

THE EFFECT OF INTERNAL MIGRATION ON THE COLOMBIAN LABOR MARKET

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ABSTRACT

Internal migration in Colombia has led to demographic transformation. These migratory movements have been greatly influenced by “available” employment opportunities in different urban areas and by increased internal armed conflict. The effect of migratory flows on the probability of finding a job and income from work in Colombia’s ten main urban areas from 2001-2005 were estimated using Logit analysis and Heckman’s selection bias correction model. Evidence shows that age had a positive but decreasing incidence on the probability of being employed. Individuals with a higher level of education, male, married or cohabiting, and households with more employed members, had a greater probability of being employed. Elasticity of worked hours to produce income increased up to 2002 then decreased. Evidence also suggests that return to education is lower for migrants and forcibly-displaced population people. Moreover, the study shows that forcibly-displaced workers earn the lowest wages and face the lowest probability of finding a job.

INTRODUCTION

Internal migration in Colombia has led to demographic transformation totally different from other Latin America countries because the internal process of migration has been directed to a few urban centers and not just one main city. Such migratory movements have been mainly influenced by “available” employment opportunities in different urban areas and increased armed conflicts. Nevertheless, migrant population is mainly comprised of unskilled labor and as such is forced to seek low paying jobs in the informal sector.

Despite the increasing importance of migratory flows for the Colombian labor market, no instruments of economic planning that model mobility trends have been developed yet. This paper aims to study and measure the incidence of migratory flows to the labor markets of Colombia’s ten main urban areas from 2001 to 2005. The following urban areas were analyzed: Barranquilla, Bogotá, Bucaramanga, Manizales, Medellín, Cali, Pasto, Pereira, Ibagué and Montería. Three groups of migrants are examined in this paper: Recent migrants are those that have migrated within the last five years. Long-term migrants are those that have migrated more than five years earlier. According to the nature of their migration decision, we classify migrants between forced and voluntary ones. The database was collected from the Ongoing Household Survey (*Encuesta Continua de Hogares*) conducted by the Colombian Statistics’ Administration Department (*Departamento Administrativo Nacional de Estadística - DANE*).

Logit analysis was used to predict the probability of finding a job based on the classification of migrant population. Some determinants of individuals’ income were considered using Heckman’s selection bias correction model. It was found that age had a positive but decreasing incidence on the probability of finding a job and earning a higher wage. Individuals having a higher level of education, male, married or cohabiting and households with more employed members had a higher probability of finding a job. *Elasticity of worked hours to produce income increased up to 2002, and then decreased.* Recent labor reforms that reduced the cost of overnight working hours may have contributed to this change.

Evidence also suggested that return to education was lower for migrants and within them forcibly-displaced individuals had the lowest wages and the lowest probability of finding a job.

LITERATURE

There are essentially two economic models which try to explain the economic impact of labor migration: the neoclassical and the new economics of labor migration. Under the macro theory of neoclassical economics, scholars argue that migration is caused by differences in the supply of and demand for labor in sending and receiving countries and/or regions (Harris and Todaro, 1970). It is also argued under this theory that migratory decisions are made by individuals after a cost-benefit analysis and when the individual perceives that he or she will have a positive net return from migration (Todaro, 1969). That is, voluntary migration is analyzed as an investment decision. Individuals will migrate and face social and moving costs if they perceive a higher monetary retribution at the destination city/region.

On the other hand, new economics of migration argues households or families make migration decisions as a group and they seek to maximize income and minimize risks resulting from market failures in unstable economies to improve their income relative to the rest of the community (Stark 1991). Under this theory, risk aversion is considered the main reason for rural-urban migration; specifically, if it diversifies risk to one's income.

Other international studies have concluded that internal migration works as an adjustment mechanism for inter-regional labor markets, see for the United States (Blanchard & Katz, 1992); Europe, the USA and Canada (Obstfeld & Peri, 1998); Spain, Europe and the USA (Mauro, Prasad & Spilimbergo, 1999); Australia (Debelle & Vickery, 1999); Italy (Bosco, 1999) and the Czech Republic and Slovakia (Firdmuc, 2004).

Other studies focusing on internal migration in Colombia have found changes in migratory patterns. These studies referred to urbanization and the migratory phenomenon as the answer to observed disparity in development levels among regions, see Adams (1969), Schultz (1971), Simmons & Cardona (1972), Martine (1975), Fields (1979), Fields (1982), Rosenzweig & Wolpin (1988) and Shefer & Steinvortz (1993). Current studies analyze violence as the key factor in forced displacement and the social costs associated with this process. Pécaut (2000), Kirchhoff & Ibáñez (2001), Meertens & Stoler (2001), Galvis (2002), Flórez (2003), Ibáñez & Vélez (2003), Ibáñez (2004), Ibáñez & Querubín (2004) and Neira (2004) are among these studies.

