

Selectivity Patterns in Puerto Rico Migration

María E. Enchautegui*

Abstract

Using 2000 Census data this paper analyses various indicators of selectivity among Puerto Rican emigrants to the United States. Comparison of income distributions of US and Puerto Rico, covariates of emigration, wage regressions and the outcomes of returnees, all suggest that those at the bottom of the skill distribution are the ones who leave Puerto Rico and the ones who gain the most from emigration. These patterns hold consistently for men but not for women. May be many Puerto Rican women are tied migrants or tied stayers.

Economic Research Unit
Department of Economics
University of Puerto Rico
Río Piedras Campus
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* Catedrática Asociada, Departamento de Economía, Universidad de Puerto Rico, Recinto de Río Piedras.

1. Introduction

Migration is the way of live for Puerto Ricans. Although the heaviest migration flow was recorded in the decade of the 1950s, still thousands of Puerto Ricans leave the Island yearly in search of a better life in the Mainland. In the year 2000, 42 percent of the population over the age of 18 born in Puerto Rico was living in the United States. Census data suggest that Puerto Rico lost about 5 percent of its adult population to the United States between 1995 and 2000.

It's well known that migration was once used and stimulated by the government of Puerto Rico to accommodate its new model of economic development. Then, thousands of agricultural workers mostly men, and thousands of women working in the needle industry at home, were displaced by industrialization. Then, structural unemployment coupled with government policies and labor contracting produced heavy emigration. Today, the high unemployment rate in Puerto Rico continues to be a central feature in the motivations for migration. Airport surveys of migrants conducted by the Planning Board of Puerto Rico, consistently show that between 60 and 70 percent of emigrants leave Puerto Rico to work or to look for work in the United States. Recent studies using time series data also show the importance of unemployment in driving the migration flow (Hernández 2001).

In the U.S., Puerto Ricans rank among the poorest ethnic groups. In 2000, the poverty rates of Puerto Ricans was 26 percent, higher than the poverty rate of African-Americans and other mayor Latino groups (Santiago, 2004). The poor economic outcomes of Puerto Ricans in the U.S. and the continued outflow of Puerto Ricans to the Mainland, pose the question of who leaves and who stays in the Island, or the overarching issue of migration selectivity. The large number of college graduates leaving the Island, recruitment of nurses, policemen, teachers and engineers, and the transfer of manufacturing personal to the U.S due to factory closings, fuel the debate that Puerto Rico is losing important human capital to the Mainland. But the poor performance of Puerto Ricans in the Mainland suggests that those who leave may be selected from the bottom of the skills distribution.

The selectivity of international migration has been addressed fervently in the literature. Earlier literature thought of migrants as positively selected. As the story goes, the most motivated and the most willing to take risk are the ones who move. However, this view was challenged by Borjas (1987) who using a Roy-type decision model, argued that the direction of the selectivity depends on the correlation between earnings at the origin and earnings at the destination, and the difference in earnings dispersion between the origin and the destination. In most capitalists countries the first term is positive. Income distribution tends to be more unequal in developing countries than in the US, implying negative selection. "United States insures those at the bottom of the income distribution against poor labor market outcomes, while taxing those at the top" (Borjas p. 534). Others have questioned this model theoretically arguing that it is not that migrants are negatively selected but that they are less positively selected (Chiswick 2000) and others empirically (Jasso and Rozensweig 1990) pointing to the sensitivity of the results

to sample and variable specifications. To this must be added that data limitation on non-migrants, legal restrictions to migration, and limited information related to motivation, willingness to take risk, work ethic, etc., have make it difficult to assess the question of selectivity of international migration.

Puerto Rican migration represents a good case to test hypotheses concerning migration selectivity. First, there are comparable Census data on migrants and non-migrants to compare those who leave with those who stay. Second, Puerto Ricans can migrate freely to the U.S., which means that we can observe the characteristics of migrants, and not the characteristics of migrants conditioned on having obtained a visa. The result is a true population of migrants and non-migrants. Third, although born US citizens, Puerto Ricans meet most conditions of immigrants. Puerto Rico speaks a different language from that of the U.S., has a different culture, and is physically separated from the United States. As other immigrants, Puerto Ricans in the U.S. undergo a process of cultural and economic assimilation. As many other immigrants, many dream of returning home.

My interest in this paper is to examine the selectivity of Puerto Rican migration using Census data o Puerto Rico and the United States. Other studies have analyzed the characteristics of Puerto Rican migrants and non-migrants, concluding that migrants are slightly less educated than non-migrants (Ortíz 1986, Rivera-Batíz and Santiago1996). In this paper I study a broader set of characteristics than prior papers, and examine more closely selectivity and wages. This analysis also inquires on differences by gender.

