Rural-Urban Migration in Bolivia: An Escape Boat?

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Abstract

This paper studies rural-urban migration in Bolivia. Domestic migration usually works as an equalization mechanism, in which regions with fewer economic opportunities send migrants to more dynamic regions. We model the migration decision and take into account the possibility of self-selection for computing the returns to migration. We present selectivity corrected quantile regression models for earnings of both migrants and non-migrants in urban and metropolitan areas. We find that migrants receive a premium at low and median quantiles of the urban/metro conditional earnings distribution. This premium is somewhat diminished by a negative selectivity correction for migrants with lower probabilities of migration.

KEYWORDS: migration, earnings, sample selection, quantile regression.
JEL CODES: C14, J24, R23

Resumo

Esse artigo estuda migração rural-urbana na Bolívia. Migração interna normalmente funciona como um mecanismo de equalização, através do qual regiões com menos oportunidades econômicas enviam migrantes para regiões mais dinâmicas. Modelamos a decisão de migrar e consideramos a possibilidade da presença de viés de auto-seleção ao calcular os retornos à migração. Apresentamos modelos de regressão quantílica, corrigidos para seletividade, dos rendimentos de migrantes e não-migrantes em áreas urbanas e metropolitanas. Os migrantes localizados em quantis inferiores e medianos da distribuição de rendimentos condicionais urbana/metropolitana recebem um prêmio. Esse prêmio é de certa forma reduzido por uma correção de seletividade negativa associada aos migrantes com baixa probabilidade de migrar.

PALAVRAS-CHAVE: migração, rendimentos, seletividade amostral, regressão quantílica.
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1 Introduction

Migration movements are substantial in Bolivia. Rural, urban and metropolitan areas work as both source and destination areas, but metropolitan areas have recently become the main attractor of migrants. Because levels of human capital are considerably lower in rural areas than in urban and metro, we have special interest in studying rural to urban/metro migration and how rural migrants integrate into urban/metro labor markets.

Migration has consequences for households and regions and may work as a mechanism to equalize relative resource scarcities over regions. Individual migration decisions respond to economic opportunities as migrants seek higher returns to their attributes. Migration flows have consequences for labor markets, demand for public goods, public expenditure, investment, poverty and overall prospects of economic development.

The decision to migrate is based on the perspective that the richest regions will be able to provide better levels of income or welfare to the migrants, relatively to what they would have in their place of origin. There are numerous factors that can explain the decision to migrate to a certain area. Among them are the relative indexes of standard of living, the unemployment rates in origin and destination, the distance between origin and destination, the family size, and the age and education attainment of the head of household. There are, however, some non-observable characteristics of the individuals that influence the decision to migrate and also their earnings at destination. To compare the performance of non-migrants and migrants at destination without taking into account these non-observables may result in biased estimates of the earnings equations.

This study analyzes the profiles of workers participating in urban labor markets. We examine which characteristics and factors can cause migrants to perform better than their non-migrant counterparts, including the role played by the unobserved (unmeasured) heterogeneity of heads of households. To this aim, we model the migration decision and employ quantile regression (Koenker and Bassett, 1978) Mincer models corrected for selectivity (Buchinsky, 1998) to compare the conditional earnings of migrant/non-migrant individuals.

We find that migrants at low and median quantiles receive a premium in urban/metro labor markets in 1997 and 2002. However, negative selectivity at low quantiles, implies that migrants with low migration probabilities are predominantly inserted into the lower tail of the conditional earnings distribution at their urban/metro destinations, eroding some of the benefits to migration.

This paper is organized as follows. Section 2 describes the data used and characterizes the migration flows in Bolivia in 1993, 1997 and 2002. Section 3 discusses some theoretical issues relating migration and selectivity. We present summary statistics of migrant and non-migrant characteristics in section 4 and the empirical results in section 5. Section 6 concludes.

2 Migration flows in Bolivia

In this work we define a migrant as an individual who has moved to a different *ciudad/localidad* in the past five years, excluding migrants from foreign countries. The data for 1993 (EIH), 1997 (ENE) and 2002 (MECOVI) come from three different databases which are not consistent among years. To keep consistency we use neither time since migration, nor birthplace in our models. Even though analyzing only recent migrants has the drawback of not allowing the study of their assimilation at destination, restricting the sample to a more homogeneous group makes the analysis of the migration decision, and the investigation of possible selectivity, more meaningful. In addition to the surveys mentioned above we use data from the census (provided by INE) to determine if a migrant's place of origin is urban, rural, or metropolitan. We also use information compiled by UDAPE, based on the 1992 census, which specifies the Human Development Index (HDI) and it's various components at the level of municipal sections (*sección*).

While family members usually migrate together, it is reasonable to attribute the migration decision to the head of household. In some circumstances the head migrates first, accumulates income and then brings the rest of the family. In others the head might even stay apart from his/her family and send remittances back home. TABLES 1A and 1B present the migration flows for head of households aged 15 to 65, between rural, urban and metropolitan areas in 2002 and 1997, respectively. It is not possible to make a similar table for 1993, because data is only available for the metro areas. A location is classified as rural by the census if its population is less than 2,000 people. It is classified as urban if its population is more than 2,000 and it is not a metropolitan area. The columns represent the migrant's origin and the rows the migrant's destination.

In 1997 (TABLE 1B), rural origin migration is the main flow (36.53% of total) with 54.7% going to urban or metro destinations. The second main flow in 1997 is of metropolitan origin and represents 33.98% of the total migration. Of these metro origin migrants, 74.77% either go to other metro areas or go to urban areas, and the other 25.23 % of them go to rural areas. The urban origin migrants represent 29.5% of the total migrants in 1997. Among them, 70% go to other urban or metro areas and 30% go to rural areas. If we look at the migrants' destination, 66.03% of the total go to urban or metro areas and 33.97% go to rural areas. Rural movers to urban/metro represent 20% of the total migration in 1997, while urban/metro movers to rural represent 17.43% of the total.

In 2002 (TABLE 1A), migrants from metro areas represent the main flow. Among them, 54.5% go to other metro areas, 23.2% to urban areas, and 22.3% to rural areas. In contrast with 1997, the number of migrants leaving the rural areas is the least expressive in 2002, representing 23.5% of the total. Of these rural migrants, 62.52% go to urban or metro areas, representing 14.7% of the total migration in Bolivia. Urban and metro migration to rural areas was almost 20% of the total in the same year. There was a slight reduction in the migration flows from rural to urban or metro from 1997 to 2002 (20% and 14.7% of the total, respectively). It is important to point out that, in 1997, there were more rural migrants going to urban (11.8% of the total) than to metro areas (8.1% of the total), and in 2002, the percentage of rural migrants going to metro areas (10.8% of the total) was considerably higher than the ones going to urban (3.9% of the total). Furthermore, the percentages of rural to metro migrants returning to their birthplace were 3% and 15% in 1997 and 2002, respectively, while the percentages for metro to rural migrants were 25% and 50%. Apparently, during the boom from 1993 to 1997 the migration dynamics were different than those for the period of stagnation that set in between 1997 and 2002.

3 Human Capital and Migration

The migration decision is an example of the worker self-investment decision (see Mincer, 1994). The worker considers two or more future streams of income depending on location. Direct costs of moving and forgone earnings are included (with a negative sign) in the income stream at the new location to which he might move. Movement takes place if the present value of the income stream at the destination exceeds that at the origin. As pointed out by Mincer (1994), "the investment formulation has empirical implications for migrant selectivity and for regional wage structure. Thus, younger people are more likely to migrate because their gains are increased by the longer expected payoff period. Migrants are attracted to areas with greatest expected earnings and employment opportunities. High discount rates or high financing costs discourage migration, one reason the more skilled and better educated workers are more likely to migrate: the fact that they previously invested in education and skills training suggests that their discount rates are lower."

