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Discrepancies in Labor Market Outcomes From Migration Evidence From Colombia

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Discrepancies in Labor Market Outcomes from Migration:

Evidence from Colombia

by

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Dedication

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Abstract

As of 2012, approximately 10% of the population in Colombia has been displaced by violence. The main motivation of this paper is to estimate the effect of interregional migration on employment outcomes in the country between 1993 and 2005. Using violence as an instrument for migration, I analyzed the differential effects of migration on specific employment outcomes across gender and skill levels. I find that a one percentage point increase in net migration only increases the unemployment rates of female migrants by 0.656 percentage point. I also find that net migration rates do not affect the employment conditions of low-skilled natives, even in industries with high composition of migrant workers.

1. Introduction

In a country like Colombia, where internal conflict has caused the displacement of approximately 4.9 million people[1] (equivalent to 10% of the population in 2012), understanding the consequences of migration flows on the local economies require special attention by policy makers. Existent literature provides inconclusive evidence regarding the impact of migration on employment outcomes in the destination areas. In a competitive equilibrium framework, a positive labor supply shock depresses wages, causing an increase in the levels of employment. However, due to the imperfections of the labor market, the final outcome is difficult to predict.

A considerable part of the existing literature suggests that migration effects on employment and wages of natives and their close substitutes are minimal (Grossman 1982, Lalond and Topel 1989, Altonji and Card 1991, Card 1991). These analyses suggest that the lack of any effect is attributable to the easy absorption of the migrants' labor supply in the existing labor markets due to a change in the composition of output and the possibility of native relocation.

This contrasts with the findings from Calderon and Ibanez (2009) in Colombia, which indicated that the effect from an increase in displaced population in the metropolitan areas was negative and significant in terms of employment for all workers, especially low-skilled workers, in terms of employment and wages. Additionally, it was found that the increase in displacement

[1] Norwegian Refuge Council. The Global Overview 2012, People Displaced by Conflict and Violence

enlarged the informal sector. These effects were associated with the rigidities of the Colombian labor market.

The purpose of this paper is to analyze the effects of interregional migration on unemployment by gender and skill level in Colombia. In particular, this paper examines the migration caused by violence. The analysis considers the changes in net migration between 1993 and 2005 across each municipality s defined in these years' censuses.

The analysis of the effects of migration on employment outcomes is complicated because individuals migrate based on the expected employment conditions in the destination areas (Harris and Todaro 1970).Thus, using ordinary least squares might be misleading since they would indicate that increases in migration cause an increase in employment in the destination areas, when in fact this is reflective of the endogeneity issue.

Calderon and Ibanez (2009) used the number of massacres as an instrument variable to estimate the migration rate exclusively in metropolitan areas. In this paper, I propose to use the change in relative violence between the place of departure and destination as an instrument to explain the change in net migration rates between 1993 and 2005 in each municipality of the country. My approach improves upon the instrument implemented by Calderon and Ibanez by using a broader measure of violence: number of victims from massacres, kidnappings, homicides and wounded population as a result of the country's conflict. In addition to the analysis of the effects of migration on the overall employment outcome, this paper concentrates on the long-term analysis of the effects by gender, skill level, and migration group.

The instrument constructed predicts the changes in net migration rate between each pair of municipalities according to their relative change in violence. The predicted net migration rates are aggregated to estimate the total net migration rate in the destination areas. This ensures that the

effect of changes in relative violence is isolated from any other factor affecting the labor market in the destination area, allowing for the prediction of net migration rates exogenously from the labor market performance.

The instrumental variable (IV) results suggest that low-skilled, female migrants are the only group affected by the increase in net migration in terms of unemployment. A 10 percentage point increase in the net migration rate increases the unemployment rates of low-skilled, female migrants by 6.5 percentage points.

Contrary to what could be expected, the result also suggests that the increase in net migration rates did not cause a negative effect on natives' employment, even in the industries where there is a high migrant presence (these industries are wholesale and retail, and other services for males, and manufacturing, private household services, and other services for females). An explanation of this phenomenon is that these industries have a significant component of informality. Independently of the definition used for *informality*, these markets are less regulated than formal markets (Florez, 2003). Because increasing the labor supply in informal markets decreases wages, employers are motivated to hire more workers, since natives have more experience than migrants, employers are more likely to hire them.

Additionally, the increase in migration resulted in an increase in demand for goods and services, which resulted in an increase in production, and therefore in an increase in demand for factors of production. Thus, the lack of a long-term effect in unemployment could be explained by an expansion in the demand for labor derived from the increase in production in the long run.

Further research needs to be done to establish whether adjustments in the wage rate explain the lack of effect on unemployment, especially in the informal sector where it is feasible to have flexible wages. Due to the absence of this information in the data available from the Colombian

census, this analysis could not determine if whether wages adjust by the increase in migration or if migrants were employed in the informal sector.

Overall, finding almost no effect on unemployment across genders, skill level, and migration groups (except for low-skilled female migrants) is not surprising according to prior literature (Grossman 1982, Lalond and Topel 1989, Altonji and Card 1991, Card 1991) which showed evidence of the adjustment of migrants to labor market conditions in the destination areas and also attributed the lack of an effect in terms of wages and unemployment to the increase in production and factors of production usage after an increase in migration.

This paper is divided into 10 sections. Section 2 reviews the sociopolitical framework of Colombia between 1980 and 2010; section 3 reviews the literature on migration and its effects on the labor market; section 4 presents the theoretical framework used in the study; sections 5 and 6 present the estimation strategy and the data sources, respectively; section 7 reviews the descriptive statistics; section 8 presents the results concerning the determinants for migration in the country; section 9 review the employment effects from migration; and the final section summarizes the final findings and proposes areas for future research.

2. Sociopolitical Overview of Colombia from 1980 to 2010

It is well known that Colombia has been characterized by an internal conflict for at least 50 years. As a result of the prolonged violence, two important massive migration processes have been identified during the twentieth century: the first one during the 1950s (named the period of "La Violencia"); and the second during the last two decades, caused by the cross fire between guerrilla, paramilitaries and the government.

During "La Violencia," there was an accelerated urbanization process in the country: Colombia went from having only one fourth of its population in the urban areas to only one fourth of its population in the rural areas when this period ended in the late 1950s (Plata, 2005). This conflict was the result of the violent confrontation between the "Liberal" and "Conservador," the two most important political parties. As a consequence of this conflict, rural peasants were forced to arm themselves. This open confrontation ended in 1958 when both parties signed a power sharing agreement, The National Front, in which the two parties agreed to alternate the presidency every four years. Despite the peaceful relationship generated between these two political parties during the period following the agreement, the agreement did not offer a solution to the problems of the rural sector, which lacked attention from the government and had little participation in government decisions.

The absence of government oversight and the confrontation with land owners who sought to increase their land holdings forced the armed peasants to continue their resistance from the jungle. These peasants became armed groups seeking social justice through a war against the government. Finally, in the 1960s, these groups formed what today is called the Revolutionary Armed Forces of Colombia (Fuerzas Armadas Revolucionarias de Colombia [FARC]).

In addition to the FARC, the M-19, the Popular Army of Liberation (Ejercito Popular de Liberación [EPL]) and the National Liberation Army (Ejercito de Liberación Nacional [ELN]) were also created. The ELN was influenced by the ideas from the Cuban Revolution, and the EPL followed the Maoist philosophy of prolonged popular war.

All of these groups gained significant power during the 1980s. Throughout the presidency of Belisario Betancur (1982-1986), the government attempted to negotiate ceasefires with the FARC and the M-19. However, in early 1985, the government broke off the negotiation process, and in November 1985, the M-19, led by the drug cartels, attacked the Justice Palace, killing over 100 people, among them Supreme Court justices. In 1989, the M-19 finally signed a peace agreement, and this guerrilla group ceased the violence.

During the early stages of the "Coca boom" in the 1980s, the guerrilla and drug dealers worked together; however, soon after these powerful drug leaders established their large ranches and created their own self-protection system (i.e. paramilitaries), a new focus of violence between the paramilitaries and guerrillas commenced.

The paramilitaries were self-defense units initially recognized by the government. Nonetheless, they were involved in multiple massacres between 1980 and 1990, most notably of members of the Patriotic Union (Union Patriótica [UP]), a demobilized branch of the FARC that created their own political party. The paramilitaries also targeted non-guerrilla-related figures,

among them judges and political candidates. In response to these crimes against civilians, in 1989, President Virgilio Barco (1986-1990) declared the self-defense groups illegal. However, this did not stop the violent actions of these groups, which continued torturing, kidnapping and killing many civilians, mainly in the rural areas. One of the paramilitary's objectives was to perform "social cleansing killings." According to Garry Leech, between 1989 and 1993 there were 1926 documented cases of these types of killings.

During the government of Ernesto Samper (1994-1998), these self-defense groups were legalized again and civilians were allowed to reorganize their own security cooperatives and self-defense groups. This led to the creation of the Cooperatives for Surveillance and Private Security (Cooperativas de Vigilancia y Seguridad Privada [CONVIVIR]), which was the origin of the current paramilitary groups.

During the administration of Andres Pastrana (1998-2002), the creation of the "Plan Colombia" sought to decrease drug trafficking, recover the economy and assist the displaced population with the help of the international community. As part of this policy, in 1998 President Pastrana officially granted a large extension of land, San Vicente del Caguan, to the guerrilla groups, which already was controlled by them, , in an attempt to negotiate a peace agreement with the FARC. However, the FARC did not take this initiative seriously, and in 2002 the negotiations ended.[2]

Alvaro Uribe (2002-2010) introduced a "democratic security and defense policy" by which a peace agreement was offered only if the armed groups agreed to a unilateral ceasefire, and to stop the crimes against civilians and drug trafficking. The policy's aim was to consolidate military

[2] As the government granted a large extension of land, the FARC continued their violent actions, such as attacking small towns, kidnapping people and even the hijacking of a commercial plane. Additionally, the US government revealed connections between FARC and IRA.

control throughout the country by the government. During this period, there was a significant decrease in the guerrillas' power. Many argue that this was attributable to the power given to the paramilitaries to help the government in the conflict.

With respect to the paramilitary groups, in 2003 the Colombian United Self Defense Forces (Autodefensas Unitdas de Colombia [AUC]) demobilized approximately 30,000 members after signing an agreement with the government. Similarly, the FARC and the ELN demobilized 20,000 members. Additionally, the "Justice and Peace Law" (Law 975) in 2005 set up the legal framework to reduce punishments for demobilized members of the armed groups if they did not fight again, and if they returned illegal assets to the government, which could then be used to compensate the victims of the violence.

Despite the efforts from the government, decreases in the military power of the guerrilla groups, and the deaths of some of their leaders, their violent actions continued. The government started new peace negotiations in 2010 under President Juan Manuel Santos.

This uninterrupted conflict has caused the displacement of close to 10% of the population in the country[3], enough for the UN Commission of Human Rights to classy Columbia as the country with the third largest displaced population, after only Sudan and Iraq.

The interaction between government, guerrilla and paramilitaries parties from 1990 to 2010 yielded a complex political framework that sets up the background for this analysis. Understanding the consequences of violence will help to assess how violence as a catalyst for migration could have an effect on employment outcomes.

[3] As of September 2011, there were 3.8 million people displaced according to the Presidency of the Republic of Colombia (Presidencia de la República, 2012). Different sources have different estimates of the number of people migrating because of violence in the country. Government data shows an increase in the figures of displacement towards the end of the 1990s and the beginning of the 2000s. The inconsistency in this pattern is explained by the creation of "Law 387," passed in 1997. This law recognized that the displaced population requires special attention; it created a special fund to assist the displaced population and to design programs dedicated to protecting this sector of the population. Hence, it is only after 1997 that the government has official counts of the displaced population in Colombia, which is why the number of registers has increased progressively ever since.

3. Literature Review

This section presents a review of the literature regarding migration and its determinants, as well as the effects of migration on the labor market overall. It concludes by reviewing the empirical analyses about these topics in the context of Colombia.

3.1 Review of Literature Regarding Migration Determinants

Early literature about migration focused on factors explaining the migration decision. This literature dates back to the nineteenth century, when Ravenstein (1889) developed the concept of push and pull as factors determining migration flows, extended later by Lee (1966). Ravenstein's theory explains migration as the desire of people to better themselves, leading them to migrate from areas with high unemployment, excessive population, and lower income, to areas with better labor conditions and earnings.

In 1954, Arthur Lewis, discussing the "economic dualism characteristics of underdeveloped economies," introduced the concept of differentials in productivity across sectors as the explanation for migration flows. He recognized the existence of two sectors, one characterized by a low marginal productivity of labor, possibly close to zero (identified as the subsistence, informal, or agricultural sector), and one with high marginal productivity of labor (known as the modern industrialized sector). The subsistence sector has a large population relative to the resources and capital in the economy, which is not specific to rural areas as it can also be a

condition of informal jobs in urban areas. Earnings are defined according to the sector where the person works as these are related to the worker's productivity. Assuming full employment, earnings are higher in formal sectors and lower in the informal sector; this earning differential motivates people to migrate across sectors. From Lewis' point of view, migration would not have an impact on employment and would only affect the spatial distribution of the labor force. Lewis' assumption of full employment, however, is not consistent with the rapidly increasing urban unemployment observed in developing countries.

Harris and Todaro (1970) introduced the existence of unemployment in each sector as part of the considerations for migration. In their model, rural to urban migration occurs due to the differential in expected real income. In other words, migrants take into consideration the probability of finding a job in urban areas. By doing so, Harris and Todaro accounted for the observed unemployment in urban areas. Their model predicts that, as long as the expected real income in the cities exceeds the expected real income in rural areas, migration to urban areas will continue. In the long run, by the "factor price equalization" process, expected income in urban and rural areas will equalize and people will find no further motivation to migrate.

The Harris-Todaro model also predicts that public policy to reduce unemployment can generate the opposite effect due to rural-urban migration. The public policy intended to increase labor demand in urban areas reduces urban unemployment, increasing the probability of employment in the city, which motivates more migration. If this migration is greater than the job creation, there will be more urban unemployment (see 'Todaro Paradox').

In 1975, Fields expanded the analysis to include the difference between the probability of obtaining a job for the unemployed job seeker, and the probability of obtaining a job for the informal employed person whose ultimate goal is to find a job in the formal sector as well. He

found that the urban unemployed person dedicates more time to looking for a job, while the individual working in the informal sector has a higher time constraint that reduces the probability of obtaining a formal sector job.

More recent studies have addressed the question of potential effects of migration on local economies in terms of employment. The literature regarding the effects of migration on labor market outcomes will be reviewed in the following section.

3.2 Review of Literature Regarding Labor Market Outcomes from Migration

Prior literature has addressed the impact of migration on the labor market. However, there has been no general agreement to date as to what the migration effects are in the labor market in destination areas. In a perfectly competitive market framework, basic economics implies that increasing labor supply decreases the equilibrium wage and increases employment. If there are market imperfections such as a minimum wage, the increase in labor supply causes unemployment since wages do not easily adjust. Nevertheless, a considerable part of the empirical literature provides relatively little evidence on the effect on employment and wages, especially for low-skilled workers, despite the rigidities of these labor markets.

Grossman (1982) studied the substitutability of illegal immigrants and native labor force in production, and found that an increase in the number of immigrants by 1% had a minimum effect on native wages (it decreased native wages by 0.02% and it decreased second generation natives by only 0.03%). Lalond and Topel (1989) found that the increase in migration in the United States had an insignificant effect on migrant employment and the employment of other substitutes, and that these effects even vanish over time. Altonji and Card (1991) compared the industry distribution of less skilled natives with immigration densities and found that a 1% increase in the share of migrants into a city increases the labor supply to industries where less skilled natives are

employed by 1%. However, these results do not have a large effect on employment and wages of less skilled natives because immigrants are not sufficiently concentrated in the industries where less skilled natives work. Similarly, Card (1991) researched the effects on wages and employment from the Mariel Boatlift on the Miami labor market, finding virtually no effect despite a 7% increase in the labor force. These studies attribute the lack of an effect from migration to the easy absorption of the migrant labor in the destination areas, as well as to the potential movement of natives' labor or capital to other cities (Card 1991, Borjas 2006).