2. Data and definitions

The data for this analysis come from the 2000 5% Public Use Micro Sample for each of the states of the United States and the District of Columbia, and the 5% sample for Puerto Rico. A recent migrant is defined as a person born in Puerto Rico, residing in Puerto Rico in 1995 and residing in the U.S. in 2000. A prior migrant is a person born in Puerto Rico, residing in the states in 1995 and residing in the states in 2000. A recent returnee is a person born in Puerto Rico, residing in Puerto Rico in 2000 and residing in the states in 1995. Stayers are defined as those born in Puerto Rico, residing in Puerto Rico in 2000, and residing in Puerto Rico in 1995. Clearly, some of the stayers could be migrants, returning to the Island prior to 1995. However, these migrants cannot be identified in the 2000 Census because the question on year of entry refers only to entry to the US proper, excluding Puerto Rico as a point of entry. Persons enlisted in the military were excluded for the analysis as were persons under the age of 18 in 1995 or 23 in 2000.

3. Income and employment in United States and Puerto Rico:

To make a general assessment of potential gains from migration we start by comparing income and employment indicators in Puerto Rico and in the U.S. The mayor source of income information for Puerto Rico is the decennial Census of Population. There seems to be some problems with the reporting of public assistance income in the Census as only 293 thousands persons report having this type of income and according to

administrative records there were 1.1 million persons and 425 thousand families on the Nutritional Assistance Program, the largest government aid program in Puerto Rico. For this reason, I also present data on annual earnings for full-time year-round workers which are defined as working at least 50 weeks per year and 35 hours per week. Teachers are counted as full-time year-round if they worked at least 40 weeks per years and at least 35 hours per week. Data for the United States are from published income tables from the Census Bureau, and the Gini coefficient is obtained from Sotomayor (2004).

Table I: Income and Employment Indicators: United States and Puerto Rico

	United States	Puerto Rico
Households:		
Median Income	\$41,994	\$14,412
P90/P10	10.4	25
Share of Aggregate Income First Quintile	3.6	0.2
Share of Aggregate Income Highest Quintile	49.4	59.2
Gini Coefficient	0.45	0.57
% employed (labor force)	60%	33%
Year-round full-time workers		
Median Earnings Men	\$37,057	\$17,000
Median Earnings Women	\$27,194	\$15,300
P90/P10		
Men	5.3	5.3
Women	4.5	3.7
P50/P10		
Men	2.4	1.9
Women	2.2	1.6

Source: Figures for the U.S. are from Historical Income Tables-Income Equality Tables IE-2 and IE-5 electronic file <http://www.census.gov/hhes/income/histinc/> accessed on August 20 2004. Data on the Gini Coefficient for Puerto Rico are from Sotomayor (this volume). Other data for Puerto Rico are tabulations by the author based on 2000 Census Data 5% PUMS.

As table 1 shows, the median household income of the U.S. is almost three times the median household income of Puerto Rico. Income is distributed more equally among U.S. households. In Puerto Rico, the lowest fifth get less than one percent of the aggregate income. The top fifth gets 59 percent in the Puerto Rico and 49 percent in the U.S. The Gini coefficient also shows more inequality in Puerto Rico than in the United States.

Both areas also differ in terms of the likelihood of being working. In the United States, 60 percent of the population over the age of 16 are employed, while in Puerto Rico only 33 percent are employed.

Median earnings of men working full-time year-round in United States are over twice the median earnings of comparable Puerto Rican workers. Earnings differentials among women still favors U.S. but is smaller than males'. However earnings inequality among s workers is somewhat higher in the United States than in Puerto Rico. The high proportion of government workers in Puerto Rico may be acting as an income equalizing force.

These data suggest that the poor would do better (relatively speaking) in the United States than in Puerto Rico, but that the rich would be penalized in the United States. However, much of it has to do with the probability of employment since when full-time full-year workers are considered, Puerto Rico does not show more inequality than United States. This suggests high out-migration from persons that are at the very bottom of the income distribution, likely the unemployed.

4. The size of the migration flow and its demographic characteristics

From Census data, the civilian population born in Puerto Rico and at least 23 years of age in 2000 (18 in 1995), is estimated to be 3.4 million. The distribution of this population according to migration status is on table 2. Fifty-six percent of the Puerto Rican-born can be classified as stayers, 39 percent as prior migrants, 3.3 percent as recent migrants and 1.6 as recent returnees. Recall, that return migration is understated in these figures because migrants who returned to the Island prior to 1995 cannot be identified. Therefore, at least about 44 percent of the adult population born in Puerto Rico have enough migration experience as to be classified as migrants.

Taking the 1995 population as the base, and without considering mortality nor very short-term moves (moves which lasted less than five years), 5.5 percent of Puerto Ricans left the Island to the U.S mainland between 1995 and 2000. The 5 year return rate for the 1995-2000 period, based on the population at risk of returning in 1995 is estimated to be 4 percent. This represents an excess of leavers over returnees of around 11 thousand yearly.

