

# WHO MIGRATED FROM CUBA TO THE U.S? THE ROLE OF EDUCATION ON THE PROBABILITY TO MIGRATE

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The self-selection problem implies that rational agents optimize their decision to participate in different markets. Roy (1951) was the first to address this problem, analyzing how individuals optimize their decision depending on their skills.

In the case of migration, self-selection not only depends on the unobservable characteristics of an individual such as ability, motivation or access to financial resources (Chiquiar & Hanson, 2005) but also on observable characteristics such as education. Migration by more educated persons implies the existence of human capital flight or “brain drain” from the sending country to the host country (Albo & Ordaz Díaz, 2011).

Since 1970, Cuba has been among the top-ten countries sending migrants to the United States, reaching seventh place in 2016. In 2015, a total of 1,225,742 persons born in Cuba were living in the U.S., representing 3% of foreigners living in the United States (U.S. Customs and Border Protection, 2016).

Self-selection and the earnings of immigrants from different countries, including Cuba, to the United States was addressed by Borjas (1991). More recently, Cobas Valdés and Fernández Sainz (2014) examined Cuban migration to the United States and educational self-selection. This article draws from the latter and focuses on the role of education on the probability of Cubans to migrate. Based on data from the U.S. Census Bureau, this article analyzes the characteristics, mainly educational, of Cubans who have migrated to the United States and compares them with those of Cubans who have remained

in Cuba. We address the patterns of self-selection among Cuban emigrants to the United States (in terms of educational levels) and analyze the importance of education on the probability to migrate.

## METHODOLOGY

Let  $U^e$  represent the utility associated with Cuban migration to the United States, and  $U^{no}$  the no-migration utility, so that:

$$\begin{aligned} U^e &= \beta_e' X + \varepsilon_e \\ U^{no} &= \beta_{no}' X + \varepsilon_{no} \end{aligned} \quad (1)$$

The X vector consists of a set of individual, observable characteristics, such as education, age, gender, professional category, etc.

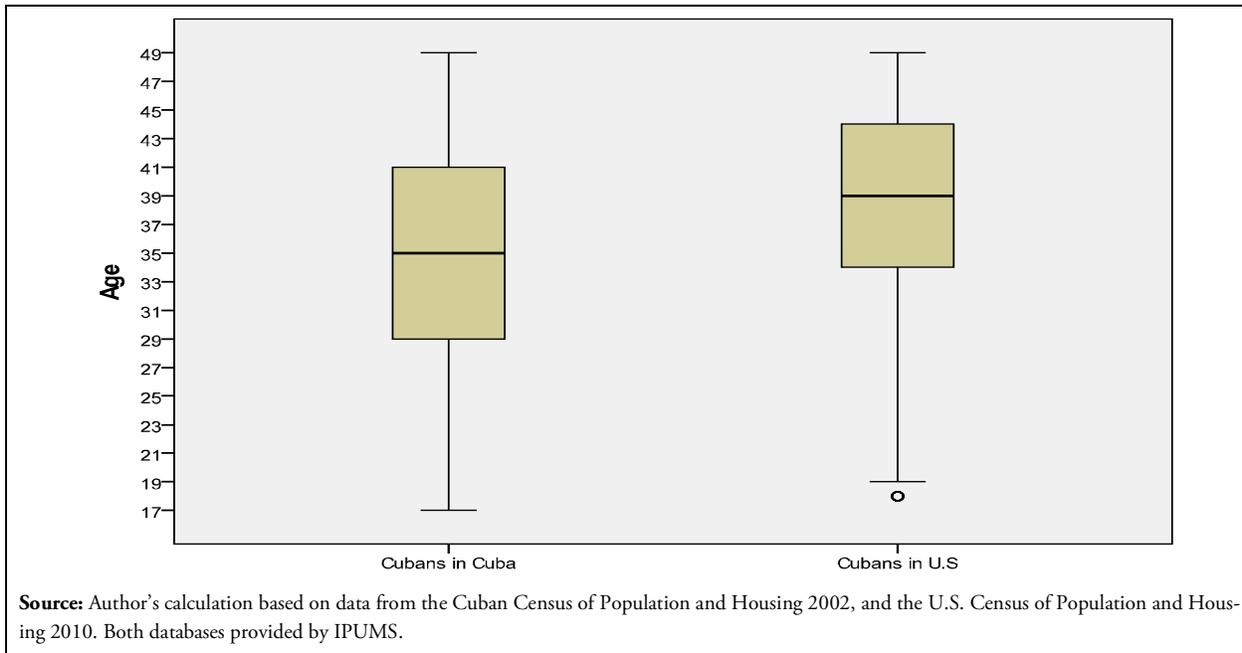
The parameters vector  $\beta$  reflects the impact that covariate X has on the individual utility,  $\varepsilon_e$  and  $\varepsilon_{no}$  are disturbances or error terms and are considered independent of vector X and it is assumed that they follow a logistic distribution. Error terms,  $\varepsilon_e$  and  $\varepsilon_{no}$  may be related to each other with correlation coefficient  $\rho$ .