METHODOLOGY

This study seeks to measure the impact of internal migration on wages and employment conditions in 10 of the largest Colombia's cities. The database was taken from the Continuous Survey of Households (*Encuesta Continua de Hogares*). Thus, Logit analysis was used to predict the likelihood that an individual would be employed and Heckman's selection model was used to analyze the factors affecting an individual's wage. Only economically active population, employed and unemployed people, were considered for the Logit analysis.

For the Logit analysis, it is assumed that the probability that an individual changes states follows a logit distribution and this probability is a function of a set of the environment and individual's characteristics. Individuals could be in one of two status, employed or unemployed. The expectation that an individual i has a job (y_i^*) is a linear function of such individual's selected variables (z_i) and a random component not observed (ε_i). The equation can thus be stated as:

$$y_i^* = \alpha'z_i + \varepsilon_i \tag{1}$$

And y_i^* can take a value of 1 or 0:

$$\begin{aligned} y_i &= 1 && \text{if an individual } i \text{ is employed} \\ y_i &= 0 && \text{if an individual } i \text{ is not employed but is seeking employment.} \end{aligned} \tag{2}$$

Thus, the probability that an individual i be employed (p_o) is:

$$\begin{aligned} p_o = \text{prob}(y_i = 1) &= \text{prob}(y_i^* > 0) &= \text{prob}(\alpha'z_i + \varepsilon_i > 0) \\ &= \text{prob}(\varepsilon_i > -\alpha'z_i) &= 1 - F(-\alpha'z_i) \end{aligned} \tag{3}$$

Where F is the cumulative distribution of ε_i . If one assumed F to be a functional form, the Logit model can be stated as:

$$F(-\alpha'z_i) = \frac{e^{-\alpha'z_i}}{1 + e^{-\alpha'z_i}} = \frac{1}{1 + e^{\alpha'z_i}} \tag{4}$$

And the probability of finding a job as:

$$p_o = \frac{e^{\alpha'z_i}}{1 + e^{\alpha'z_i}} \tag{5}$$

The probability that an individual will be employed is a linear function of (z_i), those are a set of variables like age (Age), age to the second power (Age²), educational level (Level), gender (Gender), number of employed people in the same household (Nemploy), migration term (Migre=1 for recent migrant or Migre=0 for long term migrant or native) and cause of migration (Displcf=1 for forced displaced or Displcf=0 for economic migrant), and marital status (Couple=1 for married or cohabiting). This model is used to approximate a migrant's probability of finding a job given a set of determined variables. In order to determine the most suitable model for this analysis, the Likelihood ratio statistic (LR statistic), the Wald test and pseudo R² were used.

Next, income determinants were estimated by following Mincer's model (including the recent migration variable and correcting income selection bias with Heckman's maximum likelihood method) to analyze individuals' participation in the labor market and earnings. Following this model, the log of monthly earnings (Ltotwage) was taken as dependent variable. The years of education (Yedu), potential experience (Experience) and potential experience to the second power (Experience²), the log of total worked hours in a month (Lhoursl) and the individuals who had recently migrated (Migre) or had been forced displaced (Displcf) were also considered. It should be emphasized that unitarian elasticity restriction on earnings was not imposed on total worked hours (as originally imposed by Mincer (1974)), so the log of total worked hours in a month was considered as explanatory variable. The objective equations considering the time and reason for migrating were respectively:

$$\text{Ltotwage} = f(\text{Yedu}, \text{Experience}, \text{Experience}^2, \text{Lhoursk}, \text{Migre})$$

$L_{totwage} = f(\text{Yedu}, \text{Experience}, \text{Experience}^2, \text{Lhoursk}, \text{Displcf})$

The dependent variable was also considered unobservable. Thus, the dependent variable for j -th observation was observed if the selection equation:

$$z_j\gamma + u_{2j} > 0 \tag{6}$$

where

$$\begin{aligned} u_1 &\sim N(0, \sigma) \\ u_2 &\sim N(0, 1) \\ \text{corr}(u_1, u_2) &= \rho \end{aligned} \tag{7}$$

Age (Age), age to the second power (Age²), head of family (Head=1, otherwise=0), marital status (married or cohabiting=1, otherwise=0), gender (Gender=1 for male or Gender=0 for female), and the number of single male employed individuals (Childrenxo) were considered in selection equation (6).