Table 2: Distribution of the Population Born in Puerto Rico by Migration Status

	Civilian Population At least 23 years old in 2000	% of civilian population At least 23 years old in 2000
ALL	3,489,975	100%
Stayers* (PR 2000, PR 1995)	1,939,938	55.6
Recent Migrants (US 2000, PR 1995)	113,831	3.3
Prior Migrants (US 2000, US 1995)	1,379,085	39.5
Recent Returnees (US 1995, PR 2000)	57,121	1.6
In the U.S. in 1995	1,436,206	
Returned between 1995-2000	57,121	4.0
In Puerto Rico in 1995	2,053,769	
Left to the U.S. 1995-2000	113,831	5.5

Source: Tabulations by the author based on Census of Population 2000, United States (all states) and Puerto Rico (5% Public Use Micro Sample). *This category includes migrants who returned to Puerto Rico prior to 1995.

Age and gender distributions by migration status are on table 3. In the population considered, women overpass men, and are highly over-represented among the prior migrants. However, women are under-represented among the recent returnees. Jasso and Rosenzweig (1990) noticed that the female to male ratio among international migrants increases by age cohort during ten year periods, suggesting that US emigration retain females. Possibly children act as a deterrent of return migration for females, or they may have attained an autonomy in the receiving country that may have to be given up if returning home.

Table 3: Age and gender of Puerto Ricans by Migration Status

	STAYERS	RECENT MIGRANTS	PRIOR MIGRANTS	RECENT RETURNEES
%Female	55	57	59	46
Mean Age	47.3	39.8	48.3	43.7
Age	%	%	%	%
23-34	27	47	21	36
35-44	21	22	23	23
45-54	20	13	24	15
55-64	14	8	17	13
65+	17	9	15	12

Source: Tabulations by the authors based on Census of Population 2000, United States (all states) and Puerto Rico (5% Public Use Micro Sample).

As expected if migration were an investment in human capital, recent migrants are younger than stayers, with 47 percent of them below age 35, in comparison to 27 percent of the stayers. Recent returnees are also younger than stayers and only 12 percent of them are 65 years old or older. Return migration is sometimes thought of as the migration of older people looking to spend their retirement age in the home country. However, as these figures and prior research show (Enchautegui 1991), Puerto Rican migration continues to be mainly a movement of a working age population.

Data on marital status available on the Census can say little about marital characteristics of the migrants at the time of migration. However, data on emigrants collected annually at the airport by the Puerto Rico Planning Board during the 1990s show that at least half of all emigrants are married and about a third are single. For instance in 1998, 34 percent of the migrants were single and 51 percent were married. In 1996, 36 percent were single. In 1994, 30 percent were single. The proportion single is always higher among men than among women.

In Puerto Rico as a whole and in 2000, 45 percent of the total population of Puerto Rico was single and 39 percent were married. From these figures one may conclude that single persons are under-represented in the out-migration flow and that Puerto Rican migration selects in favor of the married. Early research characterized Puerto Rican migration as a movement of the family (Mills, Senior and Goldsen 1967). Data by marital status confirm this assessment for the recent out-migration flow.

5. Educational attainment

Educational attainment is at commonly taken as an indicator of skills selection under the argument that observed skills and unobserved ability are highly correlated. Data on education are on table 4. I present median education recalculating the Census education variables fitted to a 0 to 20 scale, but this transformation is not exact owed to the way the Census categorizes the education data. With this calculated variable the median education is 12 for all migrant groups. The figures for the categorical variable neither show much difference in educational attainment between stayers and recent migrants. However, these figures do not consider differences in age structure. Age data standardized by the age structure of stayers, and figures for the younger cohorts, do show evidence that migrants are less educated than stayers. For all the age groups, 43 percent of the stayers have not graduated from high school in comparison with 49 percent of the recent migrants. Among the younger age cohort, 22 percent of stayers, but 32 of recent migrants have not graduated from high school.

Table 4: Educational Attainment of Civilians, Born in Puerto Rico, Age 25 and Older, 2000, by Migration Status

	STAYERS	RECENT MIGRANTS	PRIOR MIGRANTS	RECENT RETURNEES
		Actual-no age standardized		
Median Education	12	12	12	12
Percent with:				
No high school diploma	43	43	50	49
College Degree	17	16	9	12
		Age-Standardized		
No high school diploma	43	49	50	52
College Degree	17	13	9	11
		Age 25-34		
No high school diploma	22	32	35	39
College Degree	23	23	12	18
		Age 25-34 Men		
No high school diploma	27	35	38	46
College Degree	17	19	10	15*
		Age 25-34 Women		
No high school diploma	18	28	31	27*
College Degree	29	26	13	24*

Source: Census of Housing and Population, 2000, all states and Puerto Rico, Public Use Micro Samples (5%)

*: Small sample size

These figures agree with prior research on Puerto Ricans for 1970, 1980 and 1990 (Ortiz 1986, Rivera-Batíz and Santiago 1996) showing a slight negative selection in terms of education of the migration flow. The difference however is in magnitude. While the differences between migrants and stayers were small in prior Census years, it is quite large in 2000. For instance, Rivera-Batíz and Santiago report age-standardized figures showing that recent migrants are about 3 percentage points less likely than non-migrants to have less than a high school diploma. By 2000, the age-standardized difference is 6 percentage points.