On the other hand, Borjas (2006) found that migration increased the number of workers in each skilled group, which "reduced the wage of native workers in the same skill group by 3.5%; reduced the wage of native workers who have the same education but who differ in their experience by 0.7%; increased the wage of native workers with different educational attainment by 0.5%" in the United States. Borjas also added that the decrease in wages generated from migration motivated more employment, and this contributed to economic gains that could offset the natives' loss of income.

With respect to developing countries, Cornwell and Inder (2004) did not find evidence of effects of migration on employment outcomes by considering the likelihood of migrants to be employed, unemployed, or underemployed when compared to non-migrants in South Africa. Contrary to the theoretical framework, their empirical evidence suggested that the migrants' level of unemployment was no higher than the average level of unemployment. Migrants are more likely to find employment in the informal sector, which could explain the empirical evidence regarding unemployment. This also implies that even though migrants have a lower unemployment rate than the average, their wages are lower since they are more likely to enter the informal sector.

3.3 Studies of Migration in Colombia

Colombia has also provided a geographical framework for numerous analyses about the drivers of migration and the effects of migration on the labor market. These analyses share a common recognition of violence as one of the main drivers of migration in the country. The literature starts with the analyses by Shultz (1970) and Fields (1982) on the determinants of migration. Later, Florez (2003), Calderon-Mejia and Ibanez (2009), and Calderon, Gafaro and Ibanez (2011) analyzed different aspects of the effects of migration on the labor market.

Schultz (1970) used the classic literature to understand how internal migration occurred between 1951 and 1964. In his view, "migration is associated with the dynamic of adjustment to imbalances between regional supply and demand of labor." In his study of interregional migration in Colombia, Schultz used age, sex, and educational attainment to account for the differences across regions. Other variables incorporated in his analysis were wage rates in agriculture, cost of migration (based on distance to the most accessible major location), and violence. The study confirmed that higher wages reduced outward migration. Higher violence and accelerated population growth caused the opposite effect. On the other hand, schooling and distance did not show significant effects. In relation to violence, Schultz found that the frequency of violence is significant in explaining outmigration, except for men between the ages of 17 and 21 (whom he classified as the "violence makers").

Fields (1982) built a place-to-place migration model using 1973 census data in order to investigate why there were differences in the rates of migration between regions. The differences in terms of demographic characteristics (such as age, education, and gender) and economic characteristics (such as income and employment rates) were used to explain differences in migration rates. Fields concluded that higher income regions are related to higher immigration and

lower outmigration, compared to lower income regions. Distance was also identified as a significant factor. He did not find evidence that higher immigration rates were related to more stable employment situations in certain regions. Additionally, the marginal and average propensity to migrate increased with education for both genders. Field's paper did not account for differences in safety across regions as a factor for migration, which could be important given the political circumstances of the country during the last fifty years.

In a comparative analysis of migration profiles between 1984, 1992, and 2000 in Colombia, Florez (2003) found an increase in male participation in migration flows and in the labor market, but mainly in the informal sector. In terms of gender differentials, an interesting finding was the discrepancies in the probability of recent migrant women's participation in the informal sector, compared to natives: while the probability of recent migrant women's participation in the informal sector was 35%, the probability among female natives was 27%. For men, the probability of participating in the informal sector was similar across both migration groups.

Engel and Ibanez (2007) estimated a utility model of displacement and found evidence of the significance of threats and security perception on the probability of displacement in Colombia. The purpose of the research was to determine if, in addition to violence, the socio-demographic characteristics played an important role in determining the household decision to migrate. The data was obtained from a survey of 376 households in 2000. From these households, 200 migrated and 156 stayed in their places of origin. All of these families resided in the states of Antioquia and Cordoba, which are two of the states most affected by violence. The observable portion of the utility set in this model was measured by safety, economic status, migration, information cost, and household characteristics. An interesting finding of Engel and Ibanez is that, when variables representing security are ignored, the economic variables were significant in determining the

decision to migrate; however, the sign of the relationship is the opposite of the one expected according to classical theory. The study does not support the hypothesis that households with stronger ties to the region of origin have a lower propensity for displacement, except when looking at the results by age group.

In Calderon-Mejia and Ibanez (2009) and in Engel and Ibanez (2007), violence was considered as an explanatory variable for migration as well. Calderon-Mejia and Ibanez analyzed the impact of migration on wages, and on the probability of being employed in the informal versus formal sectors. The cumulative number of massacres in the country was used as an instrumental variable to control for the endogeneity when predicting the effects of migration on employment outcomes. The number of massacres was weighted by the distance from the site of this violence and the particular city. Calderon-Mejia and Ibanez found that the increase in labor supply, induced by the increase in the number of internal refugees, reduced wages and employment quality for native unskilled workers who were seeking the same jobs as the new refugees in the cities. It is estimated that a 10% increase in supply shock increased the likelihood of informal employment by 5%, had no effect on formal wages, and reduced informal wages by 2.3%.

Using a random utility model, Velez and Ibanez (2007) studied whether violence targets specific groups of the population, and whether or not the only factor causing migration in Colombia was violence. The model incorporated income differences between the places of origin and destination, as well as security changes from migration. The second part of the analysis determined the welfare loss from the displaced migration. Velez and Ibanez documented that the aggression against civilians is not random. Displaced households are "more likely to be landowning, headed by younger people and have larger consumption aggregates than non-displaced household. Non-displaced households have higher access to public investment because they are better educated and

have more access to social services compared to displaced population." The analysis also confirmed that perceptions of violence and security are significant drivers of migration.

Mesnard (2009) supports the results obtained previously by Engel and Ibanez (2007) regarding the positive effect of violence on migration in Colombia. Mesnard evaluated the results of the welfare program "Familias en Accion." This welfare program consists of cash transfers to the poorest quintile of the population within each municipality. Mesnard concluded that welfare programs discourage migration unless violence is extremely high.

In an analysis of the effects of migration on employment outcomes by gender, Calderon, Gafaro, and Ibanez (2011) compared female labor force participation between displaced women and women who remain in rural areas. According to their findings, displaced women had a higher participation rate in the labor market, made higher contributions to household income, and worked longer hours. However, their contributions did not result in increased bargaining power. Gafaro and Ibanez also found that displaced women can be more violent with their children, thereby increasing the probability of intergenerational violence.

This paper explores the possibility of differential outcomes on unemployment using data from Colombia. Based on the evidence found by Calderon, Gafaro and Ibanez (2011) regarding the difference on labor market participation characteristics between displaced and non-displaced women, it is plausible to set up the hypothesis of differential effects of migration on employment across migration groups and gender.

4. Conceptual Framework

The first part of the conceptual framework examines the theory behind an individual's decision to migrate and how this decision differs in a violent environment. The second part reviews the theoretical framework for the effect of labor supply shocks on labor market outcomes.

4.1 Migration Determinants

Early studies on migration focused on economic factors as the main drivers of the decision to migrate (Ravenstein, 1885, Lewis, 1954, Todaro, 1969). In the context of the Harris-Todaro (1970) model, migration from the rural area occurs due to the expected income differentials with urban areas, and according to the probability of finding a job. Given that in Colombia the majority of migrants are low-skilled workers, the decision to migrate is based on the expected low-skilled wage, and the probability of finding a job matching their skills in the destination areas.

In the absence of violence, the rural resident compares the wage in the departure area, presumably the agriculture wage (W_a), with the expected income in the destination area, determined by the low-skilled wage (W_l), and the probability of finding a job in this sector in the destination area. This probability is given by the low-skilled labor supply (P_l), and the number of low-skilled jobs available (L). The individual migrates if the expected income in the destination

area exceeds the current earnings, ($E(W_l) = W_l(\frac{L}{P_l}) > W_a$). Migration continues until the expected earnings in both sectors equalize (Harris and Todaro, 1970).

Later studies acknowledged the importance of individual characteristics on the decision to migrate (Becker, 1964, Mincer, 1974). Other studies also incorporated into the effect of catastrophic events, such as violence and natural disasters, as drivers of a less voluntary migration decision (Engle and Ibanez, 2007, Ibanez and Velez, 2008, Naude, 2008, Halliday, 2006, Drabo and Mbaye, 2011, Tse, 2011).

In the context of Colombia for example, heavy violence plays an important role in the migrant's decision to move. The household's decision is based on the utility differential between the utility at the departure area and the utility at the potential destination area (Engel and Ibanez, 2007). The households migrate if the expected utility in the destination area exceeds the utility of the household in the departure area. The observable part of the implicit expected utility at the departure area is given by

$$U_{it} = f(V_{it}, ND_{it}, Y_{it}, C_i, H_i) \; . \qquad (1)$$

Utility is a function of the effect of violence (V_{it}) for household *i* at the place of origin at time *t*, the impact of natural disasters (ND_{it}), the economic status of the household at time *t* at the place of origin (Y_{it}), the migration costs (C_i), and the household's characteristics influencing utility(H_i)[4]. Migration from an area i into an area r (M_{ir}) is implicitly determined by the differentials in expected earnings, violence, and natural disasters; adjusting for the cost of migrating between the

[4] This is adopted from Engle and Ibanez (2007). In their paper, the observable expected utility is a function of the perception of safety, the economic status of the household, migration costs, and the household characteristics affecting the individual's preferences.

two areas, migration is given by $M_{ir} = \varphi(E(W_{lr}) - E(W_{ai}), vio_r - vio_i, ND_r - ND_i, C_{ir})$ Or, $M_{ir} = \varphi(W_{lr}(\mathrm{L}_r/P_{lr}) - E(W_{ai}), vio_r - vio_i, ND_r - ND_i, C_{ir}, H_i)$.

Migration into municipality *r* from municipality *i* will be driven by higher expected income in *i* $(W_{lr}(\mathrm{L}_r/P_{lr}))$ relative to the expected income in *r* $(E(W_{ai}))$; migration into *r* from *i* will be driven by the relative increase in violence in the departure area *r* (vio_r) relative to the violence in the destination *i* (vio_i). Similarly, increases in the number of natural disasters in the departure area (ND_i) relative to the natural disasters in the area of destination (ND_r) are expected to encourage more migration into *r* relative to *i*. Migration costs (C_{ir}) are expected to discourage migration. Finally, household characteristics such as age, income, and education could have diverse effect on the migration decision.

4.2 A Simple Model of the Labor Market in the Destination Areas

This section reviews the theoretical framework for the potential effects of migration on the labor market, specifically on unemployment. Independent of motive, the increase in net migration translates into a positive labor supply shock. Its effect on the local labor market depends on how the destination area is able to absorb the additional supply of labor, and this is determined partly by the flexibility of its labor market.

Assuming that the municipalities in Colombia have a Cobb-Douglas production function with constant returns to scale and only two factors of production, high-skilled workers (H) and low-skilled workers (L), the production function looks like $F(L, \mathrm{H}) = L^{\propto} H^{1-\propto}$. In a competitive market, the marginal rate of technical substitution of the factors of production will equal the relative price of these factors, and assuming that the marginal revenue of the firm is one, the demand for low-skilled workers relative to high-skilled workers will be given b:$L = \frac{\propto H W_h}{(1-\propto) W_l}$.

Using the definition of unemployment in the low-skilled labor market ($Unemployment = 1 - \frac{L}{P_l} = \frac{P_l - L}{P_l}$), we can substitute L in the labor demand equation to predict the potential effects of labor supply changes in unemployment. Assuming that both types of workers do not compete with each other, the unemployment rate in the low-skilled labor market is given by $U_l = \frac{P_l - [\frac{\propto W_h}{1 - \propto W_l}\mathrm{H}]}{P_l}$.

The change in unemployment after the increase in labor supply depends on how the wage rate adjusts to these changes. Increasing low-skilled migration increases the rate of return on high-skilled workers and decreases the low-skilled wage rate, if the low-skilled wage rate is flexible. This is because firms take advantage of the lower wages and increase production, increasing their demand for both factors. Therefore, under this framework, increases in migration would not have an impact on the labor market since the increase in labor supply in the short run is compensated for by the posterior increase in labor demand.

However, the labor market in Colombia is highly regulated (Calderon and Ibanez, 2009). As an example, every year the government determines the monthly minimum wage[5], which especially affects the low-skilled workers. Despite these rigidities, the analysis of supply shocks in a flexible wage environment is still possible due to the existence of informal labor markets where institutional control is almost null. Informal labor markets employ a significant part of the labor force in developing countries (Suwal and Pant, 2009). The ILO formally defined the informal sector as a sector of "easy entry, reliance on indigenous resources, family ownership of enterprises, small scale of operation, labor intensive and adapted technology, skills acquired outside the formal school system and unregulated and competitive markets" (ILO, 1972). In this sector, anyone who

[5] Currently, the minimum monthly wage in Colombia is $589,599 (Colombian pesos). This corresponds to $321.74 in US dollars (exchange rate: $1 US= $1832.2 Colombian pesos).

is willing to work receives some form of earning (Harberger, 1971). Given the lack of institutional control, the informal sector is not protected by the minimum wage (Mazumdar, 1976), which allows for the absorption of additional low-skilled labor and creates an important alternative for low-skilled workers who do not enter the formal sector (Fields, 1989).

The effects on unemployment from migration in a minimum wage framework are analyzed in the following section.

4.3 Effects of Labor Shocks in a Minimum Wage Environment

The presence of a binding minimum wage does not allow the market to fully absorb the additional labor coming after migration. Thus, if there is a minimum wage and other rigidities in the labor market, such as in the low-skilled formal sector in Colombia, the increase in migration increases unemployment.

Assume that the minimum wage ($\overline{W}$) is greater than the low-skilled equilibrium wage,W_l, that the wages of the high-skilled workers (W_h) are not subject to the minimum wage, that the latter are higher than the minimum wage, and that, before the supply shock, the high-skilled labor market was in equilibrium (no unemployment:$H = \mathrm{P_h}$); if there are no changes in labor demand in either market (L or H), the increase in labor supply generates an increase in unemployment. This can be shown using the unemployment equation shown before: $\frac{\partial U_l}{\partial P_l} = \frac{\frac{\propto W_h}{1-\propto W_l}H}{(P_l)^2} > 0$.

To show this graphically, let's assume, for example, that the low-skilled labor market is in equilibrium at a point where the equilibrium wage is at the same level as the minimum wage (refer to figure 1). At this equilibrium wage (w*), the number of people employed in the low-skilled labor market is L*. Given that the majority of migrants are low-skilled workers, the increase in migration will increase the low-skilled labor supply. In an inflexible wage framework, the increase

in migration causes an increase in low-skilled unemployment since more people would be willing to work (L***) at the minimum wage compared to the number of people that firms are willing to hire at that price (L*). The unemployment under this scenario would be given by the difference between L*** and L*.

On the other hand, if there was a flexible wage, the increase in migration would increase the supply of low-skilled labor; the increase in the supply of labor would subsequently decrease the wage rate from w* to w**, causing a final increase in the number of people hired. In this framework, we should not foresee any effects on the number of people unemployed.

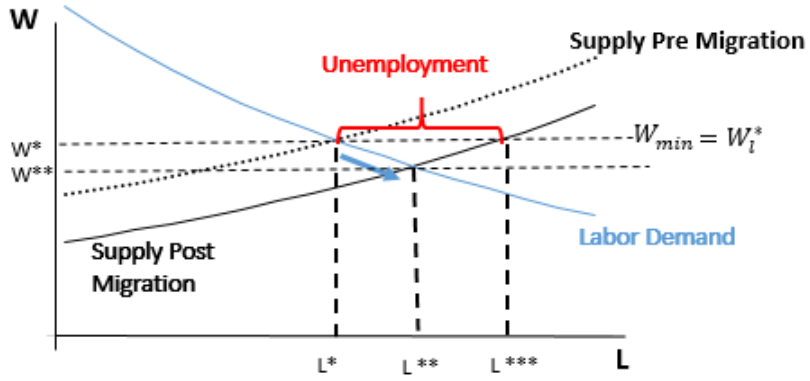

Figure 1: Wage Adjustments in the Low-Skilled Labor Market

The existing literature suggests that the final effect in terms of employment outcomes will also depend on the skill distribution of migrants since this determines which sectors or industries would be more exposed to the effects of an increase in migration (Altonji and Card, 1989). Furthermore, differential effects among genders are expected due to the differences in their skill profiles. As observed by Calderon, Gafaro, and Ibanez (2011) "labour markets are heterogeneous for male and female in Colombia": female skills are more suited for adjustment to the urban labor market than are male skills. Most of the migration due to violence in the country occurs from the

rural to the urban areas, leaving men with experience only in agriculture at a disadvantage compared to females who also know how to perform household activities. This, coupled with the economic costs imposed by forced displacement, forces females to increase their participation in the labor forces of destination areas, which leads to distinct effects across genders (Calderon, Gafaro and Ibanez, 2011).