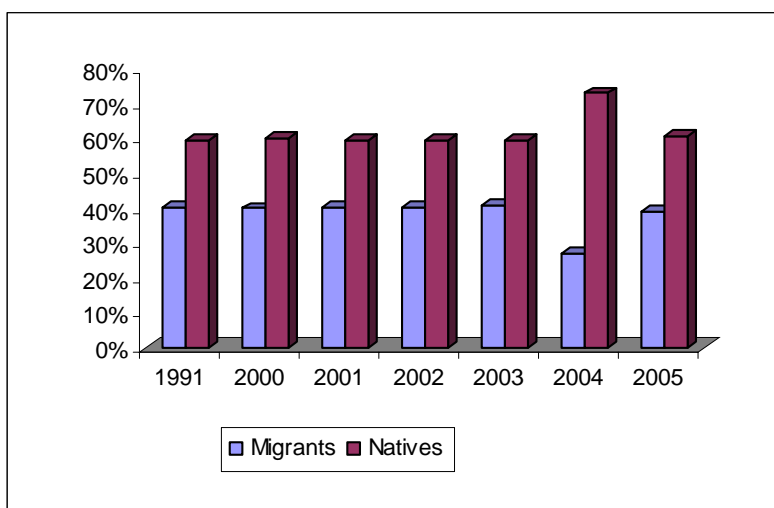
When $\rho \neq 0$, the standard regression applied to equation (7) produced biased outcomes, due to the bias selection in reservation wages are different through the individuals and this situation could be not considered inside this equation. Heckman's model estimated by maximum likelihood offered estimators where were consistent and asymptotically efficient for all parameters correcting the selection bias.

EMPIRICAL EVIDENCE

Migration Summary Statistics

Migratory flows from 1991-2005 in Colombia towards ten urban areas represented approximately 40% of the population (Figure 1). Recent migrants represented about 14% of the total migrant population.

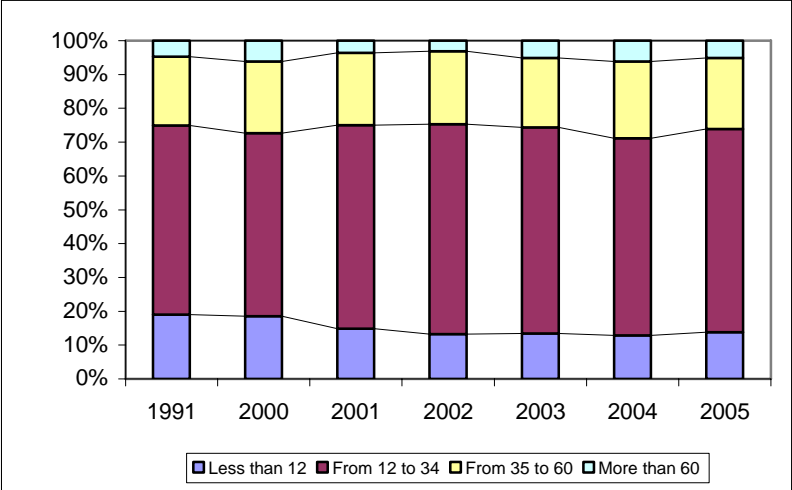
Figure 1: Relative Percentage of Migrant and Native Population Living in Ten Colombian Urban Areas (1991-2005)



Source: DANE, authors' calculations.

Within new migrants, younger population, ages 12 to 34, move more towards the main urban areas (Figure 2). This phenomenon has caused higher participation and unemployment rates in the receiving ten larger cities.

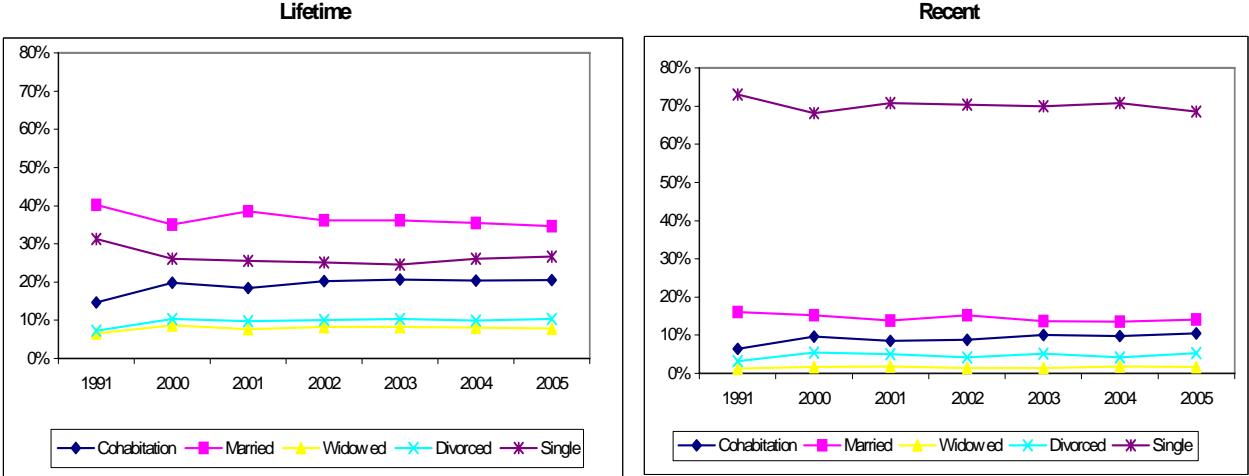
Figure 2: Recent Migration Towards Ten Colombian Urban Areas by Age Group (1991-2005)



Source: DANE, authors' calculations.

