



DISCUSSION PAPER SERIES

IZA DP No. 3279

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The Impact of Nicaraguan Immigrants on Earnings,  
Inequality and Poverty in Costa Rica**

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January 2008

Forschungsinstitut  
zur Zukunft der Arbeit  
Institute for the Study  
of Labor

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## ABSTRACT

### **South-South Migration: The Impact of Nicaraguan Immigrants on Earnings, Inequality and Poverty in Costa Rica**

More than half of those who emigrate from developing countries move to other developing countries, yet there have been few studies of the impact of this South-South migration. In this paper, we examine the impact of migration from one developing country, Nicaragua, on the labor market in another developing country, Costa Rica. We find little evidence to support the hypothesis that Nicaraguan migration to Costa Rica was an important factor contributing to falling earnings, increased inequality or stagnating poverty in Costa Rica.

JEL Classification: J61, O15

Keywords: Costa Rica, Latin America, migration, earnings, inequality, poverty

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\* I would like to thank Andy Mason, Carlos Sobrado, Juan Diego Trejos, Katherine Terrell and an anonymous referee for helpful comments. Luis Oviedo and Xin Gao provided valuable research assistance. An earlier version of this paper was written as part of the Labor Market Study for the World Bank Poverty Assessment of Costa Rica. I would like to thank the World Bank for their support for this research project, although all conclusions and opinions expressed are my own.

## 1. INTRODUCTION

In the past ten years there has been an explosion of literature on the impact of “South to North” migration flows--the impact of migrants from developing countries on the labor markets of the United States and Europe.<sup>2</sup> There has been much less study of the impact of “South-South” migration flows, despite the importance of this type of migration. A recent World Bank study of country-to-country migration flows concludes that nearly half of the migrants from developing countries reside in other developing countries (Ratha and Shaw, 2007). Hatton and Williamson (2005) conclude a recent article on world migration trends by noting that in the near future “opportunities will most assuredly change the direction of South-North flows in a more South-South direction...creating new problems for newly industrial countries” (p. 36). Hatton and Williamson (2005) also note that substantial South-South migration is not unprecedented, “when those 50 million Europeans left home before 1914, there were at the same time far more than 50 million who left China and India for jobs elsewhere in the periphery. South-South migration is not new. It is just ignored by economists” (p. 36).

South-South migration has raised many of the same issues as migration from developing countries into the United States and Europe, as many in the destination countries worry that the increased supply of relatively low-skilled immigrants will drive down wages, increase inequality, increase poverty and reduce the social protection of workers offered by destination country governments.<sup>3</sup> This has certainly been the case in Costa Rica. For example, in an editorial in the Costa Rican newspaper *La Nacion* Laura Chinchilla, the current Costa Rican Minister of Justice and First Vice-President, writes that “the large and uncontrolled increase in the immigrant population in recent years...threatens to generate negative pressure on variables such as urban space, employment, the quality and coverage of social services, the rational use of renewable resources, security, etc.” (Chinchilla M., 2004, author’s translation).

In this paper, we examine the hypothesis that migration from one developing country, Nicaragua, contributed to falling wages, increased earnings inequality and stagnating poverty in a neighboring developing country, Costa Rica. As far as we know,

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<sup>2</sup> Some widely-quoted recent studies include Ottaviano and Peri (2005), Card (2005) and Borjas (2003).

<sup>3</sup> See, for example, a front page article in the New York Times from December 27, 2007 titled “A Trek to Poor Nations, From Poorer Ones” (DeParle 2007).

ours is the only empirical study of the impact of migrants from one developing country on the wages, inequality and poverty in another developing country.<sup>4</sup>

From the end of the civil conflict in Nicaragua in 1990 to the present, Nicaraguan immigrants in Costa Rica grew from approximately 2% of the population to approximately 7% (Marquette, 2006). This migration has been caused largely by economic factors, and labor force participation rates for Nicaraguan immigrants are higher than for native born Costa Ricans. Therefore, the proportion of Nicaraguans among workers is higher than that in the population; approximately 8% in 2004. Nicaraguan immigrant workers are less educated, work more hours, and are paid less than Costa Rican-born workers. Further, Nicaraguans are concentrated in low status and low paid occupations--men in construction, women in domestic service, and both men and women in agriculture.<sup>5</sup>

Coincident with the large influx of Nicaraguan immigrants, earnings inequality in Costa Rica began increasing in the early 1990s, after falling steadily since the 1950s (Gindling and Trejos, 2005). Also in the 1990s, despite aggregate economic growth in Costa Rica, poverty rates stagnated. It is reasonable, therefore, to suspect that the influx of Nicaraguan immigrants in the 1990s contributed to the increase in earnings inequality and stagnating poverty during this period. In this paper, however, we find no evidence to support the hypothesis that the surge in Nicaraguan migration to Costa Rica was an important factor contributing to falling earnings, the increase in earnings inequality, or stagnating poverty.

## **2. DATA AVAILABLE ON NICARAGUAN IMMIGRANTS IN COSTA RICA**

Data on the number of Nicaraguan immigrants in Costa Rica, and in particular the labor market experiences of those immigrants, is sparse. The 1984 and 2000 censuses

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<sup>4</sup> In part, the paucity of studies is because of a lack of good data. Ratha and Shaw (2007, p.17) write “In most developing countries, the basic data required to gauge the impact of migration on the labor market – time series of migration flows or stocks and wage data—are lacking. Thus, most analyses are based on anecdotal evidence.” There have been more studies on the impact of emigration from a developing country on the labor market of the migrant sending country (for example, Aydemir and Borjas, 2007 and Hanson, 2007).

<sup>5</sup> A comprehensive description of the characteristics of Nicaraguan immigrants in Costa Rica can be found in Marquette (2006).

identify immigrants, but these censuses have no information on incomes, earnings or employment. Rosero-Bixby (2005) estimated the number of Nicaraguan immigrants based on the number of births to Nicaraguan women in Costa Rican health clinics, but did not collect data on personal or labor market characteristics. The only source of data on the earnings, personal characteristics, and labor market characteristics of immigrants over time that is available in Costa Rica are the yearly Household Surveys for Multiple Purposes (in Spanish, the *Encuestas de Hogares de Propósitos Múltiples*, or EHPM). While the EHPM has been conducted in July of each year since 1987 by the Costa Rican Institute of Statistics and Census, these surveys did not include any information on the immigrant status of respondents until 1997.

The analysis in this paper uses the EHPM. The EHPM are the only source of data on the labor market and personal characteristics of workers that is consistently available over time in Costa Rica. These household surveys, which have been conducted yearly since 1987, are country-wide surveys of approximately 1% of the population and are the source of official Costa Rican government statistics on earnings, unemployment, income inequality and poverty.