5. Estimation Strategy

This paper seeks to understand the labor market outcomes from net migration in Colombia, specifically when migration is caused by violence. The main variables to be explained are the changes in unemployment rates in each region between 1993 and 2005. This paper seeks to verify if the unemployment effect differs across gender and levels of education. Finally, the effect of changes in net migration on wages will be analyzed.

Let $\mathrm{Y_{rt}}$ be the employment outcome in municipality r at time t, where t corresponds to the 1993 and 2005 Colombian censuses:

$$Y_{rt} = a_0 + a_1 \mathrm{M_{rt}} + a_2 X_{rt} + c_r + b_t + u_{rt} \ . \quad (2)$$

Equation (2) is regressing the employment outcome on the net migration rate into municipality r (M_{rt}) at time t, the time variant city characteristics (X_{rt}), the municipality fixed effect (c_r), a time fixed effect (b_t), and a disturbance term (u_{rt}). The employment outcome can be the unemployment rate at the municipality of destination, or the employment rate by skill level and gender. Taking first differences in the employment outcome between 2005 and 1993 is given by

$$\Delta \mathrm{Y_r} = b_0 + a_1 \Delta \mathrm{M_r} + a_2 \Delta X_r + \Delta u_r. \quad (3)$$

By taking the first difference over the two periods, equation (3) already takes care of the municipality time invariant fixed effects. In order to be able to use linear regression, the zero-conditional mean assumption needs to hold. However, a migrant's choice of destination area may be based on the labor conditions: to find a job, looking for better opportunities, or to improve living standards (for example, to escape violence). Therefore, "if immigrants systematically choose to settle in locations with better labor market conditions, but their arrival causes a deterioration in those conditions, the sign of the resulting correlation between those two variables will be ambiguous" (Friedberg & Hunt, 1999). In other words, there is a clear endogeneity problem between migration and employment outcomes.

If migration were exogenous, equation (3) could be estimated using ordinary least squares (OLS). However, given this endogeneity issue of migration and employment outcomes, if OLS is used, the estimation of a_1 will be biased. This paper proposes the use of violence as the instrument for migration. Violence as an instrument to estimate the effect of migration on employment outcomes in Colombia was previously used by Calderon and Ibanez (2009).

In Colombia, the intensification of violence in the rural areas after the 1990's has caused millions of people to migrate. Clearly, violence will satisfy one of the two conditions of a "good" instrument: it is highly correlated with migration in Colombia (the explanatory variable) and is not correlated with the destination's labor market outcome (the dependent variable).

The violent events occur mainly in the rural areas, and arguably have no effect on employment outcomes on the municipalities where to the displaced population is migrating. One could argue that if a violent event occurs, the supply of agricultural produce will be reduced, and the jobs related with the commercialization of these products in the cities would be affected, depressing the labor market in the destination areas. This is true; however, Colombia has wide and

well-distributed rural areas, it shares a border with five different countries (Panama, Venezuela, Brazil, Ecuador and Peru), and it borders the Atlantic and Pacific oceans. Therefore, if violence caused a shortage in the production of a particular good, the effect would only be temporary since the good could usually be replaced by the supply of the same good or a substitute coming from a different region or even from a neighboring country.

5.1. Construction of the Instrument

The most commonly used instruments for migration are the historical stock of migration (Altonji and Card, 1989, McKenzie and Sasin, 2007, LaLonde and Topel, 1991) and natural experiments (Card 1991, Hunt 1992, Friedberg 1997, McKenzie and Yang 2010). The well-known violent conflict in Colombia allowed me to use this as a natural experiment for migration. Calderon and Ibanez (2009) used the number of massacres of the civilian population in Colombia, divided by the working age population and distance, as an instrument for migration inflows.

In this paper, a more comprehensive measure of violence is used: the overall number of victims from the conflict in each potential departure area. The victims of the two main guerrilla groups, ELN and FARC, and the most important paramilitary group, AUC, are considered in this analysis. The count of the number of victims includes the sum of the following: number of civilians and members of the armed forces members wounded, number of homicides from the armed conflict, number of kidnappings, number of causalities, and number of victims by massacre. Information on the number of victims by massacre was not available; hence, it is assumed that, for each massacre, there were four victims[6].

[6] Acosta, Pedro. Colombia's Economic Recession: The Impact of Guerrilla Violence, Illicit Drug, Trafficking, and the 1991 Constitution. Naval Postgraduate School Thesis. Master of Arts in National Security Affairs. 2001. Acosta used the same assumption of four victims in every massacre.

The purpose of the instrument is to estimate the changes in net migration exogenously from the labor market outcomes in the destination areas. Using the violent conflict in Colombia as a natural experiment, the instrument is constructed by using a measure of the relative change in violence between municipalities. Since violence in Colombia is wide spread (i.e., between 2000 and 2005 there was at least one violent event[7] in 58% of the census areas), the population has been desensitized with respect to violence; hence, only when there is a particular intensification of the conflict (Florez, 2003) will people migrate from more to less violent areas. In order to capture this effect, my instrument is constructed by regressing the change in net migration rates between every distinct combination of municipalities (municipality of destination, r, and potential departure area, i) on the changes in the difference in the rate of the victims of violence between them and their distance. Thus, the predictor of the change in net migration rates is given by

$$\Delta M_{ri} = \Delta(Inflow_{ri} - Outflow_{ri}) = \alpha_0 + \alpha_1 \frac{\Delta Vio_{ri}}{D_{ir}} \quad (4),$$

where M_{ri} is the net migration rate into area r from area i, $Inflow_{ri}$ is the inflow rate from area i to area r and $Outflow_{ri}$ is the outflow from area r into area i, Vio_{ir} is the difference in violence rates between destination area and departure area, and D_{ir} is the distance between the two locations.

A total of 259,596 observations resulted from the distinct combinations across the 529 municipalities in each census year (1993 and 2005). The results from the regression suggest that the increase in the rate of victims of violence in the departure area relative to the destination area represents an increase in the net migration rate into the destination area by 11 percentage points.

[7] A violent event is defined in this context as any terrorist attack, private property assault, combat, illegal pull over by the guerrilla groups ELN and FARC or by the paramilitary group AUC.

The relationship is statistically strong, with an F statistic of the violence by distance variable of 37.71.

Frankel and Romer (1999) used a similar methodology to estimate the effect of trade on income at the country level. Following the gravity model of trade, they identified that geographic characteristics had a significant effect on trade, but did not have an effect on income, and hence, were useful as instruments. To construct their instrument, they estimated a model of bilateral trade with respect to only geographic characteristics to make sure the instrument depended exclusively on the geographic characteristics and not on other variables that could be related to income. Then, they used the aggregated predicted values of this regression to estimate the effects of trade on income.

Similarly, I estimated equation (4) for each pair of municipalities of the form ri but not ir, and then calculated the predicted values for all combinations (ri and ir). This way, the estimated net migration was based only on the effect of violence and distance between the two regions, which should not be related with employment outcomes, as was previously discussed. Then, using all the observations for each potential destination, I aggregated the fitted values from the regression and used this as my instrument for the net migration caused by violence for each area ($\text{Instrument} = \widehat{\Delta M_{r=}} \sum \widehat{\Delta M_{r\iota}}$).

The dependent variables used on this regression are the changes in unemployment rate for each gender by each education type (less than primary education, primary education, secondary education and university).

Since the model is estimating the changes in labor market outcomes over 12 years (1993-2005), the changes in demographic characteristics (X_r) are important. Particularly, changes in age,

average years of schooling, and minority rates in each municipality will be used in this model. There are many other variables that are related to unemployment. However, using violence as an instrument of migration implies that I am not expecting other independent determinants of unemployment to be correlated with the instrument, and that they could therefore be included in the error term. Additionally, if we were to include these other determinants of unemployment, we could omit the effect of migration on unemployment through these other independent variables. For example, if an increase in migration increases the demand for goods and services, this will have a positive effect on economic performance of the region and employment. However, if the change in economic performance is added to the estimation, the coefficient estimated for migration will not capture this additional effect (Frankel and Romer, 1999).

Finally, special attention is given to the effects across low educated sectors of the population throughout this paper. In Colombia, the majority of people migrating to avoid violence have less than secondary education. Table 1 tabulates the number (and percentages) of migrants by their reason for migrating, according to their education level in 2005. Note that the group of people migrating because of violence has the highest percentage of population with lower education levels (92% have either less than primary, primary, or secondary education, and from this group 78% have primary education or less). Since low educated natives and migrants are potential close substitutes, the difference in their labor market effects is investigated as well (Lalond and Topel, 1991).

Table 1: Distribution of Migrants by Cause and Education Level - 2005

Reason to Migrate	Total Migrants	Education Level					
		Unknown	Less than Primary	Primary	Secondary	University	Less Primary + Primary + Secondary
NIU (not in universe)	738,047	52%	25%	16%	6%	2%	47%
Work	461,905	2%	26%	37%	25%	11%	87%
Family move	448,422	1%	18%	33%	33%	15%	84%
Study	57,988	2%	16%	27%	32%	24%	74%
Violence or insecurity	107,938	2%	39%	39%	14%	6%	92%
Natural disaster	33,369	4%	31%	37%	21%	7%	89%
Health	50,732	3%	29%	35%	23%	12%	86%
Other reason, not elsewhere classified	230,387	0%	13%	31%	34%	22%	78%
Not specified	21,711	34%	36%	18%	9%	4%	63%
Total Migrants	**2,150,500**	**19%**	**23%**	**28%**	**20%**	**10%**	**71%**

6. Data Source

The main source of the data used in this analysis came from the 1993 and 2005 Colombian censuses. This data was obtained from the Integrated Public Use Microdata Series, International (IPUMS). A total of 715,640 and 1,054,812 households were interviewed, respectively, in each census. The data provides demographic information for each individual such as age (AGE), sex (SEX), marital status (MRST), and educational attainment (EATTAND), as well as the place of residence (MUNICO), place of residence five years ago (MIGCO4), and employment status (EMPSTAT). The variable MIGCO4 indicates "the person's recoded municipality of residence within Colombia five years prior to the census. The municipality recodes identify groupings of municipalities whose population totaled at least 20,000 in 1993"[8]; with this variable, it is possible to identify migrants from natives.

For the purpose of this analysis, migrants are considered to be the people who lived in a different municipality five years ago (MUNICO<>MIGCO4). The census data contains 533 municipalities for each year.

To calculate a one year net migration rate for each combination of municipalities, the number of migrants arriving at a destination area *r* from municipality of departure *i,* minus the number of people departing from region *r* to municipality *i,* was calculated as a share of the population in the

[8] Taken from IPUMS website.

destination area *r* in the same year. The change in net migration rate is given by the difference in the shares for both census years.

The comparability of the data by municipality each year was crucial for the analysis. This was one of the challenges faced in the construction of the data set, since the definitions of some municipalities had changed when comparing 2005 to 1993. To take care of the discrepancies in defining certain municipalities, some of them were grouped together in 2005 to make them comparable with their 1993 definitions. Table 2 shows the groups created[9].

Table 2: Municipalities created for 2005 from one or two municipalities in 1993

New Municipality 2005	Created From 1993 Municipality
La Pintada	Santa Bárbara and Valparaíso
Arroyohondo	Calamar and Mahates
Hatillo de Loba	San Martín de Loba and San Fernando
Certegui	Tadó, Lloró and Bagadó
Rio Iró	Condoto, Tadó and Istmina
Cotorra	Lorica and San Pelayo
La Apartada	Ayapel and Montelíbano
Algarrobo	Fundación, Ariguaní and Pivijay
Sabanas de San Angel	Ariaguaní, Pivijay, Chivoló and Plato
Santa Bárbara de Pinto	Santa Ana and Plato
Zapayán	Pedraza, Tenerife and El Piñón
La Esperanza	Abrego and Cáchira
El Roble	Sincé, Corozal and San Benito Abad

Also, municipality Toribio (Cauca) had very few observations in 1993 compared to 2005, for unknown reasons. I made IPUMS aware of the discrepancy; however, they did not have an explanation for this issue. In addition, Uribia (Guajira) is a new municipality created in 2000, and did not show observations in the 1993 census. Due to these inconsistencies with the observations, these two municipalities were excluded from the analysis.

[9] https://international.ipums.org/international-action/variables/MUNICO#comparability_section

6.1. Labor Market Measures

The employment data comes from the question about the employment status of the respondent (EMPSTAT). It indicates whether or not the interviewee was part of the labor force during the previous week. The answers are classified as employed, unemployed, and inactive. The unemployment rate is the number of unemployed people between 25 and 65 years old with respect to the total active labor force (employed and unemployed population). For the employment rate, the number of people employed versus the total people in the labor force (active and inactive) is used, and for the inactivity rates, the number of inactive people divided by the total number of people in the labor force is calculated.

The skill level of the individual is determined according to educational attainment. The educational attainment is categorized by the level of schooling as "no schooling", "Less than Primary", "Primary Completed (five years)", "Secondary", and "University Completed". People with "No Schooling", Some Primary ("Less than Primary"), "Primary Completed" and "Secondary" education are considered low-skilled population.

6.2. Violence Data

The data for violence was provided by the Center for Economic Studies (Centro de Estudios sobre Desarrollo Economico [CEDE]) at the Universidad de los Andes in Colombia. This is annual data by municipality, and includes the number of causalities, kidnappings, attacks against civilians, injuries, massacres, and other illegal actions by each armed group in the country. The number of victims from kidnappings, homicides, massacres, and wounded are the variables used in this paper. The data from 1988 to 1993 were grouped for 1993, and the data from 2000 to 2005 were grouped for 2005.

6.3. Other Data Sources

Data for natural disasters was provided by the National System of Risk Mitigation and Disaster Preparedness (Sistema Nacional para la Prevención y Atención de Desastres- SNPAD). This institution collects data on the number of households affected, and the material damages and number of causalities resulting from earthquakes, volcanic eruptions, storms, landfalls, and droughts. In this paper, the number of people affected as a consequence of the natural disaster was the variable used. Since this data was daily, similar to the violence data, the natural disasters data was grouped from 1988 to 1993 as 1993, and from 2000 to 2005 as 2005. The number of victims from flooding, fires, hurricanes, and earthquakes were taken into consideration in the construction of the variable.

Information about the latitude and longitude of each municipality was obtained from the Instituto Geográfico Agustín Codazzi (IGAC). This entity is in charge of the cartography and analysis of soil in Colombia.[10]

[10] http://www.igac.gov.co/igac

7. Descriptive Statistics

The purpose of this section is to provide descriptive statistics of the data used in the analysis. This section starts with the description of the violence patterns and the geographic distribution of violence in the country, continues with the demographic characteristics of migrants, and finalizes with descriptive statistics of different employment measures in Colombia between 1993 and 2005.

7.1 Violence Patterns

The violence data contain detailed information about the perpetuators, the type of action committed, and the location of the violent event. Table 3 summarizes the violence data by the type of action, by year, and by armed group. Only the data pertaining to the most important armed groups is included in the analysis (ELN, FARC, and AUC).

From the total number of victims of violence, fatalities of their own group members, homicides, kidnappings, and massacres are the most representative actions in 1993 and 2005. This data groups the total number of victims during each period. In 2005, there was a considerable increase in the number of fatalities, kidnappings, homicides and massacres perpetuated by the guerrilla groups, compared to 1993. The opposite pattern is observed with respect to the actions perpetuated by paramilitaries. In 2005, the number of victims from most of the categories of violent actions perpetuated by the guerrillas increased by more than 100%, except for FARC "other kidnappings" and ELN "fatalities" and "homicides," compared to 1993. On the other hand, the

number of all paramilitary actions decreased by 54 percentage points in 2005, when compared to 1993. Overall, the number of victims of violent actions decreased by 54%.