According to Figure 3, recent migrants are mostly composed by single people. Perhaps one of the consequences of long term migration was to settle down and start a family, as the share of single people is much lower than the one of married people.

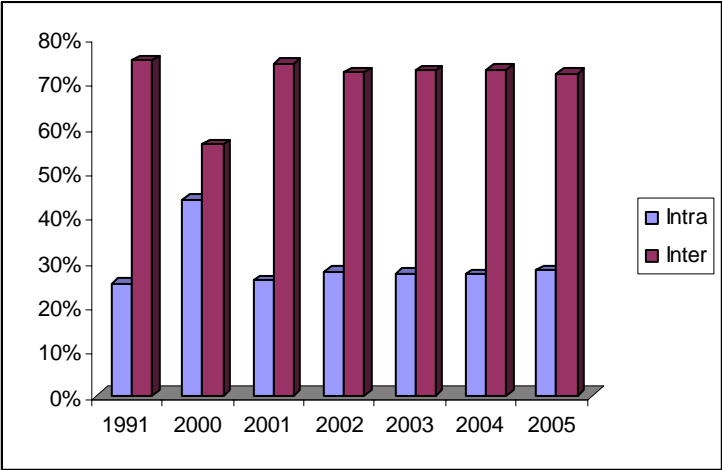
Figure 3: Lifetime Migrants and Recent Migrants in Ten Colombian Urban Areas by Marital Status (1991-2005)



Source: DANE, authors' calculations.

The evidence also shows that migrating distance has increased over time. However, this variable must be analyzed with care due to the geographical differences in Colombian departments' sizes and topography. Inter-departmental migrants represented 72.07% of all migrants for March 2005, whereas intra-departmental migrants represented only 27.93% (Figure 4).

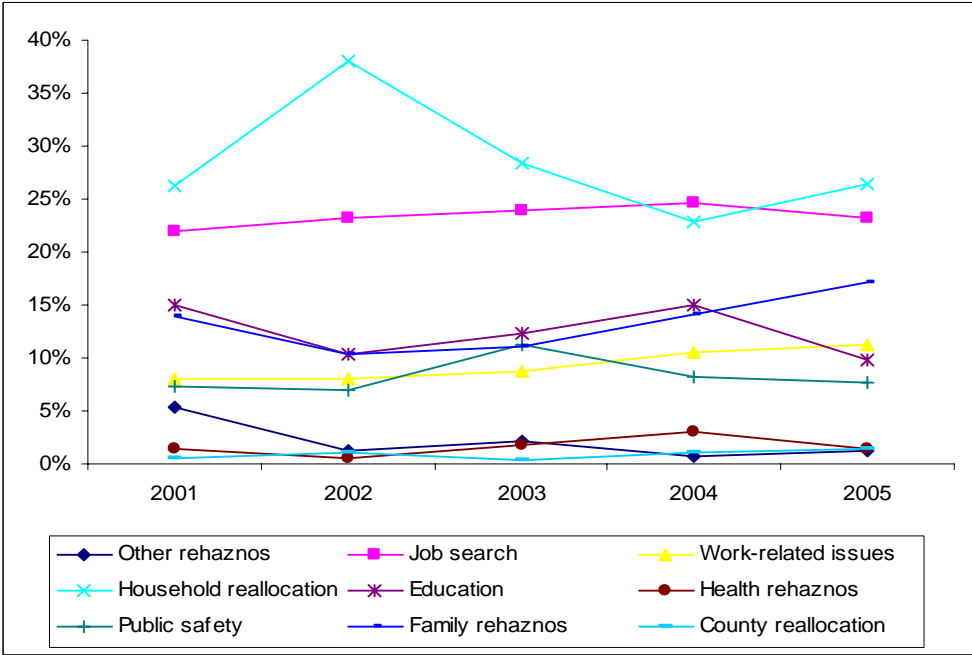
Figure 4: Relative Percentage of Intra-departmental and Inter-departmental Migrant Population in Ten Colombian Urban Areas (1991-2005)



Source: DANE, authors' calculations.

For the past few years, job search and home transfer have been among the main reasons for migration in Colombia. Motives concerning family, work-related issues and public safety have also influenced migratory movements (Figure 5).