The 1997 and 2000 to 2004 EHPM include a variable that indicates where the person was born. We use this variable to identify Nicaraguan immigrants; we consider anyone born in Nicaragua as a Nicaraguan immigrant to Costa Rica. Table 1 presents the number and proportion of Nicaraguan-born workers in the total work force in Costa Rica. According to the 2000 EHPM, the proportion of workers born in Nicaragua was 6.7%, reasonably close to the estimate from the 2000 census (7.0%). Thus, we have some confidence that the EHPM data for the 2000-2004 period will present a reasonable portrait of Nicaraguans in the Costa Rican labor market.<sup>6</sup> According to the household survey data, from 2000 to 2004 the proportion of workers in Costa Rica who were born in Nicaragua increased steadily, reaching 7.75% in 2004. This represents around 8000 new Nicaraguan-born workers entering Costa Rica each year from 2000 to 2004. This last is consistent with estimates based on the number of births to Nicaraguan women in Costa

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<sup>6</sup> It is likely, however, that both the EHPM and the Census underestimate the number of Nicaraguan immigrants in the Costa Rican labor market because they both undercount seasonal, migrant and irregular workers (Marquette, 2006).

Rican health clinics of about 9000 new Nicaraguan immigrants a year from 2000-2004 (Rosero-Bixby, 2005).

In 2000 and 2001 there is another variable in the household surveys that allow us to identify Nicaraguan immigrants, self-reported nationality. Table 2 presents the distribution of Costa Rican workers in 2000 and 2001 by nationality. As we can see from table 2, Nicaraguans make up the overwhelming proportion of total immigrants in the Costa Rican work force. According to the self-reported nationality of the worker, in 2004 5.7% of Costa Rican workers identify themselves as Nicaraguans, with another 1.5% classed as naturalized Costa Rica citizens. Combining those who class themselves as Nicaraguan citizens with naturalized Costa Rican citizens (the majority of whom are Nicaraguan-born) results in a number that is almost identical to the proportion of workers who report being born in Nicaragua.

### **3. NICARAGUAN IMMIGRANTS AND EARNINGS IN COSTA RICA**

#### **(a) Why do Nicaraguans immigrants earn less than Costa Rican-born workers?**

Nicaraguan-born workers earn from 65% to 75% the monthly earnings of native Costa Ricans (see table 3). In this sub-section we explore why Nicaraguan immigrants earn less. The first technique we use is to estimate an earnings equations where the independent variable is the natural logarithm of real monthly earnings (in 1999 colones) and the dependent variables include a dummy variable that is one if the worker is Nicaraguan born (other explanatory variables include: years of education, gender, experience, experience squared, dummy variables that are one if the worker lives in an urban area, works in the public sector, and a set of dummy variables indicating the industry of employment). The results of estimates of this equation using data for 2000 and 2004 are presented in Table 4.<sup>7</sup> All of the coefficients in the earnings equation are significantly different from zero at the 1% level except for the coefficient on the Nicaraguan immigrant dummy variable. The coefficient on the Nicaraguan immigrant dummy variable in the earnings equations is not significantly different from zero at any reasonable significance level. This indicates that Nicaraguans are not paid differently

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<sup>7</sup> The results were similar when we estimated these equations using data for 2001 to 2003.

from Costa Rican born workers after controlling for education, gender, zone, hours worked, sector of employment, size of firm and experience. Thus, we find no evidence of labor market discrimination against Nicaraguan immigrants in Costa Rica in these earnings equations.

Why then do Nicaraguan immigrants earn less? To examine this issue further, we next calculate the Oaxaca/Blinder decomposition of the log wage gap between Nicaraguan born workers and Costa Ricans. The Oaxaca/Blinder technique decomposes Costa Rican-Nicaraguan earnings differences into a part due to differences between in average personal and labor market endowments and a part due to earnings differences between Costa Rican and Nicaraguans with the same personal characteristics. This last part is often interpreted as a measure of labor market discrimination.

To estimate the Oaxaca/Blinder decomposition, we estimate separate earnings equations for Nicaraguan born workers only and Costa Rican born workers only. From the results of these estimations we can calculate the mean earnings for each group as

$$(EQ 1) \quad \ln Y_k = \sum_j B_{kj} * X_{kj}$$

where  $\ln Y_k$  is the average of the log of monthly earnings for group k and the  $X_{kj}$  are the mean values of each variable j for group k (k= N for Nicaraguan immigrants and C for Costa Ricans born workers). The difference in the mean of log earnings can be decomposed into:

$$(EQ 2) \quad \ln Y_C - \ln Y_N = \sum_j X_{Nj} * (B_{Cj} - B_{Nj}) + \sum_j B_{Cj} * (X_{Cj} - X_{Nj})$$

The first term in equation 2 measures the part of the Costa Rican-Nicaraguan earnings differential due to earnings differences between Costa Rican and Nicaraguans with the same personal characteristics (labor market discrimination), while the second term measures the part due to differences in average personal and labor market endowments. Table 5 presents the results of this decomposition using data from the 2004 EHPM (results using data from other years are similar). A positive number in table 5 indicates that a variable contributes to the earnings gap between Nicaraguan-born workers and



Costa Ricans, a negative number indicates that a specific variable, by itself, would cause Nicaraguan earnings to be higher than the earnings of Costa Ricans.<sup>8</sup>

We can see from table 5 that Nicaraguan-born workers are paid slightly more than Costa Rica-born workers with the same characteristics (the total “labor market discrimination effect” is a negative 0.03--although this difference is not statistically significant). That is, we find no evidence of labor market discrimination against Nicaraguan born workers in Costa Rica. The earnings difference between Nicaraguan born and Costa Rican born workers is due to the different personal and labor market endowments of Nicaraguan-born workers compared to Costa Rican born workers. This “endowment” effect is caused almost entirely by the lower education levels of Nicaraguan immigrants compared to Costa Rican born workers.

Although we do not find evidence of labor market discrimination against Nicaraguan immigrants, the Oaxaca/Blinder decompositions indicate that returns to education are higher for natives than for immigrants (in table A1 we see that the coefficient in the earnings equation on education is .08 for Costa Ricans and .05 for Nicaraguans).<sup>9</sup> The lower earnings equation coefficient on education for Nicaraguans is counteracted by a higher earnings equation intercept so that the total labor market discrimination effect is negative. Differences in the intercepts of the earnings equations measure differences in the earnings between Costa Ricans and Nicaraguans not captured by differences in the measured variables used in the earnings equations. One such unmeasured variable may be the motivation/ambition of the worker. In a classic article, Chiswick (1978) concludes that migrants are a self-selected group of more able and highly motivated individuals, and that therefore migrants may earn more than natives with the same observable human capital and employment characteristics. Chiswick (1978) argues that this self-selection of immigrants can result in both a lower coefficient

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<sup>8</sup> The earnings equations used to construct the Oaxaca/Blinder decomposition are presented in appendix table A1.