Table 3: Number of Victims by Type of Crime and Armed Group

Crime Type	Armed Group	1993	2005	1993	2005
Guerrilla Fatalities	FARC	1594	4368	5%	28%
Homicides	FARC	376	1182	1%	7%
Civil Kidnappings	FARC	315	1046	1%	7%
Masacres Fatalities	FARC	200	676	1%	4%
Other Kidnappings	FARC	134	7	0%	0%
Armed Forces Fatalities	FARC	114	244	0%	2%
Political Homicides	FARC	68	82	0%	1%
Armed Forces Wounded	FARC	24	242	0%	2%
Political Kidnappings	FARC	5	136	0%	1%
Guerrilla Fatalities	ELN	1362	946	4%	6%
Homicides	ELN	418	236	1%	1%
Civil Kidnappings	ELN	315	646	1%	4%
Political Homicides	ELN	146	8	0%	0%
Armed Forces Fatalities	ELN	145	39	0%	0%
Massacres (Fatalities)	ELN	96	148	0%	1%
Other Kidnappings	ELN	84	13	0%	0%
Armed Forces Wounded	ELN	40	55	0%	0%
Political Kidnappings	ELN	31	211	0%	1%
Paramilitaries Fatalities	AUC	15451	3288	45%	21%
Homicides	AUC	5893	794	17%	5%
Masacres Fatalities	AUC	2392	980	7%	6%
Civil Kidnappings	AUC	2110	366	6%	2%
Armed Forces Fatalities	AUC	1555	13	4%	0%
Political Homicides	AUC	1054	41	3%	0%
Political Kidnappings	AUC	488	30	1%	0%
Armed Forces Wounded	AUC	166	21	0%	0%
Other Kidnappings	AUC	47	10	0%	0%
Victims	ALL	34623	15828	100%	100%

In order to control for the size of the population of the municipality, the variable used in the model is the victimization rate. The victimization rate is measured as the total number of victims in the armed conflict, divided by the total population between 25 and 65 years old in the municipality. On average, the victimization rate in the country decreased from 2 to 1 for every 10,000, compared to 1993.

The magnitude of violence varies according to the type of municipality (metropolitan vs. non-metropolitan). Table 4 compares the victimization rate between metropolitan and non-metropolitan areas.[11] In both types of areas, the victimization rate in the armed conflict decreased.

[11] The following municipalities are considered metropolitan areas, according to the National Department of Statistics in Colombia: Bogota D.C., Medellin, Cali, Barranquilla, Cartagena, Cucuta, Bucaramanga, Ibague, Pereira, Pasto, Monteria, Villavicencio, and Manizales.

For metropolitan areas, the mean ratio decreased from 1.4 to 0.2 victims for every 10,000 people, and in non-metropolitan areas the rate decreased from 2 victims to 1 victim for every 10,000 people.

Table 4: Sumary of Statistics
Victims Rate by Municipality Type for every 10,000 People

	Year = 1993			Year = 2005		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Metro	13	1.4	1.3	13	0.2	0.1
Non Metro	498	2.0	2.8	501	1.0	1.8
All Municipalities	529	2.0	2.7	529	1.0	1.8

A comparison of means test rejects the null hypothesis that there is no significant difference in the average victimization rate in the metropolitan areas, as compared to the non-metropolitan areas, supporting the alternative hypothesis that non-metropolitan areas, on average, have a higher number of victims per population in the area; This supports the idea that most of the violence in Colombia mainly occurs in the rural areas (Table A1 in the appendix).

7.2 Geographic Distribution of Violence

The summary statistics of the average number of victims by state between 1988 and 1993 and between 2000 and 2005 are shown in Table A2 in the appendix. Arauca, Antioquia, and Valle were the most violent states during this period in 1993, and Arauca, Cesar, and Casanare in 2005. According to the CEDE data, the mean number of victims by state decreased from 5 in the 1993 period to 3 in the 2005 period.

The location of the violence did not change during both periods (1993 and 2005). Most of the states that were most affected by violence are in the central part of the country, except for Caqueta, Guaviare, and Putumayo. This central part of the country is mainly covered by the Andes Mountain Range, and is the most densely populated. On the other hand, Caqueta, Guaviare, and

Putumayo are located in the least developed areas of the country, characterized by the Amazon jungle (a significant region in the south of the country).

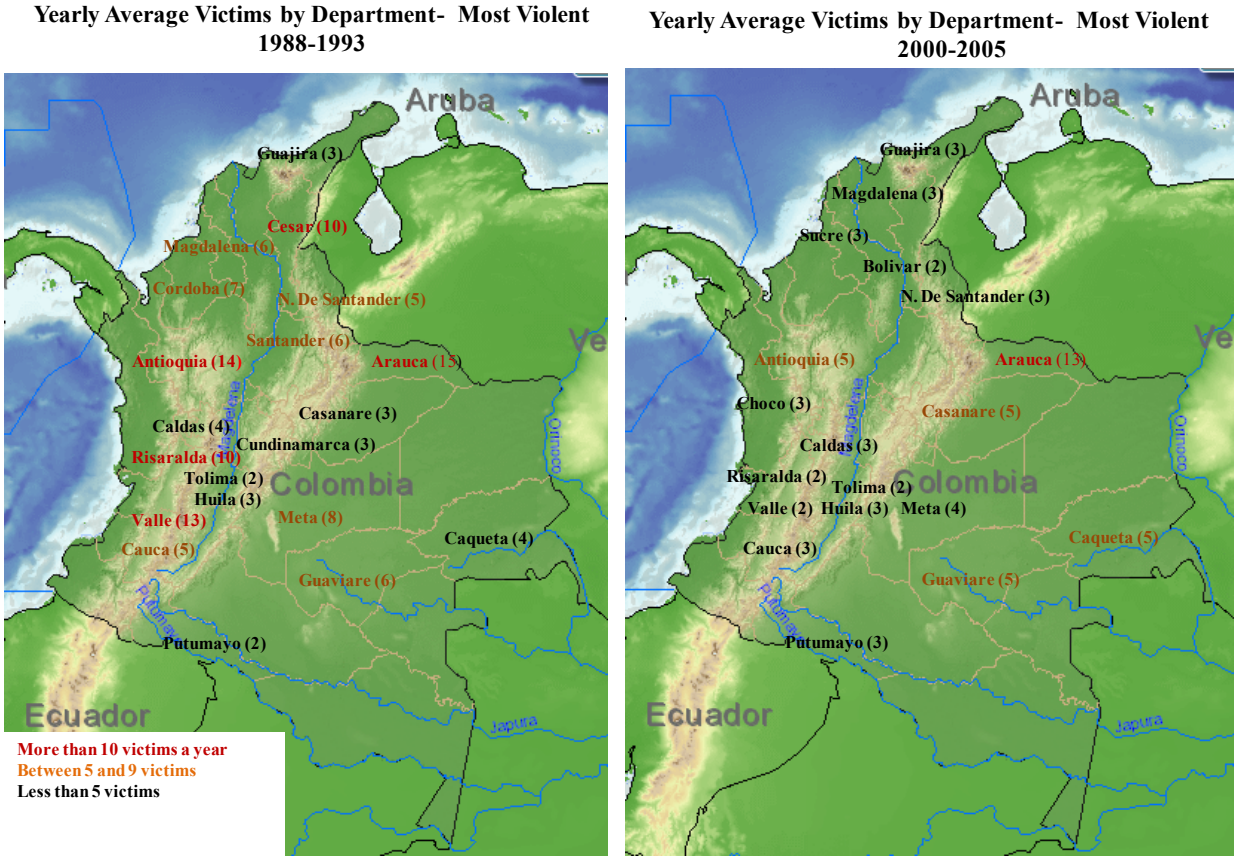

Figure 2: Average Victims in Most Violent States[13]

7.3 Migrants' Demographic Characteristics

This section summarizes the gender, age, and education characteristics of the migrant population. In terms of gender composition, the percentage of males is slightly greater than the percentage of females among migrants: the percentage of male migrants correspond to 50.15%

[13] The Colombian map is taken from www.geology.com

and 50.40%, while the percentage of females were 49.85%, and 49.64% in 1993 and 2005, respectively.

Between 1993 and 2005, the overall number of migrants decreased; however, the number of females decreased more than the number of males. While the number of female migrants decreased by 25.54%, the number of male migrants decreased by 22.98%. Table 5 below shows these figures.

Table 5: Average Number of Migrants by Municipality

1993		Male			Female	
Variable	**Obs**	**Mean**	**Dev.**	**Obs**	**Mean**	**Dev.**
Number of Migrants	508	3,881	13,125	508	4,185	15,224
Percentage of Migrants	508	50.15%	4.03%	508	49.85%	4.03%
2005		**Male**			**Female**	
Variable	**Obs**	**Mean**	**Dev.**	**Obs**	**Mean**	**Dev.**
Number of Migrants	505	2,989	9,476	505	3,116	10,157
Percentage of Migrants	505	50.40%	3.70%	505	49.64%	3.70%

A difference in means test (results presented in Table 6) confirms that the percentage of males is higher compared to the percentage of females, and that the 0.3 percentage point difference between the percentage of male and female migrants is statistically significant.

Table 6: Difference in Means Test- Migrants by Gender

Two-sample t test with equal variances						
Group	**Obs**	**Mean**	**Std. Err**	**Std. Dev.**	**[95% Conf. Interval]**	
Male	1020	50.38%	0.001469	0.0469164	0.5009173	0.5066825
Female	1020	49.87%	0.0014622	0.046699	0.4958311	0.5015696
combined	2040	50.13%	0.0010376	0.0468658	.4992152	.5032851
diff		0.30%	0.0025316		0.0010348	0.0091644
diff = mean(M) - mean(F)				t = 2.4604		
Ho: diff = 0				degrees of freedom = 2038		
		Ha: diff < 0	Ha: diff != 0	Ha: diff > 0		
		Pr(T < t) = 0.9930	Pr(T > t) = 0.0140	Pr(T > t) = 0.0070		

In terms of education, the distribution of the migrant population between the ages of 25 and 65 shows that the majority of them are low-educated (secondary education or less); however, the percentage of low-educated migrants decreased in 2005, compared to 1993. While more than 70% of the migrant population between these ages had less than basic education (primary completed or less) in 1993, in 2005 this number had lessened to slightly less than 50% of the migrant population. In 2005, the distribution of migrants by education level was more balanced: 20% of the migrants had less-than-primary education, 28% had primary completed, 21% had secondary, and 10% had completed university. This is compared to 1993, where 31% of migrants had less-than-primary, 40% had completed primary, 23% had completed secondary, and only 1% had completed university (see Table 7).

Table 7: Migrants Distribution by Education Level (Between 25-65 years old)

Education Level	Number of Migrants		Percentage of Total Migrants	
	1993	2005	1993	2005
Less Than Primary	664,540	395,028	31%	20%
Primary Completed	841,910	540,969	40%	28%
Secondary Completed	482,030	412,906	23%	21%
University Completed	31,070	200,964	1%	10%
Unknown	90,150	398,225	4%	20%
Total	2,109,700	1,948,091	100%	100%

The distribution of migrants by education level is similar for both genders (see Table 8). The decrease in the percentage of low-educated migrants in 2005, compared to 1993, is consistent across genders as well: in 1993, 95.8% of all male migrants and 94.1% of all female migrants had secondary or less education, while in 2005, the corresponding percentage were 68.9% and 69.6%, respectively. Conversely, the percentage of male migrants with university education increased

from 1.8% to 10.3%, and the change in the percentage of females with university education increased from 1.1% to 10.3%.

The distribution of the migrant population by education level is in line with the distribution of the population in the whole country. While the population with the lowest levels of education decreased (population with no education decreased 9 percentage points and population with primary education decreased by 4 percentage points), the percentage of the population with higher levels of education increased from 1993 to 2005 (percentage of population with secondary education increased 4 percentage points and population with university education increased 10 percentage points). These changes in the educational distribution can be seen in Table 11 in the appendix.

Table 8: Migrants distribution by Sex and Education (Between 25-65 years old)

Education Level	1993				2005			
	Number of Migrants		% of Migrants		Number of Migrants		% of Migrants	
	Male	Female	Male	Female	Male	Female	Male	Female
Less Than Primary	330,550	333,990	31.6%	31.9%	202,944	192,084	20.8%	19.8%
Primary Completed	420,770	421,140	40.2%	40.2%	267,156	273,812	27.3%	28.2%
Secondary Completed	251,540	230,490	24.0%	22.0%	203,847	209,059	20.8%	21.6%
University Completed	19,050	12,020	1.8%	1.1%	100,781	100,182	10.3%	10.3%
Unknown	40,960	49,190	3.9%	4.7%	203,294	194,931	20.8%	20.1%
Total	1,062,870	1,046,830	100%	100%	978,022	970,069	100%	100%

Migrants were younger than non-migrants in both years (see Tables 9 and 10): in 1993, the percentage of male and female migrants of age 40 or less were 82% and 84% respectively, while the percentages of non-migrant males and females of the same ages were both 75%. On the other hand, in 2005 the percentages of male and female migrants over 40 years were 17% and 16% respectively, while the percentages of non-migrant males and females were 24% and 25%, respectively. For both migrant groups, the younger population percentages decreased as the older

population percentages increased. The increase in the older population percentages is higher for migrants than for non-migrants.

Table 9: Migrants by Gender and Age Group

Age Range	1993 Number of Migrants		1993 Percentage		2005 Number of Migrants		2005 Percentage	
	Male	Female	Male	Female	Male	Female	Male	Female
5-10	380,870	369,830	17.05%	15.23%	242,516	235,195	13.04%	12.09%
11-25	786,860	1,005,810	35.22%	41.43%	595,847	696,922	32.03%	35.84%
26-40	669,830	668,880	29.98%	27.55%	513,162	520,993	27.58%	26.79%
41-55	251,010	220,810	11.24%	9.09%	305,119	286,676	16.40%	14.74%
>=56	145,340	162,490	6.51%	6.69%	203,787	204,879	10.95%	10.54%
Total	2,233,910	2,427,820	100%	100%	1,860,431	1,944,665	100%	100%

Table 10: Non Migrants by Gender and Age Group

Age Range	1993 Number of Non-Migrants		1993 Percentage		2005 Number of Non-Migrants		2005 Percentage	
	Male	Female	Male	Female	Male	Female	Male	Female
5-10	1,884,360	1,810,220	16.16%	14.85%	2,339,535	2,232,615	14.67%	13.20%
11-25	3,992,050	4,045,370	34.23%	33.20%	5,068,904	5,076,879	31.78%	30.02%
26-40	2,928,040	3,277,090	25.11%	26.89%	3,710,878	4,109,250	23.27%	24.30%
41-55	1,635,640	1,731,960	14.03%	14.21%	2,817,324	3,142,725	17.66%	18.58%
>=56	1,221,350	1,321,700	10.47%	10.85%	2,012,318	2,350,480	12.62%	13.90%
Total	11,661,440	12,186,340	100%	100%	15,948,958	16,911,949	100%	100%

In summary, the majority of migrants are low-educated males, 40 years old or younger. However, these characteristics, especially the age and education distribution, are not significantly different from the country's overall population.

7.4 Labor Market Measures: Summary Statistics

The changes in employment measures have not been consistent between genders. The data suggests a decrease in the employment participation of males and an increase in female working participation in 2005, compared to 1993. While the male employment rate decreased by 14.5 percentage points and the male inactivity rate increased by 13.7 percentage points in 2005 when compared to 1993, the female employment rate increased by 2.6 percentage points and the female inactivity rate decreased by 2.7 percentage points. In terms of the unemployment rate, there was

almost no change for females, and an increase in the male unemployment rate by 1.6 percentage points.

Table 11: Summary of Statistics of Employment Measures

	1993					
Employment Measure as Rate	**Male**			**Female**		
	Obs	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
Unemployment	497	2.8%	2.3%	453	4.1%	2.6%
Employment	497	88.8%	4.8%	453	23.5%	9.8%
Inactivity	497	8.7%	3.6%	453	75.5%	10.1%
	2005					
	Male			**Female**		
Unemployment	514	4.4%	3.2%	496	4.0%	2.9%
Employment	514	74.3%	10.3%	496	26.1%	10.6%
Inactivity	514	22.4%	9.7%	496	72.8%	11.0%

The male unemployment rate went from 2.8% (standard deviation of 2.3%) in 1993 to 4.4% (standard deviation of 3.2%) in 2005. For females, the unemployment rate went from 4.1% (standard deviation of 2.6%) in 1993 to 4.0% (standard deviation of 2.9%) in 2005.

A comparison of means test rejects the null hypothesis that there is no significant difference between the male and female unemployment rates in 1993, and supports the null hypothesis that this year, male unemployment rates were lower than those of females. Table 12 reports these results.