Figure 5: Migrant Population Distribution by Reasons for Migrating in Ten Colombian Urban Areas (1991-2005)



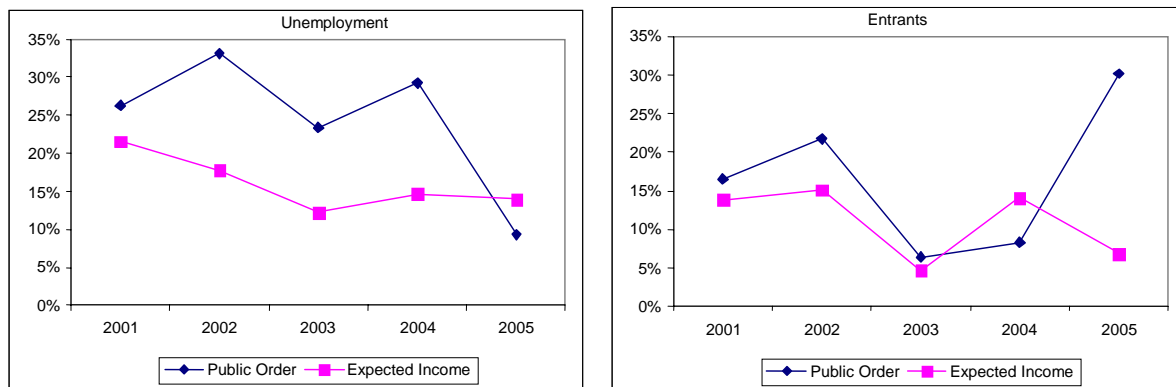
Source: DANE, authors' calculations.

The share of the migrant population who argues economic reasons to migrate provides empirical evidence which supports the neoclassical and new economics of migration theories, evidence also suggests that a

proportion of the population has migrated for economic reasons (2001-2005). These migration patterns have been used to analyze the migrant profile and the degree of misalignment in labor markets.

Individuals who moved short distances due to economic motivations had a lower economic position than those who migrated longer distances. Within this population, single people migrated more often, probably because they had more freedom (no family to support, no families to reallocated, no school reallocation etc.) to look for employment opportunities. First time job seekers were also predisposed to migrate longer distances. The forcibly-displaced population had higher unemployment rates than economic migrants, which is coherent with the expected economic outcomes of the unexpected, not planned migration decision that those migrants had to take (Figure 6).

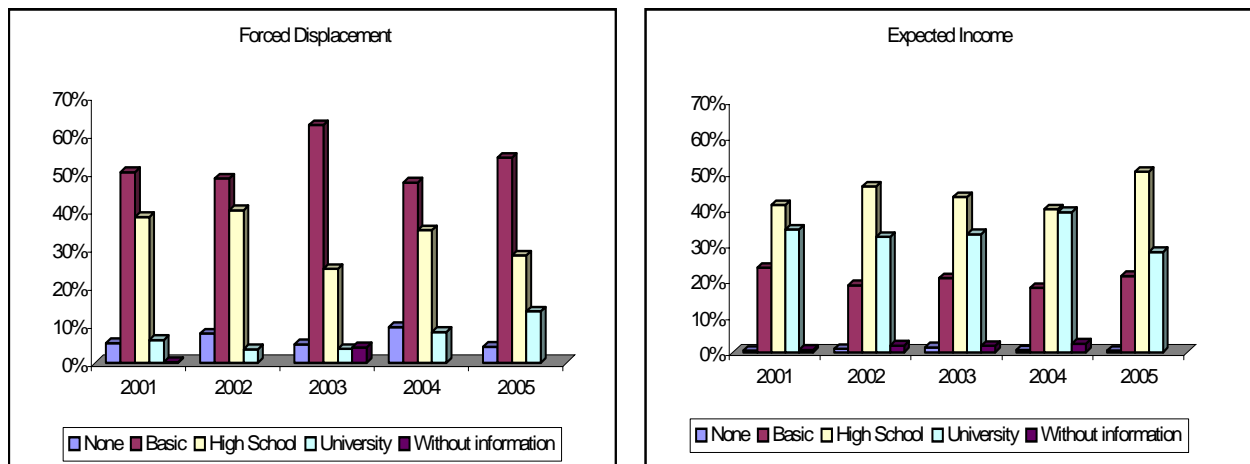
Figure 6: Unemployment Rates and Entrants for Economic Migrants and Forcibly-displaced in Colombia (1991-2005)



Source: DANE, authors' calculations.

Within the displaced population by gender, women migrating due to forced displacement increased throughout the sample period. They also migrated longer distances. The forcibly-displaced had lower schooling levels (Figure 7).