<sup>9</sup> The earnings equation coefficients on gender, zone (urban) and firm size (large) are also higher for Costa Rican born workers than for Nicaraguan immigrants. These differences have a much smaller impact on the Nicaraguan-Costa Rican earnings gap than do differences related to education.

on education and the larger earnings equation intercept for migrants, which is what we find in Costa Rica.<sup>10</sup>

Another variable not included in the earnings regressions that is often used in these types of analysis is the time since migration. Unfortunately, this information is not available in the EHPM data. Chiswick (1978), for example, finds that immigrant's earnings in the United States increase with the time since migration, and that fully assimilated immigrants earn more than similarly qualified natives. It is possible that had we been able to include this variable, we may have also found that fully assimilated Nicaraguan immigrants in Costa Rica earn more than similarly qualified natives. The omission of this variable from the regressions could also help explain why we find that the intercept of the earnings equations for Nicaraguan migrants is higher than the intercept in the earnings equations for Costa Rican born workers.<sup>11</sup>

We have noted that Nicaraguan immigrants are concentrated in low paying, low status occupations of construction, domestic service and agriculture. Table 6 illustrates this industrial segregation in 2000: Nicaragua born men are disproportionately in construction and agriculture, while Nicaraguan born women are disproportionately in domestic service.<sup>12</sup> Some have argued that this occupational segregation is an important cause of low Nicaraguan earnings (for example, Marquette, 2006). The results presented in table 5 show that, once we control for the impact of education and other human capital characteristics, differences in the distribution of Nicaraguan immigrants and Costa Ricans between industry sectors are not an important cause of the Nicaraguan-Costa Rican earnings differential. That is, low education levels are the key to lower Nicaraguan earnings, and it is because they are less educated that Nicaraguans find employment in

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<sup>10</sup> "Immigrants tend to be high-ability, highly motivated persons. This is also true of persons with higher levels of schooling. Suppose that among those with little schooling only the most able and most highly motivated migrate, while among those with high levels of schooling the immigrants are drawn more widely from the ability distribution. Then, a regression which did not include ability or motivation variables would show an upward-biased intercept and a downward-biased slope coefficient of schooling" (Chiswick, 1978, p.912). Another reason for the lower coefficient on education for Nicaraguan immigrants may be differences in the quality of education received by Nicaraguan immigrants and Costa Ricans. It may also be that more-educated Nicaraguans find work in industries or occupations that do not fully utilize their educational qualifications. We discuss this possibility next.

<sup>11</sup> We thank an anonymous referee for suggesting this possibility.

<sup>12</sup> The results for 2000 are illustrative, these proportions are similar when we look at the data from 2001-2004.

those sectors (agriculture, construction and domestic service) that employ less-educated workers and pay low earnings.

**(b) Nicaraguan immigrants and industry wage premiums**

If the influx of Nicaraguan immigrants into Costa Rica had a significant impact on the market wages of Costa Rican workers with whom they compete, we would expect to find that mean wages in the industry sectors where Nicaraguans are concentrated (agriculture, construction and domestic service) fell during the surge in Nicaraguan migration from 1990 to 2004. To examine this possibility we re-estimated the earnings equations excluding the Nicaraguan immigrant dummy variable and including dummy variables for industry sector (because we do not include the Nicaraguan dummy variable in this regression, we can estimate the earnings equations for the entire 1990-2004 period). Changes in the coefficients on the industry dummy variables in this regression will measure changes in the relative mean wages in each industry sector controlling for changes in other work place and personal characteristics (such as education). Figure 1 presents the coefficients on these industry sector dummy variables for 1990 to 2004, with the coefficients for agriculture, construction and domestic service in bold lines. In figure 1, the omitted industry dummy is for commerce, so what is reported are log earnings of each industry relative to log earnings in commerce.

Between 1990 and 2004, the adjusted real mean earnings in the industries where Nicaraguan immigrants are concentrated (domestic service, construction and agriculture) increased faster than in any other industry sector. At the same time, in most sectors with few Nicaraguan immigrants (finance, utilities, transportation and communications, finance and other services), the adjusted mean earnings stayed constant or fell throughout the 1990s and 2000s.<sup>13</sup> Thus, we find no evidence that the influx of Nicaraguans had an impact on the earnings premiums paid to workers in different industry sectors in Costa Rica (after controlling for changes in other characteristics of workers such as education). That is, our evidence is not consistent with a story where the influx of Nicaraguans immigrants into a small number of industry sectors is driving down the earnings of Costa Rican born workers in those industries. Rather, our evidence is consistent with a story

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<sup>13</sup> The approximate increases in adjusted real earnings were (from greatest to least): domestic service (30% increase), construction (8% increase), agriculture (7% increase), manufacturing (7% increase), other personal services (0%), while adjusted real earnings decreased in finance, transportation, and utilities.

where Nicaraguan immigrants are attracted to those industry sectors where wages are increasing (even though wages in those sectors are low relative to other industries). Wages in those industry sectors may be increasing because there is an increase in demand for labor (such as the tourism-driven construction boom) or because Costa Rican born workers have left those industries to work in other booming industry sectors that pay better for high-quality workers. As an example of the latter phenomenon, low-skilled Costa Rican born women, who in the 1980s would have been domestic servants, may have found better paid work in the new export industries (for example: apparel, electronics or tourism), leading to both an increase in the wages paid to domestic servants and to an increase in demand for Nicaraguan immigrant women in the domestic servant sector.

### **(c) The impact of immigration by skill group**

In the previous sub-section we attempted to identify the impact of immigration on wages by comparing differences in wages across industries with different rates of immigrant concentration in those industries. This is similar to attempts in the United States to identify the impact of immigration by exploiting differences in wages across cities and regions that experienced different rates of immigration. Borjas (2003) has criticized these techniques because they do not take into account economic pressure to equalize labor market conditions across regions and/or industries. Also, the positive correlation between immigrant share and rising wages may exist because immigrants are attracted to industries where demand for workers and wages are increasing. In this latter case, the direction of causality is not that immigration drives up wages, but that high wages attract immigrants. Borjas (2003) suggests that more appropriate tests of the impact of immigration on wages would use the entire economy as the unit of analysis (rather than one region or industry) and compare changes in wages and immigrant shares within skill groups.

