0074 (0.0072)	0.0052 (0.0115)
D2019 × Recent immigration rate	0.0074 (0.0092)	0.0017 (0.0068)	0.0116 (0.0102)
D2021 × Recent immigration rate	0.0228** (0.0085)	-0.0043 (0.0050)	0.0264*** (0.0092)
Constant	-1.0882*** (0.0748)	0.5792*** (0.0295)	-1.1096*** (0.0835)
R-squared	0.2303	0.0540	0.2610
Panel B. Impact of long-term immigrants			
Long-term immigration	0.0028 (0.0030)	-0.0015 (0.0016)	0.0023 (0.0035)
D2016 × Long-term immigration rate	0.0080 (0.0118)	0.0006 (0.0038)	0.0109 (0.0120)
D2017 × Long-term immigration rate	0.0037 (0.0076)	0.0026 (0.0024)	0.0070 (0.0078)
D2018 × Long-term immigration rate	0.0002 (0.0031)	0.0034** (0.0013)	0.0031 (0.0033)
D2019 × Long-term immigration rate	0.0006 (0.0012)	0.0012 (0.0010)	0.0017 (0.0012)
D2021 × Long-term immigration rate	0.0025*** (0.0007)	-0.0005 (0.0008)	0.0028*** (0.0010)
Constant	-1.0971*** (0.0775)	0.5807*** (0.0307)	-1.1205*** (0.0853)
R-squared	0.2303	0.0541	0.2611
Observations	2,825,912	1,952,655	2,825,912

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.

Table 8: OLS estimates of the impact of immigration on job quality

Variables	(1) Hours worked	(2) Hourly wage	(3) Informality
Panel A. Impact of recent immigrants			
Recent immigration rate	0.0030 (0.0097)	-0.0468 (0.0485)	0.0439 (0.0367)
D2016 × Recent immigration rate	0.0058 (0.0096)	0.0665*** (0.0221)	-0.0102 (0.0133)
D2017 × Recent immigration rate	0.0135** (0.0064)	0.0435* (0.0242)	-0.0173 (0.0151)
D2018 × Recent immigration rate	0.0083 (0.0073)	0.0460 (0.0343)	-0.0285 (0.0239)
D2019 × Recent immigration rate	0.0065 (0.0073)	0.0422 (0.0282)	-0.0304 (0.0204)
D2021 × Recent immigration rate	0.0042 (0.0092)	-0.0209 (0.0356)	-0.0125 (0.0168)
Constant	3.0384*** (0.0645)	6.0280*** (0.1367)	1.5356*** (0.1117)
R-squared	0.0870	0.3202	0.2218
Panel B. Impact of long-term immigrants			
Long-term immigration	0.0004 (0.0021)	-0.0127 (0.0075)	0.0076 (0.0069)
D2016 × Long-term immigration rate	-0.0024 (0.0132)	0.0221 (0.0214)	0.0205 (0.0191)
D2017 × Long-term immigration rate	0.0101 (0.0070)	0.0011 (0.0179)	0.0171 (0.0142)
D2018 × Long-term immigration rate	0.0079*** (0.0017)	0.0070 (0.0070)	0.0064 (0.0048)
D2019 × Long-term immigration rate	0.0030*** (0.0009)	0.0041 (0.0038)	0.0022* (0.0012)
D2021 × Long-term immigration rate	0.0007 (0.0011)	-0.0013 (0.0053)	-0.0002 (0.0026)
Constant	3.0324*** (0.0653)	6.0536*** (0.1418)	1.5220*** (0.1248)
R-squared	0.0870	0.3205	0.2222
Observations	1,680,093	1,512,519	1,680,122

Notes: \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

Source: Authors' calculations using GEIH, DANE.