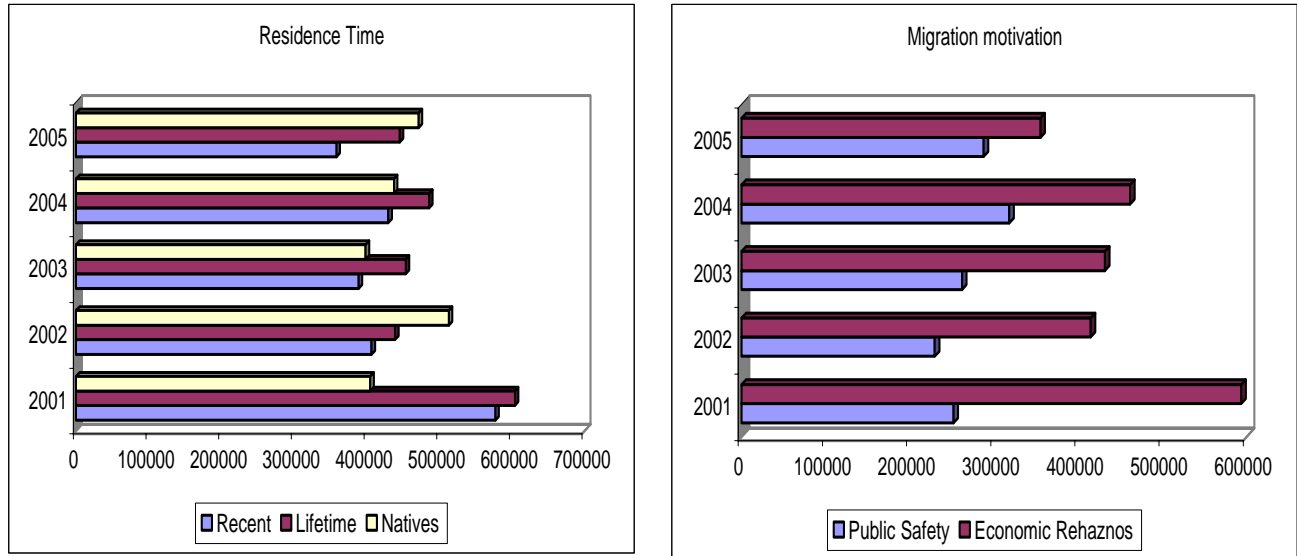
Figure 7: Educational Level of Economic Migrants and the Forcibly-displaced in Colombia (1991-2005) (in Terms of Years of Schooling)



Source: DANE, authors' calculations.

Once relocated, with the exception of the displaced due to violence, there are no significant evidence of different wages for natives or migrants (Figure 8).

Figure 8: Migrants' Wages According to Length of Residence and Reason for Migration in Colombia (1991-2005)



Source: DANE, authors' calculations (constant prices for 1998).

EMPIRICAL RESULTS

The model for estimating the probability of having work in Colombia's ten main urban areas 2001–2005 is presented in Table 1. The explain variables in this case are: Age, Age to the second power (Age^2), Schooling (level), Migrant term status (Migre), Gender (Gender), marital status (Couple), and number of employed per household (Nemploy).

The results show that age had a positive yet decreasing effect on the probability of finding a job. People with higher educational levels, married or cohabiting, households with additional working members, male and recent migrants had a greater probability of finding work. It should be emphasized that the incidence of schooling and gender on wages in Colombia is consistent with previous studies. Previous studies have recognized the importance of having skills and schooling. Accumulated human capital thus has an important effect on people's productivity, wages and welfare (Castellar & Uribe, 2001). Nevertheless, the return to education is usually greater for men than women (Arias & Chavez, 2002). Statistical tests demonstrate that the model had explanatory power. The likelihood ratio (LR) test and Wald values demonstrated that the coefficients were significantly different than zero just as pseudo- R^2 showed how well the model explained the information. Moreover, the estimated model had a high prediction level (more than 66% for all cases). The marginal effects of age were also estimated, considering the average years of education, number of people employed in a household and whether the individuals were married or cohabiting. Marginal changes in the probability of finding a job by gender or by migratory characteristics did not become evident with age changes.

The model for estimating the probability of finding work in Colombia's ten main urban areas (2001–2005) (Table 2) was re-estimated only with economic migrants and the forcibly-displaced population (Displacf). Forcibly-displaced people had a lower probability of finding a job. All the values considered

showed that the model had explanatory and predictable power (higher than 70% for all cases). The marginal effect of age was also estimated. It was found that age had a greater marginal effect on the probability of finding a job for the displaced population. Displaced population' early introduction to the labor market may explain this last result.

Table 1: The Probability of an Individual Finding Work in Ten Colombian Urban Areas (2001–2005)

Variables	Estimated coefficients (p-value)				
	2001	2002	2003	2004	2005
Constant	-4.7578* (0.0000)	-4.7227* (0.0000)	-4.8050* (0.0000)	-3.5931* (0.0000)	-2.3672* (0.0000)
Age	0.1769* (0.0000)	0.1741* (0.0000)	0.1769* (0.0000)	0.1228* (0.0000)	0.1256* (0.0000)
Age ²	-0.0016* (0.0000)	-0.0016* (0.0000)	-0.0016* (0.0000)	-0.0011* (0.0000)	-0.0011* (0.0000)
Level	0.0001 (0.9700)	0.0059* (0.0050)	0.0059* (0.0060)	0.0043** (0.0410)	0.0038*** (0.0840)
Migre	0.1935* (0.0000)	0.2184* (0.0000)	0.2201* (0.0000)	0.0821 (0.1090)	0.0751 (0.1710)
Gender	0.4915* (0.0000)	0.4781* (0.0000)	0.5102* (0.0000)	0.4713* (0.0000)	0.3655* (0.0000)
Couple	0.3054* (0.0000)	0.3109* (0.0000)	0.2863* (0.0000)	0.3195* (0.0000)	0.3095* (0.0020)
Nemploy	1.0344* (0.0000)	1.0007* (0.0000)	1.0431* (0.0000)	0.3280* (0.0000)	0.2381* (0.0000)