An individual will migrate if the utility associated with migration is higher than the utility of not migrating, that is, if:

$$\begin{aligned} U^e &> U^{no} \\ \beta_e' X + \varepsilon_e &> \beta_{no}' X + \varepsilon_{no} \end{aligned} \quad (2)$$

Taking account that the utility (to migrate or not migrate) is unobservable, what we observe is the decision taken by the individual. We assume  $Y = 1$  when

Figure 1. Boxplot of the Age



the individual selects the alternative to emigrate and  $Y = 0$  when the individual selects the alternative not to migrate, so that:

$$\begin{aligned}
 Prob[Y = 1/X] &= Prob[U^e - U^{no} > 0 / X] \\
 &= Prob[\beta'_e X + \varepsilon_e - \beta'_{no} X - \varepsilon_{no} > 0 / X] \\
 &= Prob[(\varepsilon_e - \varepsilon_{no}) > [-(\beta_e - \beta_{no})'X] / X] \\
 &= F(\beta'X) \\
 &= \Lambda(\beta'X)
 \end{aligned}
 \tag{3}$$

where  $\Lambda(\beta'X)$  is the Cumulative Logistics Distribution Function and  $\beta$  is the parameter vector.

Emigration by those with a high level of education will be more likely if the education has a greater return in the United States than in Cuba. Hence, the most qualified individuals find incentives to migrate. This implies positive educational selectivity of individuals.

#### DATA

The data used in this paper come from the random sample of 1% respondents of the 2010 U.S. Population and Housing Census, provided by IPUMS (2010). This sample includes only individuals who entered the United States at the age of 17 or over.