Table 12: Difference in means Test - Unemployment Rate by Gender - 1993 data

Two-sample t test with unequal variances						
Group	**Obs**	**Mean**	**Std. Err.**	**Std. Dev.**	**[95% Conf. Interval]**	
Male	497	2.78%	0.0010236	0.0228203	0.0257856	0.029808
Female	453	4.09%	0.0012444	0.0264848	0.0384566	0.0433475
Total	950	3.40%	0.0008266	0.0254787	0.0324237	0.0356682
diff		-1.31%	0.0016113		-0.0162676	-0.0099429
diff = mean(M) - mean(F)					t = -1.6814	
Ho: diff = 0				Satterthwaite's degrees of freedom = 896.573		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000		

Similarly, a comparison of means test using the 2005 census data rejects the hypothesis that the unemployment rates of males and females are not statistically different, and supports the alternative hypothesis that this year's female unemployment rate is lower in comparison to the male unemployment rate, using $\alpha = 0.05$. These results are in Table 13.

Table 13: Difference in Means Test - Unemployment Rate by Gender - 2005 data

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	514	4.42%	0.0014015	0.0317752	0.041456	0.0469629
Female	496	4.04%	0.0013124	0.0292291	0.0377793	0.0429366
Total	1010	4.23%	0.0009628	0.0305969	0.0404288	0.0442073
diff		0.39%	0.0019201		0.0000836	0.0076194

diff = mean(M) - mean(F) t = 2.0059

Ho: diff = 0 Satterthwaite's degrees of freedom = 1005.71

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.9774 Pr(T > t) = 0.0451 Pr(T > t) = 0.0226

A mean comparison test of the difference in employment rates between males and females in 2005 rejects the null hypothesis that these rates are similar, in favor of the alternative hypothesis that the male employment rates are higher than the female employment rates (see A4 in the Appendix). A mean comparison of the male and female employment rates between 1993 and 2005 supports the alternative hypothesis that the male employment rate decreased by 14 percentage and female employment rate increased 2.6 percentage points between these years (see Tables A5 and A6 the Appendix).

Also, a mean comparison of male and female inactivity rates in 2005 supports the alternative hypothesis that female inactivity rates are significantly higher than those of males, and that for males it increased, while for females it decreased. These changes are statistically significant.

Since the majority of migrants had less than secondary education completed (94% in 1993 and 69% in 2005), I looked at the labor market changes across the low-skilled population.

A mean comparison test shows that the unemployment rates of low-skilled males and females increased in 2005, compared to 1993, by approximately 1.8 percentage points and 0.6 percentage points, respectively. Although low-skilled female employment and inactivity rates did not change, low-skilled male employment rates decreased, and their inactivity rates increased significantly (see Tables A10 to A13 in the Appendix).

When comparing migrants and non-migrants, the data shows that low-skilled migrants are more active in the labor force, independently of gender: male and female migrants both have higher unemployment and employment rates and lower inactivity rates than non-migrants (see Tables 26 to 28 in the Appendix). This data reflects the nature of the labor market structure in less developing countries: migrants in these countries are forced to openly engage the labor market to survive, while natives do not feel the same pressure as they are established already or have strong friends and family networks that allow them to remain unemployed for longer periods of time or even become inactive.

7.5 Overview of the Unemployment and Migration Changes by Skill Level (1993 – 2005)

Table 14 compares the trends in unemployment for the entire country, for municipalities with positive net migration, and for municipalities with no change or negative change in net migration.

Table 14: Unemployment Rates Comparison (25 to 65 years old)

			Male				Female			
			Less Primary	Primary	Secondary	University	Less Primary	Primary	Secondary	University
Net Migration Rate >0	1993	Mean	2.6	3.5	3.4	3.0	4.5	3.8	2.9	5.7
		Std. Dev.	2.4	3.0	3.5	8.8	4.2	4.0	3.6	18.2
	2005	Mean	4.7	5.0	5.3	3.7	4.0	4.2	4.9	2.9
		Std. Dev.	3.6	3.3	3.9	4.7	4.2	4.1	4.4	4.3
Change			2.1	1.5	1.8	0.7	-0.5	0.4	1.9	-2.8
Net Migration Rate <=0	1993	Mean	2.3	3.0	3.5	2.3	4.2	3.2	3.0	2.5
		Std. Dev.	2.6	2.6	3.9	8.4	4.7	3.7	4.1	9.3
	2005	Mean	4.0	4.7	5.4	3.1	3.9	4.0	4.6	2.2
		Std. Dev.	3.7	3.7	4.1	4.1	3.7	4.4	4.3	3.1
Change			1.8	1.7	1.9	0.8	-0.3	0.8	1.6	-0.3
Overall	1993	Mean	2.4	3.2	3.5	2.6	4.3	3.4	2.9	3.9
		Std. Dev.	2.6	2.8	3.7	8.6	4.5	3.8	3.9	14.1
	2005	Mean	4.3	4.8	5.3	3.4	3.9	4.1	4.7	2.5
		Std. Dev.	3.7	3.5	4.0	4.4	3.9	4.2	4.3	3.6
Change			1.9	1.6	1.8	0.8	-0.4	0.6	1.7	-1.4

Overall unemployment increased across gender and most education levels for both groups of municipalities. The description of the trend in unemployment indicates that the changes are independent of whether or not the municipality had positive or negative net migration, as the average changes in both groups are similar.

Exceptions to this trend are females with less than primary education and females with university education. The unemployment rate of the university-educated female decreased by 1.4 percentage points overall, and this decrease doubled for municipalities with positive net migration. Similarly, females with less than primary education had a decrease in unemployment rates of 0.4 percentage points overall; this percentage is slightly higher in municipalities with positive net migration (+0.5 percentage points).

With respect to changes in the net migration rate, Table 15 shows these changes across genders and education groups (for every 10,000 people). Overall, between 1993 and 2005 there was an increase in the net migration rate, especially for males with university and primary education and females with primary and secondary education.

Table 15: Net Migration Rates Comparison (25 to 65 years old for every 10,000 people)

			Male				Female			
			Less Primary	Primary	Secondary	University	Less Primary	Primary	Secondary	University
Net Migration Rate	1993	Mean	-39	-485	-332	-261	-98	-700	-432	-236
		Std. Dev.	1152	1525	1928	4096	1079	4202	1760	4673
	2005	Mean	48	-73	-156	257	-3	-105	-124	-150
		Std. Dev.	1072	1223	1609	2355	1087	1187	1278	2436
Change			87	412	175	518	94	595	308	87

In summary, this data indicates an increase in unemployment and net migration from 1993 to 2005 for most education groups of the population. The groups with the least change in net migration rates are males with less than primary education, and females with less than primary and females with university education; from these three groups, females with less than primary education and females with university education also lowered their unemployment rates in 2005.

Overall, the summary of the data indicates that the increase in unemployment suffered by some population groups between 1993 and 2005 was similar among municipalities with positive migration compared to municipalities with negative or zero migration.

8. Determinants of Migration in Colombia: Hypothesis and Findings

Under normal circumstances, people choose to migrate expecting to improve their living conditions. Therefore, migration can be explained for the most part by the inequalities in living standards and job opportunities between departure and destination regions.

In the case of Colombia, in addition to the differences in work opportunities, households move due to family ties, to study, or to avoid violence. The purpose of this section is to identify the migration drivers in the context of Colombia between 1993 and 2005.

In many cases, the decision to migrate is not purely economic: the migrant is willing to suffer a decrease in wealth by moving in order to decrease his/her exposure to violence (Engle & Ibanez, 2007). My hypothesis is that, in Colombia, people move to less violent areas, areas with the least effect from natural disasters, and areas where there are better economic conditions, taking into account the cost of migrating (distance).

The 2005 census provides some insights about the most important determinants of migration in the country[14]. Table 16 shows the distribution of the migrant population according to their reason for migrating. Family ties are the most important factor for females to migrate, while

[14] Unfortunately, the 2005 census is the first one asking this type of question about the reasons to migrate, and this data is therefore not comparable with other years.

for males, work is more important than family as a factor for migration. This is supported by Fields (1982), who found that women tend to move due to non-economic reasons more than men.

Table 16: Distribution of Migrants by Motive - 2005 Census

Cause of Migration	Number of Migrants	% of Total Migrants	% Male	% Female
Work	461,905	33%	38%	28%
Family move	448,422	32%	27%	37%
Study	57,988	4%	4%	4%
Violence or insecurity	107,938	8%	7%	8%
Natural disaster	33,369	2%	2%	2%
Health	50,732	4%	3%	4%
Other reason, not elsewhere classified	230,387	16%	17%	16%
Not specified	21,711	2%	1%	2%
NIU (not in universe)	738,047	-	-	-
Total Number of Migrants	**1,412,453**		**705,308**	**707,145**

The migration motive varies according to demographic characteristics, education level, distance between regions, and particularly, in the case of Columbia, violence (Schultz, 1970). Using the census data, Table 17 tabulates the percentage of migrants by gender and education level according to their migration cause. The data shows that members of the population with low education levels are more motivated by work and violence to migrate, while those with higher education levels tend to migrate more due to family ties and due to school reasons. This is true for both men and women. Table 17 also confirms that, independent of the education level, males migrate more due to work reasons and females due to family reasons. Among low-educated groups, the percentage of males migrating due to work reasons is 13 percentage points higher when compared to the percentage of females migrating for the same reasons, and the percentage of females migrating because of family reasons is 11 percentage points higher than the percentage of males migrating for this reason. The difference is narrower, but still significant, when comparing the distribution between male and female with higher education levels: males migrate more due to

work reasons by 6 percentage points, and females migrate more due to family ties by 8 percentage points.

Table 17: Distribution of Migrants by Motive and Skill Level - 2005 Census

	Male		Female	
	Skill Level			
Cause of Migration	**Low**	**High**	**Low**	**High**
Work	42.8%	31.0%	29.8%	25.1%
Family move	23.6%	31.6%	34.5%	40.4%
Study	3.0%	5.9%	3.2%	5.0%
Violence or insecurity	10.4%	3.4%	10.7%	3.8%
Natural disaster	2.8%	1.5%	2.9%	1.6%
Health	3.8%	2.9%	4.2%	2.9%
Other reason, not elsewhere classified	12.5%	23.2%	12.7%	20.5%
Not specified	1.0%	0.4%	1.9%	0.6%
Total Number of Migrants	**396,664**	**294,146**	**399,332**	**296,832**

Previous analyses demonstrated the incidence of violence on interregional migration in the country (Schultz 1970, Erazo, Galan, Ibanez, and Kirchhoff 2000, Engel and Ibanez 2007, Calderon and Ibanez 2009). This paper argues that this pattern continued between 1993 and 2005. This section identifies the potential drivers of migration in Colombia between 1993 and 2005, using a cross municipality regression of changes in violence, natural disasters, and distance as explanatory variables, and employing ordinary least squares:

$$\Delta M_{ri} = n\beta_0 + \beta_1 \Delta Vio_{ri} + \beta_2 \Delta ND_{ri} + \beta_3 \Delta Educ_{ri} + \beta_4 D_{ri}\mathrm{t} + u_{ri} \quad (6),$$

where M_{ri} is the net migration rate between any two locations *r* (the municipality of destination) and i (the municipality of departure). Vio_{ri} is the factor of violence difference between municipalities *r* and *i*; ND_{ri} measures the difference in the effects of natural disasters; $Educ_{ri}$ is the difference in education level of the population between 25 and 65 years old, measured as the difference in the average years of schooling between the two regions; and D_{ri} is the distance

between the two locations. Municipality r corresponds to the municipality of destination and municipality i is the municipality of departure. Δ refers to the changes between 1993 and 2005 for each variable.

The changes in net migration rates (dependent variable) were analyzed by gender and skill level. People with primary education or less were grouped as low-skilled migrants, and people with secondary or university education were grouped as high-skilled migrants. Even though the National Department of Statistics in Colombia considers any person 12 years old or older part of the working age population, in this paper I consider only the population between 25 and 65 years old because of two reasons: by the age of 25, most of the population has completed their education, and even though the retirement age in Colombia is 57 years old for females and 60 years old for males, in many cases people continue working until later years. Hence, in order to capture all of the potential working age population, I used the 25 to 65 range.

8.1 Independent Variables

Each independent variable measures the relative change in the particular variable between two pairs of municipalities, one municipality of destination and one of departure (i.e. ΔVio_{ri} measures the change between 1993 and 2005 of the difference in violence between a destination area r and a departure area i). Because we are using changes in all variables between each pair of municipalities, there is no need to control for a region's fixed effects.

8.1.1. Violence

As a measure of violence, I calculated the rate of victims of violence for each municipality: in other words, the number of victims of homicides, kidnappings, massacres, and people injured

by armed groups,[15] divided by the total population between 25 and 65 in the destination area. The variable used in the model was the change in the difference of victimization rates between every pair of municipalities. It is expected that an increase in the levels of violence in the destination area relative to the departure area discourages net migration.

8.1.2. Natural Disasters

The number of victims from natural disasters as a fraction of the population between 25 and 65 years old is the variable used to measure the effect of natural disasters in each municipality. As with violence, an increase in the natural disaster victim rate in the destination areas relative to departure areas might dissuade people from migrating because of the potential economic effects of these events. Since the low-skilled population generally have lower living standards, lower quality of assets, and lower income, it would be expected that they would suffer a greater impact from natural disasters, and therefore that the increase in the natural disaster victim rate might increase the likelihood of this sector of the population leaving the most affected areas; however, it is also possible that the economic impact from the natural disasters would leave people in the departure area without enough resources to move, or force them to stay to preserve their remaining assets and repair the damages caused by the natural disaster. Consequently, the expected effect from the natural disaster variable is ambiguous.

8.1.3. Education

The education variable measures changes in the differences in number of years of schooling between the area of destination and the area of departure. This is used to determine if people in Colombia could be moving to pursue higher education in the destination areas.

[15] Ibanez and Calderon (2009) used the sum of the massacres, divided by the distance to the major metropolitan areas, as an instrument for the migration rate.

8.2. Model Results

The results of the OLS regression of the overall migration changes, and for the migration changes by skill group, are presented in Table 18.

Table 18: Migration Determinants - Model Results

	Dependent Variable: Net Migration Rate by Gender/Skill Group				
	(1)	(2)	(3)	(4)	(5)
Explanation	Overall	Male Low	Female Low	Male High	Female High
Change in Conflict Victims Rate Difference	-0.0265***	-0.0133***	-0.00987***	-0.00139**	-0.00194***
	(0.00553)	(0.00259)	(0.00241)	(0.000706)	(0.000689)
Change in Natural Disasters Victims Rate Difference	3.49e-05	2.40e-05*	1.36e-05	7.87e-07	-2.87e-06
	(3.01e-05)	(1.42e-05)	(1.18e-05)	(3.56e-06)	(3.30e-06)
Distance*t	5.43e-08*	1.93e-08	2.37e-08**	6.07e-09**	3.57e-09
	(2.79e-08)	(1.29e-08)	(1.21e-08)	(2.83e-09)	(2.89e-09)
Change in Years of Schooling	-5.25e-06**	-3.91e-06***	-1.76e-06	3.11e-07	4.69e-07
	(2.63e-06)	(1.25e-06)	(1.14e-06)	(3.90e-07)	(3.86e-07)
Constant	-1.92e-05*	-6.85e-06	-8.42e-06*	-2.04e-06**	-1.46e-06
	(1.00e-05)	(4.66e-06)	(4.33e-06)	(9.94e-07)	(1.05e-06)
Observations	130,110	130,110	130,110	129,798	129,798
R-squared	0.000	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As expected, an increase in violence in the destination area relative to violence in the departure area significantly reduces net migration into that destination area. A one percentage point increase in the victimization rate in the region of destination relative to the region of departure in 2005 compared to 1993 decreases net migration rate into the destination area by 133 low-skilled males, by 99 low-skilled females, by 14 high-skilled males, and by 20 high-skilled females for every 10,000 people.

In the case of high-skilled males, this effect of changes in victimization rate on net migration rates is significant using an alpha equal to 0.05. The Table shows the coefficients with the standard errors in parentheses.