Following Borjas (2003) we divide the data into education and experience (skill) cells for each year in which we can identify Nicaraguan immigrants in the data (1997, 2000, 2001, 2003, 2003 and 2004). These cells are defined by five distinct education groups (primary incomplete, primary complete, secondary incomplete, secondary complete and university) and 8 distinct experience groups defined in 5-year intervals

(indicating if the worker has 1 to 5 years of experience, 6 to 10 years, and so on until 35-40 years). Following Borjas (2003), we restrict the analysis to persons between 16-64 years old who have between 1 and 40 years of experience. For each education/experience cell, we calculate the total number of workers, the number of Nicaraguan immigrants in the work force, and the mean monthly real earnings (1999 colones) of native Costa Ricans. We calculate the numbers within each cell separately for men and women (Borjas, 2003, uses data only from men).

Let  $P_{ijt}$  denote the Nicaraguan-born share of the work force in a particular skill (education/experience) group in time  $t$ , calculated as the number of Nicaraguan-born workers in that cell divided by the total number workers in that cell at time  $t$ . Let  $Y_{ijt}$  denote the mean value of the natural logarithm of the mean real monthly earnings of native Costa Ricans in the cell defined by education group  $i$ , experience group  $j$ , and in year  $t$ . Using these variables defined for each education/experience/year cell separately for each gender, we estimate the following equation, separately for men and women:

$$(EQ\ 3)\ Y_{ijt} = \beta P_{ijt} + s_i + x_j + \pi_t + (s_i * x_j) + (s_i * \pi_t) + (\pi_t * x_j) + e_{ijt}$$

where  $s_j$  is a vector of dummy variables indicating the group's education,  $x_j$  is a vector of dummy variables indicating the group's experience, and  $\pi_t$  is a vector of dummy variables indicating time period. The linear fixed effects in equation (3) control for differences in labor market outcomes across schooling groups, experience groups, and over time. The interactions  $(s_i * \pi_t)$  and  $(\pi_t * x_j)$  control for the possibility that the impact of education and experience change over time, and the interactions  $(s_i * x_j)$  control for the fact that the experience profile for a particular labor market outcome differs across schooling groups (Borjas, 2003, page 1347). The regression is weighted by the sample size used to calculate  $Y_{ijt}$ . The reported standard errors are clustered by education-experience cells to adjust for potential heteroskedasticity and serial correlation.

A negative and significant coefficient  $\beta$  on  $P_{ijt}$  would indicate that Nicaraguan immigrants are seen by employers as substitutes for native Costa Ricans, and that increased immigration results in lower earnings for native Costa Ricans. A positive and significant coefficient  $\beta$  on  $P_{ijt}$  would indicate that Nicaraguan immigrants are

complements to native Costa Ricans, and that increased immigration results in higher earnings for native Costa Ricans.

The first two rows of table 7 present the results of the estimation of equation 3, separately for men and women. The coefficients on  $P_{ijt}$  are not significantly different from zero for either men or women. Therefore, the results of the estimation of equation 3 do not provide evidence that the influx of Nicaraguan immigrants contributed to a statistically significant fall in the earnings of native-born Costa Ricans.<sup>14</sup>

Given that Nicaraguan immigrants are disproportionately low skilled--over 60% have only a primary education or less--the impact on Costa Rican wages might be more noticeable for less-educated workers. To examine this issue, we re-estimate equation (3) for the 5 different education levels.<sup>15</sup> The results of these regressions are also presented in table 7. Once again, there is no evidence from these regressions that competition from Nicaraguan immigrants reduced the wages for men. For men in almost all education groups, the coefficients on  $P_{ijt}$  are positive (although insignificant). For women, the coefficients on  $P_{ijt}$  are negative for those with less than a complete secondary education and positive for those with a secondary complete and university education, although only two of these coefficients is significantly different from zero at traditional significance levels--the negative coefficient for the lowest education level (primary incomplete) and the positive coefficient for secondary graduates. Thus, these results suggest that less-educated Nicaraguan female immigrants are substitutes for less-educated Costa Rican-born women, while more-educated Nicaraguan female immigrants are complements to more-educated Costa Rican-born women. Given that Nicaraguan immigrant women disproportionately work as domestic servants, one interpretation of these results is that Nicaraguan immigrants compete with less-educated Costa Rican women in the market for domestic servants, driving down the wages of less-educated Costa Rican women. At the

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<sup>14</sup> The results are similar when we use alternative measures of  $P_{ijt}$ : the proportion of Nicaraguan immigrants in the labor force or the proportion of all immigrants (not only Nicaraguans). The results are also similar if we use the earnings of paid employees only or hourly earnings as the dependent variable. As a further specification test, we re-estimated equation 3, separately for men and women, excluding the interactions with the time fixed effects. These results are also similar to those reported in the body of the paper: after excluding the time interactions the coefficient on of  $P_{ijt}$  for men is negative and insignificant, while the coefficient on of  $P_{ijt}$  for women is positive and insignificant.

<sup>15</sup> Note that in these regressions we cannot include the schooling dummies nor the experience-schooling interactions.

same time, the increased supply of Nicaraguan women willing to work as domestic servants complements more-skilled Costa Rican women, aiding them in obtaining employment at higher wages.<sup>16</sup>

#### **4. NICARAGUAN IMMIGRANTS AND EARNINGS INEQUALITY IN COSTA RICA**

From the 1950s until the early 1990s, income and earnings inequality in Costa Rica fell steadily (Gindling and Trejos, 2005). Then, beginning in the early 1990s, inequality in Costa Rica began to increase. For example, from 1992 to 2002 the Gini coefficient, a standard measure of inequality, increased from 0.40 to 0.45 (after falling by about the same amount between 1980 and 1992—Gindling and Trejos, 2005). The increase in earnings inequality coincided with the surge in immigration from Nicaragua that began in the early 1990s, and it is therefore reasonable to suspect that the two phenomena are related. In this section, we examine the evidence on the question of whether Nicaraguan migration into Costa Rica caused the increase in inequality.