* Significant at 1% ** Significant at 5% *** Significant at 10%

Table 2: The Probability of Economic Migrants and the Forcibly-displaced Population Finding Work in Ten Colombian Urban Areas (2001-2005)

Variables	Estimated coefficients (p-value)				
	2001	2002	2003	2004	2005
Constant	-3.0925* (0.0000)	-3.0179* (0.0000)	-2.7844* (0.0000)	-2.9915* (0.0000)	-3.7769* (0.0000)
Age	0.1489* (0.0000)	0.0958* (0.0000)	0.0774* (0.0080)	0.1049* (0.0010)	0.1711* (0.0000)
Age ²	-0.0018* (0.0000)	-0.0011* (0.0000)	-0.0008** (0.0350)	-0.0012* (0.0040)	-0.0020* (0.0000)
Level	-0.0145 (0.1350)	-0.0124* (0.0000)	-0.0002 (0.9860)	-0.0025 (0.7890)	-0.0198*** (0.0760)
Gender	0.5234* (0.0020)	0.6084* (0.0000)	0.5479* (0.0010)	0.1989 (0.1960)	0.4357** (0.0140)
Couple	-0.3722** (0.0220)	-0.1217** (0.0300)	0.0551 (0.7360)	0.0173 (0.9090)	-0.5581* (0.0030)
Nemploy	2.5193* (0.0000)	3.4302* (0.0000)	3.2759* (0.0000)	2.8316* (0.0000)	3.2596* (0.0000)
Displcf	-2.3133* (0.0000)	-1.9400* (0.0000)	-1.9798* (0.0000)	-1.8176* (0.0000)	-1.2338* (0.0000)

* Significant at 1% ** Significant at 5% *** Significant at 10%

Table 3 presents the estimates for some income (Ltotwage) determinants in the ten main Colombian cities 2001–2005. The independent variables considered were schooling (Yedu), experience (Experience), Squared of experience (Experience²), hours worked (Lhoursl) and the migrant term status (migre) (less than five year since migration is considered a recent migration). The selection equation considered age

(Age), Age to the second power (age²), the number of single children for each individual having a job (Childrenxo), and dummy variables for head of household (head), marital status (couple) and gender.

Using Heckman’s method correction selection bias, it was found that the return to education was between 6% and 9%. This estimation also showed the positive but decreasing effect of work experience on income (with the exception of 2002). Such a relationship decreased during the covered period. Elasticity of worked hours to income increased until 2002 and then decreased. Such result was consistent with Colombian labor reform as extra night-time hours were reduced.

As noted earlier, under the macro theory of neoclassical economics, scholars argue that migration is caused by differences in the supply of and demand for labor in sending and receiving countries and/or regions (Harris and Todaro, 1970). It is also argued under this theory that migratory decision are made by individuals after a cost-benefit analysis and when the individual perceives that he or she will have a positive net return from migration. Being a recent migrant had a positive relationship with wage level. This result is consistent with the theory of neoclassical economics where individual migratory decision is based on a cost-benefit analysis. Thus, most recent migrants expected to obtain higher incomes in their target or receiving city.

Table 3: Some Determinants of Income for Individuals in Ten Colombian Urban Areas (2001–2005)