3.1 Self-Selectivity and Migrant Earnings

The parametric approach for selectivity in migration is based on Roy's model (1951) and it is explored in the international migration context by Borjas (1999). Suppose there are two regions in a country (0 and 1). Assume region 0 is the source and region 1 the destination region. Individuals receive earnings at origin with the following distribution:

$$\ln w_0 = \mu_0 + \varepsilon_0 \text{ , where } \varepsilon_0 \sim N(0, \sigma_0^2) \qquad (1)$$

In the case of migration, their earnings in region 1 will be:

$$\ln w_1 = \mu_1 + \varepsilon_1 \text{, where } \varepsilon_1 \sim N(0, \sigma_1^2) \qquad (2)$$

and ε_0, ε_1 have correlation coefficient ρ.

The earnings received in both regions may be decomposed into one part associated with observable socio-economic characteristics (μ_0 and μ_1), and another part associated with non-observable characteristics (ε_0 and ε_1). The sign of the indicator function determines the migration decision for an individual in region 0:

$$I = \ln(w_1 / (w_0 + C)) \approx (\mu_1 - \mu_0 - \pi) + (\varepsilon_1 - \varepsilon_0), \qquad (3)$$

where C indicates moving costs and π represents a time equivalent measure of the emigration costs to region 1 (i.e. $\pi = C / w_0$). Assume π is constant for all individuals at a certain region of origin. Given that migration to region 1 occurs when I>0, the emigration rate from the region of origin 0 is given by:

$$P = \Pr[\upsilon > -(\mu_1 - \mu_0 - \pi)] = 1 - \Phi(z) \qquad (4)$$

where $\upsilon = \varepsilon_1 - \varepsilon_0$; $z = -(\mu_1 - \mu_0 - \pi) / \sigma_\upsilon$ and Φ is the standard normal distribution function.

From equation (4) one can infer that region 0's emigration rate is: (a) a decreasing function of the average income at the region of origin; (b) an increasing function of the average income at the region of destination; and (c) a decreasing function of the emigration costs. There are some other implications of the theory about the types of selectivity bias generated by the endogenous decision to migrate. In particular, consider the conditional means $E(\ln w_0 \mid I > 0)$ and $E(\ln w_1 \mid I > 0)$:

$$E(\ln\ w_0 \middle| I > 0) = \mu_0 + \frac{\sigma_0 \sigma_1}{\sigma_\upsilon}\left(\rho - \frac{\sigma_0}{\sigma_1}\right)\lambda \qquad (5)$$

$$E(\ln\ w_1 \middle| I > 0) = \mu_1 + \frac{\sigma_0 \sigma_1}{\sigma_\upsilon}\left(\frac{\sigma_1}{\sigma_0} - \rho\right)\lambda \qquad (6)$$

where $\lambda = \phi(z) / P$; and ϕ is the standard normal density. The variable λ is inversely related to the emigration rate and assumes the value zero when $P = 1$. The variable λ is the "inverse Mill's ratio" and, as proposed by Heckman (1979), should be included in the earnings functions to correct for self-selection bias.

Assume initially that $P < 1$ in a way that at least part of the population at region of origin 0 is better off not migrating. Hence, the second terms in equations (5) and (6) define the types of selection bias generated by the income maximizing behavior. Equation (5) shows that the average emigrant could be better or worse than the average individual at origin depending on ρ being larger or smaller than σ_0 / σ_1. Similarly, equation (6) shows that the average immigrant to the destination region 1 may earn more or less than the average individual at destination depending on σ_1 / σ_0 being greater or smaller than ρ.

The model described above is appropriate to describe choices and earnings of average migrants, but it is incapable of discerning the behavior of individuals throughout the entire conditional earnings distribution. It seems reasonable that the motivations and opportunities of individuals at the top of the earnings distribution are different from those of individuals at the bottom. Therefore, we use quantile regression methods to estimate earnings equations for migrants and non-migrants in urban regions in Bolivia.

3.2 A Primer on Quantile Regression

We use quantile regressions (Koenker and Bassett, 1978) to estimate earnings and return gaps between migrant and non-migrant workers at different points of the conditional earnings distribution. Just as least squares models the mean of the distribution of the dependent variable *Y* conditional on the regressors *X*, quantile regressions give models for different percentiles of this distribution. The τ-th quantile of *Y* conditional on *X* is given by:

$$Q_\tau\left(Y_i \middle| X_i\right) = X_i' \phi(\tau) \qquad (7)$$

where the coefficient $\phi(\tau)$ is the slope of the quantile line giving the effect of changes in *X* on the τ-th conditional quantile of *Y*. Estimation for different quantiles (τ from 0 to 1) yields regression lines for various percentiles of the conditional distribution of *Y* such that at least a proportion τ of regression residuals are below the estimated regression line and approximately a (1-τ) fraction are above it. For instance, median regression (τ = 0.5) splits the sample in half (half of the residuals above and below the regression line) and gives the same results as ordinary least squares when the distribution is symmetric.

FIGURE 1 captures the basic intuition of our approach. We compute the difference in the intercepts and education coefficients from the estimated quantile Mincer functions for migrant and non-migrant workers located at the *same* quantile of the conditional distribution of each sector. Thus, we examine:

$$Q_\tau\left(\ln w_{mig} \middle| e, X\right) - Q_\tau\left(\ln w_{non\text{-}mig} \middle| e, X\right) = \left(\alpha_{mig}(\tau) - \alpha_{non\text{-}mig}(\tau)\right) + \left(\beta_{mig}(\tau) - \beta_{non\text{-}mig}(\tau)\right) e + \left(\theta(\tau) - \theta(\tau)\right) X. \qquad (8)$$

Quantile coefficients have the usual regression interpretation. For example, taking τ = 0.9, $\alpha_{mig}(0.9) - \alpha_{non-mig}(0.9)$ (the distance A-A') gives the sectoral gap in the level of wages for uneducated workers at the 90th quantile of the conditional wage distribution of each group, that is, the difference between the wage floor of the best paid 10% of uneducated migrants and the wage floor of the top 10% of uneducated non-migrants (for any given *X*). Similarly, $\alpha_{mig}(0.1) - \alpha_{non-mig}(0.1)$ measures the adjusted wage gap at the 10th quantile of the conditional distributions (distance C-C'). Meanwhile $\beta_{mig}(0.9)$ is the slope of the Mincer regression line fitted through the 90th conditional quantiles, and as is conventional refers to the return to education at this quantile. It gives the percentage change in the wage floor of the best-paid 10% of migrant workers (within each observed skill level) from an additional year of schooling. Thus, $\beta_{mig}(0.9) - \beta_{non-mig}(0.9)$ gives the gap in the returns to education between migrant and non-migrant workers at this quantile.

In the case of dummy variables, each coefficient measures the log earnings difference between a worker with the particular characteristic (e.g., secondary education) and an otherwise similar worker with the excluded category (e.g., less than basic education) at the *same* conditional quantile. The anti-log of the coefficient (minus 1) gives the relative (adjusted) earnings percentage gap of high school workers with respect to those with less than basic education at each given quantile.