##### **(a) Can the presence of Nicaraguans in the household surveys explain the measured increase in inequality in Costa Rica?**

It is possible that the influx of Nicaraguans, who on average earn wages lower than Costa Rican natives, may have increased the number of low-wage workers in the Costa Rican labor market and directly caused the increase in inequality in Costa Rica. If the presence of Nicaraguan immigrants in the data is causing the increase in inequality, then we should see our measures of inequality decrease when we exclude Nicaraguan immigrants from the sample. Table 8 presents two measures of earnings inequality for each year from 2000-2004, both including and excluding those born in Nicaragua. Contrary to expectations, excluding Nicaraguans from the data does generally lead to a decrease in measures of inequality. Rather, excluding Nicaraguans from the data leads to an increase in our measures of inequality (the Gini coefficient and the log variance of

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<sup>16</sup> Borjas (2003 and 2008) finds robust negative effects on the wages of immigrants in the United States comparing data from the 10-year U.S. censuses for 1960 to 2000. Our data only allow us to compare the earnings of Nicaraguan migrants and Costa Rican born workers over a seven year period. This is a limitation of our analysis because it may be that this time series is too short, and migration flows too small, to identify a significant negative wage effect of Nicaraguan immigration on Costa Rican workers.

earnings), indicating that, if anything, the presence of Nicaraguans in the data reduces earnings inequality. Any impact is small; for most years the Gini coefficient is identical to two digits whether we include or exclude Nicaraguans in the calculations.

To further estimate the impact of Nicaraguans on earnings inequality we estimated the decompositions of earnings inequality developed by Fields (2003) and used by Gindling and Trejos (2005) to study changes in earnings inequality in Costa Rica. The Fields decomposition technique is based on the estimation of a standard log-linear earnings equation,

$$(EQ 4) \quad \ln Y_{it} = \sum_j B_{tj} * X_{itj} + E_{it} = \sum_j B_{tj} * Z_{itj}$$

where  $\ln Y_{it}$  is the log of monthly earnings for individual  $i$  in year  $t$ , the  $X_{itj}$  are variables  $j$  associated with person  $i$  in year  $t$  that might affect earnings. The residual,  $E_{it}$ , is the part of the variation in earnings among workers that cannot be explained by variation in the other variables included in the earnings equation.  $Z_{itj}$  is a vector that includes both  $X_{itj} + E_{it}$ .

Fields (2003) illustrates the derivation of the decomposition using the variance of the log of earnings as the measure of dispersion. Given the log-linear earnings function (EQ 4), the variance of the logarithm of earnings can be written as

$$(EQ 5) \quad \text{Var}(\ln Y_{it}) = \text{Cov}(\ln Y_{it}, \ln Y_{it}) = \text{Cov}(\sum_j B_{tj} * Z_{itj}, \ln Y_{it}) = \sum_j \text{Cov}(B_{tj} * Z_{itj}, \ln Y_{it})$$

Dividing equation (5) by the variance of the logarithm of earnings,

$$(EQ 6) \quad 1 = \frac{\sum_j \text{Cov}(B_{tj} * Z_{itj}, \ln Y_{it})}{\text{Var}(\ln Y_{it})} = \sum_j S_{t,j}$$

The  $S_{t,j}$  measure the proportion of the variance in the logarithm of earnings explained by each variable  $j$  in year  $t$ . Shorrocks (1982) showed that if one can describe income (or the logarithm of income) as the sum of different components, then the  $S_{t,j}$  measure the



contribution of each variable  $j$  to inequality for a large number of inequality measures (not only for the variance), including the Gini coefficient.

Using the results of the earnings equations presented in the first and third columns of Table 4, we calculate the Fields' decomposition. Table 9 presents the  $S_{t,j}$ , the proportion of the variance in the logarithm of earnings explained by each variable  $j$  in year  $t$ . From table 9, we see that the presence of Nicaraguans in the data, after we control for the effects of other demographic and work place characteristics, has no impact on earnings inequality (the Nicaraguan immigrant variable accounts for 0% of earnings inequality in each year). The most important determinants of earnings inequality in Costa Rica relate to education, which explains 21%-24% of earnings inequality, and the number of hours worked (13%-19%). The increase in inequality from 2000 to 2004 was driven by the increasing contributions of education and hours worked to overall inequality (it is only for those two variables that the contribution to inequality increased by more than 0.01).

**(b) Can the presence of Nicaraguan immigrants explain the increase in the dispersion of hours worked?**

Consistent with the results presented in table 9, Gindling and Trejos (2005) conclude that the increase in inequality in Costa Rica in the 1990s was due to three factors: (1) an increase in the proportion of workers in non-standard work arrangements (part-time and over-time), causing increased inequality in the number of hours worked among workers; (2) an increase in the dispersion of educational attainment; and (3) a fall in the relative earnings of less-educated workers compared to more-educated workers, causing an increase in returns to education. While the presence of Nicaraguans in the Costa Rican labor market may not have directly caused the increase in inequality, the increase in the supply of low-skilled and less-educated immigrants may have indirectly contributed to earnings inequality by contributing to these three primary causes of the increase in inequality. In the next three sub-sections, we examine each of these issues in turn.

Table 10 presents several measures of the dispersion of hours worked among workers, including and excluding Nicaraguan immigrants. We find no evidence that the presence of Nicaraguan immigrants contributed to an increase in the dispersion of hours

worked among workers in Costa Rica. The variance of the log of hours worked is identical whether we include Nicaraguan immigrants or not. Nor is there evidence that the presence of Nicaraguans increased the proportion of workers who work more or less than a standard (full-time) work week. The proportion of workers who work part-time or over-time is sometimes slightly more, sometimes slightly less, when we exclude Nicaraguan immigrants from the sample (depending on the year we examine).

**(c) Can Nicaraguan immigration explain the increase in inequality in the distribution of education among workers in Costa Rica?**

The increase in earnings inequality in Costa Rica from 1992-2004 was caused, in part, by an increase in the inequality of education levels among workers in Costa Rica. Gindling and Trejos (2005) found that the increase in the inequality of education levels was caused by a decrease in the proportion of workers who were secondary school graduates, and an increase in the proportion of secondary school drop outs. Table 11 presents the distribution of workers by education level for all Costa Rican workers and for Nicaraguan immigrants. It is clear that Nicaraguan immigrants are, on average, less educated than Costa Rican-born workers. The proportion of Nicaraguan immigrants with a primary education or less is much higher (about 63%) than for Costa Rican-born workers (at most 48%). The proportion of Nicaraguan immigrants with college education is lower than among Costa Rican-born workers (6% versus 20-22%). Finally, the proportion of Nicaraguan immigrants with a completed secondary education is lower, and the proportion of Nicaraguan immigrants who are secondary school drop outs is higher, than for Costa Rican-born workers. This suggests that the influx of Nicaraguan immigrants into Costa Rica in the 1990s and 2000s contributed to the increase in the inequality of education levels among Costa Rican workers, and in this way contributed to the increase in earnings inequality.