Table 9: IV estimates of the impact of immigration on labor market status

Variables	(1) Employed	(2) Unemployed	(3) Labor Participation
Panel A. Impact of recent immigrants			
Recent immigration rate	-0.0249* (0.0131)	0.0025 (0.0067)	-0.0335*** (0.0123)
D2016 × Recent immigration rate	0.0027 (0.0083)	0.0099*** (0.0038)	0.0168** (0.0082)
D2017 × Recent immigration rate	0.0074 (0.0093)	0.0075* (0.0045)	0.0201** (0.0090)
D2018 × Recent immigration rate	0.0096 (0.0098)	0.0032 (0.0050)	0.0191** (0.0093)
D2019 × Recent immigration rate	0.0039 (0.0068)	0.0019 (0.0036)	0.0101 (0.0067)
D2021 × Recent immigration rate	-0.0007 (0.0050)	0.0037* (0.0020)	0.0047 (0.0054)
Constant	-1.0737*** (0.0802)	0.5759*** (0.0257)	-1.0912*** (0.0908)
R-squared	0.2290	0.0538	0.2594
KP-stat	23.53	23.49	23.53
Panel B. Impact of long-term immigrants			
Long-term immigration	-0.0040* (0.0022)	0.0003 (0.0011)	-0.0055*** (0.0021)
D2016 × Long-term immigration rate	-0.0162** (0.0077)	0.0118*** (0.0035)	-0.0089 (0.0078)
D2017 × Long-term immigration rate	-0.0099*** (0.0036)	0.0080*** (0.0016)	-0.0047 (0.0037)
D2018 × Long-term immigration rate	-0.0099*** (0.0023)	0.0050*** (0.0010)	-0.0074*** (0.0023)
D2019 × Long-term immigration rate	-0.0021** (0.0009)	0.0010** (0.0004)	-0.0013 (0.0009)
D2021 × Long-term immigration rate	0.0012 (0.0009)	0.0004 (0.0005)	0.0024*** (0.0009)
Constant	-1.0646*** (0.0809)	0.5726*** (0.0255)	-1.0819*** (0.0919)
R-squared	0.2291	0.0539	0.2595
KP-stat	16.47	16.48	16.47
Observations	2,825,912	1,952,655	2,825,912

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.

Table 10: IV estimates of the impact of immigration on labor market status for natives

Variables	(1) Employed	(2) Unemployed	(3) Labor Participation
Panel A. Impact of recent immigrants			
Recent immigration rate	-0.0295** (0.0130)	0.0038 (0.0067)	-0.0392*** (0.0122)
D2016 × Recent immigration rate	0.0073 (0.0081)	0.0081** (0.0037)	0.0220*** (0.0081)
D2017 × Recent immigration rate	0.0116 (0.0091)	0.0055 (0.0045)	0.0246*** (0.0088)
D2018 × Recent immigration rate	0.0135 (0.0097)	0.0011 (0.0050)	0.0232** (0.0092)
D2019 × Recent immigration rate	0.0066 (0.0068)	-0.0002 (0.0037)	0.0125* (0.0065)
D2021 × Recent immigration rate	-0.0013 (0.0049)	0.0035* (0.0020)	0.0044 (0.0054)
Constant	-1.0855*** (0.0805)	0.5853*** (0.0259)	-1.1022*** (0.0914)
R-squared	0.2306	0.0547	0.2609
KP-stat	24.02	23.91	24.02
Panel B. Impact of long-term immigrants			
Long-term immigration	-0.0048** (0.0022)	0.0006 (0.0011)	-0.0065*** (0.0021)
D2016 × Long-term immigration rate	-0.0152** (0.0077)	0.0111*** (0.0035)	-0.0081 (0.0078)
D2017 × Long-term immigration rate	-0.0094*** (0.0036)	0.0073*** (0.0016)	-0.0045 (0.0037)
D2018 × Long-term immigration rate	-0.0096*** (0.0022)	0.0040*** (0.0010)	-0.0078*** (0.0023)
D2019 × Long-term immigration rate	-0.0019** (0.0009)	0.0005 (0.0004)	-0.0013 (0.0009)
D2021 × Long-term immigration rate	0.0014 (0.0009)	0.0002 (0.0005)	0.0027*** (0.0009)
Constant	-1.0757*** (0.0813)	0.5821*** (0.0257)	-1.0918*** (0.0926)
R-squared	0.2307	0.0547	0.2611
KP-stat	16.94	17.03	16.94
Observations	2,745,117	1,892,207	2,745,117

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.