For example, the university education dummy for the 10th percentile (τ = 0.1) gives the income gap between workers with less than basic and college educated workers located at the 10th percentile of the conditional income distribution, that is, the difference between the earnings floor of the bottom 10 percent of college educated workers and the floor of the bottom 10 percent of workers with less than basic education (controlling for other explanatory characteristics). Similarly, the coefficient at the 50th percentile measures the college earnings premium at the median earnings of the two conditional distributions. In the case of continuous regressors, the coefficient measures the conventional slope of the regression line fitted through a given conditional quantile. It is important to stress that this interpretation pertains to a conditional analysis where confounding effects on income arising from the correlation of the various individual characteristics are being isolated.

We can think of bottom conditional quantiles as pertaining to workers with wages lower than granted by their education, experience level and other measured wage determinants, and the upper quantiles to workers with wages higher than predicted by observed skills. The relative positioning of workers in the conditional wage distribution can be related to differences in "ability", which may include a worker's labor market connections, family human capital, school quality, and/or work ethics (Arias, Hallock and Sosa, 2001). The interplay of this unobserved heterogeneity with each regressor results in regression coefficients that vary across quantiles.

The sample selection problem inherent to the migration model presented is resolved by implementing a two-step method developed by Buchinsky (1998). In the first step, we estimate the individual's probability of migration. In the second step, we estimate the earnings equations of migrants at the destination, since we only observe earnings of individuals who have migrated. The non-observable characteristics that influence the decision to migrate and that can possibly bias the earnings estimates are modeled and incorporated into the quantile regression models to correct for the selection bias problem. For details of the implementation of this methodology see Buchinsky (1998) and Tannuri-Pianto and Pianto (2002).

4 Migrant Characteristics

Our goal is to study the migration flows from rural to urban/metro areas. Because rural workers are typically less skilled than the urban/metro ones, we are concerned that it would be more difficult for migrants of rural origin to integrate and succeed in the more developed urban sector, than the other way around. TABLES 2A, 2B and 2C show summary statistics for heads of households who are rural migrants to urban/metro areas, rural non-migrants and urban/metro non-migrants. The first striking difference between rural migrants and non-migrants is the overrepresentation of women among the migrants: 36% of the rural-urban migrants are female in 2002 (12% of the rural non-migrants and 24% of the urban non-migrants are female). Similar figures are found for 1997 and 1993. The great majority of the rural population is indigenous (ethnic, as determined by their mother tongue; 76% in 2002 and 80% in 1997) and a somewhat smaller proportion of these ethnic individuals migrate to urban/metro areas (54% in 2002 and 61% in 1997).

Another very interesting characteristic of the migrants is their young age relative to the rural non-migrant population, and even to the urban non-migrant population. The migrants' average age has increased from 29 years old in 1993 to 36 years old in 2002, but it is still 6 years less than the non-migrant average in 2002. Education attainment is also distinct between migrants and non-migrants. In 2002, rural migrants have on average 7.3 years of education, while rural non-migrants have only 4.5 years, and urban non-migrants 9.2 years. Similar patterns exist for 1997 and 1993.

We define family size as the number of people from the family that actually migrate with the head of household migrant. Even though there might be some endogeneity between family size and the migration decision, we notice that the migrants have typically smaller families than the non-migrants in all years analyzed. Finally, it is worth mentioning that in 2002 the migrants blend in the urban labor markets in terms of participation in the formal, informal and self-employed sectors, but their unemployment rate is just 0.8% while it is 3.1% for the urban non-migrants. In 1997 and 1993, migrants have a higher participation in the informal sector and a smaller participation in the self-employed sector than their urban non-migrants counterparts.

5 Empirical Results

5.1 Probability Models

To investigate for the presence of self-selection among the migrants, we first have to model the migration decision. In TABLES 3A and 3B, we present probability models for the rural-urban migrants in 2002 and 1997. Those estimations are based on the population at origin, including rural migrants to urban and rural non-migrants. It is not possible to estimate a similar model for 1993, because the survey does not collect data for the rural (origin) areas. We also present estimations for the urban-rural migrants, and these are based on the urban migrants to rural and on the urban non-migrants. We estimated the probability models using

Ichimura's (1993) semi-parametric least squares; performed a Hausman like test, and could not reject the H_0 of normality. Hence, we present the results from the probit models.

There are some general features about rural migration to urban areas: younger individuals have higher probability to migrate, high levels of education increase the chances of migration relatively to the comparison group (less than basic), and smaller families are more likely to migrate. One very interesting result is that female heads of household have a considerably higher probability of migration than males, both in 2002 and in 1997. We include the HDIs (Human Development Indexes) for income, education and infant mortality rates in the probability models as a measure of local development and public goods provision. Variables that describe general characteristics of the place of origin and destination are often used in models of international migration to account for selectivity (see Borjas, 1999)[1]. In 2002, the coefficient of *HDI-income* is positive and significant, indicating that the rural migrants to urban areas do not come from the poorest areas. The variable *HDI-education attainment* is a composite index of average adult education, and school enrollment rates. Its coefficient is negative such that higher levels of education attainment reduce the probability of migration, showing that education may generate positive externalities for a community that would discourage the migration decision. In 1997, the coefficient of *HDI-income* is again positive and significant as well as the coefficient of the *infant mortality rate*, which is negative, indicating again that the migrants do not come from the least developed areas.

Even though urban migration to rural areas is not the main focus of this work, TABLES 3A and 3B also show the probability models for this migration flow. We notice some striking differences. First, age is either non-significant (in 2002) or significant and positive (in 1997), implying that urban to rural migration occurs at older ages. Second, all education categories that are significantly different than less than basic have negative coefficients, demonstrating that people with low levels of education are more likely to migrate from urban to rural areas. Third, ethnic heads of household are more likely to migrate to rural areas (significant in 2002). Finally, being a female head decreases the probability of urban to rural migration.

5.2 Quantile Earnings Functions

In 1997 and 2002, the models are corrected for self-selectivity, *i.e.*, we apply a methodology that accounts for the possibility that the sample of migrants is not random, and that some unobserved effects that drive their migration decision also affect their earnings at destination. In 1993, we estimate earnings functions without the sample-selection correction, because of lack of data at origin (as explained above). TABLE 4 shows the quantile regression results. The linear term of the selectivity polynomial is negative and significant at the 10^{th} quantile in 1997 and 2002 and at the 50^{th} quantile in 1997. Using equations (5) and (6) for the conditional means as a guide to interpret these results, we see that the implication is of relatively larger unobserved heterogeneity in rural areas, causing lower ability migrants to benefit (in absolute terms) from migration. If a person's observable characteristics indicate that she is less likely to migrate and she still migrates, she will earn less than expected at destination. Based on the instruments from the probit model, individuals with large families that come from very poor localities (as measured by the HDI-income and the infant mortality rates) are less likely to migrate, but if they still do so they earn less than their observable human capital characteristics would predict in the urban / metro sector.

FIGURES 2A, 2B and 2C present a visual summary of the quantile regression and least square results for the 2002, 1997 and 1993 earnings equations. Each plot depicts one coefficient in the quantile regression model. The solid line running through the shaded gray area represents the 9-point estimates of the coefficient for τ 's ranging from 0.1 to 0.9. The shaded gray area represent the 90 percent pointwise confidence interval. Superimposed on the plot is a dashed line representing the ordinary least squares estimate of the mean effect, with two dotted lines representing again the 90 percent confidence interval for the coefficient. A solid

[1] In the international migration context one would include variables for political regime, unemployment rates, GDP growth, measures of income inequality, etc.

horizontal line is drawn at zero. With very few exceptions, the quantile regression estimates lie inside the mean regression confidence interval, indicating that the location shift interpretation of the covariate marginal effects may be reasonable. However, we still observe many differences in magnitude among coefficients at different quantiles[2].