**(d) Can Nicaraguan immigration explain the increase in returns to education in Costa Rica?**

Because Nicaraguan immigrants are less educated, on average, than native Costa Ricans, the acceleration of Nicaraguan immigration could exert more downward pressure on the wages of the less-educated than on the more-educated, and in that way contribute to the increase in returns to education, and through that to the increase in earnings

inequality in Costa Rica. In section 3(c) we estimated the impact of Nicaraguan immigration on the earnings of Costa Rican workers by education level. These estimates provide evidence that, at least for women, Nicaraguan immigration reduced the wages of the less-educated Costa Rica-born workers and increased the wages of more-educated Costa Rican-born workers. For men, we found no evidence of a negative immigration effect on the earnings of men at any education level. Therefore, there is some evidence that immigration from Nicaragua may have contributed to the higher return to education in Costa Rica, but only for women and not for men. However, since women are less than 35% of the work force, and since returns to education increased more for men than for women during the 1990s, it is likely that some other factor (such as skill-biased technological change) was primarily responsible for the increase in returns to education (Gindling and Trejos, 2005).

## **5. NICARAGUAN IMMIGRANTS AND POVERTY IN COSTA RICA**

Despite average annual growth rates of GDP of over 3%, poverty rates barely changed in Costa Rica from the mid-1990s to the mid-2000s. Again, given the substantial Nicaraguan immigration during this period, and given that Nicaraguan families have, on average, higher poverty rates than other Costa Rican families (see table 12), one might suspect that stagnating poverty and Nicaraguan immigration are related. In 2004 the poverty rate for Nicaraguan families was 30.6%, compared to 21.7% for Costa Rican families. However, because Nicaraguan families are a small percent of the total poor families (about 10% in 2004), the impact of this difference on aggregate poverty rates is small. To measure the impact of the presence of Nicaraguan families on aggregate poverty rates we calculated the poverty rate including and excluding households with heads born in Nicaragua (table 12). Although poverty rates do fall when we exclude Nicaraguan families, the change in aggregate poverty rates is very small; at most 1/2 of 1 percentage point. Thus, it is unlikely that the influx of Nicaraguans into Costa Rica in the 1990s and 2000s was directly responsible for the stagnation of aggregate poverty rates in Costa Rica during this period.

## 6. CONCLUSIONS

More than half of those who emigrate from developing countries move to other developing countries. Despite the importance of this South-South migration, and despite concern in the destination countries about the impact of migration on earnings, inequality and poverty, there have been few studies of the impact of immigration on labor markets in developing countries. In this paper we examine the impact of immigration from one developing country, Nicaragua, on the labor market of another, Costa Rica.

We find that, after controlling for education and other human capital and work place characteristics, Nicaraguan immigrants earn the same as Costa Rican-born workers. That is, we find no evidence of labor market discrimination against Nicaraguan immigrants in Costa Rica. Where differences exist between Nicaraguan immigrants and others in the labor market (such as lower earnings and a concentration in low-paying industry sectors of the economy), these differences are due mostly to the lower education levels of Nicaraguan immigrants compared to Costa Rican-born workers.

We find no evidence that Nicaraguan immigration had a significant impact on average earnings in Costa Rica. Earnings in those industry sectors with the highest concentration of immigrants (domestic service, construction and agriculture) actually increased faster than earnings in other industries. Further, on average we find no statistically significant relationship between earnings and the share of Nicaraguan immigrants within skill groups.

Coincident with the rapid inflow of Nicaraguan immigrants in the 1990s and 2000s, returns to education (the gap in earnings between more- and less-educated workers) in Costa Rica increased. Given that Nicaraguan immigrants are less educated than Costa Rican workers, we might expect the impact of Nicaraguan immigrants on earnings to differ by education level. When we divide the data by gender and education group, we find that Nicaraguan immigration did not have a significant negative impact on the earnings of Costa Rican born men at any education level. On the other hand, we find that Nicaraguan immigration had a significant negative effect on the earnings of Costa Rican born women at the lowest education level (who had not completed a primary education). At the same time, we find that Nicaraguan immigration had a significant

positive effect on the wages of female workers with more education in Costa Rica. That is, our evidence suggests that Nicaraguan immigrants are substitutes for less-educated Costa Rican-born women, while Nicaraguan immigrants are complements for more-educated Costa Rican women. Given that Nicaraguan immigrant women disproportionately work as domestic servants in Costa Rica, one interpretation of these results is that Nicaraguan immigrants compete with less-educated Costa Rican women in the market for domestic servants, having a negative effect on the wages of less-educated Costa Rican women. At the same time, the increased supply of Nicaraguan women willing to work as domestic servants complements more-skilled Costa Rican women, aiding them in obtaining employment at higher wages.

While we have presented evidence that Nicaraguan immigration contributed to the increase in returns to education for women, because women are less than 35% of Costa Rican workers, and because returns to education were increasing faster for men than for women, it is unlikely that Nicaraguan immigration was the primary cause of the increase in returns to education in Costa Rica in the 1990s. Gindling and Trejos (2005) present evidence that the primary cause of the increase in returns to education in Costa Rica was skill-biased technological change driven by increasing investment in imported capital.

In summary, we find little evidence that Nicaraguan immigration had a large impact on earnings, inequality or poverty in Costa Rica. One indication of this is that the standard measures of inequality and poverty are similar whether or not we include Nicaraguan immigrants in the calculations. We find evidence that Nicaraguan immigrants are substitutes for less-educated Costa Rican women, while immigrants are complements to more-educated women. However, we find no evidence that Nicaraguan immigration had a significant impact on the wages of Costa Rican-born men at any education level.

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**Table 1: Number and Proportion of Nicaraguan Born Workers in Costa Rica, 2000-2004**

Year	2000	2001	2002	2003	2004
Number of Workers Born in Nicaragua	97617	103658	108035	122076	128215
Proportion of All Workers	6.71	6.68	6.81	7.44	7.75



**Table 2: Proportion of Workers by Nationality, 2000-2001**

	2000	2001
Costa Rican by Birth	91.2	90.9
Naturalized Costa Rican	1.43	1.58
Nicaraguan	5.88	5.71
Other Central American	0.85	0.81
Rest of America	0.36	0.7
Rest of World	0.26	0.32

**Table 3: Real Monthly Earnings of Nicaraguan Born and Costa Rican Born Workers  
(1999 colones)**

	2000	2001	2002	2003	2004
Costa Ricans	92128	92129	93031	102058	88257
Nicaraguans	69345	69345	60099	69256	59144
Ratio of Nicaraguan to Costa Rican Earnings	0.75	0.75	0.65	0.68	0.67