Migration selectivity by education may have a gender component. Younger recent female migrants are more negatively selected in terms of education than men. To illustrate, in 2000, 28 percent of the female recent migrants aged 25 to 34 did not have a high school diploma, in comparison to 18 percent of comparable stayers. Other research by this author has pointed to the limited employment opportunities in Puerto Rico for low-skilled women in comparison to low-skilled men (Enchautegui 2004). The construction industry and the repair and maintenance industries are strong in Puerto Rico and important employment niches for low-skilled men. However, the disappearance of garment factories in Puerto Rico, has limited the employment opportunities of low-skilled women.

The least educated of all the migration groups are the recent returnees with age-standardized figures of 52 percent without a high school diploma. Among the younger male group, 39 percent are without a high school diploma. Recall that these are not all the returnees but only recent returnees.

6. Labor market indicators

Table 5 shows labor market indicators by migration status for the population 23 years and older. In spite of a lower educational attainment, recent migrants are 10 percentage points more likely to be in the labor force than stayers, although part of this large difference is due to age. Among the younger age group the difference is 5 percentage points for men and 3 percentage points for women. Returnees, however, has an extremely low labor force participation.

Table 5: Labor Market Indicators of Civilian Puerto Rican-born Age >=23, 2000 by Migration Status (Percentages)

	Stayers	Recent Migrants	Prior Migrants	Recent Returnees
All age>=23				
In the labor force	41	51	48	32
With work disability	19	20	21	19
Unemployed(in the labor force)	16	14	9	30
Age 23-34 Women				
In the labor force	52	55	60	48 *
With work disability	11	13	15	14 *
Age 23-34 Men				
In the labor force	68	73	67	35 *
With work disability	14	18	20	14 *

Source: Tabulation by the author based on Census of Housing and Population, 2000, all states and Puerto Rico, Public Use Micro Samples (5%)

In spite that Puerto Rico has a much higher unemployment rate than the U.S., the unemployment rates of recent migrants is only 2 percentage points higher than the unemployment rate of stayers. But with time in the U.S. the probability of unemployment declines. Again, returnees, show very negative employment outcomes. Enchautegui (1991) using 1980 Census data which allows for identification of a larger group of returnees also found that return migrants performed poorly in Puerto Rico.

It is also interesting to analyze health status by migration outcomes to see if people with poorer health outcomes are more likely or less likely to leave. While unhealthy people may be less inclined to leave the island in search of work, they may also be more likely to leave in search of better health care or to collect Supplemental Security Income if disable, which is not available in Puerto Rico. Our indicator of health status comes from the Census and indicates whether a person has an employment disability. The overall differences by migration status in work disability are very small and do not point to a clear tendency for emigration of the less healthy.

7. Multivariate Analysis of Migration

The information presented in prior sections is summarized and confirmed in a multivariate analysis estimating the log odds of the probability of migration. Since the Census does not contain information related to the individual prior to the move, I focus this analysis on stayers and on recent migrants, for which the time since migration has been no more than five years. The dependent variable takes on the value of 1 if the individual is a recent migrant and 0 if the individual is a stayer. The correlates are education, age, gender, work disability and recent labor market experience. Results are on table 6. The multivariate analysis confirms that the better educated are less likely to migrate. A person with a college degree is 27 percent less likely to move than a person with a high school diploma. A high school dropout by contrast, is 51 percent more likely

to migrate than a high school graduate. Age also behaves as expected, with a declining probability of migration as age increases. Women are 25 percent more likely to migrate than men. Work disability is positively associated with recent migration. Since there is no information about employment status prior to migration I use the variable about when did the person last worked, distinguishing those who last worked prior to 1995. From this variable we can infer whether persons disconnected from the labor force are more or less likely to move. It is found that persons with no recent labor market experience are less likely to be recent migrants.