Table 11: IV estimates of the impact of immigration on labor market status for immigrants

Variables	(1) Employed	(2) Unemployed	(3) Labor Participation
Panel A. Impact of recent immigrants			
Recent immigration rate	-0.0433*** (0.0140)	0.0056 (0.0063)	-0.0554*** (0.0161)
D2016 × Recent immigration rate	0.0017 (0.0182)	0.0138 (0.0088)	0.0223 (0.0207)
D2017 × Recent immigration rate	-0.0090 (0.0175)	0.0243** (0.0102)	0.0176 (0.0155)
D2018 × Recent immigration rate	0.0122 (0.0124)	0.0051 (0.0061)	0.0270** (0.0137)
D2019 × Recent immigration rate	0.0033 (0.0101)	0.0002 (0.0060)	0.0086 (0.0117)
D2021 × Recent immigration rate	-0.0298*** (0.0093)	0.0230*** (0.0087)	-0.0149* (0.0081)
Constant	-0.7168*** (0.0895)	0.5437*** (0.0363)	-0.6833*** (0.1079)
R-squared	0.2350	0.0597	0.2560
KP-stat	4.873	5.586	4.873
Panel B. Impact of long-term immigrants			
Long-term immigration	-0.0058** (0.0025)	0.0004 (0.0011)	-0.0080*** (0.0028)
D2016 × Long-term immigration rate	-0.0287 (0.0256)	0.0192 (0.0165)	-0.0146 (0.0208)
D2017 × Long-term immigration rate	-0.0338** (0.0135)	0.0252** (0.0109)	-0.0170** (0.0076)
D2018 × Long-term immigration rate	-0.0225*** (0.0060)	0.0098*** (0.0028)	-0.0167*** (0.0057)
D2019 × Long-term immigration rate	-0.0043** (0.0020)	0.0007 (0.0014)	-0.0041* (0.0022)
D2021 × Long-term immigration rate	-0.0017 (0.0017)	0.0028** (0.0013)	0.0010 (0.0017)
Constant	-0.7123*** (0.0932)	0.5432*** (0.0367)	-0.6769*** (0.1129)
R-squared	0.2353	0.0597	0.2566
KP-stat	1.102	1.304	1.102
Observations	75,652	57,114	75,652

Notes: \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

Source: Authors' calculations using GEIH, DANE.

Table 12: IV estimates of the impact of immigration on job quality

Variables	(1) Hours worked	(2) Hourly wage	(3) Informality
Panel A. Impact of recent immigrants			
Recent immigration rate	0.0149* (0.0080)	-0.1755*** (0.0412)	0.1483*** (0.0321)
D2016 × Recent immigration rate	-0.0061 (0.0062)	0.0829*** (0.0227)	-0.0257 (0.0166)
D2017 × Recent immigration rate	0.0006 (0.0062)	0.0785*** (0.0266)	-0.0540*** (0.0201)
D2018 × Recent immigration rate	-0.0018 (0.0058)	0.1190*** (0.0299)	-0.0913*** (0.0228)
D2019 × Recent immigration rate	0.0081* (0.0043)	0.0609*** (0.0210)	-0.0507*** (0.0150)
D2021 × Recent immigration rate	0.0021 (0.0038)	-0.0167 (0.0152)	0.0385*** (0.0134)
Constant	3.0298*** (0.0635)	6.1216*** (0.1240)	1.4775*** (0.1417)
R-squared	0.0869	0.3156	0.2132
KP-stat	23.90	24.12	23.90
Panel B. Impact of long-term immigrants			
Long-term immigration	0.0022* (0.0013)	-0.0293*** (0.0068)	0.0246*** (0.0052)
D2016 × Long-term immigration rate	0.0047 (0.0063)	-0.0535** (0.0222)	0.0889*** (0.0175)
D2017 × Long-term immigration rate	0.0102*** (0.0035)	-0.0482*** (0.0110)	0.0511*** (0.0085)
D2018 × Long-term immigration rate	0.0097*** (0.0017)	-0.0199*** (0.0063)	0.0258*** (0.0044)
D2019 × Long-term immigration rate	0.0046*** (0.0006)	-0.0039 (0.0024)	0.0035*** (0.0012)
D2021 × Long-term immigration rate	-0.0005 (0.0006)	0.0077*** (0.0023)	-0.0034*** (0.0013)
Constant	3.0215*** (0.0646)	6.1709*** (0.1152)	1.4297*** (0.1398)
R-squared	0.0869	0.3179	0.2166
KP-stat	16.86	17.36	16.86
Observations	1,680,093	1,512,519	1,680,122