The change in the relative number of victims of natural disasters in the region of destination with respect to the region of departure is not significant in explaining net migration rates between

the two places for almost all groups, except for low-skilled males: an increase in the natural disaster victimization rate in the destination area relative to the departure area by one percentage point results in a subsequent increase to the net migration rate of low-skilled males by 2 for every 100,000 people. This result is significant using an alpha of 0.1. The explanation of this result could be the need for extra work to repair the damages caused by these events in the destination areas, which increases the demand for low-skilled workers, and therefore increases immigration of this type of worker, particularly males. This is an interesting finding, given that the literature on the effects of natural disasters on migration is inconclusive in general. Naude (2008), Halliday (2006), and Tse (2011) support this finding, explaining that the need for reconstruction after a natural disaster, as well as the lack of sources and liquidity to pay for moving from one region to another, lowers the probability of migration. On the other hand, Drabo and Mbaye (2011) found different effects. They argue that natural disasters have a positive and significant effect on migration, particularly in the case of climate events; however, they also recognized that the effect varies according to the geographical location.

The changes in the difference in years of schooling between the destination and departure region are only significant in the overall model and in the low-skilled male's model. The results suggest that, as the years of schooling increase in the destination area relative to the departure area, net migration of low-skilled males decreases. This finding indicates that the lowest educated males are less likely to migrate to places where there is more competition from better qualified low-skilled workers, since this will decrease their probability of getting a job.

9. Employment Outcomes Model Results and Discussion

In this section, I will discuss the results from the two stages model of the impact of migration on employment outcomes. The first part of this section reviews the variables used in the model, the second part reviews the results in the construction of the instrument for net migration changes. In the third section, the changes in net migration and unemployment patterns are presented. The fourth section reviews the overall unemployment outcome from migration by skill level; the fifth section shows the employment outcomes among the low-skilled sector of the population; finally, the sixth section reviews the effect of migration on native's employment in the industries with a high percentage of migrants.

9.1. Variables Used in the Model

The dependent variable in these models is the unemployment rate change between 1993 and 2005 in each municipality of Colombia. The main independent variable is the change in net migration rates during the same period or its instrument. Other independent variables used in the model are related to the changes in demographic characteristics in the municipalities. These variables are:

- Aging of the population in the municipality. This is measured by the changes in average age of the municipality between 1993 and 2005

- Changes in the level of education of the municipality between 1993 and 2005, measured by the change in the average years of schooling in each location.
- Changes in the ethnic composition of each municipality. This indicates the change in the percentage of people belonged to any indigenous group or black community with respect to the total population of the municipality. This variable is named the change in minority rates.

9.2. How Good Is the Instrument?

The results from the first stage regression are shown in Table 19. Each column in the table presents the results of a regression of net migration rate changes with respect to the instrument and the exogenous variables. The first column is the result from the regression of net migration on the instrument and a constant. Each column adds a different exogenous variable. Note that as more exogeneous variables are added in the first stage, there is not a significant variation in the coefficient of the instrument. The fourth column is the first stage regression, which includes the instrument and all the exogenous variables. The F statistic in this regression with respect to the instrument (column four) is 16.96; with 495 observations, this F statistic demonstrates that the instrument is sufficiently strong, and hence, that the instrument is relevant in explaining net migration rate changes, even after the effect of the exogenous variables is netted out (Stock, Wright and Yogo, 2002).

Figure 2 plots the actual changes in net migration rates, and the predicted change in net migration rates using the instrument. As the plot shows, not all the points are in the first quadrant, indicating that, for some observations, the net migration changes are not predicted precisely by the instrument.

Table 19: First Stage Regression Results

Dependent Variable: Actual Net Migration Rate Change				
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
Net Migration Instrument	0.659***	0.652***	0.656***	0.650***
	(0.159)	(0.159)	(0.162)	(0.158)
Change in Age		-0.000505	-0.000512	-0.000583
		(0.000507)	(0.000521)	(0.000530)
Change in Years of Schooling			-0.00412	-0.00462
			(0.00349)	(0.00359)
Change in Minority Rates				-0.0104
				(0.00732)
Constant	0.00193	-0.000437	0.00466	0.00658
	(0.00199)	(0.00340)	(0.00637)	(0.00679)
Observations	511	511	511	495
R-squared	0.037	0.039	0.043	0.044

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The correlation between the actual net migration rate and the constructed variable for the net migration rate is 0.19. It could be argued that this is not a very high correlation; however, the instrument only explains the portion of the aggregated change in migration occurring because of violence. As will be reviewed in the following section, other factors affect the decision to migrate, such as, family, school, and work opportunities, and these factors are not taken into account in the construction of the instrument since the research primarily concerns violence as a main driver for migration.

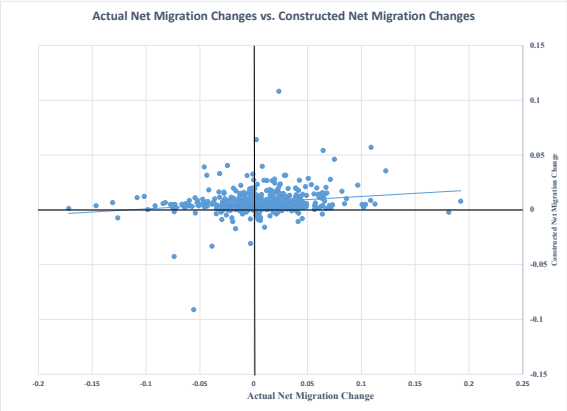

Figure 3: Actual Net Migration Change and Constructed Instrument

9.3. Overall Effects on Unemployment

This section presents the second stage results of the model. Table 20 reports the estimated coefficients and robust standard errors of the OLS and IV models where the dependent variable is the change in male unemployment rate by education level, and the variable of interest is the change in net migration rates between 1993 and 2005. Columns 1 to 4 report the OLS, and columns 5 to 8 report the same results using the violence factor as the instrument.

As expected, the endogenous component of migration is reflected in the OLS results. These results show that an increase in net migration rates decreases unemployment rates for the lower skill segment of the male population. The results obtained using the instrument suggest a different effect directionally for most of the groups, but these results are not significant.

According to the OLS results, an increase in net migration rates decreases male unemployment rates by 0.0986 percentage points for the population without primary education, and by 0.101 percentage points for the population with primary education. The results are significant using alphas of 0.10 and 0.05, respectively. For the population with a secondary education level, the OLS results suggest a negative effect as well, but the effect is not significant. For the population with university education, the effect of migration on unemployment is positive but not significant. On the other hand, the IV estimates suggest that an increase in net migration increases male unemployment for all levels of education, except for the male population with primary education. The estimates suggest that the increase by one percentage point in net migration rate increases the male unemployment rate of the lowest skill level by 0.05 percentage points, decreases the unemployment rate of males with primary education by 16 percentage points, increases the unemployment rate of males with secondary education by 0.03 percentage points, and increases the unemployment rate of males with university education by 0.382 percentage

points. However, none of these results were significant. Therefore, it can be concluded that there is no evidence of an unemployment effect of net migration changes in Colombian municipalities.

Since the OLS result reflects the fact that migrants move towards areas with better employment opportunities, it would be expected to find higher levels of migration towards cities with better employment conditions. This questionable causality relationship between migration and unemployment will be reflected in the OLS results. On the other hand, the IV result reflects the change in migration estimated from the relative change in violence rates in the destination area. Thus, the IV estimate accounts for this possible endogeneity problem. This is the nature of the difference between the OLS and IV results.

The change in average age among the population does not have an effect on unemployment rates; neither does the changes in the percentage of minorities present in each municipality for male unemployment rates. These results are consistent whether the OLS or the IV method is used.

Alternatively, increasing the average years of schooling in the municipality is positively related to male unemployment with lower skill levels (primary and less than primary education). The OLS and IV results are similar and significant with respect to this variable. A one year increase in the average years of schooling increases male unemployment rates of males with less than primary education by 0.0113 percentage points, and by 0.00567 for males with primary education, according to the OLS results. The IV results show that an increase in the average years of schooling by one increases male unemployment rates by 0.0119 and 0.00541 percentage points for males with less than primary education and males with primary education, respectively. This could be explained by the idea that people will move where they are most likely to obtain jobs matching their skills. Municipalities with higher levels of education tend to have higher demand for more

qualified workers, leading to higher unemployment of the less educated population relative to the other skill levels.

Table 20: OLS and IV Results for Male Unemployment Rate

Dependent Variable: Male Unemployment Rate Change by Skill Level								
	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variable	Less Primary	Primary	Secondary	University	Less Primary	Primary	Secondary	University
Net Migration Rate Change	-0.0986*	-0.101**	-0.0956	0.0878	0.0499	-0.164	0.0354	0.382
	(0.0511)	(0.0478)	(0.0604)	(0.119)	(0.149)	(0.195)	(0.242)	(0.483)
Change in Average Age	-0.000174	-0.000295	0.000221	1.63e-05	-7.69e-05	-0.000337	0.000307	0.000353
	(0.000478)	(0.000583)	(0.000711)	(0.000844)	(0.000492)	(0.000595)	(0.000725)	(0.00114)
Change in Years of Schooling	0.0113***	0.00567**	-0.00268	-0.000689	0.0119***	0.00541*	-0.00215	0.000444
	(0.00339)	(0.00287)	(0.00373)	(0.00825)	(0.00356)	(0.00292)	(0.00377)	(0.00850)
Change in Minority Rates	0.00398	0.0122	0.0174	0.0404	0.00492	0.0118	0.0182	0.0419
	(0.0113)	(0.00832)	(0.0132)	(0.0301)	(0.0113)	(0.00822)	(0.0134)	(0.0300)
Constant	0.00443	0.00712	0.0218***	0.00180	0.00299	0.00774	0.0205***	-0.000120
	(0.00550)	(0.00601)	(0.00719)	(0.0143)	(0.00590)	(0.00618)	(0.00757)	(0.0151)
Observations	495	495	495	334	495	495	495	334
R-squared	0.044	0.024	0.013	0.008	0.019	0.019	0.002	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The estimation results for females indicate that net migration changes do not have a significant impact on changes in female unemployment rates independent of the skill level, using either the OLS or IV methods (see Table 21).

Changes in average age or years of schooling do not show any significant effects either when explaining the changes in female unemployment rates for all education levels.

The changes in the minority rates in each municipality have a significant effect on female unemployment rate changes for females with primary and university education in both OLS and IV regressions. The IV regression suggests that the increase in the minority rate by one percentage

point increases unemployment rates for females with primary education and females with university education by 0.0304 percentage points and 0.0716 percentage points, respectively.

Table 21: OLS and IV for Female Unemployment Rate

Dependent Variable: Female Unemployment Rate Change by Skill Level								
	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variable	Less Primary	Primary	Secondary	University	Less Primary	Primary	Secondary	University
Net Migration Rate Change	-0.0541	0.0191	-0.0931	0.0132	-0.0278	-0.447	0.242	-0.555
	(0.0565)	(0.0596)	(0.0650)	(0.216)	(0.222)	(0.296)	(0.268)	(1.099)
Change in Average Age	0.000163	-0.000886	-7.40e-05	0.000336	0.000180	-0.00119	0.000145	0.000921
	(0.000600)	(0.000666)	(0.000782)	(0.00267)	(0.000605)	(0.000749)	(0.000834)	(0.00319)
Change in Years of Schooling	0.00218	0.00225	0.000872	0.0123	0.00229	0.000339	0.00225	0.00740
	(0.00437)	(0.00387)	(0.00382)	(0.0150)	(0.00461)	(0.00437)	(0.00412)	(0.0179)
Change in Minority Rates	-0.00350	0.0334**	0.00985	0.0753*	-0.00334	0.0304**	0.0119	0.0716*
	(0.0177)	(0.0131)	(0.0131)	(0.0395)	(0.0174)	(0.0134)	(0.0132)	(0.0388)
Constant	-0.00511	-0.00383	0.0156*	-0.0383	-0.00536	0.000687	0.0124	-0.0252
	(0.00697)	(0.00700)	(0.00802)	(0.0315)	(0.00758)	(0.00796)	(0.00882)	(0.0404)
Observations	495	495	495	270	495	495	495	270
R-squared	0.003	0.018	0.006	0.010	0.002			

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Overall, the findings for both males and females indicate that increasing net migration in Colombia had no effect on the unemployment rates, based on the instrumental variables approach. Previous literature supports the idea that migration has minimal impact on the labor market (Lalonde and Topel, 1989, Card 1991, Altonji and Card 1991, Carrington and Delima, 1994, Friedberg and Hunt, 1995). The insignificant effects of migration may be attributed to the easy adjustment of migrants into the labor market in the destination areas, and to the possible relocation decisions of natives after waves of migration (Card, 1991 and Borjas et al, 1997).

Lalonde and Topel (1995) found that immigrants are "easily absorbed in the US labor market with minor distributional effects on native workers." Card (1991) did not find a significant effect of the Cuban refugees' immigration from the Mariel Boatlift on Miami's labor market, even across population with similar characteristics as of migrants. Altonji and Card (1991) also found

no effect of increases in immigration on labor participation or employment rates of low-skilled natives in 120 major US cities.

Based on the previous evidence, my hypothesis is that in the case of Colombia if there was an effect of migration on unemployment it would be among low-skilled workers because most of the people migrating due to the violent conflict have lower skilled levels. In order to verify this hypothesis, in the following section I concentrate on the analysis of the unemployment effects among low-skilled workers (with secondary education or less), and compare these results across migration groups.

9.4. Migration Effects on Low-Skilled Employment

Based on the evidence found by Florez (2003), the migrant population in Colombia is primarily poorly educated. The effect of migration on the destination's labor market is determined by the distribution of the immigrant population in terms of education and work experience in contrast to that of the natives (Borjas, 2006). Because highly educated labor sectors would be less affected by low-skilled migration, this section focuses on the comparative analysis between each migration group among the low-skilled population.

The 2005 census data verifies that the trend observed by Florez with respect to the education of the migrant population in previous years continued in 2005: more than 70% of the migrants had secondary education or less overall, and from the group of migrants displaced by violence, the proportion of low-educated members of the population is even higher, reaching 90% (see Table 22).

Table 22: Distribution of Migrants by Cause and Education Level - 2005

Reason to Migrate	Total Migrants	Education Level					
		Unknown	Less than Primary	Primary	Secondary	University	Less Primary + Primary + Secondary
Work	461,905	2%	26%	37%	25%	11%	87%
Family move	448,422	1%	18%	33%	33%	15%	84%
Study	57,988	2%	16%	27%	32%	24%	74%
Violence or insecurity	107,938	2%	39%	39%	14%	6%	92%
Natural disaster	33,369	4%	31%	37%	21%	7%	89%
Health	50,732	3%	29%	35%	23%	12%	86%
Other reason, not elsewhere classified	230,387	0%	13%	31%	34%	22%	78%
Not specified	21,711	34%	36%	18%	9%	4%	63%
Total Migrants	**2,150,500**	**19%**	**23%**	**28%**	**20%**	**10%**	**71%**

Table 23 shows the unemployment outcomes from migration by migrant condition and gender. The OLS results suggest that the increase in net migration rates decreases unemployment of low-skilled native males by 0.08 percentage points, and that there is no unemployment effect on low-skilled females or on migrants. The IV results were the same directionally, but were lower for low-skilled native females and for low-skilled migrant males, and are also not statistically significant despite being greater than the OLS results.

The only significant IV result is for low-skilled migrant females: it indicates that the increase by ten percentage points in net migration increases the low-skilled female unemployment by 6.56 percentage points, with alpha=0.1.

There are two possible explanations for this effect among low-skilled migrant females. The first possible explanation is that violence could be causing more low-skilled female migration in comparison to low-skilled male migration, which could result in a more significant increase in the low-skilled female labor supply. However, the findings in section eight indicated that low-skilled females did not have a more significant increase in migration due to increases in violence. The second potential explanation is that, due to the easier adjustment of female skills to the labor needs in destination areas (Calderon, Gafaro, and Ibanez, 2011), females are more motivated to work

even if they were inactive before migration. This implies that after migrating females that were not working previously now are and therefore the effect of migration on labor supply could be greater for females than for males.