In the first plot of FIGURES 2A, 2B and 2C the intercept of the model may be interpreted as the estimated conditional quantile function of the log hourly earnings of a male non-migrant head of household, with less than basic education, without an ethnic background, residing in the department La Paz (but not the capital), and working in the formal sector. At any estimated quantile we can say that a migrant earns more or less than a non-migrant if zero is not part of the corresponding confidence interval in the plot for the covariate "migrant". At low and median quantiles, rural-urban migrants earn more than urban non-migrants in 1997 and 2002, but only migrants at high quantiles earn more than the non-migrants in 1993.

The fourth and sixth plots of FIGURES 2A, 2B and 2C show the difference in earnings associated with being an ethnic migrant and a female migrant relatively to being an ethnic non-migrant and a female urban non-migrant, respectively. In 1993, low quantile ethnic migrants (20^{th} and 30^{th}) earn more than ethnic urban non-migrants, while at higher quantiles (60^{th} to 80^{th}) they earn less. In 1997, there is no statistically significant difference in earnings for the ethnic migrants and non-migrants at low quantiles, and they perform well relatively to the ethnic urban non-migrants above the 50^{th} quantile. In 2002, the scenario changes once more towards hurting the ethnic migrants at low quantiles: they earn less from the 10^{th} to the 30^{th} quantiles. The story is the opposite for female migrants. They used to earn less than their urban non-migrant counterparts throughout all quantiles in 1993 and 1997, but in 2002, female migrants receive a premium at low quantiles (10^{th} to the 30^{th}).

Finally, the subsequent plots in FIGURES 2A, 2B and 2C present returns to education levels for urban non-migrants and the equivalent differentials for migrants. In 1993, migrants have lower returns to primary education at almost every quantile, lower returns to secondary, technical and university at high quantiles, but higher returns to secondary and university at low and median quantiles. In 1997, migrants have lower returns to secondary education and have higher returns to technical education throughout all quantiles. The returns to university education repeat the pattern of 1993, higher for migrants than urban non-migrants at low quantiles and lower at high quantiles. In 2002, this scenario changes substantially. At the 80^{th} and 90^{th} quantiles, migrants and non-migrants have similar returns to all categories of education. At low and median quantiles, migrants have higher returns to basic, primary, secondary and technical education. The only exception is university education for which returns are lower for migrants than for urban non-migrants even at low and median quantiles.

6 Conclusion

Our analysis of rural to urban migration in Bolivia shows that the pattern of this migration flow conforms with the theory of human capital which postulates that the younger and better educated heads of household, with smaller families, seeking more developed areas, are more likely to migrate. A very interesting feature of the migration process in Bolivia is that rural migrants do not come from the poorest or least developed areas and that communities with higher levels of education discourage migration, maybe because of the positive externalities generated by education.

From 1997 to 2002, we observe a slight decrease in the percentage of rural to urban/metro migration. Metropolitan areas are still the main attractor, but there are some non-negligible migration movements from metro to rural areas, with 50% of these migrants going back to their birthplaces in 2002. This migration movement appears to be less in conformity with the human capital theory of migration. Although it may be

[2] We performed some tests for differences in coefficients among quantiles, and even though there is an overlap of the mean confidence interval with almost all quantile confidence intervals, the differences between many of the quantile coefficients are statistically different from zero.

the case that, with the stagnation in the late 90's, the family network in rural areas serves to reduce migration costs or provides a safety net for migrants that is not existent in urban areas. Also, since both individual-specific characteristics and individual responses to social and economic forces matter, these migrants are probably filling niches in the labor market at destination and being compensated for specific skills. A relatively low skilled migrant in the metro areas could be relatively highly skilled in rural areas compensating his migration.

One peculiarity about Bolivia is that female heads of household and individuals with ethnic background are more likely to migrate from rural to urban/metro areas. Their performance in the urban labor markets changes considerably from 1993 to 2002. Female migrants were doing worse relatively to their urban counterparts in 1993 and 1997, but there was a premium for female migrants at low quantiles in 2002. Ethnic migrants, on the other hand, were hurt at low quantiles in 2002, and they were doing better than the ethnic non-migrants in previous years.

Returns to migration are positive at low and median quantiles and migrants' returns to all education categories, except university, are higher than those for non-migrants in 2002. Selectivity is negative at low quantiles in 1997 and 2002. Although migrants represent a relatively more educated segment of the rural population, they tend to insert themselves into the lower part of the urban/metro conditional earnings distribution as their likelihood of migration decreases and unobserved heterogeneity plays a stronger role, eroding some of the benefits from migration.

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Table 1A - Migration Flows in Bolivia, by origin and destination, 2002
(Head of Households only)

		Origin			
Destination		**Rural**	**Urban**	**Metro**	**Total**
Rural		14,278	15,767	16,669	46,714
	(1)	30.56	33.75	35.68	100.00
	(2)	37.48	31.88	22.27	28.77
	(3)	8.79	9.71	10.26	28.77
Urban		6,269	7,964	17,343	31,576
	(1)	19.85	25.22	54.92	100.00
	(2)	16.45	16.11	23.17	19.44
	(3)	3.86	4.90	10.68	19.44
Metro		17,551	25,719	40,830	84,100
	(1)	20.87	30.58	48.55	100.00
	(2)	46.07	52.01	54.55	51.79
	(3)	10.81	15.84	25.14	51.79
Total		38,098	49,450	74,842	162,390
	(1)	23.46	30.45	46.09	100.00
	(2)	100.00	100.00	100.00	100.00
	(3)	23.46	30.45	46.09	100.00

Note: (1) percentage of destination flow, (2) percentage of origin flow, (3) percentage of total flow

Table 1B- Migration Flows in Bolivia, by origin and destination, 1997
(Head of Households only)

		Origin			
Destination		**Rural**	**Urban**	**Metro**	**Total**
Rural		24,443	13,070	12,667	50,180
	(1)	48.71	26.05	25.24	100.00
	(2)	45.30	30.01	25.23	33.97
	(3)	16.55	8.85	8.58	33.97
Urban		17,510	11,676	18,115	47,301
	(1)	37.02	24.68	38.30	100.00
	(2)	32.45	26.81	36.09	32.02
	(3)	11.85	7.90	12.26	32.02
Metro		12,006	18,811	19,417	50,234
	(1)	23.90	37.45	38.65	100.00
	(2)	22.25	43.19	38.68	34.01
	(3)	8.13	2.73	13.14	34.01
Total		53,959	43,557	50,199	147,715
	(1)	36.53	29.49	33.98	100.00
	(2)	100.00	100.00	100.00	100.00
	(3)	36.53	29.49	33.98	100.00

Note: (1) percentage of destination flow, (2) percentage of origin flow, (3) percentage of total flow

Table 2A - Characteristics of Rural Migrants to Urban, Rural and Urban Non-Migrants, 2002.
(Head of Households only)