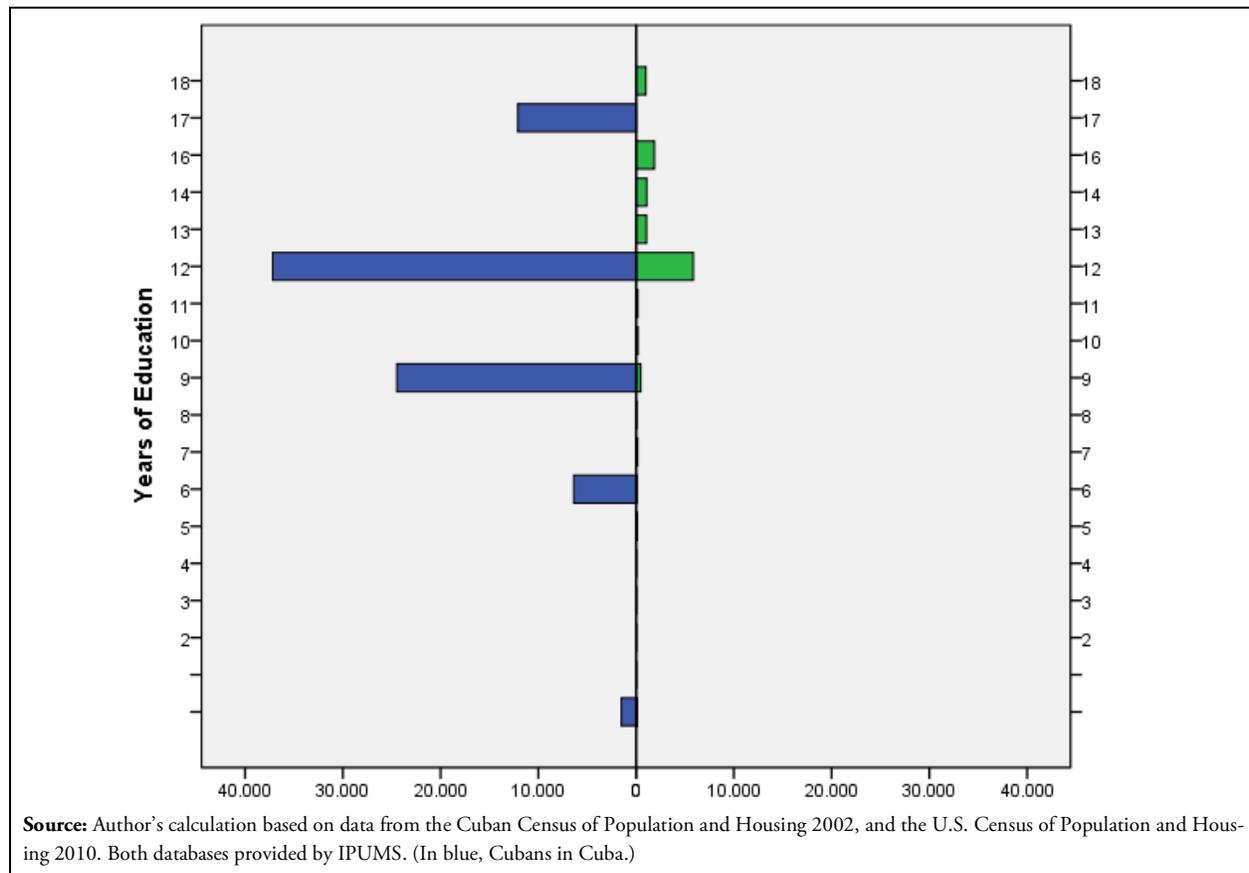
This approach intends to avoid people who have completed their training in the United States (Lowell et al. 2008).

The sample above is complemented with a sample of Cubans living in Cuba in 2002 provided by IPUMS International (2011), which corresponds to a 10% random sample of the Population and Housing Census of Cuba conducted in 2002. In both samples we have only considered working individuals and between 17 and 49 years old

The proportion of Cubans in Cuba between 17 and 24 years old is 3 times higher than that of Cubans in the United States in this age group. Figure 1 shows that 50 percent of Cubans in Cuba is made up of those aged 35 and above and that 50% of the Cubans in the United States sample are 39 years old or above. The mean age for Cubans in the United States is 38 while in the case of those who did not migrate is 35. It is therefore younger Cubans who do not emigrate.

In the sample of Cubans in United States, the percentage of individuals with over 12 years of education is 41%, whereas in the Cubans in Cuba sample, this group represents 15% of individuals. Thus, the proportion of Cubans in the U.S. with higher educa-

Figure 2. Histogram of the Years of Education



tion is almost 3 times higher than the proportion of people with the same educational level in Cuba. This fact suggests that those with higher educational attainment decided to migrate.

Similarly, only 4% of the Cubans in the United States had less than 9 years of education. Arguably, these individuals did not have incentives to emigrate to the United States.

Figure 2 shows the distribution of years of education of both samples. These results are consistent with the data provided by the 2010 U.S. Census, indicating that 20.8% of the Cuban population in the U.S. had studied between 9 and 12 years and 30.2% had received 13 or more years of education. (U.S. Census Bureau, 2010).