**Table 4: Log Earnings Regression Results: 2000 and 2004**  
**standard errors in parentheses**

<b>Dependent Variable: Log of Monthly Earnings</b>				
Variable	2000 (1)	2000 (2)	2004 (1)	2004 (2)
<b>(standard errors in parentheses)</b>				
<b>EDUCATION</b>	0.091 *** (.002)	0.094 *** (.002)	0.097 *** (.001)	0.099 *** (.001)
<b>MALE</b>	0.290 *** (.013)	0.294 *** (.013)	0.235 *** (.012)	0.252 *** (.011)
<b>URBAN</b>	0.100 *** (.013)	0.156 *** (.012)	0.065 *** (.011)	0.111 *** (.011)
<b>LOG OF HOURS WORKED</b>	0.492 *** (.011)	0.511 *** (.011)	0.570 *** (.009)	0.584 *** (.009)
<b>PUBLIC</b>	0.149 *** (.021)	0.097 *** (.018)	0.185 *** (.019)	0.130 *** (.016)
<b>LARGE</b>	0.256 *** (.013)	0.256 *** (.013)	0.273 *** (.011)	0.274 *** (.011)
<b>NICARAGUAN IMMIGRANT</b>	0.001 (.022)	-0.004 (.022)	-0.022 (.018)	-0.027 (.018)
<b>EXPERIENCE</b>	0.029 *** (.0013)	0.029 *** (.0013)	0.029 *** (.0011)	0.029 *** (.0011)
<b>EXPERIENCE SQUARED</b>	-0.0003 *** (0.00002)	-0.0003 *** (.00002)	-0.0004 *** (0.00002)	-0.0004 *** (0.00002)
<b>Constant</b>	7.832 *** (.093)	7.653 *** (.045)	7.735 *** (.116)	7.300 *** (.037)
<b>INDUSTRY SECTOR</b>	Yes	No	Yes	No
<b>R2</b>	0.476	0.466	0.564	0.555
<b>N</b>	12808	12808	14522	14522

Note: \*\*\* indicates the coefficient is significant at the 1% level of significance.

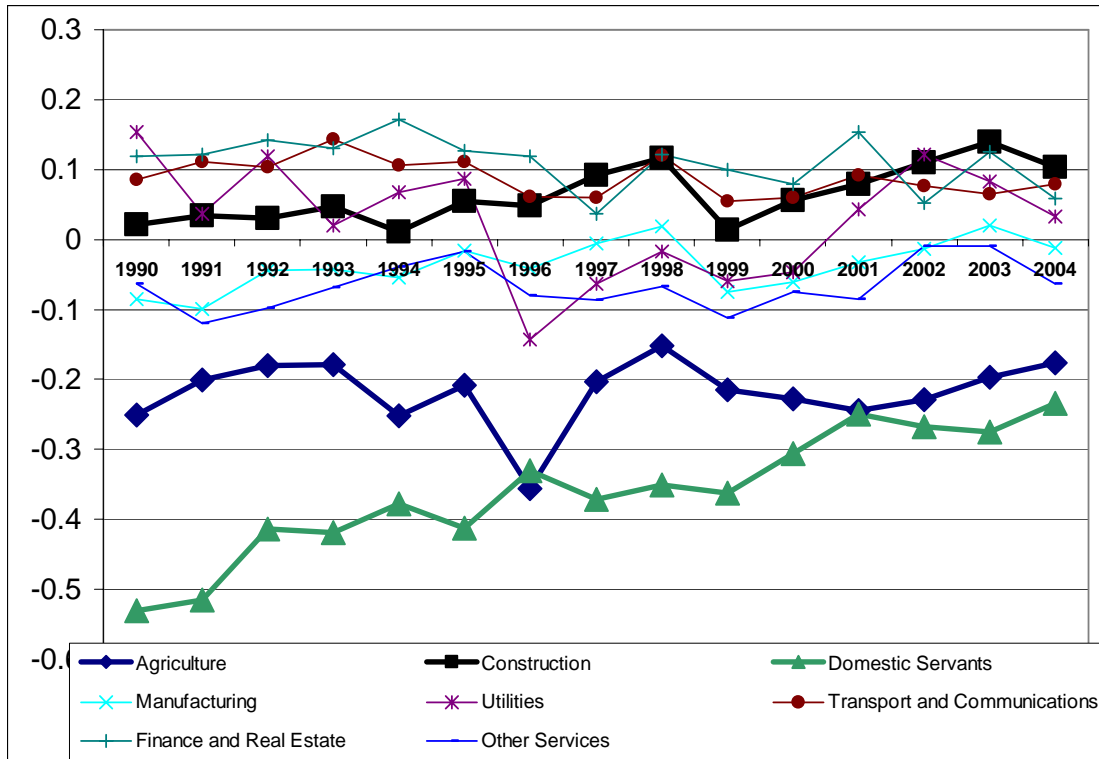
No asterix indicates the variable is not significant at the 10% level of significance.

**Table 5: Oaxaca Decompositon of the Log Earnings Gap Between Nicaraguans and Costa Ricans, 2004.**

<b>VARIABLE</b>	<b>LABOR MARKET DISCRIMINATION (COEFFICIENT) EFFECT</b>	<b>ENDOWMENT (QUANTITY) EFFECT</b>	<b>TOTAL CONTRIBUTION OF EACH VARIABLE THE EARNINGS GAP</b>
<b>EDUCATION</b>	0.20	0.20	0.40
<b>MALE</b>	0.02	0.01	0.03
<b>URBAN</b>	0.04	0.00	0.03
<b>LOG OF HOURS WORKED</b>	0.01	-0.05	-0.04
<b>PUBLIC</b>	-0.01	0.02	0.01
<b>LARGE</b>	0.07	-0.01	0.06
<b>EXPERIENCE</b>	0.02	0.00	0.03
<b>INDUSTRY SECTOR</b>	-0.07	0.01	-0.06
<b>EARNINGS EQUATION INTERCEPT</b>	-0.32	0.00	-0.32
-----			
<b>TOTAL</b>	-0.03	0.17	0.14

**Table 6: Percent of Workers in Each Industry Sector, by Migrant Status and Gender, 2000**

Industry Sector	MEN		Women	
	Nicaraguan Immigrants	Costa Rican Natives	Nicaraguan Immigrants	Costa Rican Natives
<b>Agriculture</b>	27.4	20.9	5.9	3.5
<b>Manufacturing</b>	14.7	15.6	16.7	15.9
<b>Electricity, gas and water</b>	0.2	1.1	0.0	0.5
<b>Construction</b>	26.2	8.9	0.0	0.6
<b>Commerce (including tourism)</b>	16.1	19.5	29.7	25.9
<b>Transport and communication</b>	2.7	8.9	1.9	2.7
<b>Finance and Real Estate</b>	3.0	6.2	2.7	5.7
<b>Domestic Service</b>	0.0	0.3	35.2	10.4
<b>Other Personal Services</b>	9.8	18.5	8.0	34.8
<b>TOTAL</b>	100	100	100	100