	Rural Migrants to Urban		Rural Non-Migrants		Urban Non-Migrants	
Variables	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Family Monthly Income	415.3889	330.9234	158.5711	343.8044	683.8862	1115.0490
Female	0.3581	0.4825	0.1169	0.3214	0.2435	0.4293
Ethnic (language)	0.5372	0.5018	0.7565	0.4293	0.3561	0.4789
Age (years)	36.4109	13.7375	42.5289	12.1616	40.3913	11.7694
Education (years)	7.3011	4.8738	4.5194	3.5639	9.2056	4.8854
Educ. less than basic	0.3157	0.4678	0.5444	0.4982	0.1848	0.3882
Educ. basic	0.2144	0.4131	0.2726	0.4454	0.2090	0.4067
Educ. primary	0.1841	0.3900	0.1296	0.3360	0.2274	0.4192
Educ. secondary	0.1764	0.3836	0.0311	0.1737	0.2020	0.4015
Educ. technical	0.0610	0.2408	0.0198	0.1392	0.0815	0.2737
Educ. university	0.0484	0.2160	0.0024	0.0492	0.0953	0.2937
Married	0.6269	0.4867	0.8218	0.3828	0.7365	0.4406
Family Size	3.1239	1.7379	4.8057	2.3286	4.4461	2.1974
IDH - Income *	0.2673	0.1453	0.2261	0.1132	0.3644	0.1387
IDH - Education Attain.*	0.5001	0.1578	0.4868	0.1526	0.7402	0.0879
Infant Mortality Rate *	92.6914	27.4103	93.6926	24.5520	63.6093	20.6970
Economic Active Pop.	0.9132	0.2834	0.9736	0.1603	0.9099	0.2863
Unemployed (def 1)	0.0078	0.0888	0.0061	0.0780	0.0307	0.1724
Unpaid	0.0000	-	0.0119	-	0.0210	-
Formal	0.3442	-	0.1081	-	0.3611	-
Informal	0.1812	-	0.0661	-	0.1802	-
Sel-employed	0.4746	-	0.8139	-	0.4376	-
Departments:	**Origin**	**Destination**				
Chuquisaca	0.0089	0.0199	0.1066	-	0.0372	-
La Paz	0.2749	0.3051	0.2441	-	0.2990	-
Cochabamba	0.0673	0.1982	0.2022	-	0.1604	-
Oruro	0.0897	0.0685	0.0454	-	0.0455	-
Potosi	0.2018	0.0974	0.1551	-	0.0438	-
Tarija	0.0063	0.009	0.0475	-	0.0493	-
Santa Cruz	0.2237	0.1878	0.1574	-	0.3167	-
Beni	0.1241	0.1141	0.0333	-	0.0443	-
Pando	0.0034	0.0000	0.0083	-	0.0038	-
N. Obs.	79		1,868		2,711	

Note: Urban includes Metro and Urban. * indicates information at the origin. IDH education attainment: adult literacy plus school enrollment (primary, secondary and above).

Table 2B - Characteristics of Rural Migrants to Urban, Rural and Urban Non-Migrants, 1997.
(Head of Households only)

	Rural Migrants to Urban		Rural Non-Migrants		Urban Non-Migrants	
Variables	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Family Monthly Income	276.7347	261.2753	190.0511	706.1106	475.0564	786.8536
Female	0.2586	0.4392	0.1205	0.3256	0.2117	0.4086
Ethnic (language)	0.6145	0.4882	0.7975	0.4019	0.4287	0.4950
Age (years)	32.0164	12.7654	43.2564	12.0438	41.4400	11.6438
Education (years)	7.0304	4.3240	4.0841	3.7634	8.8135	5.1125
Educ. less than basic	0.2898	0.4551	0.6147	0.4868	0.2288	0.4201
Educ. basic	0.3074	0.4629	0.2399	0.4271	0.1904	0.3927
Educ. primary	0.2142	0.4115	0.0836	0.2768	0.2086	0.4063
Educ. secondary	0.1213	0.3275	0.0276	0.1638	0.1915	0.3935
Educ. technical	0.0497	0.2181	0.0324	0.1772	0.0938	0.2916
Educ. university	0.0176	0.1317	0.0017	0.0418	0.0869	0.2817
Married	0.6347	0.4830	0.8027	0.3980	0.7580	0.4284
Family Size	2.7507	1.9204	4.4477	2.2715	4.5314	2.1785
IDH - Income *	0.2587	0.1504	0.2109	0.1203	0.3686	0.1417
IDH - Education Attain.*	0.5475	0.1486	0.4661	0.1509	0.7408	0.1024
Infant Mortality Rate *	86.4632	22.9128	95.9811	23.4956	65.9236	20.9023
Economic Active Pop.	0.9059	0.2929	0.9853	0.1204	0.9124	0.2827
Unemployed (def 1)	0.0108	0.1037	0.0012	0.0339	0.0128	0.1125
Unpaid	0.0260	-	0.0040	-	0.0050	-
Formal	0.3643	-	0.1104	-	0.4001	-
Informal	0.2428	-	0.0436	-	0.1270	-
Sel-employed	0.3669	-	0.8420	-	0.4679	-
Departments:	**Origin**	**Destination**				
Chuquisaca	0.0367	0.0370	0.1067	-	0.0377	-
La Paz	0.3996	0.3239	0.2654	-	0.3536	-
Cochabamba	0.0863	0.1304	0.2316	-	0.1617	-
Oruro	0.0435	0.0718	0.0455	-	0.0545	-
Potosi	0.1183	0.0870	0.1844	-	0.0545	-
Tarija	0.0473	0.0626	0.0451	-	0.0396	-
Santa Cruz	0.1272	0.1647	0.1102	-	0.2445	-
Beni	0.1083	0.1170	0.0112	-	0.0505	-
Pando	0.0329	0.0055	0.0000	-	0.0035	-
N. Obs.	161		2,504		4,013	

Note: Urban includes Metro and Urban. * indicates information at the origin. IDH education attainment: adult literacy plus school enrollment (primary, secondary and above).

Table 2C - Characteristics of Rural Migrants to Metro, and Metro Non-Migrants, 1993.
(Head of Households only)

	Rural Migrants to Metro		Metro Non-Migrants	
Variables	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Family Monthly Income	170.9144	180.1861	291.4388	620.2878
Female	0.2716	0.4465	0.2160	0.4116
Ethnic (language)	0.7361	0.4425	0.5456	0.4980
Age (years)	29.1884	11.0291	40.1805	11.9532
Education (years)	6.8469	4.4971	8.8722	5.1598
Educ. less than basic	0.3030	0.4614	0.2153	0.4111
Educ. basic	0.2862	0.4538	0.2258	0.4182
Educ. primary	0.2153	0.4127	0.1886	0.3912
Educ. secondary	0.1305	0.3382	0.1900	0.3924
Educ. technical	0.0583	0.2353	0.0801	0.2714
Educ. university	0.0066	0.0815	0.1016	0.3022
Married	0.5909	0.4936	0.7301	0.4440
Family Size	2.5525	1.7903	4.5461	2.2814
IDH - Income *	0.2090	0.1313	0.3819	0.1166
IDH - Education Attain.*	0.4987	0.1312	0.7878	0.0584
Infant Mortality Rate *	87.5184	20.2719	59.0126	17.1012
Economic Active Pop.	0.9256	0.2635	0.9004	0.2995
Unemployed (def 1)	0.0232	0.1512	0.0327	0.1778
Unpaid	0.0140	-	0.0055	-
Formal	0.3742	-	0.4084	-
Informal	0.3940	-	0.2012	-
Sel-employed	0.2177	-	0.3848	-
Departments:	**Origin**	**Destination**		
Chuquisaca	0.1071	0.0785	0.0380	-
La Paz	0.4836	0.4414	0.4169	-
Cochabamba	0.0447	0.1333	0.1321	-
Oruro	0.0586	0.0473	0.0611	-
Potosi	0.1635	0.0823	0.0374	-
Tarija	0.045	0.0607	0.0298	-
Santa Cruz	0.0975	0.1565	0.2634	-
Beni	0.0000	0.0000	0.0213	-
Pando	0.0000	0.0000	0.0000	-
N. Obs.	127		3,538	

Note: * indicates information at the origin. IDH education attainment: adult literacy plus school enrollment (primary, secondary and above).