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.



Table 13: IV estimates of the impact of immigration on job quality for natives

Variables	(1) Hours worked	(2) Hourly wage	(3) Informality
Panel A. Impact of recent immigrants			
Recent immigration rate	0.0087 (0.0080)	-0.1355*** (0.0401)	0.1286*** (0.0323)
D2016 × Recent immigration rate	0.0008 (0.0062)	0.0471** (0.0215)	-0.0081 (0.0164)
D2017 × Recent immigration rate	0.0055 (0.0062)	0.0467* (0.0253)	-0.0384* (0.0201)
D2018 × Recent immigration rate	0.0034 (0.0059)	0.0892*** (0.0288)	-0.0762*** (0.0229)
D2019 × Recent immigration rate	0.0116*** (0.0044)	0.0414** (0.0200)	-0.0425*** (0.0150)
D2021 × Recent immigration rate	0.0008 (0.0038)	-0.0134 (0.0137)	0.0349*** (0.0130)
Constant	3.0142*** (0.0648)	6.1056*** (0.1200)	1.4720*** (0.1399)
R-squared	0.0871	0.3211	0.2179
KP-stat	24.29	24.48	24.29
Panel B. Impact of long-term immigrants			
Long-term immigration	0.0011 (0.0013)	-0.0226*** (0.0066)	0.0213*** (0.0053)
D2016 × Long-term immigration rate	0.0067 (0.0063)	-0.0585*** (0.0221)	0.0915*** (0.0176)
D2017 × Long-term immigration rate	0.0102*** (0.0035)	-0.0494*** (0.0109)	0.0517*** (0.0086)
D2018 × Long-term immigration rate	0.0099*** (0.0017)	-0.0180*** (0.0062)	0.0252*** (0.0044)
D2019 × Long-term immigration rate	0.0049*** (0.0006)	-0.0049** (0.0022)	0.0035*** (0.0012)
D2021 × Long-term immigration rate	-0.0003 (0.0006)	0.0059*** (0.0022)	-0.0027** (0.0013)
Constant	3.0068*** (0.0648)	6.1482*** (0.1200)	1.4275*** (0.1399)
R-squared	0.0871	0.3227	0.2206
KP-stat	17.41	18.02	17.41
Observations	1,629,717	1,466,000	1,629,745

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.