Table 6. Odds ratio of the probability of migration (logit estimates)
(Recent Migrants vs Stayers)

Variable	Odds Ratio	Chi-sq Prob.
Age2334	3.897	<.0001
Age3544	2.341	<.0001
Age4554	1.299	<.0001
Age5564	1.133	<.0692
No high school diploma	1.511	<.0001
Some College	0.811	<.0001
Bachelor Degree or more	0.733	<.0001
Female	1.259	<.0001
Last Worked Prior to 1995	0.574	<.0001
Has a Work Disability	1.566	<.0001

8. Wages

The success of economic migrants, like Puerto Ricans, is ultimately measured in the labor market. Hourly wages (based on geometric means) for Puerto Ricans in states with at least 100 adult Puerto Ricans in the 5 percent sample, and the percentage with a college degree are in table 7. The location with the lowest wage is Puerto Rico where workers are paid in average \$8.33 per hour. The next lowest wage location is Rhode Island where Puerto Ricans are paid \$1.38 more than in Puerto Rico. In Rhode Island Puerto Ricans made 16 percent more than in Puerto Rico. While the highest paid states also have the highest proportion of Puerto Rican college graduates, the relationship between education and wages is less clear in states with wages in the middle range. Puerto Rico stands out for its low wage and its high percentage of college educated workers. Ranking sixth in terms of proportion of college graduates, it ranks 20th and last in terms of wages.

Table 7: Hourly Wages and Education for Puerto Ricans in Puerto Rico and Other Selected Locations 2000 (Age>23, With wages in 2000)*

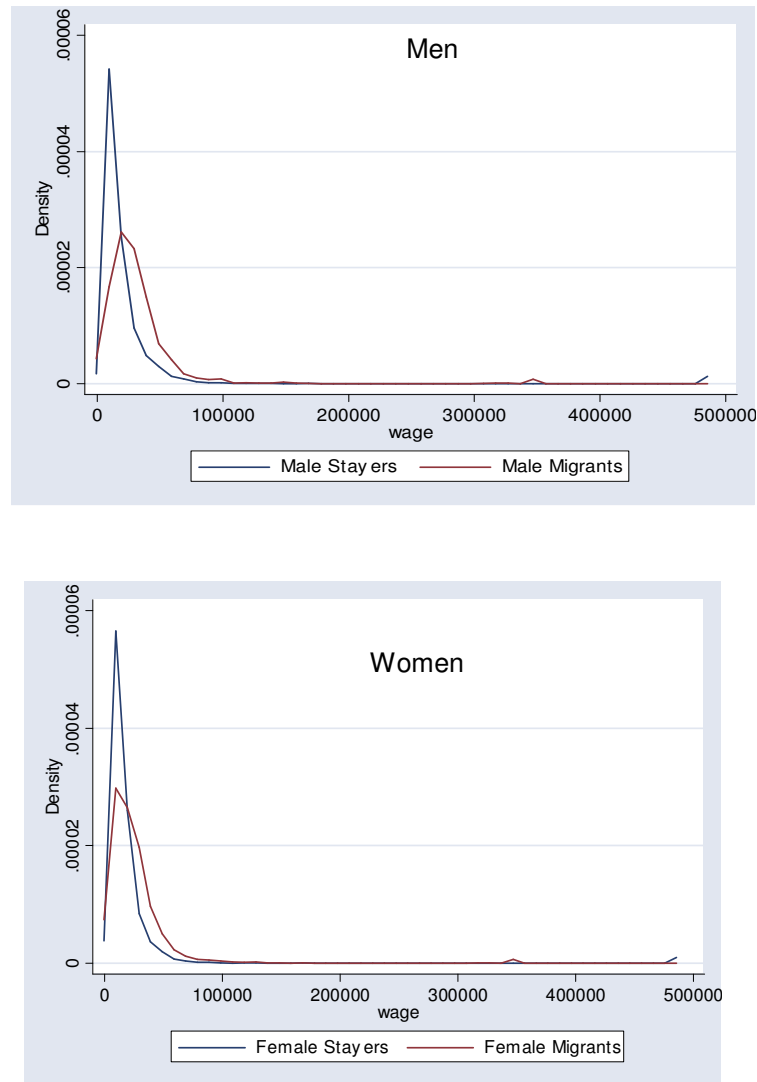
Location	Hourly wage	Wage Ratio:PR	% College degree	Educ. Ratio
Puerto Rico	8.33	1.00	28.8	1.00
Rhode Island	9.68	1.16	9.7	0.34
Pennsylvania	10.28	1.23	7.4	0.26
Wisconsin	10.59	1.27	16.4	0.57
Florida	10.70	1.28	20.0	0.70
Massachusetts	11.25	1.35	12.5	0.43
North Carolina	11.59	1.39	29.0	1.01
Ohio	11.59	1.39	14.8	0.51
Connecticut	11.70	1.41	7.7	0.27
New Jersey	11.82	1.42	8.4	0.29
Iowa	11.94	1.43	20.3	0.71
Delaware	12.30	1.48	11.5	0.40
Illinois	12.30	1.48	15.0	0.52
Michigan	12.55	1.51	18.3	0.63
New York	12.68	1.52	11.0	0.38
Virginia	12.68	1.52	31.7	1.10
Texas	13.20	1.58	33.1	1.15
California	14.01	1.68	25.7	0.89
Arizona	15.03	1.80	29.0	1.01
Maryland	16.12	1.94	41.6	1.45

Source: Tabulations by the author based on Census of Housing and Population, 2000, all states and Puerto Rico, Public Use Micro Sample (5%).