	2001	2002	2003	2004	2005
Ltotwage					
Yedu	0.085701* (0.0000)	0.060044* (0.0000)	0.087726* (0.0000)	0.084535* (0.0000)	0.083520* (0.0000)
Experience	0.034324* (0.0000)	-0.023940* (0.0000)	0.031629* (0.0000)	0.031990* (0.0000)	0.029082* (0.0000)
Experience ²	-0.000312* (0.0000)	-0.000606* (0.0000)	-0.000188* (0.0000)	-0.000240* (0.0000)	-0.000158* (0.0000)
Lhoursl	0.607823* (0.0000)	1.761563* (0.0000)	0.750097* (0.0000)	0.679969* (0.0000)	0.694719* (0.0000)
Migre	0.170371* (0.0000)	0.112294 (0.2570)	0.109554* (0.0000)	0.145221* (0.0000)	0.114743* (0.0000)
Constant	8.580908* (0.0000)	1.646389* (0.0000)	8.059344* (0.0000)	8.349310* (0.0000)	8.367825* (0.0000)
Select					
Age	0.048202* (0.0000)	0.058472* (0.0000)	0.059352* (0.0000)	0.049575* (0.0000)	0.0637134* (0.0000)
Age ²	-0.000771* (0.0000)	-0.000779* (0.0000)	-0.000948* (0.0000)	-0.000828* (0.0000)	-0.001004* (0.0000)
Couple	-0.180302* (0.0000)	-0.015499 (0.3990)	-0.070653* (0.0000)	-0.054534* (0.0020)	-0.078445* (0.0000)
Head	0.276232* (0.0000)	0.344201* (0.0000)	0.336966* (0.0000)	0.303561* (0.0000)	0.266490* (0.0000)
Gender	-0.061297* (0.0020)	0.093955* (0.0000)	-0.031444 (0.6810)	-0.023387 (0.1760)	-0.011071* (0.0000)
Childrenxo	-0.587124* (0.0000)	-0.319991* (0.0000)	-0.222115* (0.0000)	-0.170637* (0.0000)	-0.172990* (0.0000)
Constant	0.900427* (0.0000)	0.464591* (0.0000)	0.221928* (0.0010)	0.190535* (0.0040)	0.003432* (0.0000)

* Significant at 1%

** Significant at 5%

*** Significant at 10%

Table 4 presents some determinants of income for economic migrants and forcibly-displaced people (Displcf) from 2001–2005. Using Heckman method for bias correction, return on education decreased from 7.23% to 6.29% for economic migrants and forcibly-displaced people. The forcibly-displaced population earned the lowest wages.

Table 4: Some Determinants of Income for Economic Migrants and Forcibly-displaced People in Ten Colombian Urban Areas (2001–2005)

	2001	2002	2003	2004	2005
Ltotwage					
Yedu	0.072307 * (0.0000)	0.043533** (0.0200)	0.081917 * (0.0000)	0.073479* (0.0000)	0.062983* (0.0000)
Experience	0.026777 * (0.0000)	-0.047265** (0.0110)	0.038665 * (0.0000)	0.035125 * (0.0000)	0.026328* (0.0000)
Experience ²	-0.000216** (0.0320)	-0.000269 (0.5520)	-0.000395* (0.0020)	-0.000441 * (0.0000)	-0.000258 (0.0030)
Lhoursl	0.322045* (0.0000)	1.178669* (0.0000)	0.567996 * (0.0000)	0.520213 (0.3700)	0.601091* (0.0000)
Displcf	-0.149482** (0.0340)	-1.474875* (0.0000)	-0.202769* (0.0050)	-0.136197* (0.0000)	-0.225647* (0.0000)
Constant	10.216490* (0.0000)	5.318187* (0.0000)	9.013098* (0.0000)	9.312580* (0.0000)	9.187710* (0.0000)
Select					
Age	0.041343** (0.0330)	0.0125358 (0.4670)	-0.025876 (0.1440)	0.002656 (0.8960)	0.066862* (0.0000)
Age ²	-0.000806* (0.0020)	-0.0003615 (0.1120)	0.000094 (0.6930)	-0.000367 (0.1850)	-0.001056* (0.0000)
Couple	-0.345296* (0.0000)	0.2294569 (0.4870)	-0.034074 (0.6910)	-0.131030 (0.1300)	-0.407488* (0.0000)
Head	0.549678* (0.0000)	0.4187526* (0.0000)	0.378442* (0.0000)	0.487593* (0.0000)	0.448952* (0.0000)
Gender	-0.241634* (0.0070)	-0.6365688 (0.4440)	-0.271569* (0.0010)	-0.231625* (0.0040)	-0.071763 (0.3960)
Childrenxo	-0.200428* (0.0000)	-0.595643* (0.0000)	-0.259420* (0.0000)	-0.180072* (0.0000)	-0.205574* (0.0000)
Constant	0.0514504* (0.0020)	0.973138* (0.0000)	2.202317* (0.0000)	1.523053* (0.0000)	0.548720*** (0.0730)

* Significant at 1%

** Significant at 5%

*** Significant at 10%

CONCLUDING REMARKS

Migration has become a relevant demographic transformation phenomenon in Colombia. For the last three decades, migrants have represented 40% of the total population. The rates of working age population and unemployment rates in urban areas have increased. The evidence indicates those individuals with a higher educational level, married or cohabiting, and households with multiple employed members had greater possibilities of finding a paying job. The elasticity of hours worked to income increased until 2002 and then decreased, probably due to the reduction in extra night hours.

Return to education is lower for migrants and forcibly-displaced people earned the lowest wages and faced the lowest probability of finding a job. This paper argues that migrants cannot improve their quality of life due to labor market rigidity and the absence of labor legislation conducive to social networks for migrants.

Future research on formal and informal employment and factors that attract and expels migrants are needed. Other methodologies for studying the effect of internal migration on the labor market should also be considered.

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