## FINDINGS

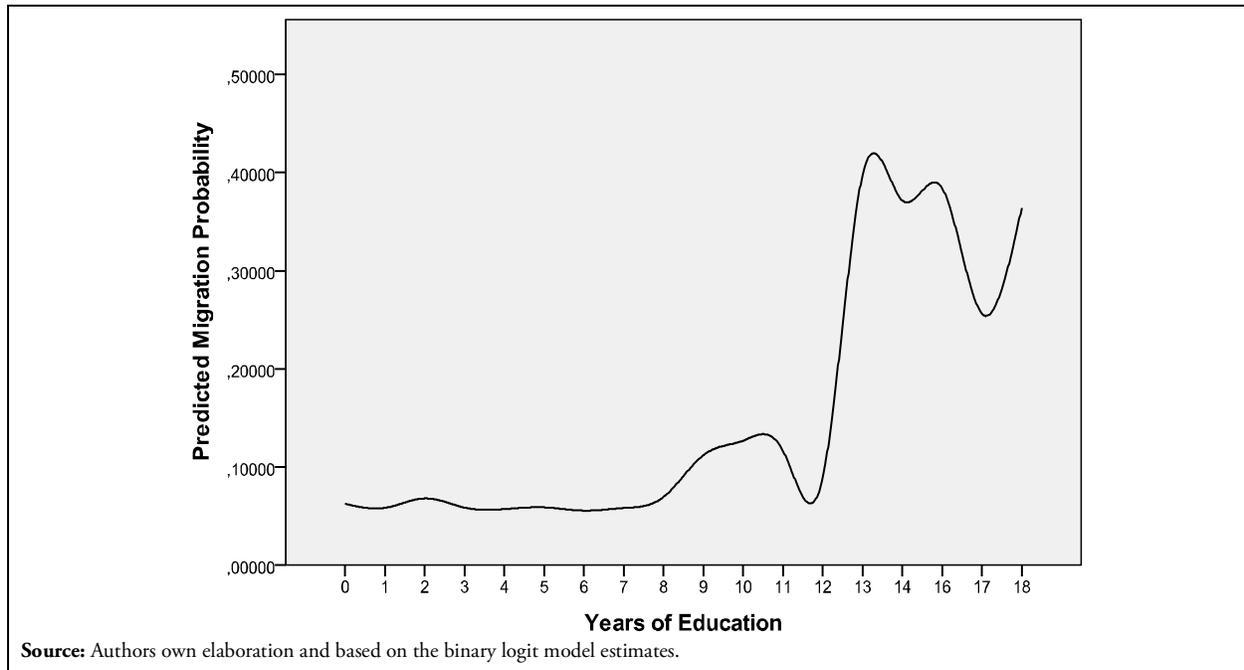
To study the self-selection problem in terms of educational level of Cubans, we estimate by maximum likelihood a logit model to calculate the migration

probability using the sample described in the previous section. Our interest is to analyze the impact of education on the migration probability. Educational attainment is classified in three categories based on years of schooling: (i) 0–8 years; (ii) 9–12 years; and (iii) 13 or more.

The principal finding of the estimation is that, taking the level of education into consideration, the opportunity to emigrate for an individual with 13 or more years of education is 15 times higher than for an individual with 8 years or fewer of education and 7 times than for an individual having 9 to 12 years of education.

Figure 3 shows the behavior of the migration probability according to the years of education of the individual. It peaks when the individual has 13 or more years of education. This group contains individuals whose level of education is above the mean of years of studies in Cuba (11.15 years).

Figure 3. Predicted Migration Probability and Years of Study



Migration of better educated individuals has a negative impact on source countries since the educational investment of these people is unrecoverable (Didou, 2009).

## CONCLUSIONS

In this paper we have analyzed the self-selection problem of Cuban emigrants to the United States in terms of an observable characteristic, namely educational level. We have used samples drawn from the Population and Housing Census of the United States (2010) and the Census of Population and Housing for Cuba (2002). In both samples we have only considered workers aged between 17 and 49 years of age.

For the analysis we have used a binary logit model that explains the choice of the individual, at the time of emigration, depending on the educational level. The main conclusion from the maximum likelihood estimation of the model is that Cubans positively self-select in their migration decision to move to the United States, in terms of educational level, that is, the more highly educated people migrate, meaning those with more years of education than the mean of the distribution of years of education in Cuba.

The positive educational self-selection has negative consequences for Cuba not only in terms of the non-recoverable educational investment but also, and more importantly, in terms of an important loss of human capital.

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