*States with at least 100 civilian Puerto Ricans, age >23 in the 5% sample.

The lower wages of Puerto Ricans in Puerto Rico compared to Puerto Ricans in the Mainland can also be observed in their respective wage distributions. The complete wage distribution of migrants and stayers using Kernel densities are depicted on Graph 1. These distributions differ in terms of the higher concentration of wages in Puerto Rico in the lowest segment of the wage distribution and in terms of the higher variance of the wages of migrants.

Graph 1: Kernel Densities of Annual Wages of Migrants and Stayers



With much higher wages in the Mainland and unrestricted migration, one might ask why so few Puerto Ricans leave yearly toward the United States and who gain the most from migration. To answer this question I look at relative wages. I start by comparing median wages for Puerto Ricans in the US and Puerto Ricans in Puerto Rico, by gender and education. This information is on table 8. Among men, relative wages are higher for the least educated. A Puerto Rican man without a high school diploma makes over twice the wages in US than in Puerto Rico. The wage gain for the college educated although still substantial is much smaller: 75 percent. There is no clear pattern in relative wages by education among women, although the least educated women have lower relative wages than those with a college degree, the difference is small. Not only do college educated men would likely gain less from out-migration, but the relative variance of their wages would also be higher.

If these were the wages potential migrants use in forming their migration decision, one would conclude that low educated men have the most economic gain from migration, while no patterned relationship between wages and education exists for women.

Table 8: Median Annual Wages and Variance of Puerto Ricans in US relative to Wages in Puerto Rico, by Gender and Education, 2000 (with wages, age \geq 23)

	Ratio of Median Wages		Ratio of Variance of log wage	
	Men	Women	Men	Women
No High School Diploma	2.04	1.63	1.11	1.25
High School Diploma	2.08	1.75	1.11	1.25
Some College	1.87	1.67	1.47	1.25
College Degree	1.75	1.72	1.50	1.25

Source: Tabulations by the author based on Census of Housing and Population, 2000, all states and Puerto Rico, Public Use Micro Samples (5%)

Better information on wages can be obtained when controlling for characteristics (education, experience, industry, and class of worker). I estimated an equation of log annual earnings for Puerto Ricans in the United States and in Puerto Rico by gender. Table 9 shows results for returns to continuous education (turning the Census education variable into a 0-20 scale), and in parenthesis are the results for regressions where education was modeled with dummy variables. The coefficients for the remaining variables are those obtained from the continuous specification.

Returns to an additional year of education are higher in Puerto Rico than in the U.S. One more year of education increases earnings between 10 and 13 percent in Puerto Rico, and by 8 to 9 percent for Puerto Ricans in the U.S. The lines showing coefficients for educational dummies indicate that, while a high school diploma pays somewhat more in the U.S. than in Puerto Rico, the contrary is true for a college degree, where the returns are higher in Puerto Rico. Lower educated women end up better in the U.S. than in Puerto Rico. The higher returns to education in developing than in developed economies have been observed in a variety of studies and may be related to diminishing returns to education and the dynamism of development (Psacharopoulos 1985, Ram 1996).

That low-skilled workers end up better in the U.S. than in Puerto Rico is also demonstrated by the large differential favoring United States in the construction industry, an industry where many non-college men find jobs. The differential in returns to education favoring Puerto Rico is larger for women than for men.

Table 9: Log Annual Earning Regression Estimates for the Puerto Rican-born in Puerto Rico and in the U.S. by Gender, 2000*

	<u>Males Puerto Rico</u>	<u>Males U.S.</u>	<u>Female Puerto Rico</u>	<u>Female US</u>
Education	0.106	0.08	0.13	0.09
(High school diploma	0.27	0.27	0.25	0.33
Some college	0.46	0.43	0.59	0.51
BA or more)	1.00	0.94	1.1	0.97
Experience	0.027	0.033	0.025	0.025
Industry				
Utilities	0.72	0.69	0.7	0.67
Construction	0.07	0.16	0.24	0.22
Manufacturing	0.34	0.25	0.39	0.25
Sales	0.17	0.076	0.098	-0.06
Transportation	0.3	0.25	0.54	0.3
Com/Information	0.53	0.39	0.56	0.47
Banking, Finance	0.46	0.37	0.57	0.55
Professional	0.18	0.13	0.26	0.14
Educ, health, soc. Serv.	0.18	0.25	0.18	0.22
Public Administration	0.26	0.54	0.2	0.55
Public Sector	-0.01	-0.009	0.12	-0.02

Source: Based on regression analysis of Census of Housing and Population, 2000, all states and Puerto Rico, Public Use Micro Samples (5%)

*The equation also included experience squared. A dummy variable for public sector and an intercept.

The coefficients for experience and industry are those obtained from the equation with continuous education.