Table 23: OLS and IV Results by Migrant Group - Low Skilled Unemployment Rate

Dependent Variable: Unemployment Rate Change by Skill Level and Migration Group

	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variable	**Male Native**	**Female Native**	**Male Migrant**	**Female Migrant**	**Male Native**	**Female Native**	**Male Migrant**	**Female Migrant**
Net Migration Rate Change	-0.0883*	-0.0322	-0.109	-0.166	-0.0216	-0.200	-0.118	0.656*
	(0.0462)	(0.0501)	(0.0693)	(0.218)	(0.142)	(0.143)	(0.251)	(0.337)
Change in Average Age	-0.000275	-0.000304	-7.36e-05	-0.000122	-0.000232	-0.000414	-7.92e-05	0.000429
	(0.000543)	(0.000499)	(0.000459)	(0.000859)	(0.000551)	(0.000518)	(0.000433)	(0.000926)
Change in Years of Schooling	0.00697**	0.00387	0.00326	-0.00206	0.00725**	0.00318	0.00323	0.00107
	(0.00278)	(0.00273)	(0.00452)	(0.00676)	(0.00285)	(0.00293)	(0.00425)	(0.00715)
Change in Minority Rates	0.0124	0.0171	-0.0282**	-0.00774	0.0128	0.0160	-0.0282**	-0.00174
	(0.00897)	(0.0105)	(0.0139)	(0.0269)	(0.00892)	(0.0104)	(0.0141)	(0.0262)
Constant	0.00854	-0.000849	0.0121*	0.00747	0.00789	0.000779	0.0122*	-0.000190
	(0.00558)	(0.00536)	(0.00660)	(0.0104)	(0.00572)	(0.00586)	(0.00651)	(0.0114)
Observations	495	495	495	494	495	495	495	494
R-squared	0.031	0.011	0.018	0.004	0.025		0.018	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Unemployment rates for native and male migrants are not affected negatively by migration. This is because people migrating due to violence are more likely to participate in informal sectors in the destination areas (Calderon and Ibanez, 2010). Informal sectors are more flexible than formal sectors, which facilitates the absorption of the additional labor after the supply shock caused by migration.

As in the previous cases, the change in average age in the municipalities was not significant in explaining changes in unemployment rates for any of the gender/migration groups among the low-skilled population. There was not a significant change in the average age of this sector of the population which could explain why there is not an effect in unemployment rates.

Changes in years of schooling are a significant variable to explain the change in unemployment rates for only low-skilled native males. This could be explained because, as the

population in the destination areas becomes more educated, employers will want to hire people with higher qualification, leaving sectors of the population with lower skills at a disadvantage. Additionally, despite the lower degree of education of these natives, they could be more specialized than low-skilled migrants and this could explained by for migrants could be easier to adjust and obtain a job.

The increase in minority rates has a negative effect on unemployment rates for low-skilled male migrants. Networking is an important tool for migrants to obtain jobs. Therefore, if there is an increase in their migration in a particular area, this could help other minorities who are migrating improve their probabilities of obtaining jobs as they migrate, causing unemployment to decrease for this group.

Tables 24 and 25 show the results of net migration changes on employment and inactivity rates of low-skilled workers, natives, and migrants. The results indicate that the increase in net migration rates raised employment of native females (OLS and IV), as well as native males and migrant females when looking at the IV results only. For these significant categories, the results are almost identical to the inactivity effect. This suggests that, by increasing net migration, more people entered the labor force and actually got jobs.

Among women, the increase in employment in Colombia after the 1980s is the result of "long-term development trends pertaining to demographic and cultural change," as well as the process of trade liberalization of the country since the constitutional reform of 1991 (Isaza-Castro and Reilly, 2012). Previous evidence has also shown that these liberalization processes favor women in countries that specialize in labor intensive manufacturing production (Fontana, 2003), which could have contributed to the female unemployment improvement in this case as well.

Amador et al. (2011) attributed the increase in female labor participation from 1984 to 2006 in Colombia to changes in culture and perception, specifically the lagged of labor participation, divorce rates, and to some legislative changes that occurred after 1990. In their words, "if a child saw their mother working as they grew up, they will be more prone to see this as 'normal'." The results of the probit model showed that a one percent increase in lagged participation rate increased the probability of participation in the labor market by 63%. On the other hand, women increased their labor participation as insurance in case they became the single head of a household, and the data demonstrates that a one percentage point increase in lagged divorce rates increases the probability of female labor force participation by 77 percentage points.

Additionally, two legislation changes took place in 1990 and 1997 which also may have motivated the increase in female labor participation. The first one, Law 50, stated that pregnant female workers had the right to a 12-week paid leave, and that females could not be fired due to pregnancy; if that occurred, the woman had to be compensated the equivalent to two months of paid leave in addition to the 12-week paid leave. The second law, C-470 of 1997, revised Law 50 by clarifying that the compensation for firing a female because of pregnancy should be understood as a sanction, and mandated that all women who resigned from their jobs during a pregnancy or during the three months after delivery should be reinstated to their previous jobs (Amador et al., 2011).

The purpose of the following section is to verify if the increase in net migration displaced the native labor force in those industries where there was a high presence of migrant labor.

Table 24: OLS and IV Results by Migrant Group - Lowed-Skilled Employment Rate

Dependent Variable: Employment Rate Change by Skill Level and Migration Group								
	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variable	Male Native	Female Native	Male Migrant	Female Migrant	Male Native	Female Native	Male Migrant	Female Migrant
Net Migration Rate Change	0.0296	0.176**	0.124	0.171	0.984*	0.786*	0.771	1.430**
	(0.100)	(0.0738)	(0.119)	(0.121)	(0.565)	(0.427)	(0.541)	(0.726)
Change in Average Age	-0.000333	0.000229	-0.00274*	-0.00342***	0.000293	0.000629	-0.00232	-0.00260
	(0.00181)	(0.00148)	(0.00150)	(0.00132)	(0.00188)	(0.00151)	(0.00152)	(0.00167)
Change in Years of Schooling	0.0119	0.0165**	0.0136	0.0340***	0.0158*	0.0190***	0.0162*	0.0392***
	(0.00822)	(0.00681)	(0.00876)	(0.0100)	(0.00891)	(0.00735)	(0.00885)	(0.0118)
Change in Minority Rates	-0.0972***	-0.0853***	-0.0508*	-0.0175	-0.0912***	-0.0814***	-0.0467*	-0.00965
	(0.0259)	(0.0164)	(0.0266)	(0.0290)	(0.0271)	(0.0171)	(0.0265)	(0.0313)
Constant	-0.157***	-0.000215	-0.139***	-0.0880***	-0.167***	-0.00613	-0.146***	-0.100***
	(0.0171)	(0.0132)	(0.0156)	(0.0156)	(0.0185)	(0.0149)	(0.0161)	(0.0214)
Observations	495	495	495	495	495	495	495	495
R-squared	0.044	0.093	0.029	0.053				

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 25: OLS and IV Results by Migrant Group - Low-Skilled Inactivity Rate

Dependent Variable: Inactivity Rate Change by Skill Level and Migration Group								
	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variable	Male Native	Female Native	Male Migrant	Female Migrant	Male Native	Female Native	Male Migrant	Female Migrant
Net Migration Rate Change	0.0373	-0.173**	-0.0334	-0.158	-1.038*	-0.793*	-0.706	-1.586**
	(0.0908)	(0.0734)	(0.101)	(0.125)	(0.537)	(0.439)	(0.486)	(0.751)
Change in Average Age	0.000750	-0.000174	0.00286*	0.00345**	4.51e-05	-0.000580	0.00242	0.00252
	(0.00173)	(0.00146)	(0.00150)	(0.00142)	(0.00181)	(0.00149)	(0.00151)	(0.00182)
Change in Years of Schooling	-0.0182**	-0.0192***	-0.0157*	-0.0360***	-0.0226***	-0.0218***	-0.0185**	-0.0419***
	(0.00771)	(0.00694)	(0.00816)	(0.0105)	(0.00856)	(0.00745)	(0.00830)	(0.0126)
Change in Minority Rates	0.0981***	0.0847***	0.0788***	0.0153	0.0913***	0.0808***	0.0745***	0.00633
	(0.0246)	(0.0167)	(0.0268)	(0.0309)	(0.0264)	(0.0175)	(0.0268)	(0.0333)
Constant	0.156***	0.00191	0.132***	0.0916***	0.167***	0.00792	0.139***	0.105***
	(0.0161)	(0.0129)	(0.0151)	(0.0166)	(0.0178)	(0.0147)	(0.0155)	(0.0230)
Observations	495	495	495	495	495	495	495	495
R-squared	0.058	0.096	0.047	0.052				

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

9.5. Employment Effects in Industries with a High Migrant Component

Table 26 shows the distribution of migrants between 25 and 65 years old moving into the main metropolitan areas of the country because of violence, who at the time of the census were

currently working. This data suggests that the majority of these migrants obtained jobs in manufacturing, private household and services and other services, hotels and restaurants, and wholesale and retail.

Table 26: Distribution by Industry of Migrants because of Violence in Metropolitan Areas

	Low Skilled		High Skilled	
Industry	**Female**	**Male**	**Female**	**Male**
Agriculture, fishing, and forestry	1%	7%	0%	1%
Manufacturing	22%	16%	1%	6%
Electricity, gas and water	0%	0%	0%	0%
Construction	0%	0%	0%	0%
Wholesale and retail trade	6%	27%	0%	2%
Hotels and restaurants	18%	1%	20%	0%
Transportation and communications	1%	12%	0%	22%
Financial services and insurance	0%	0%	0%	0%
Public administration and defense	0%	1%	3%	2%
Real estate and business services	6%	4%	0%	2%
Education	3%	0%	74%	47%
Health and social work	1%	0%	1%	15%
Other services	21%	29%	1%	3%
Private household services	21%	2%	0%	0%
Number of People	2,166	3,368	364	234

The purpose of this section is to determine if the increase in migration affected the employment of natives in industries where people migrating because of violence are more likely to work, according to the census statistics. To do this, I concentrated the analysis on the employment changes of low-skilled workers in manufacturing, private household services, and other services sectors for females; and in manufacturing, wholesale and retail trade, and other services sectors for males. Table 27 shows the results for natives and migrants using OLS and IV. The dependent variable here is the employment changes of low-skilled workers by migration group (natives or migrants) as a fraction of the working age population in 2005.

Table 27: OLS and IV Results by Migrant Group - Low-Skilled Employment in Industries with High Migrant Presence

Dependent Variable: Employment Rate Change as a Rate of Population between 25 and 65 years Old								
	OLS				IV			
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Male Native	Female Native	Male Migrant	Female Migrant	Male Native	Female Native	Male Migrant	Female Migrant
Net Migration Rate Change	0.0674**	0.00433	0.0988***	0.0291***	0.345*	0.159*	-0.0225	0.0242
	(0.0280)	(0.0156)	(0.0121)	(0.00512)	(0.187)	(0.0881)	(0.0432)	(0.0157)
Change in Average Age	-0.000132	-0.000237**	1.76e-06	1.57e-05	4.97e-05	-0.000136	-7.77e-05	1.25e-05
	(0.000224)	(0.000119)	(7.73e-05)	(2.87e-05)	(0.000291)	(0.000170)	(0.000126)	(3.06e-05)
Change in Years of Schooling	0.000684	0.00483***	-0.00112	0.000695**	0.00182	0.00546***	-0.00162*	0.000675**
	(0.00229)	(0.00115)	(0.000700)	(0.000289)	(0.00267)	(0.00137)	(0.000925)	(0.000301)
Change in Minority Rates	0.0152**	0.00295	0.000650	3.10e-05	0.0169**	0.00392	-0.000110	6.26e-07
	(0.00658)	(0.00293)	(0.00141)	(0.000540)	(0.00719)	(0.00325)	(0.00170)	(0.000551)
Constant	-0.0177***	-0.00250	-0.00652***	-0.00205***	-0.0204***	-0.00400*	-0.00535***	-0.00200***
	(0.00330)	(0.00164)	(0.00113)	(0.000397)	(0.00430)	(0.00232)	(0.00168)	(0.000427)
Observations	495	495	495	495	495	495	495	495
R-squared	0.038	0.038	0.142	0.142			0.138	0.138

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The IV result indicates that native employment is not affected by the increase in net migration rates in industries where migrants tend to work more. Employment of male and female natives increased by 0.345 and 0.159, respectively, as a result of a one percentage point increase in net migration rates. The IV results do not show any significant effect on migrants. The OLS results coincide with the IV results for male natives. The OLS results also show a positive impact on male migrants and female migrants; however, this outcome is the result of the migrant's selectivity of the place of destination based on its employment conditions.

The particular sectors included in the analysis are characterized by their informality, and this could explain these results: due to the absence of rigidities in the informal sector, the additional labor supply caused by migration is easily absorbed in these markets. The increase in labor supply reduces the equilibrium wage, which increases employment so that natives are not displaced.

In conclusion, the results show that, among the low-skilled workers, female migrants are the only group suffering an increase in unemployment as a consequence of the increase in net migration rates. The increase in migration is not displacing the employment of natives. In fact, the employment of natives in industries with a high migrant composition actually increased.

The lack of an effect on unemployment for most education levels and migration groups should not be surprising, as the existing literature shows that unexpected migration flows do not seem to adversely affect local labor market conditions (Card, 1990, Hunt, 1992, Carrington and De Lima, 1996, Pischke and Velling, 1997, Friedberg, 2001).

On the other hand, the increase in native employment in industries with high representation of migrants is related to the informality of these industries; this could be reflecting the preferences of employers towards natives due to their experience, compared to that of migrants.

These findings reflect the labor market conditions of developing countries, where the rigidities of formal labor market contribute to the enlargement of the informal sectors. Additionally, the presence of large informal sectors minimizes the effects of labor supply shocks on unemployment. The results of this paper are consistent with the finding of Calderon and Ibanez about the enlargement of the informal sector from the increase of displacement in Colombia.

10. Conclusions and Policy Implications

This study investigated the gender discrepancy in the effects of interregional migration on local labor markets in developing countries. This research contributes to the existing literature in two different ways. First, it improves upon the instrument used by Calderon and Ibanez based upon the violence in Colombia. Second, it focuses on the long-term labor market outcomes by gender, skill level, and migration group caused by migration in developing countries.

The instrument constructed in this paper uses a broad definition of violence. The total number of victims from massacres, kidnappings, homicides, and wounds were part of this measure. Additionally, the instrument measures the changes in net migration based on the changes in relative violence between every distinct combination of municipalities, weighted by the distance between them. This method allows for estimation of the changes in total net migration exogenously from the labor market performance in the destination areas. By considering the changes between 1993 and 2005, it is possible to determine if the supply shock from migration had any long-term effects on labor markets.

The evidence found by this research indicates that the only group with a remaining positive unemployment effect due to the increase in net migration is that of the low-skilled female migrants. However, this effect is very low (a one percentage point increase in net migration, which increases the unemployment rate by 0.65 percentage points).

Despite the rigidities of the labor market in Colombia (i.e., minimum wage law), the significant presence of informality allows for adjustments of wages. The majority of migrants from the armed conflict are low-skilled workers who are close substitutes of existing informal workers in the destination areas (Calderon and Ibanez, 2009), facilitating their absorption in the labor market. This is supported by the evidence found by Calderon and Ibanez (2009), which suggested that the displaced population in Colombia were more likely to enter the informal sector. Similarly, the equilibrium in the labor market could have been attained due to an increase in labor demand in the long run after the increase in migration. Possibly, the additional labor supply increased the demand for goods and services in the destination areas, causing a long-term increase in the demand for factors of production.

Perhaps if the majority of migrants attempted to enter the formal labor market, the employment outcome could be different from the evidence found in this research. Unfortunately, the current data available does not allow me to test if there was an adjustment in the wage rate as a consequence of the interregional migration, or if in fact there was an adjustment in the labor demand that absorbed the additional labor supply from migration.

Additionally, the present analysis showed that the increase in net migration did increase employment of low-skilled natives in industries with a significant component of the migrant labor force.

The increase in the unemployment rate of female migrants could be the result of a higher increase in female labor force participation during the last twenty years in Colombia related to the violence and other sociopolitical changes in the country: violence motivated more females to migrate as heads of household. Because females are better suited in terms of their skills to adjust to the labor market in the destination areas than men (Calderon, Gafaro and Ibanez, 2011), the

increase in migration causes a higher increase in female labor supply. On the other hand, it is possible that this sector of the labor market has been saturated, and it is not very elastic to price changes.