Table 3A - Probability Models for Rural-Urban and Urban-Rural Migration, 2002
(Head of Households only)

Variables	Rural to Urban/Metro		Urban/Metro to Rural	
	Coefficient	Std. Error	Coefficient	Std. Error
Constant	0.788	(0.687)	0.804	(1.394)
Potential Experience	-0.041	(0.021)**	-0.007	(0.018)
Potential Experience^2	0.053	(0.038)	-0.040	(0.039)
Educ. basic	0.195	(0.233)	-0.117	(0.168)
Educ. primary	0.187	(0.250)	-0.660	(0.176)***
Educ. secondary	0.740	(0.266)***	-1.158	(0.209)***
Educ. technical	0.719	(0.362)**	-0.266	(0.201)
Educ. university	1.570	(0.433)***	-0.826	(0.231)***
Ethnic (language)	-0.247	(0.179)	0.456	(0.127)***
Female	0.638	(0.207)***	-0.699	(0.165)***
Married	0.157	(0.201)	0.086	(0.170)
Family Size	-0.154	(0.041)***	-0.306	(0.049)***
IDH - Income	3.002	(0.608)***	1.150	(0.450)***
IDH - Education Attainment	-2.569	(0.919)***	-1.708	(1.252)
Infant Mortality Rate	-0.006	(0.005)	-0.005	(0.008)
Chuquisaca	-1.788	(0.424)***	-0.042	(0.296)
Cochabamba	-0.746	(0.253)***	0.229	(0.173)
Oruro	-0.176	(0.402)	0.725	(0.379)*
Potosi	-0.127	(0.313)	0.371	(0.308)
Tarija	-1.940	(0.419)***	0.240	(0.283)
Santa Cruz	-0.545	(0.287)*	-0.005	(0.229)
Beni	0.136	(0.336)	1.472	(0.375)***
Pando	-0.922	(0.547)*	1.028	(0.330)***
N. Obs.	1,947		2,841	
Wald chi-square (22)	182.61		174.93	
Prob > chi-square	0.0000		0.0000	
Pseudo R2	0.2630		0.2629	

Note: ***, **, * - denote significance at 1%, 5% and 10%, respectively. IDH education attainment: adult literacy plus school enrollment (primary, secondary and above). La Paz is the excluded department.

Table 3B - Probability Models for Rural-Urban and Urban-Rural Migration, 1997.
(Head of Households only)

Variables	Rural to Urban/Metro		Urban/Metro to Rural	
	Coefficient	Std. Error	Coefficient	Std. Error
Constant	0.638	(0.582)	-1.744	(1.193)
Potential Experience	-0.071	(0.017)***	0.012	(0.015)
Potential Experience^2	0.082	(0.032)***	-0.061	(0.031)*
Educ. basic	0.243	(0.143)*	-0.097	(0.158)
Educ. primary	0.382	(0.178)**	-0.218	(0.176)
Educ. secondary	0.567	(0.212)***	-0.421	(0.187)**
Educ. technical	0.277	(0.263)	0.086	(0.166)
Educ. university	1.393	(0.555)**	-0.622	(0.274)**
Ethnic (language)	-0.218	(0.189)	0.180	(0.136)
Female	0.325	(0.147)**	-0.424	(0.152)***
Married	0.298	(0.145)**	0.389	(0.159)**
Family Size	-0.183	(0.032)***	-0.448	(0.052)***
IDH - Income	0.773	(0.424)*	-0.670	(0.351)*
IDH - Education Attainment	0.265	(0.514)	0.477	(1.101)
Infant Mortality Rate	-0.011	(0.004)***	0.014	(0.006)**
Chuquisaca	-0.391	(0.209)*	0.292	(0.250)
Cochabamba	-0.597	(0.181)***	0.076	(0.190)
Oruro	0.116	(0.256)	-0.155	(0.267)
Potosi	0.214	(0.204)	0.123	(0.209)
Tarija	-0.235	(0.364)	0.801	(0.299)***
Santa Cruz	-0.422	(0.248)*	0.537	(0.209)***
Beni	-	-	-0.123	(0.252)
Pando	0.200	(0.366)	-	-
N. Obs	2,638		4,091	
Wald chi-square (21)	213.95		144.03	
Prob > chi-square	0.0000		0.0000	
Pseudo R2	0.2682		0.2660	

Note: ***, **, * - denote significance at 1%, 5% and 10%, respectively. IDH education attainment: adult literacy plus school enrollment (primary, secondary and above). La Paz is the excluded department.

Table 4 - Quantile earnings functions corrected for selectivity, 1993, 1997 and 2002
Urban stayers and rural-urban movers, (ln hourly earnings, head of households).