All the coefficients in the table are statistically significant at least at the 5% level.

Key in migration research is to determine an accurate wage counterfactual for stayers if they were movers, or for movers if they were stayers. Census data is in reality very limited to perform an exercise controlling for selectivity. I simulate how stayers would do in the U.S. by taking the wage structure of migrants and plugging in the characteristics of stayers. Based on these estimations, I calculated the percentage of stayers that would see their wage reduced if they were migrants. This information is on table 10.

Table 10: Percentage of Stayers with Reduced Wages and Changed Quintile if Were Migrants

	MEN	WOMEN
% with lower assigned wages in US	23	28
% move up in wage quintile	9.3	1.46
% move down in wage quintile	24.3	39.7
% no change in wage quintile	66.1	58.8

Note: Stayers were assigned wages based on regressions equations of migrants. The quintiles refer to the wage quantile in the wage distribution of migrants. The quintile position of stayers in Puerto Rico was compared to his/her assigned position in the wage in the wage structure of migrants.

Although wages are much higher in the US than in Puerto Rico, 23 percent of male stayers and 28 percent of the female stayers would see their wages decline if they were to move to the US. I also estimated what percentage of the stayers would move up or down in the income distribution if they were to move to the United States. Almost 1 in every four male stayers would be moving down at least one quintile if they were to move to the US. These are men who are located in a given wage quintile in Puerto Rico, but upon simulating their move to the US, lose relative ground moving to a lower wage quintile in the U.S. Women show a greater relative loss. Among female stayers, 28 percent would lose wages upon migrating to the United States, and 39 percent would move down in the income distribution.

The ones who lose the most from migration are college educated men. Table 11 produces the means of the difference between the predicted wage in Puerto Rico and the predicted wage in US for stayers by education and gender. A positive is interpreted as a higher wage in Puerto Rico. College educated male stayers stand to loss the most from migration while high school male graduates stand to gain the most. A college educated men stayer would lose, in average, 46 hundred dollars if he were to migrate. In constrast, a high school male graduate would gain almost 6 thousand dollars by doing so. There is no consistent pattern for women. Women without a high school diploma and with a college degree lose something by migrating, but the loss is negligible, less than 140 dollars.

Table 11: Mean Difference of Wages in Puerto Rico Minus Predicted Wages in U.S. by Education and Gender (based on regression equation)

	Men	Women
No High School Diploma	-3162	138
High School Diploma	-5838	-3462
Some College	-4749	-3466
College Degree	4688	110

Note: Predicted wages are based on coefficients of the regression equation of migrants, using characteristics of stayers. This predicted wage is compared to the actual wage of stayers in Puerto Rico.

9. Discussion and Conclusion

Data on income distribution of Puerto Rico and the United States suggest, following Borjas hypothesis about income distribution differentials and migration, that those at the lower tail of the income distribution would have the greatest incentive to leave the Island and migrate to the United States. Since the higher inequality of Puerto Rico in comparison to U.S.' seems to come primarily from persons not working full-time year-round, out-migrants may be drawn from the lowest income segment of the Puerto Rican population, likely people without jobs or with sporadic employment.

Analyzing data from the 2000 Census, and comparing with results from prior studies, Puerto Rican out migration seem to have become more negatively selected in terms of education, especially among women. However, in spite of their lower educational attainment, migrants have a stronger attachment to the labor force that non-migrants proving that Puerto Rican migration is a migration of labor looking to improve their lot in the United States.

With wages in the U.S. as high as they are and with employment probabilities always higher in the U.S than in Puerto Rico, one might ask why the country has not yet emptied. Obviously, migration is not a rational choice for those who remain in Puerto Rico, since even with open borders they have decided to stay home. But it is not only psychic costs what prevent some Puerto Ricans from leaving the Island. Even within a low-wage zone like Puerto Rico, many would lost wages if they were to migrate. College educated men in Puerto Rico stand to lose the most from migration.

The data examined are consistent in presenting a story of negative selectivity: (1) comparison of income distributions in the U.S and Puerto Rico suggest that those at the bottom gain the most from migration, mostly the unemployed; (2) the descriptive data on education and multivariate analysis of migration show that the least educated are more likely to migrate; (3) data on wages for the U.S. and Puerto Rico shows that the least educated gain the most wages from emigration; (4) earnings variance is larger for the more educated; (5) regression analysis shows that returns to education are higher for the least educated in the U.S than in Puerto Rico but lower for the better educated; (6) simulation of wages for would-be migrants show that the better educated would lost while the least educated would gain wages by migrating; and (7) the extremely poor

outcomes of returnees in Puerto Rico are difficult to explain unless one argue that out-migration is negatively selected. From these patterns it can be concluded that out-migrants are negatively selected in terms of skills and that there is not “brain drain” in Puerto Rico.