**Figure 1: Mean Log Real Earnings (1999 colones) in Each Industry Sector, Relative to Commerce, Adjusted for Personal and Workplace Characteristics, 1990-2004**

**Table 7: Impact of Nicaraguan Immigrant Share on the Earnings of Costa Rican Born Workers, by Gender and Education Level**

<b>Education Level</b>	<b>MEN</b>	<b>WOMEN</b>
<b><u>All Education Levels</u></b>		
<b>Coefficient</b> (standard error)	<b>-0.051</b> (0.269)	<b>-0.093</b> (0.270)
<b><u>Primary Incomplete</u></b>		
<b>Coefficient</b> (standard error)	<b>0.137</b> (0.393)	<b>-0.575*</b> (0.281)
<b><u>Primary Complete</u></b>		
<b>Coefficient</b> (standard error)	<b>0.976</b> (0.589)	<b>-0.793</b> (0.757)
<b><u>Secondary Incomplete</u></b>		
<b>Coefficient</b> (standard error)	<b>0.333</b> (.324)	<b>-0.865</b> (0.799)
<b><u>Secondary Complete</u></b>		
<b>Coefficient</b> (standard error)	<b>-0.206</b> (0.385)	<b>0.974**</b> (0.393)
<b><u>University</u></b>		
<b>Coefficient</b> (standard error)	<b>0.255</b> (0.907)	<b>0.506</b> (0.620)

Note: \*\* indicates the coefficient is significant at the 5% level of significance.

\* indicates the coefficient is significant at the 10% level of significance.

**Table 8: Earnings Inequality Among Workers (with Non-Zero Incomes), Including and Excluding Nicaraguans**

	2000	2001	2002	2003	2004
All Workers					
Gini coefficient	0.434	0.465	0.465	0.456	0.438
Log Variance	0.748	0.870	0.878	0.832	0.760
Excluding Those Born in Nicaragua					
Gini coefficient	0.438	0.469	0.467	0.461	0.441
Log Variance	0.773	0.898	0.898	0.859	0.779



**Table 9: Fields' Decomposition: Proportion of Inequality Attributable to Each Variable, 2000 and 2004**

	<b>2000</b>	<b>2004</b>
<b>TOTAL</b>	<b>1.00</b>	<b>0.99</b>
EDUCATION	0.21	0.24
MALE	0.02	0.02
URBAN	0.01	0.01
LOG OF HOURS WORKED	0.13	0.19
PUBLIC	0.02	0.02
LARGE	0.05	0.06
NICARAGUAN MIGRANT	0.00	0.00
EXPERIENCE	0.01	0.01
INDUSTRY SECTOR	0.02	0.00
Residual	0.53	0.44

**Table 10: Distribution of Log Hours Among Workers (with non-zero earnings), Including and Excluding Nicaraguans**

Variance of Log of Hours Worked	2000	2001	2002	2003	2004
<b>All Workers</b>					
Log Variance	0.28	0.35	0.37	0.37	0.34
<b>Excluding Those Born in Nicaragua</b>					
Log Variance	0.28	0.36	0.37	0.37	0.34
<b>Part-time, Full-time and Over-time</b>					
	2000	2001	2002	2003	2004
<b>All Workers</b>					
Part-time	0.22	0.23	0.24	0.24	0.22
Full-time	0.46	0.44	0.41	0.42	0.36
Over-time	0.32	0.33	0.35	0.34	0.42
<b>Excluding Those Born in Nicaragua</b>					
Part-time	0.22	0.24	0.24	0.24	0.22
Full-time	0.47	0.44	0.42	0.42	0.35
Over-time	0.31	0.32	0.34	0.33	0.43

**Table 11: Proportion of Workers (who report non-zero earnings)  
at Each Education Level In Costa Rica**

<b>All Workers (including those born in Nicaragua)</b>			
Education Level	2000	2002	2004
Primary Incomplete	18	17	15
Primary Complete	32	31	30
Secondary Drop-Out	18	18	19
Secondary Complete	13	13	14
University	19	21	21

<b>Not including those born in Nicaragua</b>			
Education Level	2000	2002	2004
Primary Incomplete	17	15	13
Primary Complete	32	32	31
Secondary Drop-Out	17	18	18
Secondary Complete	13	13	15
University	20	22	22

<b>Only those born in Nicaragua</b>			
Education Level	2000	2002	2004
Primary Incomplete	37	40	39
Primary Complete	27	23	24
Secondary Drop-Out	18	23	21
Secondary Complete	10	7	9
University	6	6	6

**Table 12: Incidence of Poverty, Including and Excluding Nicaraguans**

	2000	2001	2002	2003	2004
All Workers					
Extreme Poor	6.1	5.9	5.7	5.7	5.6
All Poor	20.6	20.3	20.6	21.0	21.7
Excluding Those Born in Nicaragua					
Extreme Poor	6.1	5.8	5.3	5.3	5.3
All Poor	20.5	20.0	19.9	19.9	21.1
Nicaraguans only					
Extreme Poor	5.4	8.5	12.2	12.2	9.3
All Poor	22.1	25.8	30.6	30.6	30.6

## APPENDIX TABLE A1

**Table A1: Log Earnings Regression Results for Costa Ricans and Nicaraguans, 2004**  
standard errors in parentheses

<b>Dependent Variable: Log of Monthly Earnings</b>				
Variable (standard errors in parentheses)	Costa Ricans		Nicaraguans	
EDUCATION	0.085	***	0.049	***
	(.001)		(.004)	
MALE	0.294	***	0.263	***
	(.012)		(.038)	
URBAN	0.104	***	0.031	***
	(.012)		(.034)	
LOG OF HOURS WORKED	0.519	***	0.518	***
	(.001)		(.026)	
PUBLIC	0.161	***	0.534	***
	(.019)		(.134)	
LARGE	0.281	***	0.141	***
	(.012)		(.032)	
EXPERIENCE	0.027	***	0.027	***
	(.019)		(.0036)	
EXPERIENCE SQUARED	-0.0003	***	-0.0004	***
	(.00002)		(.00005)	
Constant	7.843	***	7.653	***
	(.047)		(.129)	
INDUSTRY SECTOR	Yes		Yes	
R2	0.576		0.489	
N	13277		1245	

Note: \*\*\* indicates the coefficient is significant at the 1% level of significance.