	1993			1997			2002		
Variables / Quantiles	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**	**10th**	**50th**	**90th**
Constant	-0.595	0.016	0.728	-0.217	0.492	1.465	0.093	0.912	1.733
	(0.201)*	(0.032)	(0.168)*	(0.565)	(0.220)*	(0.830)*	(0.075)	(0.035)*	(0.101)*
Lambda	-	-	-	-1.562	-0.257	-0.866	-1.194	-2.037	-0.388
				(0.175)*	(0.326)	(1.503)	(0.158)*	(0.184)*	(0.451)
Lambda^2	-	-	-	0.334	-0.043	0.186	0.296	0.601	0.253
				(0.030)*	(0.072)	(0.448)	(0.049)*	(0.050)*	(0.174)
Potential Experience	0.039	0.043	0.047	0.038	0.043	0.042	0.046	0.030	0.018
	(0.017)*	(0.002)*	(0.004)*	(0.023)*	(0.010)*	(0.024)*	(0.005)*	(0.003)*	(0.027)
Potential Experience^2	-0.071	-0.068	-0.063	-0.064	-0.065	-0.059	-0.097	-0.044	-0.014
	(0.030)*	(0.003)*	(0.014)*	(0.042)	(0.014)*	(0.052)	(0.009)*	(0.008)*	(0.067)
Educ. basic	0.229	0.047	0.153	0.264	0.172	0.055	0.148	0.149	-0.083
	(0.065)*	(0.018)*	(0.112)	(0.083)*	(0.048)*	(0.375)	(0.034)*	(0.025)*	(0.118)
Educ. primary	0.343	0.181	0.236	0.271	0.253	0.205	0.235	0.196	0.167
	(0.115)*	(0.024)*	(0.029)*	(0.195)	(0.079)*	(0.347)	(0.033)*	(0.019)*	(0.107)
Educ. secondary	0.468	0.471	0.679	0.513	0.482	0.549	0.329	0.410	0.550
	(0.075)*	(0.034)*	(0.054)*	(0.239)*	(0.061)*	(0.468)	(0.033)*	(0.064)*	(0.231)*
Educ. technical	0.874	0.861	0.823	0.893	0.889	0.743	0.723	0.781	0.651
	(0.163)*	(0.037)*	(0.149)*	(0.239)*	(0.074)*	(0.335)*	(0.039)*	(0.089)*	(0.075)*
Educ. university	1.329	1.558	1.614	1.327	1.557	1.397	1.327	1.445	1.313
	(0.054)*	(0.025)*	(0.085)*	(0.117)*	(0.145)*	(0.370)*	(0.032)*	(0.092)*	(0.231)*
Migrant	0.021	0.063	0.579	1.433	0.401	0.547	1.279	0.842	-0.634
	(0.210)	(0.069)	(0.080)*	(0.215)*	(0.430)	(1.127)	(0.170)*	(0.151)*	(0.398)
Educ. basic * Migr.	0.016	0.013	-0.179	-0.369	0.133	0.177	0.058	0.704	1.321
	(0.077)	(0.057)	(0.194)	(0.134)*	(0.105)	(0.394)	(0.053)	(0.077)*	(0.094)*
Educ. primary * Migr.	-0.269	-0.127	-0.465	0.104	0.233	0.069	0.256	0.615	0.916
	(0.155)*	(0.055)*	(0.073)*	(0.086)	(0.093)*	(0.133)	(0.049)*	(0.069)*	(0.403)*
Educ.secondary * Migr.	0.501	0.226	-0.796	-0.409	-0.154	0.162	-0.013	0.542	0.020
	(0.155)*	(0.080)*	(0.149)*	(0.189)*	(0.105)	(0.176)	(0.051)	(0.064)*	(0.551)
Educ. technical * Migr.	0.154	0.060	-0.742	0.472	0.808	0.931	-0.030	0.868	0.590
	(0.087)*	(0.050)	(0.195)*	(0.224)*	(0.171)*	(0.280)*	(0.239)	(0.093)*	(0.058)*
Educ.University * Migr	1.586	0.535	-1.000	0.716	-0.080	-0.518	-0.896	-0.207	0.029
	(0.242)*	(0.098)*	(0.074)*	(0.174)*	(0.213)	(0.244)*	(0.102)*	(0.116)*	(0.405)
Ethnic (language)	-0.141	-0.134	-0.248	-0.146	-0.176	-0.230	-0.080	-0.089	-0.147
	(0.037)*	(0.022)*	(0.034)*	(0.118)	(0.025)*	(0.230)	(0.029)*	(0.020)*	(0.048)*
Ethnic * Migrant	-0.059	-0.069	-0.197	0.205	0.083	0.294	-0.064	0.185	-0.525
	(0.126)	(0.044)	(0.144)	(0.280)	(0.032)*	(0.128)*	(0.044)	(0.067)*	(0.176)*
Female	-0.536	-0.477	-0.492	-0.276	-0.304	-0.259	-0.227	-0.065	-0.129
	(0.067)*	(0.024)*	(0.045)*	(0.223)	(0.025)*	(0.097)*	(0.039)*	(0.018)*	(0.110)
Female * Migrant	-0.126	-0.250	-0.734	-0.422	-0.400	-0.641	0.574	0.017	-0.095
	(0.123)	(0.041)*	(0.117)*	(0.155)*	(0.032)*	(0.211)*	(0.035)*	(0.039)	(0.123)
N. Obs.	3.000			3.712			2.384		

Note: Standard errors in parentheses. * indicates at least 10% of significance. IDH education attainment: adult literacy plus school enrollment (primary, secondary and above).

FIGURE 1- Quantile Wage Functions

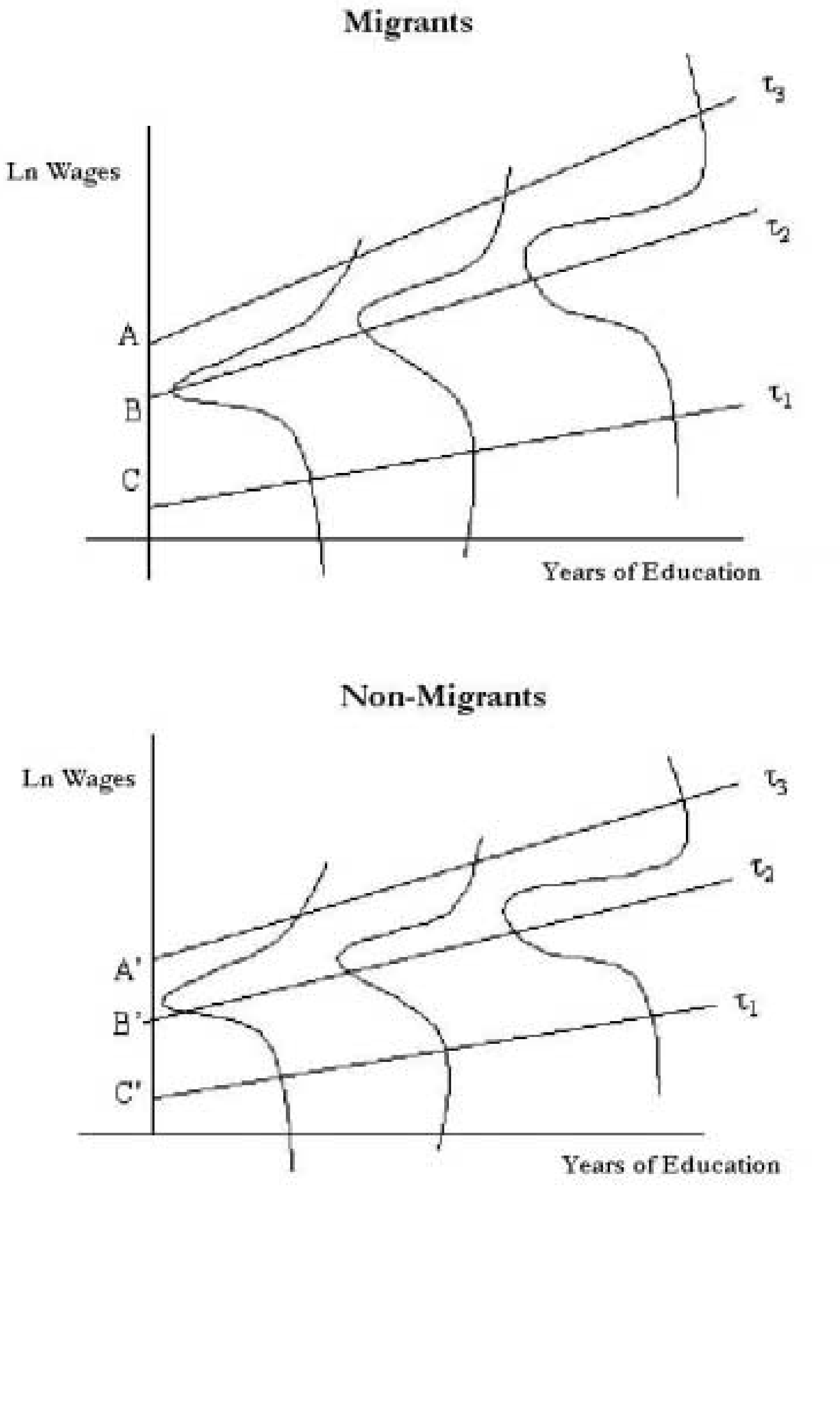

FIGURE 2A - Quantile Regression Coefficients, 2002.