The patterns just described hold consistently for men but not for women. The tendency for the least educated to migrate is stronger among women, and female would-be migrants in general, face greater earnings losses than men. However, their earnings profile is not consistent in showing greater potential economic gains for the least educated. Something prevents low-educated women from transforming their migration decisions into economic gains. May be many of the low-educated women are accompanying their husbands, becoming tied migrants and tied stayers.

It would be instructive to compare these findings with findings for other immigrant populations. A paper by Chiquiar and Hanson (2002) conducted an analysis of selectivity of Mexican immigrants. Mexican migrants show better educational attainment than nonmigrants. Using uncorrected wage equations and Kernel densities as their counterfactual, Chiquiar and Hanson found that wage gains are quite large for all groups but are the largest for the least educated. To reconcile wage differences that decline with education with migration rates that increase with education the authors argue that migration costs must decline with education. Chiquiar and Hanson conclude that male Mexican migration is intermediately selected and female migration is positively selected. The results for Puerto Ricans are in this sense more consistent than those for Mexico, since the least educated are more likely to leave and the least educated also have the higher gain from migration. Migration costs that decline with education are difficult to argue in Puerto Rico, because of the open borders, and the constant flow of in-migrants and back-and forth- travelers between Puerto Rico and the United States. The only aspect which could reduce migration cost for the better educated is labor contracting. US companies do search in Puerto Rican universities. A job offer taken in this way, largely reduces the migration cost of the better educated. But still this labor hiring is minuscule and cannot possibly make a big difference in migration costs in the aggregate.

In spite of the negative selection that permeates all the data examined, it cannot be lost from perspective that the analysis also shows that Puerto Rican migration continues to be a flow of labor looking to take advantage of better economic opportunities in the United States. Out-migration is the rational choice for the least educated as their employment opportunities in the Island dwindle. Low-skilled manufacturing has virtually disappeared. Employment in the utilities sector is controlled by strong unions. Widespread use of government aid increases reservation wage and place Caribbean immigrants in a better position to take low-paying jobs. Finally, there is fierce competition from an ever growing supply of the college-educated workers.

References:

- Borjas, George. 1987. Self-Selection and the Earnings of Immigrants. *American Economic Review* 77(4):531-553.
- _____. 1989. Immigrant And Emigrant Earnings: A Longitudinal Study [*Economic Inquiry*](#). Vol. 27(1): 21-37.
- Chiquiar, Daniel and Gordon Hanson. 2002. *International Migration, Self-Selection and the Distribution of Wages, Evidence from Mexico and the United States*. University of San Diego Working Paper.
- Chiswick, Barry R. 2000. "Are Immigrants Favorably Selected: An Economic Analysis, In *Migration Theory: Talking Across Disciplines*, edited by Caroline D. Brettell and James F. Hollifield, eds. New York: Routledge.
- Enchautegui, María E. 2004. *Amarres de las Mujeres: Hogar y Empleo: Dos Investigaciones*. San Juan Puerto Rico: Estado Libre Asociado de Puerto Rico, Oficina de la Procuradora de las Mujeres.
- _____. 1991. "The Value of U.S. Labor Market Experience in the Home Economy: The Case of Return Migration to Puerto Rico," *Economic Development and Cultural Change* 42(1):169-190, 1993.
- Hernández Pol, Julio. 2001. *Los Determinantes de la Migración Puertorriqueña*. Tesis de Maestría, Departamento de Economía, Universidad de Puerto Rico, Recinto de Río Piedras.
- Jasso, Gillermina and Mark Rosenzweig. 1990. Self-Selection and the Earnings of Immigrants: A Comment. *American Economic Review* 80(1):298-304.
- Mills, C. Wright, Clarence Señor and Rose K. Goldsen. 1967. *The Puerto Rican Journey*. New York: Russell and Russell.
- Ortiz, Vilma. 1986. Changes in the Characteristics of Puerto Rican Migrants from 1955 to 1980. *International Migration Review* 20(3):612-627.
- Psacharopoulos, George. 1985. Returns to Education: A Further International Update and Implications. *Journal of Human Resources* 20 (Fall):583-604.
- Rati, Ram. 1996. Level of Development and Rates of Returns to Schooling: Some Estimates from Multi-country Data. *Economic Development and Cultural Change* 44 (4):839-857.
- Rivera-Batíz, Francisco and Carlos Santiago. 1996. *Island Paradox*. New York: Russell Sage Foundation.

Santiago, Carlos. 2004. Puerto Rican Poverty in the United States. Paper presented in Conference Puerto Ricans in the Mainland and in the Island, Russell Sage Foundation, New York.

Sotomayor, Orlando. Paper presented in Conference Puerto Ricans in the Mainland and in the Island, Russell Sage Foundation, New York.
Development and Income Distribution: The Case of Puerto Rico

Sandis, Eva. 1970. Characteristics of Puerto Rican Migrants to and from the United States. *Journal of Human Resources*. 4(2):22-43.