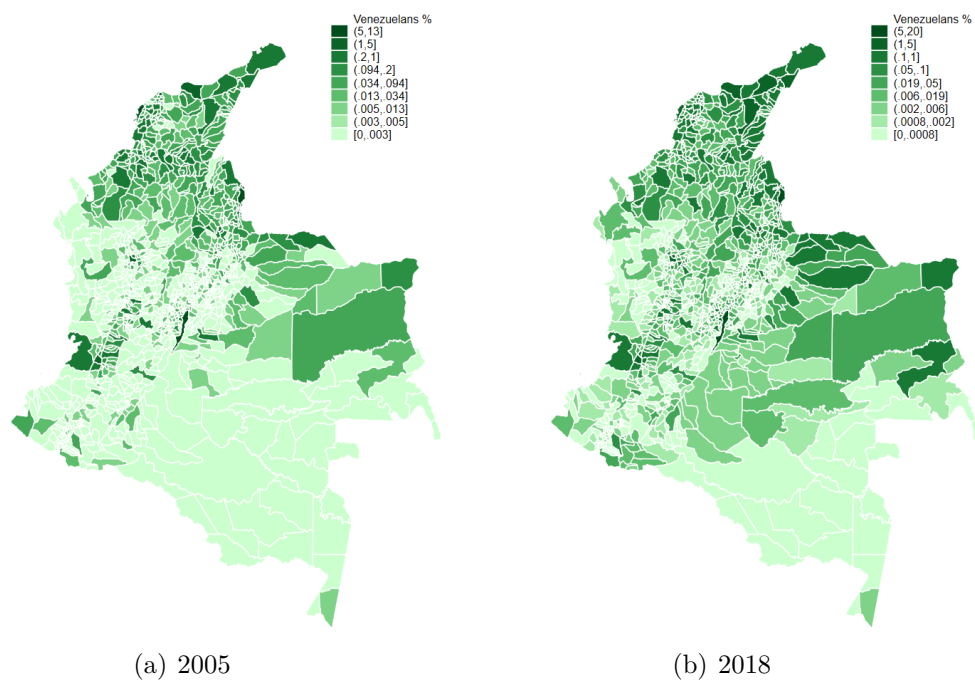
Table 14: IV estimates of the impact of immigration on job quality for immigrants

Variables	(1) Hours worked	(2) Hourly wage	(3) Informality
Panel A. Impact of recent immigrants			
Recent immigration rate	0.0228 (0.0145)	-0.2587*** (0.0468)	0.0878*** (0.0208)
D2016 × Recent immigration rate	-0.0973*** (0.0219)	-0.0637 (0.0659)	0.0750*** (0.0239)
D2017 × Recent immigration rate	-0.0017 (0.0134)	-0.0675 (0.0559)	0.0148 (0.0198)
D2018 × Recent immigration rate	-0.0170 (0.0109)	0.1228*** (0.0402)	-0.0421*** (0.0155)
D2019 × Recent immigration rate	-0.0130 (0.0103)	0.0782*** (0.0297)	-0.0194* (0.0108)
D2021 × Recent immigration rate	-0.0086 (0.0103)	-0.0638** (0.0281)	0.0173* (0.0089)
Constant	3.3005*** (0.0492)	6.7774*** (0.1747)	1.2074*** (0.1397)
R-squared	0.0859	0.1268	0.0811
KP-stat	5.722	5.279	5.722
Panel B. Impact of long-term immigrants			
Long-term immigration	0.0038 (0.0023)	-0.0388*** (0.0093)	0.0131*** (0.0037)
D2016 × Long-term immigration rate	-0.1015*** (0.0326)	-0.2914** (0.1148)	0.1621*** (0.0388)
D2017 × Long-term immigration rate	0.0137 (0.0112)	-0.2229*** (0.0444)	0.0674*** (0.0112)
D2018 × Long-term immigration rate	0.0009 (0.0061)	-0.0810*** (0.0169)	0.0272*** (0.0061)
D2019 × Long-term immigration rate	-0.0014 (0.0021)	-0.0060 (0.0055)	0.0043*** (0.0016)
D2021 × Long-term immigration rate	-0.0024 (0.0019)	0.0060 (0.0041)	-0.0025* (0.0014)
Constant	3.2986*** (0.0493)	6.8297*** (0.1500)	1.1859*** (0.1456)
R-squared	0.0859	0.1287	0.0831
KP-stat	1.582	1.092	1.582
Observations	47,413	44,144	47,414

*Notes:* \*\*\* significant at the 1%, \*\* significant at the 5%, \* significant at the 10%. Standard errors in parentheses

*Source:* Authors' calculations using GEIH, DANE.

Figure 10: Percentage of Venezuelan immigrants in Colombia. 2005 and 2018



Source: National census 2005 and 2018, own calculations