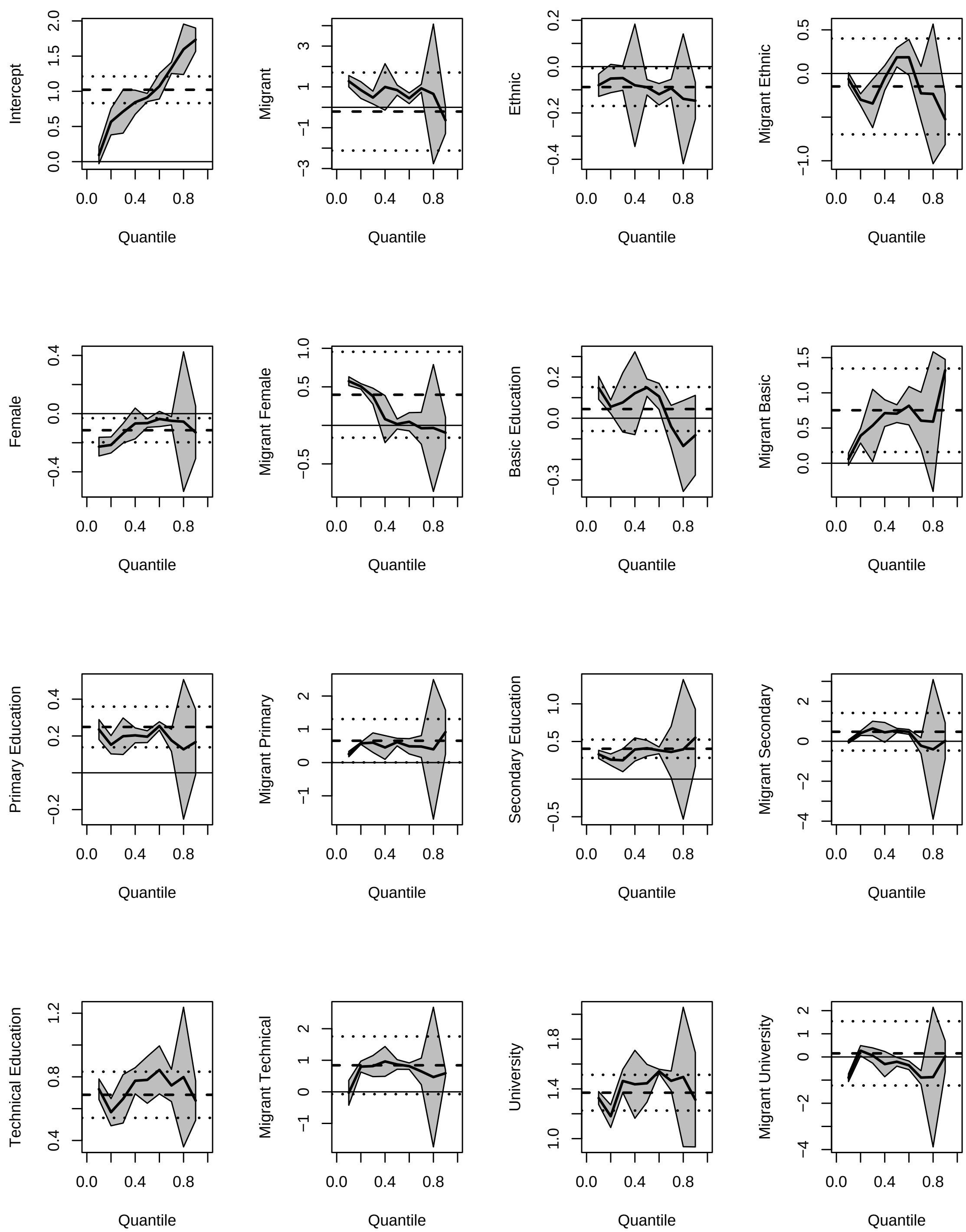

FIGURE 2B - Quantile Regression Coefficients, 1997.

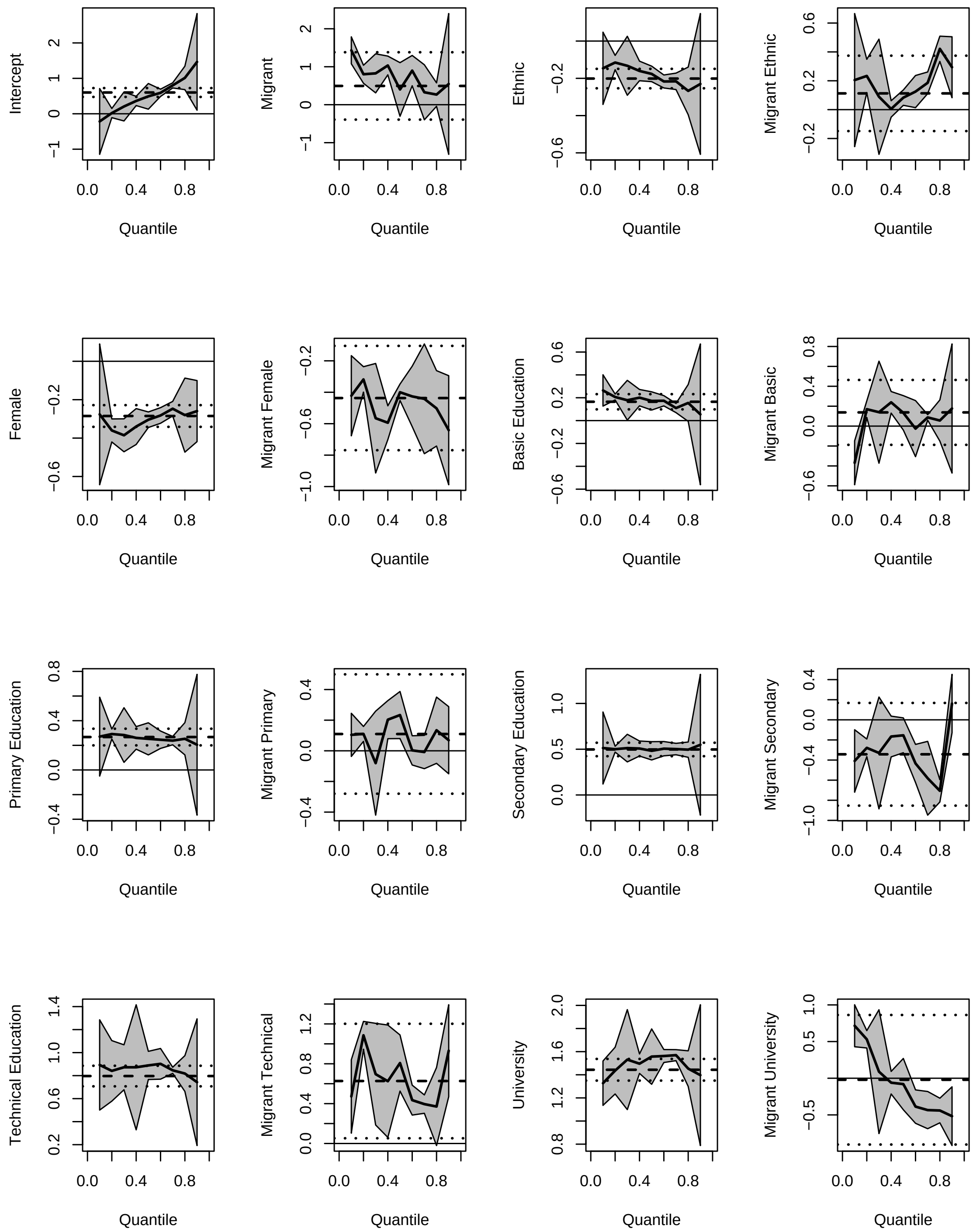

FIGURE 2C - Quantile Regression Coefficients, 1993.