Overall, these findings are consistent with Card (1990), Card and Altonji (1991), and Friedberg and Hunt (1998), who attributed the lack of an effect of migration on the labor market to the absorption of the new labor supply in the destination areas and the possible relocation of natives into other cities. Likewise, the migrants in this analysis have characteristics similar to natives; thus, they are close substitutes. Migrants are likely to work in industries with significant informal employment characteristics, facilitating migrant engagement in the local markets as wages adjust with the increase in labor supply in these industries.

Based on this analysis, policies intended to improve labor markets in Colombia should target low-skilled female migrants, since the study suggests that this is the most vulnerable sector to changes in migration caused by violence in the country.

Additionally, not finding a significant effect on the unemployment of other skill levels of the population does not guarantee that their labor conditions are optimal due to the increasing participation of migrants in the informal markets in destination areas. Consequently, the jobs obtained by migrants are generally of lower quality than the jobs held by natives.

These results discussed herein must be reviewed with caution. The instrument was found to be a good predictor of net migration changes in Colombia; however, the instrument does not explain other migration flows unrelated to violence. Furthermore, the instrument does not control for the relationship between less violent areas and better labor market performance. In other words,

there could be residual endogeneity in these results, resulting from the potential effect of violence on the local economy and their labor market performance.

In addition, this study also analyzes the migration drivers in Colombia between 1993 and 2005, which confirms that violence and unemployment in the place of origin relative to the potential place of destination operate as a push factor, especially for the low-skilled population. Another factor tested as a migration driver was the presence of natural disasters. Contrary to what was expected, changes in the effects of natural disasters are not significant in explaining changes in net migration in the country. For low-skilled males, the effect is actually positive, indicating that, after a natural disaster, additional low-skilled male labor is required in the places affected by such events. The existing literature is inconclusive about the potential effects of a natural disaster in terms of migration flow. Naude (2008), Halliday (2006), and Tse (2011) all suggest that natural disasters do not have an effect on migration due to the need for reconstructing the affected areas, and due to the economic loss imposed upon households that does not allow them to pay for migration. On the other hand, Drabo and Mbaye (2011) found evidence indicating that climate-related natural disasters are positively associated with emigration rates. Thus, this analysis also sheds some light towards understanding the migration flows in response to natural disasters in the context of Colombia.

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Appendix

Table A1: Comparison of Means Test. Victim's Rate by Metro Area Type

Group	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
Non Metro	999	0.0001514	7.59E-06	0.0002397	0.0001365	0.0001662
Metro	26	0.000081	2.14E-05	0.0001093	0.0000369	0.0001252
combined	1025	0.0001496	7.42E-06	0.0002375	0.000135	0.0001641
diff		0.0000703	2.27E-05		0.000024	0.0001166

diff = mean(0) - mean(1) t = 3.0934

Ho: diff = 0 Satterthwaite's degrees of freedom = 31.6439

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.9979 Pr(|T| > |t|) = 0.0041 Pr(T > t) = 0.0021

*0 is the group of municipalities that are not a metropolitan area and 1 are the group of municipalities that are metropolitan areas

Table A2: Summary of Statistics of The Number of Victims by State

1988-1993						2000-2005					
State Name	**Obs**	**Mean**	**StdDev**	**Min**	**Max**	**State Name**	**Obs**	**Mean**	**StdDev**	**Min**	**Max**
Arauca	42	15	13.832602	0	44	Arauca	42	13	23.388068	0	144
Antioquia	750	14	75.863472	0	1205	Cesar	150	6	11.42652	0	52
Valle	252	13	35.139888	0	300	Casanare	114	5	7.8471315	0	42
Risaralda	84	10	17.008384	0	101	Caqueta	96	5	11.36382	0	89
Cesar	150	10	15.532633	0	128	Antioquia	750	5	12.212918	0	206
Meta	174	8	12.953617	0	70	Guaviare	24	5	11.424532	0	55
Cordoba	168	7	18.469257	0	148	Meta	174	4	6.1151987	0	38
Guaviare	24	6	15.399922	0	63	Huila	222	3	7.7992956	0	55
Santander	522	6	19.529324	0	230	LaGuajira	90	3	6.035848	0	29
Magdalena	156	6	13.169046	0	94	Sucre	156	3	5.7867251	0	42
N. de Santander	234	5	13.581246	0	136	Choco	186	3	8.3705053	0	59
Cauca	246	5	8.0081964	0	60	N. de Santander	234	3	11.454339	0	135
Caqueta	96	4	6.5419614	0	34	Magdalena	156	3	7.7460601	0	61
Caldas	162	4	6.7647858	0	36	Cauca	246	3	6.6904537	0	65
Cundinamarca	702	3	24.813335	0	358	Putumayo	78	3	5.6638698	0	33
LaGuajira	90	3	7.6688647	0	51	Caldas	162	3	4.8107701	0	25
Huila	222	3	5.6139658	0	32	Bolivar	276	2	7.1948186	0	67
Casanare	114	3	4.7563275	0	29	Tolima	282	2	3.8774219	0	23
Putumayo	78	2	5.3225624	0	29	Valle	252	2	5.9818546	0	53
Tolima	282	2	4.9339495	0	39	Risaralda	84	2	4.6839743	0	35
Atlantico	138	2	10.313906	0	83	Cordoba	168	1	7.0112541	0	81
Quindio	72	2	4.1093951	0	21	Guainia	12	1	3.4200833	0	12
Sucre	156	2	2.9378171	0	14	Vichada	18	1	2.7344331	0	11
Bolivar	276	2	3.729235	0	34	Narino	378	1	3.7140088	0	30
Boyaca	738	1	5.269749	0	82	Vaupes	18	1	3.1524448	0	13
Choco	186	1	3.3433387	0	29	Quindio	72	1	2.4059378	0	13
Narino	378	1	2.1099302	0	21	Santander	522	1	3.5823427	0	52
Vichada	18	1	1.5769997	0	6	Cundinamarca	702	1	2.9397495	0	41
Guainia	12	1	1.2431631	0	4	Boyaca	738	0	1.6478725	0	23
Amazonas	48	0	1.3247173	0	9	Atlantico	138	0	0.7913969	0	8

Table A3: Total Population Distribution by Education Level (Between 25-65 years old)

Education Level	Number of Migrants		Percentage of Total Migrants	
	1993	2005	1993	2005
Less Than Primary	4,935,120	4,928,950	36%	27%
Primary Completed	5,345,720	6,516,120	39%	35%
Secondary Completed	2,833,810	4,587,805	21%	25%
University Completed	177,470	1,991,262	1%	11%
Unknown	285,730	519,229	2%	3%
Total	13,577,850	18,543,367	100%	100%

Table A4: Difference in Means Test - Employment Rate by Gender - 2005 data

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	514	0.7426771	0.0045459	0.1030633	0.7337461	0.751608
Female	496	0.2611637	0.0047452	0.1056809	0.2518405	0.270487
Total	1010	0.5062111	0.0082584	0.2624545	0.4900056	0.5224166
diff		48.15%	0.0065713		0.4686182	0.4944085

diff = mean(M) - mean(F) t = 73.2748

Ho: diff = 0 Satterthwaite's degrees of freedom = 1004.29

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 1.0000 Pr(T > t) = 0.0000 Pr(T > t) = 0.0000

Table A5: Difference in Means Test - Male Employment Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	497	88.8%	0.2%	0.0484719	88.4%	89.2%
2005	514	74.3%	0.5%	0.1030633	73.4%	75.2%
Total	1011	81.4%	0.3%	0.1087672	80.7%	82.1%
diff		14.53%	0.5%		13.5%	15.5%

diff = mean(1993) - mean(2005) t = 73.2748

Ho: diff = 0 Satterthwaite's degrees of freedom = 734.783

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 1.0000 Pr(T > t) = 0.0000 Pr(T > t) = 0.0000

Table A6: Difference in Means Test - Female Employment Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	453	23.5%	0.5%	0.0978189	22.6%	24.4%
2005	496	26.1%	0.5%	0.1056809	25.2%	27.0%
Combined	949	24.9%	0.3%	0.1027606	24.2%	25.5%
diff		-2.6%	0.7%		-3.9%	-1.3%

diff = mean(1993) - mean(2005) t = -3.9013

Ho: diff = 0 Satterthwaite's degrees of freedom = 946.828

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.0001 Pr(T > t) = 0.0001 Pr(T > t) = Pr(T > t) = 0.9999

Table A7:Difference in Means Test - Inactivity Rate by Gender - 2005 data

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Male	514	0.2241882	0.0042991	0.0974669	0.2157422	0.2326341
Female	496	0.7278263	0.0049558	0.1103719	0.7180892	0.7375634
Total	1010	0.4715194	0.0085748	0.2725101	0.454693	0.4883458
diff		-50.36%	0.0065607		-0.5165127	-0.4907636

diff = mean(M) - mean(F) t = -76.7662

Ho: diff = 0 Satterthwaite's degrees of freedom = 983.115

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.0000 Pr(T > t) = 0.0000 Pr(T > t) = 1.0000

Table A8: Difference in Means Test - Lowed-Skill Male Unemployment Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	511	2.7%	0.1%	0.0229933	0.0251071	0.0291038
2005	514	4.5%	0.1%	0.0329007	0.0422524	0.0479545
combined	1025	3.6%	0.1%	0.0297768	0.0343057	0.0379558
diff		-1.8%	0.2%		-0.035996	

diff = mean(1993) - mean(2005) t = -10.1559

Ho: diff = 0 Satterthwaite's degrees of freedom = 918.004

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.0000 Pr(T > t) = 0.0000 Pr(T > t) = 1.0000

Table A9: Difference in Means Test - Lowed-Skill Female Unemployment Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	511	3.6%	0.1%	0.0281878	0.033608	0.0385076
2005	514	4.2%	0.1%	0.0326646	0.0387992	0.0444603
combined	1025	3.9%	0.1%	0.0306272	0.0369748	0.0407291
diff		-0.6%	0.2%		-0.0093111	-0.0018328

diff = mean(1993) - mean(2005) t = -2.9242

Ho: diff = 0 Satterthwaite's degrees of freedom = 1003.18

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.0018 Pr(T > t) = 0.0035 Pr(T > t) = 0.9982

Table A10: Difference in Means Test - Low-Skilled Male Employment Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	511	89.0%	0.2%	0.0487714	0.8853339	0.8938114
2005	514	73.9%	0.5%	0.1055766	0.7296808	0.7479782
combined	1025	81.4%	0.3%	0.1116026	0.8071402	0.8208208
diff		15.1%	0.5%		.1406671	.1608191

diff = mean(1993) - mean(2005) t = 29.3714

Ho: diff = 0 Satterthwaite's degrees of freedom = 723.346

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 1.0000 Pr(T > t) = 0.0000 Pr(T > t) = 0.0000

Table A11: Difference in Means Test - Low-Skilled Female Employment Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	511	22.7%	0.4%	0.09712	0.2185063	0.2353877
2005	514	23.2%	0.4%	0.099653	0.2238454	0.2411162
combined	1025	23.0%	0.3%	0.0983892	0.2236916	0.2357524
diff		-0.6%	0.6%		-.0175949	.0065274

diff = mean(1993) - mean(2005) t = -0.9003

Ho: diff = 0 Satterthwaite's degrees of freedom = 1022.6

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.1841 Pr(T > t) = 0.3682 Pr(T > t) = 0.8159

Table A12: Difference in Means Test - Low-Skilled Male Inactivity Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	511	8.6%	0.2%	0.0359721	0.0829726	0.0892253
2005	514	22.8%	0.4%	0.0998481	0.2189136	0.2362182
combined	1025	15.7%	0.3%	0.1031847	0.1507151	0.1633638
diff		-14.1%	0.5%		-0.2829338	

diff = mean(1993) - mean(2005) t = -30.2100

Ho: diff = 0 Satterthwaite's degrees of freedom = 644.641

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.0000 Pr(T > t) = 0.0000 Pr(T > t) = 1.0000

Table A13: Difference of Means Test - Low-Skilled Female Inactivity Rate

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
1993	511	76.4%	0.4%	0.101035	0.7555084	0.7730703
2005	514	75.7%	0.5%	0.1042083	0.7483332	0.7663935
combined	1025	76.1%	0.3%	0.1026469	0.7545248	0.7671076
diff		0.7%	0.6%		-0.0056547	0.0195066

diff = mean(1993) - mean(2005) t = 1.0803

Ho: diff = 0 Satterthwaite's degrees of freedom = 1022.36

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.8599 Pr(T > t) = 0.2803 Pr(T > t) = 0.1401

Table A14: Difference in Means Test - Low-Skilled Employment Rate - Migrants vs. Non Migrants

Two-sample t test with unequal variances

Male

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Migrant	847	81.9%	0.4%	0.1112191	0.8118077	0.8268093
Non Migrants	1009	80.9%	0.4%	0.1158766	0.8017966	0.8161135
combined	1856	81.4%	0.3%	0.1138612	0.8084965	0.8188634
diff		1.0%	0.5%		-0.00000827	0.0207151

diff = mean(Migrant) - mean(Non Migrants) t = 1.95

Ho: diff = 0 Satterthwaite's degrees of freedom = 1821.13

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) =0.9749 Pr(T > t) = 0.0502 Pr(T > t) = 0.0251

Female

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Migrant	583	27.8%	0.5%	0.1108282	0.2692838	0.2873139
Non Migrants	922	23.4%	0.3%	0.1010482	0.2274021	0.2404642
combined	1505	25.1%	0.3%	0.1071132	0.2457034	0.2565352
diff		4.4%	0.6%		0.0332421	0.0554894

diff = mean(Migrant) - mean(Non Migrants) t = 11.2520

Ho: diff = 0 Satterthwaite's degrees of freedom = 692.579

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 1.0000 Pr(T > t) = 0.0000 Pr(T > t) = 0.0000

Table 15: Difference in Means Test - Low-Skilled Unemployment Rate - Migrants vs. Non Migrants

Two-sample t test with unequal variances

Male

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Migrant	847	5.4%	0.3%	0.0762872	0.0483669	0.0586567
Non Migrants	1009	3.6%	0.1%	0.0312999	0.0345658	0.038433
combined	1856	4.4%	0.1%	0.0570822	0.0416645	0.0468617
diff		1.7%	0.3%		0.0115177	0.0225072

diff = mean(Migrant) - mean(Non Migrants) t = 6.0751

Ho: diff = 0 Satterthwaite's degrees of freedom = 1083.83

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 1.0000 Pr(T > t) = 0.0000 Pr(T > t) = 0.0000

Female

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Migrant	583	8.1%	0.3%	0.0792483	0.0745288	0.0874213
Non Migrants	922	4.2%	0.1%	0.0305399	0.0403755	0.0443233
combined	1505	5.7%	0.1%	0.0579285	0.054383	0.060241
diff		3.9%	0.3%		0.0318858	0.0453656

diff = mean(Migrant) - mean(Non Migrants) t = 11.2520

Ho: diff = 0 Satterthwaite's degrees of freedom = 692.579

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 1.0000 Pr(T > t) = 0.0000 Pr(T > t) = 0.0000

Table 16: Difference in Means Test - Low-Skilled Inactivity Rate-Migrants vs. Non Migrants

Two-sample t test with unequal variances

Male

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Migrant	847	13.5%	0.3%	0.0876518	0.1286913	0.1405141
Non Migrants	1009	16.2%	0.3%	0.1071814	0.1555353	0.1687779
combined	1856	15.0%	0.2%	0.0996734	0.1450446	0.1541197
diff		1.0%	0.5%		-0.00000827	0.0207151
diff = mean(Migrant) - mean(Non Migrants)					t = -6.0922	
Ho: diff = 0				Satterthwaite's degrees of freedom = 1852.76		
		Ha: diff < 0	Ha: diff != 0	Ha: diff > 0		
		Pr(T < t) = 0.0000	Pr(T > t) = 0.0000	Pr(T > t) = 1.0000		

Female

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Migrant	583	69.8%	0.5%	0.1170301	0.6881276	0.7071667
Non Migrants	922	75.6%	0.3%	0.1049398	0.7491304	0.7626956
combined	1505	73.3%	0.3%	0.1133567	0.7276106	0.7390739
diff		4.4%	0.6%		0.0332421	0.0554894
diff = mean(Migrant) - mean(Non Migrants)					t = -9.7879	
Ho: diff = 0				Satterthwaite's degrees of freedom = 1138.3		
		Ha: diff < 0	Ha: diff != 0	Ha: diff > 0		
		Pr(T < t) = 0.0000	Pr(T > t) = 0.0000	Pr(T > t) = 1.0000		